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# **aWEshkar**

A Peer Reviewed Research Journal

Prin. L. N. Welingkar Institute of Management Development & Research

Vol. 33 Issue I  
March 2026

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## EDITORIAL

### **Mountains of Trash: The Growing Waste Crisis in Modern Cities**

We are living in a very challenging time in the global scenario where we witness the geopolitical tensions rise around us and things get dynamically out of proportion. In these crucial times we forget to witness and underscore a very significant issue of mounting waste which is affecting the brand image of multiple counties and cities across the globe. Unlike wars that capture immediate global concern, waste accumulates steadily, creating long-term environmental and societal problems that needs immediate attention and it's a very serious concern to be addressed.

The global waste management is under tremendous stress as waste gets accumulated from multiple sources ranging from household garbage, plastics to electronic and industrial waste. Rapid urbanization, consumerism, and disposable lifestyles have accelerated this problem. Cities are expanding faster than their waste management systems can handle, leading to overflowing landfills, polluted water bodies, and contaminated soil. In many developing countries, waste is often dumped in open spaces or burned, releasing harmful pollutants into the air. Improper solid waste management results in problems like loss of biodiversity, environmental degradation like global warming air pollution, greenhouse gas emissions, food shortages, human health and more. Shifts in human behaviour towards environmental sustainability could potentially mitigate the adverse effects of solid wastes.

There are several types of wastes produced on a daily basis such as plastic waste, solid waste and e-waste etc. The varied nature of waste leads to an imperious need to classify them and take appropriate treatments. The waste management process starts with waste sorting, and sorting wastes at the generation source helps in managing the whole process effectively. Waste sorting by citizens help in better management of wastes thereby achieving sustainability of environment. Given the kinds of waste and their implications, waste sorting is the first and foremost aspect to be encouraged. Waste sorting could be defined as the appropriate separation of waste into different elements operated manually for beneficial waste management like recycling or reuse. Waste sorting could be performed by residents, tourists and by governments. At the global level, the United Nations has established targets within the 2030 Agenda for Sustainable Development to curb waste generation. Sustainable Development Goal (SDG) 12 is dedicated to responsible production and consumption, and its indicator 12.5 calls for a reduction in waste through prevention, reuse, reduction, and recycling strategies by 2030.

Despite the scale of the problem, waste management rarely receives the same urgency in policy discussions as other global issues. While addressing such important issue, the lackadaisical attitude by the government looks for quick fix solutions ignoring the long term and meaningful closures. Whereas, the waste management is only considered as an environmental issue but creates an imperative issue in social and economic circuits. The repercussions of such poor waste management leads to showcase our tourism and quality of urban living in poor light along with significant rise in healthcare expenses. Hence it is important for universities and educational institutes to create meaningful awareness and provide them the required skill set for students to take up waste management seriously and create meaningful sustainable model and solutions to address this paramount problem and showcasing our globe as a healthy living planet. The world may continue to face geopolitical conflicts, but ignoring the mounting waste crisis would be a costly mistake. Waste does not respect borders, and its impacts accumulate over time. If humanity can mobilize immense resources to confront wars, it can also mobilize the will to confront waste.

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6. **ANALYSIS AND RESULTS:** the findings of the study
7. **DISCUSSION:** the reasoning for your findings with relevant theoretical support
8. **LIMITATIONS:** what the study could not take into account
9. **FUTURE SCOPE OF RESEARCH:** scope of improvement
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## RESEARCH

### UNIVERSAL HUMAN VALUES - IMPACT AND OUTCOMES FOR BUSINESS MANAGEMENT STUDENTS - STUDY TO ASSESS THE ACCEPTANCE AND TAKEAWAYS FROM THIS COURSE FOR POST GRADUATE BUSINESS STUDENTS

Shahnaz Pohowala & Siddhartha Goutam\*

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#### **Abstract**

*It is widely believed that there has been a gradual decline in human values over the last many years. This could be the cause and effect of the many socio-economic changes in society. Gen Z is found to be grappling with a VUCA - BANI world, without the necessary tools to handle it with confidence and resilience.*

*To address this gap, the All-India Council for Technical Education (AICTE), in consultation with experts from industry and academia, took the crucial step in 2017, of developing and incorporating the course “Universal Human Values” (UHV) in technical and higher education institutions. Since then, the course is being delivered in several institutions by AICTE certified faculty mentors.*

*The genesis of this study was to ascertain how post graduate students would accept the course, and to what extent it could impact their thought process and behaviour. The scope of the study is to analyse students’ perceptions, experience, and takeaways from the course. For the purpose of this study, we have surveyed approximately 700 Post graduate management students, from diverse disciplines and backgrounds. Their acceptance of the course, the extent to which they relate to it, and are willing to adopt it in their lives, determines the success (or otherwise) of the course.*

*Prior to the course, a Pre-Course Survey was administered to the students, to gather their existing beliefs and mindsets on value-based living. On completion of the course, a Post Course Survey was again conducted to gather their views and mindset after the course. The questions were framed on each topic to ascertain if students’ understanding of that topic had improved or remained the same before and after attending the workshop. This data gave us insights on how students have related to the course and whether their understanding of values-based living has improved after attending the workshops.*

*From the analysis, it was evident that the course was well received by the students, and they felt that it equipped them with the right understanding to practice and propagate values-based living. Overall, more than 86% of the students felt that their understanding of the UHV concepts has improved after attending the course. 79% of the students said they would recommend it to their peers.*

*The data also threw up some valuable insights and recommendations for education institutions, healthcare providers and employers. It clearly illustrates that Gen Z and Millennials are in dire need of guidance on holistic and values-based living, and this course can be one of the ways to give them this direction and perspective. Considering that these generations are the future parents, teachers, corporate leaders, entrepreneurs, policy makers of tomorrow, it is imperative to equip them with strong value systems, resilience and the ability to navigate the challenges of this VUCA - BANI world.*

---

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## **Background**

The importance of values is a much discussed and debated topic in business and academic circles. Much has been said about its significance, and steady decline, over the years.

All of us would have heard our parents speak about the integrity, simplicity, connectedness, discipline “in their time”. When family and social connections were much stronger. When earning an honest living was valued over career growth. When simple living and high thinking was a virtue.

Over the years, this socio-economic culture gradually changed; brought on by a combination of several factors - the industrial revolution, urbanisation, dissolution of the joint family, liberalisation, and most recently, social media and the tech boom.

The effects of this gradual societal change have manifested in various forms, like higher incidences of inequality, discrimination, crime, ecological imbalance, and much more. The consequent changes in human mindset is bound to impact all areas of our lives, both personal and professional. At the personal level, it has impacted our belief and image of self, our relationships, our health and wellbeing, our interactions and harmony in society at large. On the professional front, it has led to cutthroat competition, work life imbalance, stress, erosion of work ethics and corporate culture.

It was strongly felt in both academic and corporate

circles that there is a dire need to bring back the old value systems into our society, right from a young age. What better way than by incorporating them into our education curriculum! Our current education system focuses mainly on the acquisition of knowledge and skills, and not as much on the attainment and practice of values-based living. This absence of values in education was the missing link that had to be bridged. The tenets of our traditional Indian knowledge systems had to be brought back into the curriculum.

In 2017, in consultation with experts from industry and academia, the All-India Council for Technical Education (AICTE) took the crucial step of developing and incorporating the course “Universal Human Values” in technical and higher education.

### **Some of the steps taken by them are:**

An introductory 15 sessions module (UHV I) was introduced as an essential part of the Student Induction Program (SIP).

Since Academic Year 2018-19, a one semester foundation course of 3 credits called “Universal Human Values – Understanding Harmony & Ethical Conduct” (UHV II) was introduced in the Model Curriculum.

Over 30000 faculty members from education institutions pan India, have attended the Faculty Development Programs conducted by the AICTE. More than 18000 are certified to teach the course.

The National Committee (NC-UHV) and National Coordination Committee for Student Induction Program (NCC-SIP) were formed, which conduct regular meetings and deliberations on the subject.

From Academic Year 2020-21, UHV was introduced as a Minor Degree for undergraduate students.

From Academic Year 2021-22, AICTE has instituted the “Prof. R.R. Gaur Award for Excellence”, to recognise institutions which make outstanding efforts to impart the course and become role models for an equitable and just society

### **Objectives of this Study**

The authors intend to conduct a study to ascertain whether, and to what extent, one can learn about human values in a “classroom environment”, and at the post graduate level.

Some of the doubts and questions which are yet to be answered :

- Are values what we imbibe by observing our parents, teachers, environment, right through our childhood and youth?
- Isn't values based living the sum total of all our childhood and life experiences that shape our personality and value systems?
- How effective is it to teach values in a classroom environment?
- How receptive would Post Graduate students be to learning about values in a classroom setting ?

These thoughts were the genesis of this study.

### **Literature Review**

The National Education Policy (NEP) 2020, makes a strong case for nurturing students to achieve their full human potential, to develop a just and equitable society, and to promote national development.

This led AICTE to introduce the Minor degree in UHV, with the vision to develop a compassionate, holistic world view among students. After all, these are the parents, teachers, professionals, policy makers of tomorrow, who would propagate values-based living for themselves and society.

### **Some of the most salient features and objectives of the UHV courses are:**

They present a universal approach to human values, without any social, economic, geographical, or any other biases.

They supplement domain knowledge and technical skills with values, which would fulfil the most basic human needs of happiness and prosperity.

The course is delivered through a series of proposals which encourage students to self-reflect, self-verify, accept (or reject) the principles, based on their own natural understanding and life experiences at that point of time.

The self-dialogues and self-explorations encourage students to evaluate their own preconditioning and existing beliefs and value systems.

The prime focus of the course is to bring about a qualitative transformation in the mindset of the students, which would lead them to a more enriching personal and professional life.

The holistic and values-based world view would enhance students' employability and their preparedness and resilience to face the world.

As professionals and policy makers of tomorrow, students would be able to judiciously deploy their knowledge and skills towards environmental preservation, sustainable production, resource optimisation, waste management, etc.

As individual mindsets transform from a skill based to values based living, it would lead to a more sustainable social order, where mankind coexists harmoniously with all other elements of nature.

#### **The Course Outcomes are:**

Students should be able to recognise and appreciate the complementarity of skills and values and how to balance them in practice.

As future parents, teachers, professionals, policy makers, students should be able to develop a more holistic and humane worldview and ensure value-based living for themselves and their community.

Students should be able to define aspirations to ensure sustained happiness and prosperity for self, family, society and nature.

While these are the desired outcomes from the course, there is limited evidence that these outcomes are being achieved. The purpose of this study is to know directly from students the value and impact of this course on them.

Deloitte conducted a global study in 2022 on Gen Z and Millennials, which infers that both these generations are going through a lot of churn and uncertainty, leading to insecurity, stress, poor mental health, and other issues.

As per their India study, 49% of Gen Z respondents say they feel stressed or anxious all or most of the time. The 5 top reasons for this (in order of priority) are Family and Personal Relationships, Long Term Financial Security, Mental Health, Day-to-day Expenses, and Job Workload.

Similarly, 43% of Millennial respondents said they feel stressed or anxious all or most of the time. Their 5 top reasons (in order of priority) are Family and Personal Relationships, Long term Financial Security, Mental Health, Job Workload and Day to day Expenses.

Compared to their global counterparts, both these generations in India have higher, sometimes significantly higher, incidence of stress on these issues. For Gen Z, stress levels are 3% higher than 2021 levels.

62% of Gen Z and 64% of Millennials in India strongly or somewhat agree that they feel burnt out due to intensity of work pressure. This is significantly higher than global respondents.

55% of Gen Z and 63% of Millennials in India strongly or somewhat agree that many people have recently quit their organisations due to work pressure. This is significantly higher than global respondents.

73% of Gen Z and 76% of Millennials in India strongly or somewhat agree that although their organisation talks more about mental health, it has not resulted in any meaningful impact for employees. This is significantly higher than global respondents.

21% of both these generations expect the overall socio political situation in India to remain the same

over the next 12 months. 29% Gen Z and 27% Millennials expect it to worsen. In this respect India fares better than global respondents.

Climate change, health concerns and sexual harassment are among the Top 5 issues of greatest concern for both these generations in India.

88% of Gen Z & 91% of Millennials in India feel the future is uncertain and “the world is at a tipping point” due to inadequate response to climate change. 89% of Gen Z and 92% of Millennials have been personally impacted by at least one severe weather event in the last 12 months. This is significantly higher than their global respondents.

95% of both generations in India are committed to minimising their personal carbon footprint on the environment, of which 80% (Gen Z) and 84% (Millennials) do so consistently.

McKinsey conducted a series of surveys in 2021 and 2022 in the USA, which found that Gen Z reported the highest levels of anxiety and depression, and the least positive life outlook. 25% of Gen Z respondents reported feeling stressed and depressed, as against 13% of Millennials and 8% of baby boomers. This feeling was further compounded by the impact of Covid 19 lockdowns which led to learning and job losses. Gen Z also reported twice, and sometimes 3 times higher instances of mental health issues, suicidal thoughts or attempts than other generations. Despite this, Gen Z is the least likely to seek help or treatment for their health and behavioural issues. This may be on account of several factors like age, affordability, disinterest in self-care, social stigma, etc.

As per the 2020 Healthcare Consumer Behavioural Health Survey, 24% of Gen Z and 15% Millennials with behavioural health issues

did not seek treatment for a mental disorder. 32% of Gen Z and 18% Millennials did not seek treatment for substance abuse.

68% of Gen Z are less proactive about maintaining good health and feel less in control of their health and lifespan. Affordability is one of the factors that prevents them from seeking medical help. 25% of Gen Z respondents said they could not afford mental health treatment in spite of having insurance, also because few insurance policies cover behavioural and mental health.

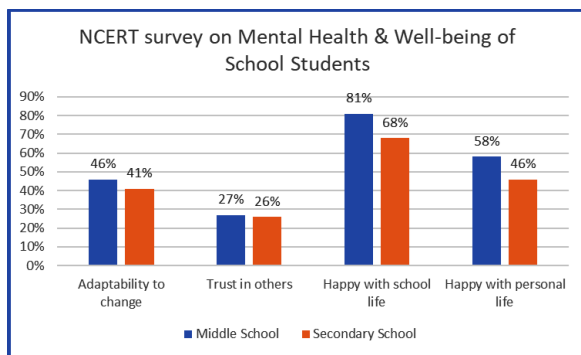
Due to these factors and an overall shortfall of mental health workers, Gen Z tend to turn to Emergency Health services or social media or medical apps to seek solutions.

58% of Gen Z reported two or more unmet social needs (job, education, money, housing, transportation, food, safety), as against 16% of older generations. An earlier survey had determined that people with poor mental health are twice as likely to report unmet needs. This survey concludes that Gen Z need to build their resilience with a more holistic approach to their physical and mental health.

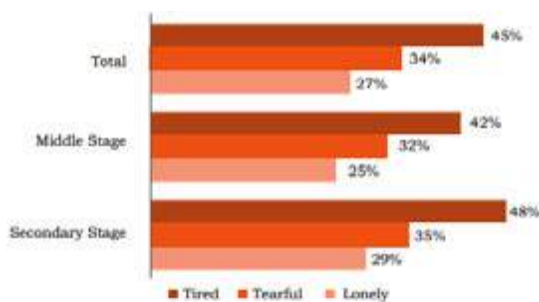
With the above statistics on stress levels, family and relationship issues, mental health, burnout and environmental concerns, it is very evident that Gen Z and Millennials are in urgent need of guidance to build awareness and resilience to the changes and uncertainties that life will inevitably throw at them.

In 2022, National Council of Educational Research and Training (NCERT) conducted a survey on the Mental Health and Well-being of School Students. More than 3 lakhs students from middle and secondary classes, pan India, private and public schools were surveyed in 3 categories –

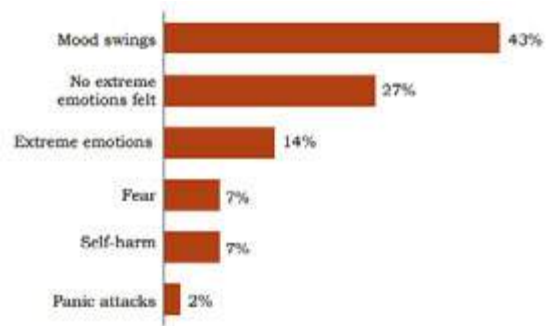
Understanding of Self, Emotions Experienced and Coping Mechanisms. 46% of middle school and 41% of secondary school students reported the ability to adapt to change and unexpected situations. Only 27% of middle school and 26% of secondary school students reported that they could frequently trust people. 81% of middle school and 68% of secondary school students are happy with their school life. However, only 58% of middle school and 46% of secondary school students are happy with their personal life.



Overall, 45% students felt tired and low on energy, 34% felt tearful, 27% felt lonely, at least 2-3 times in a week. 25% of middle school and 42% of secondary school students reported feeling anxious about the future.

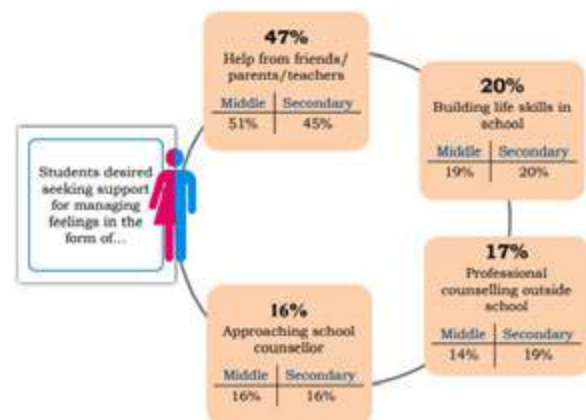


These feelings were further compounded during Covid, when 37% and 13% of middle school and 48% and 15% of secondary school students respectively reported experiencing mood swings and extreme emotions like emotional breakdowns.



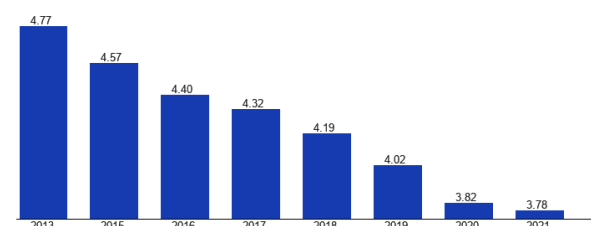
With regard to managing these feelings, students largely depend on family, teachers and friends as a support system. This suggests that education institutions bear a large share of responsibility to provide this support.

### Support Desired for Managing Feelings



As per the Global Economy.com, India's Happiness Index has steadily dropped from 4.77 in 2013 to 3.78 in 2021. The Happiness ranking is a part of the World Happiness Report, where respondents of different countries evaluate the quality of their lives on a scale of 0 to 10.

### India's Happiness Index 2013 - 2021



In their paper “Values-Based Education for Sustainability Marketers: Two Approaches for Enhancing Student Social Consciousness”, Melissa Markley Rountree and Stephen K. Koernig have inferred that values-based learning has a direct impact on creating sustainability focused products and services for the marketplace. Organisations are increasingly under the scanner from policy makers, consumers and climate activists, to bring in sustainable products and practices. Hence the onus to set a strong foundation by introducing morals and values in the curriculum lies with the education system.

Management Centre for Human Values in Indian Institute of Management Calcutta: Human Value Education in Management Institutes - C. Panduranga Bhatta Pragyana Rath traces back the gradual decline of Liberal Arts in education with the increasing dominance of globalisation and capitalism. With the rise of multinationals, the skills required were predominantly technical and vocational skills. The study of Liberal Arts became more service oriented, rather than an end in itself. Higher education, and especially management education, was customised to meet this demand for graduates with business and technical knowledge and skills. In the midst of this, IIM Calcutta realised the need for values-based education and set up a Management Centre for Human Values (MCHV) in 1992, which delivered management education integrating Indian ethos, values, ethics, corporate social responsibility, etc. The focus of the curriculum was to teach students to embrace heterogeneity as our own and not just tolerate it as a necessary evil. The authors derived the Gene Mutation Legacy model which hypothesises that Indian ethos determines what we are at present, which in turn determines our future. The model addresses the analysis of what we knowingly and unknowingly exclude and how it can impact future

generations.

In their paper “Human Values Scale (HVS): Development and Validation” – April 2022, authors Sreenu Telu and Yoginder S Verma have devised a Human Values Scale to measure 3 key values – Caring, Courage and Justice. This scale could be deployed by industry to examine the value systems of potential recruits or for promotions to higher positions. It could also examine if values of employees are in consonance with the organisation culture.

### **Research Methodology**

The UHV 1 course was conducted in workshop mode for approximately 700+ Post Graduate management students. They were from pan India, vastly heterogenous in terms of region, family, education, and economic backgrounds. Most of them were in the age group of early to mid 20's.

Prior to the workshops, a Pre-Course Survey was administered to the students, to gather their existing beliefs and mindsets on value-based living.

On completion of the workshop, a Post Course Survey was again conducted to gather their views and mindset after going through the workshop. The questions were framed on each topic to ascertain if students' understanding of that topic had improved or remained the same before and after attending the workshop. This data would give us insights on how students have related to the course and whether their understanding of values-based living has improved after attending the course.

Tool Used: Both surveys were administered online, and the responses were analysed using MS Excel.

## Scope of the Study

The scope of the study is to ascertain and analyse students' perceptions, experience, and takeaways from the UHV course. For the purpose of this study, we have surveyed Post graduate management students, from diverse disciplines and backgrounds. They are all future parents, teachers, corporate executives, entrepreneurs, policy makers, for whom the knowledge and practice of values-based living is imperative. Their acceptance of the course and the extent to which they relate to it and are willing to adopt it in their lives, determines the success (or otherwise) of the course.

The study attempts to understand what students in this age group think about the course, whether they can relate to the concepts, whether they feel they can be deployed in their day-to-day life, whether they can achieve their career and life goals without compromising on values.

## Context of the Study

This study was conducted in the backdrop of the course that was conducted for Post Graduate management students. While there is a lot of material and discussion on the course design, contents and delivery, there are limited insights on how students have responded to the course. Individual schools and colleges may have gathered feedback from their students. This study attempts to make the students' feedback more widely available, which may be a motivator for more students to attend the course and for more schools and colleges to include it in their curriculum.

## Limitations of the Study

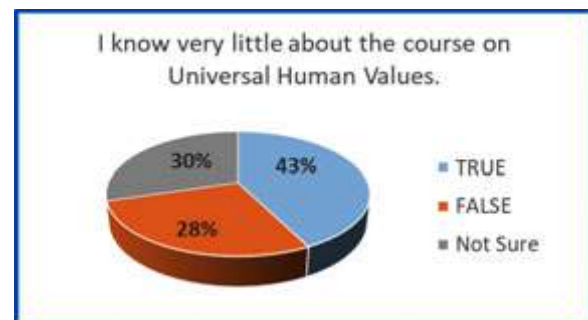
The Post Course Survey was administered within a

week of completion of the workshops when subject recall is high. From the responses, it is evident that students relate to the course and see an improvement in their understanding of most of the concepts discussed. It remains to be seen to what extent they will / can practice them when faced with opposing influences and/or conflicting situations in their life. If these are beyond their control, to what extent will these values guide them to achieve their career and life goals without compromising on principles. This may require further study after a longer time lapse after completing the course.

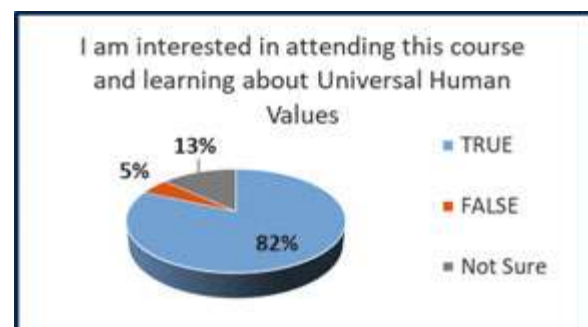
## Data Analysis

The responses from the **Pre-Course Survey** are summarized as under.

~700 students have responded to the Pre-Course questionnaire.



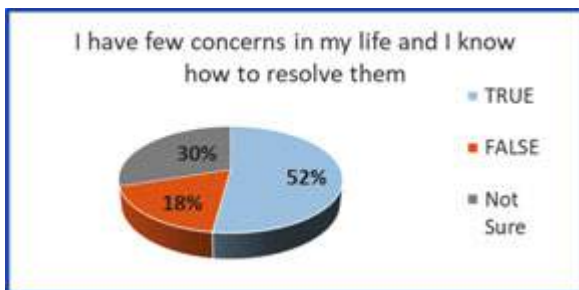
43% of the students know very little about the course. 28% know about it and 30% are undecided.



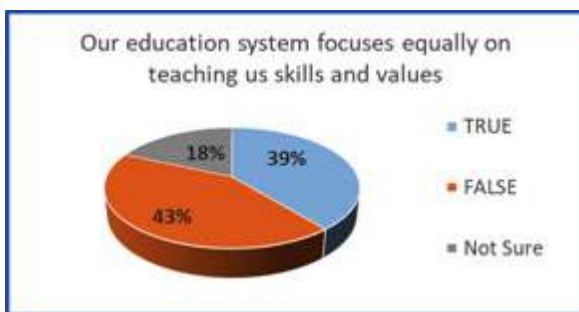
82% of the students were interested in learning about Universal Human Values and 13% were undecided. Only 5% were not interested in learning about it.



59% of the students are clear about their life goals and know how to achieve them. 11% are not clear, and 30% are undecided.

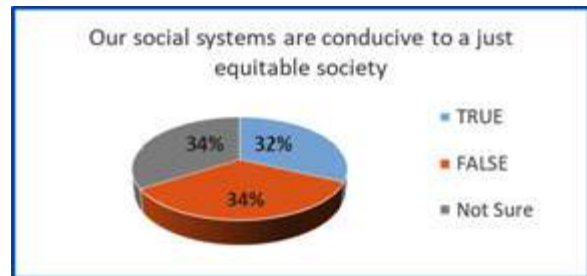


52% of students have some concern in their life and they know how to resolve them. 18% do not have any concerns and / or do not know how to resolve them. 30% are undecided.



43% of students believe that our current education system does not focus equally on teaching skills

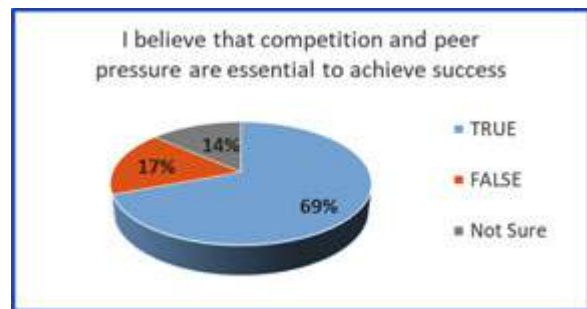
and values. 39% believe it does, and 18% are undecided.



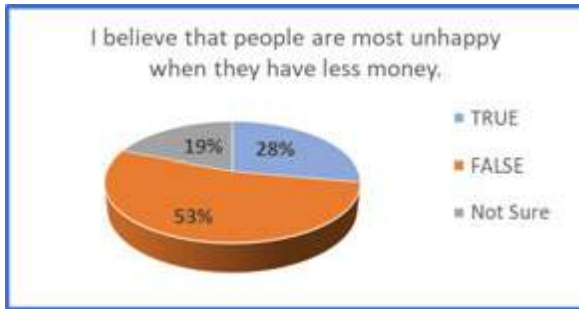
34% of students believe that our social systems are not conducive to a just equitable society. 32% believe they are, and 34% are undecided.



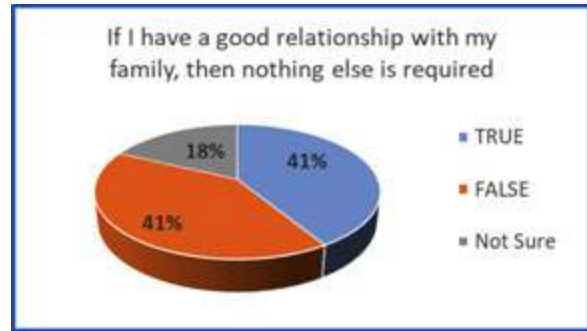
86% of students expect the course to help them develop a holistic vision of life. Only 3% do not expect this and 10% are not sure what to expect



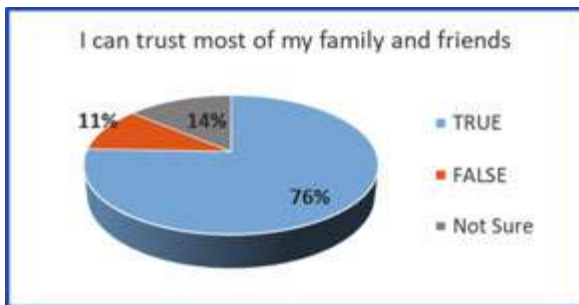
69% of students believe that competition and peer pressure are essential to achieve success. Only 17% believe they are not essential, and 14% are undecided.



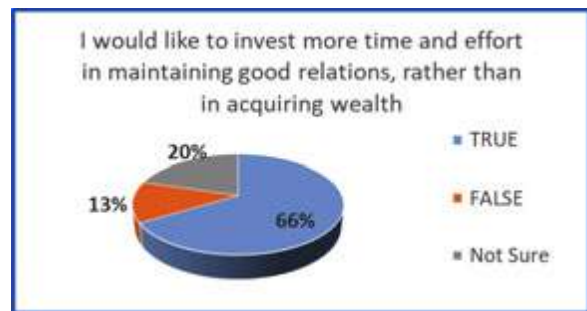
53% of the students believe that less money is not the prime reason for people to be unhappy. 28% believe that it is, and 19% are undecided.



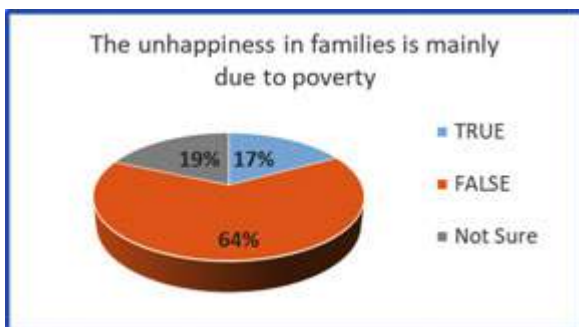
Students are almost equally divided in their opinion that having a good relationship with their family is the most important thing. 41% each are for and against, while 18% are undecided.



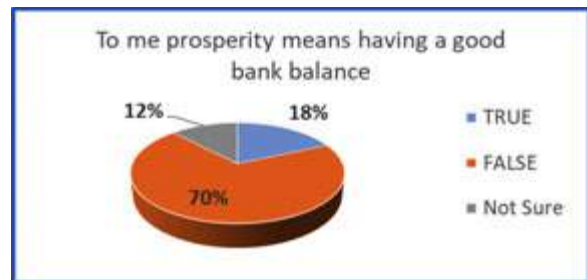
76% of the students say that they can trust most of their family and friends. 11% say they cannot and 14% are undecided.



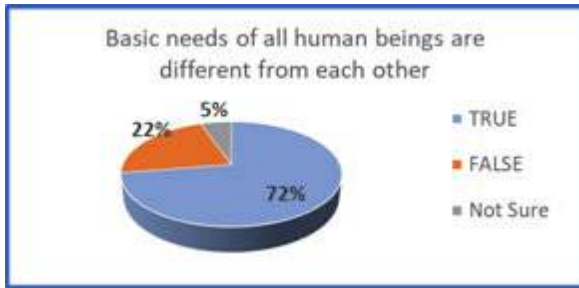
66% of students would like to invest more time and effort in maintaining good relations, rather than in acquiring wealth. 13% would not, and 20% are undecided.



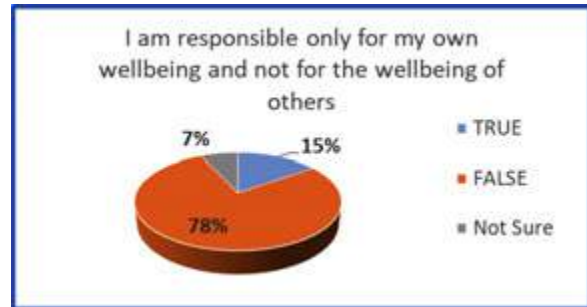
64% of students believe that unhappiness in families is not mainly due to poverty. 17% believe it is, and 19% are undecided.



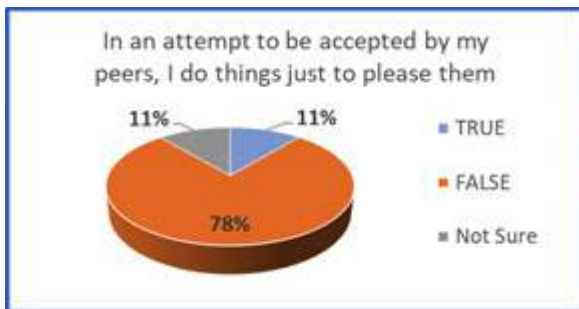
For 70% of the students, prosperity does not mean having a good bank balance. For 18% it does, and 12% are undecided.



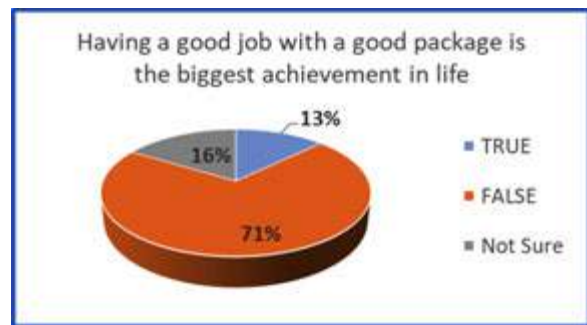
72% of students believe that basic needs of all human beings are different from each other. 22% believe that they are not different and 5% are undecided.



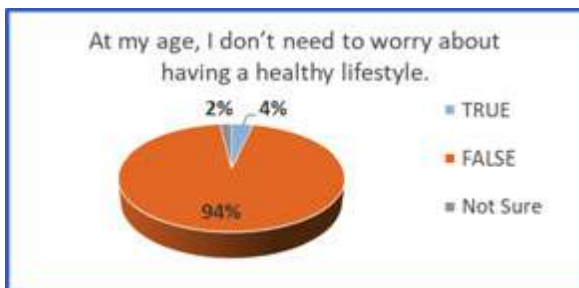
78% of students believe that they also have a responsibility towards the wellbeing of others. 15% believe they are responsible only for their own wellbeing, and 7% are undecided.



78% of students do not do things just to be accepted by their peers. 11% do, and 11% are undecided.



71% of students do not believe that having a good job with a good package is the biggest achievement in life. 13% believe so, and 16% are undecided.



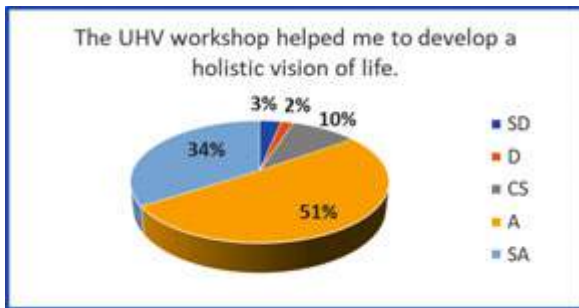
94% of students understand that even at their age, they need to adopt a healthy lifestyle. Only 4% believe it is not a worry at their age, and 2% are undecided.



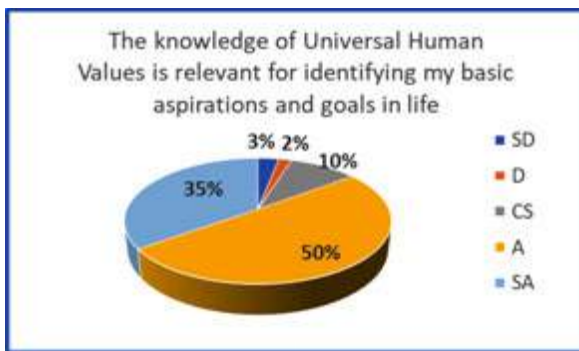
40% of the students do not believe that when they have an argument with anyone, that person intends to hurt them. 27% believe that the other person intends to hurt them, and 34% are undecided.

The responses to the Post Course Survey are summarized as under.

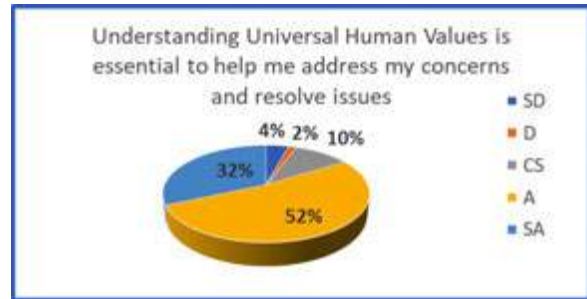
SD	Strongly Disagree
D	Disagree
CS	Can't say
A	Agree
SA	Strongly Agree



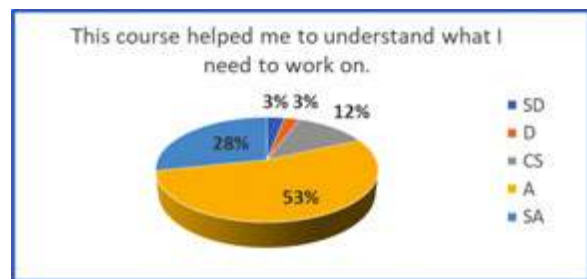
85% of students agree that the course helped them to develop a holistic vision of life, of which 34% strongly agreed. Only 5% believe that the course did not help them develop a holistic vision of life, and 10% were undecided.



85% of students agree that the knowledge of Universal Human Values is relevant for them to identify their basic aspirations and life goals, of which 35% strongly agree. Only 5% students do not agree that it is relevant, and 10% are undecided.



84% of students agree that understanding of Universal Human Values is essential for them to address their concerns and resolve issues, of which 32% strongly agree. Only 6% students disagree that it is essential, and 10% are undecided.



81% of students agree that the course helped them to understand what they need to work on, of which 28% strongly agree. Only 6% of students do not agree that the course helped them to understand this, and 12% are undecided.



85% of students agree that what they learnt in the course is important, and it will help them in their career and in life, of which 35% strongly agree. Only 5% disagree to this and 10% are undecided.

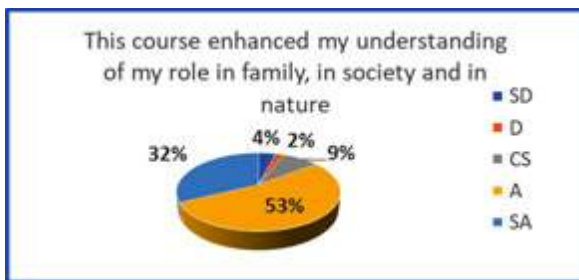


86% of students agree that the course enhanced their understanding of their own role and responsibility towards achieving their life goals, of which 32% strongly agree. Only 5% did not agree to this, and 9% are undecided.

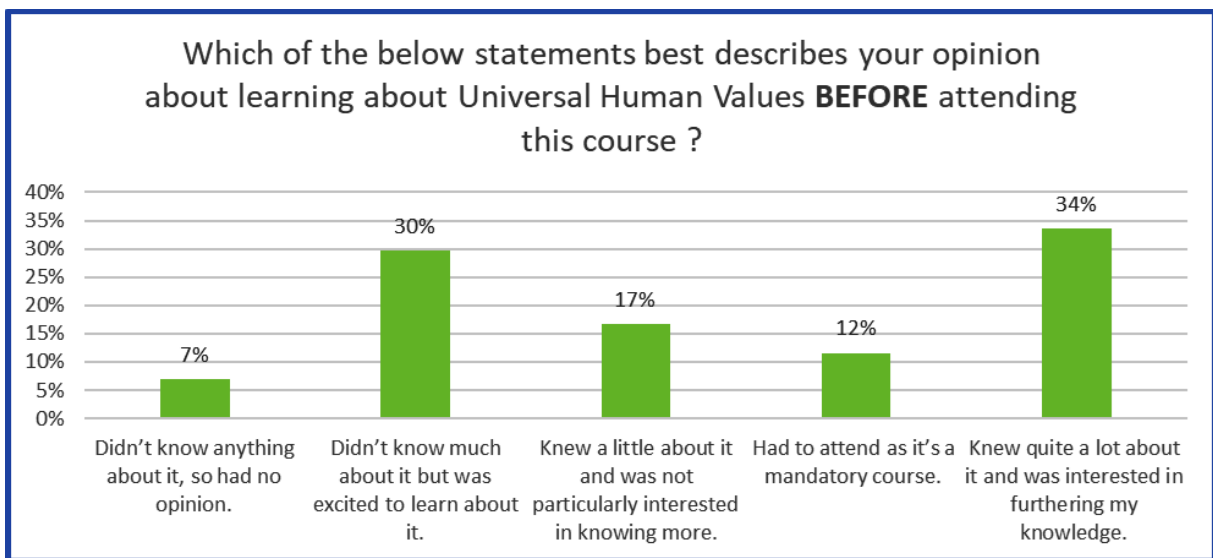
85% of students agree that the course has enhanced their understanding of their role in family, society and nature, of which 32% strongly agree. Only 6% disagree to this, and 9% are undecided.



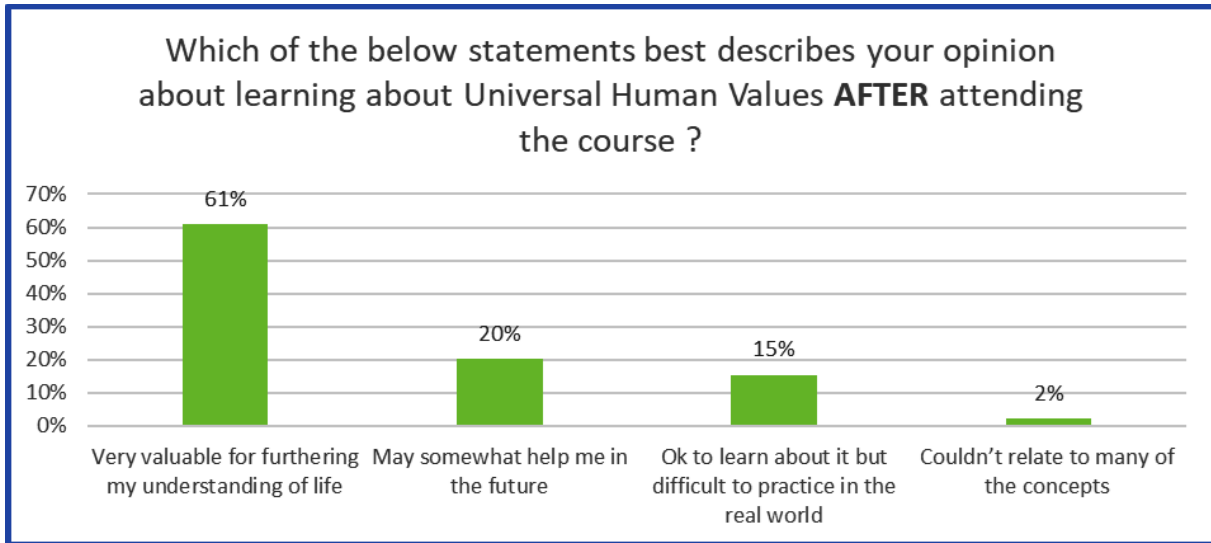
86% students agree that the course was organised in a manner that helped them understand the concepts, of which 31% strongly agree. 7% do not agree to this, and 7% are undecided.



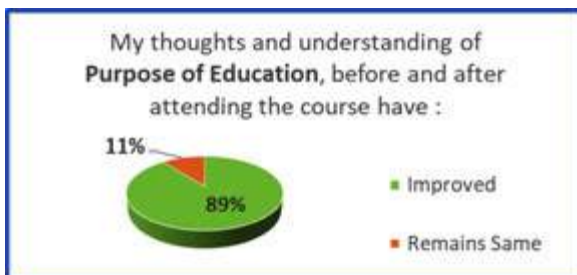
86% of students agree that the course enhanced their understanding of their role in family, society and nature, of which 32% strongly agree. Only 6% disagree to this, and 9% are undecided.



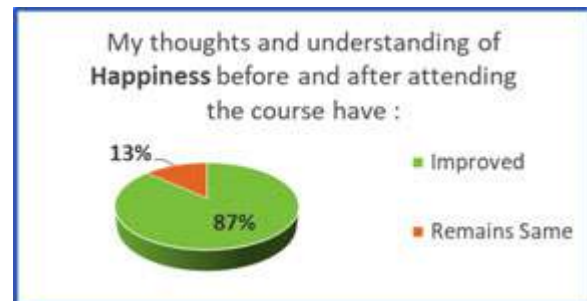
Before attending the course, 34% students knew about it and were interested to further their knowledge. 30% didn't know much about it but were interested to learn. 7% didn't know anything about it. 17% knew a little about it and were not interested in knowing more, and 12% attended only because it was a mandatory course.



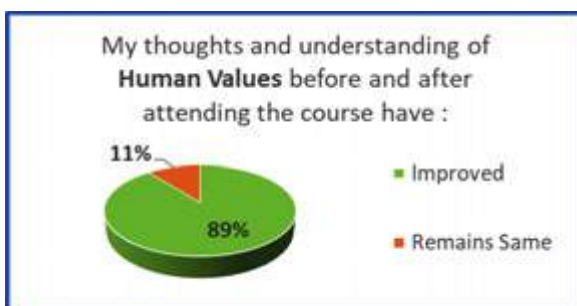
After attending the course, 61% students found it very valuable for furthering their understanding of life. 20% felt it may somewhat help them in the future. 15% felt it is ok to learn about it but difficult to practice in real life. 2% were not able to relate to many of the concepts.



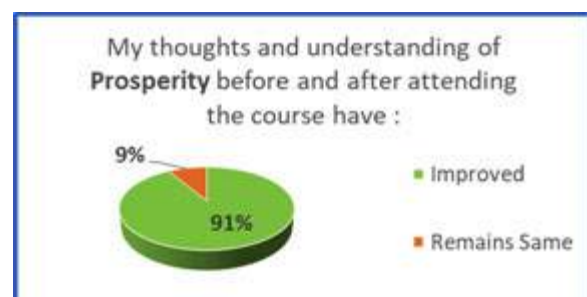
89% students believe their thoughts and understanding of the purpose of education have improved. 11% do not feel any change.



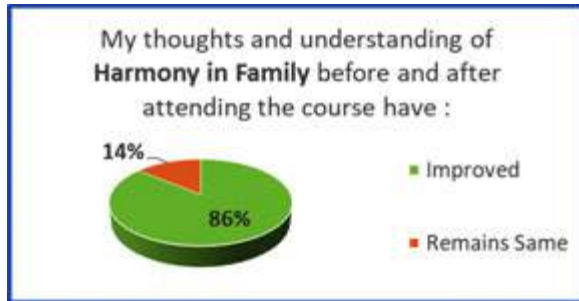
87% students believe that their thoughts and understanding of Happiness has improved. 13% do not feel any change.



89% students believe their thoughts and understanding of Human Values have improved. 11% do not feel any change.



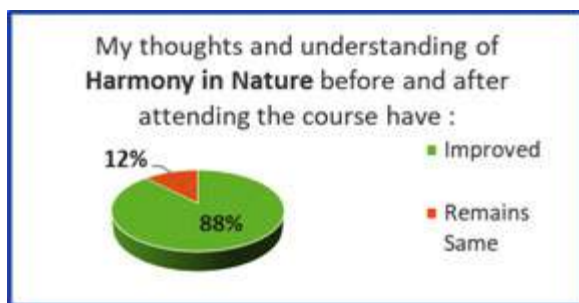
91% students believe their thoughts and understanding of Prosperity has improved. 9% do not feel any change.



86% students believe their thoughts and understanding of Harmony in the Family has improved. 14% do not feel any change.



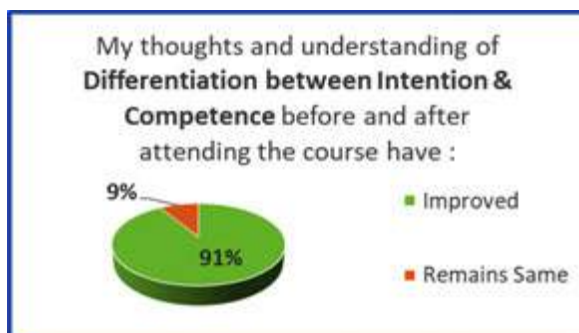
86% students believe their thoughts and understanding of the Feeling of Trust has improved. 14% do not feel any change.



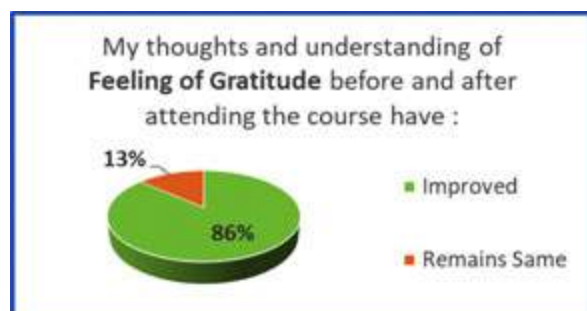
88% students believe their thoughts and understanding of Harmony in Nature has improved. 12% do not feel any change.



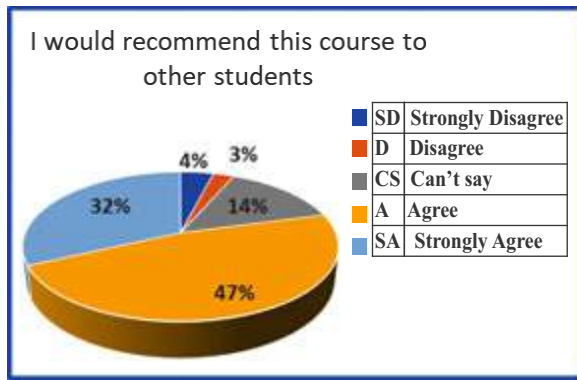
89% students believe that their thoughts and understanding of the Feeling of Respect has improved. 11% do not feel any change.



91% students believe their thoughts and understanding of Differentiation between Intention & Competence has improved. 9% do not feel any change.



86% students believe their thoughts and understanding of the Feeling of Gratitude has improved. 13% do not feel any change.



86% students believe their thoughts and understanding of Harmony in the Family has improved. 14% do not feel any change.

### Findings

- ✓ 85% of students agree that the course helped them to develop a holistic vision of life, of which 34% strongly agreed.
- ✓ 85% of students agree that the knowledge of Universal Human Values is relevant for them to identify their basic aspirations and life goals, of which 35% strongly agree.
- ✓ 84% of students agree that understanding of Universal Human Values is essential for them to address their concerns and resolve issues, of which 32% strongly agree.
- ✓ 81% of students agree that the course helped them to understand what they need to work on, of which 28% strongly agree.
- ✓ 85% of students agree that what they learnt in the course is important, and it will help them in their career and in life, of which 35% strongly agree.
- ✓ 86% of students agree that the course enhanced their understanding of their own role and responsibility towards achieving their life

goals, of which 32% strongly agree.

- ✓ 85% of students agree that the course has enhanced their understanding of their role in family, society and nature, of which 32% strongly agree.
- ✓ 61% of students found it very valuable for furthering their understanding of life.
- ✓ Majority of the students believe that their thoughts and understanding of the key UHV concepts improved after attending the course.

Purpose of Education	89%
Human Values	89%
Happiness	87%
Prosperity	91%
Harmony in Family	86%
Harmony in Nature	88%
Differentiation between Intention & Competence	91%
Feeling of Trust	86%
Feeling of Respect	89%
Feeling of Gratitude	86%

- ✓ 79% students would recommend the course to their peers, of which 32% would strongly recommend.

### Recommendations & Way Forward

Studies show that Gen Z and Millennials, in India and globally, are in dire need of guidance on holistic and values-based living, and this course can be one of the ways to give them this direction and perspective. Considering that these generations are the future parents, leaders, policy makers of tomorrow, it is imperative to equip them with strong value systems, resilience and the ability to manage the challenges of the VUCA - BANI world.

86% students believe their thoughts and understanding of Harmony in the Family has improved. 14% do not feel any change.

#### **Recommendations for Educationists:**

- Since the course has been so well received by this diverse cohort of management students, it may be concluded that the course should be made an integral part of business school curriculum.
- Other Educational Institutions at school (primary and secondary) and college (UG and PG) levels may also incorporate it into their regular curriculum. This is so the values are ingrained from a very early age and become a part of their DNA.
- Course may be delivered in workshop mode to make it more interactive, and provide students the space to discuss, reflect and relate it with their own life experiences. Besides classroom lectures and discussions, course may be delivered through films, documentaries, role plays, followed by free flow discussions on the key learnings.
- Course may be delivered throughout the student life cycle in small, easily digestible modules, which would refresh their learnings and keep them top-of-mind when faced with an ethical dilemma.
- As part of the curriculum, students may participate in social internships for various environmental and social causes which would help them translate their learnings into practice.
- Education Institutions must create an ecosystem where students and faculty can freely discuss / debate on sensitive matters

like values, mental health, etc, without fear of stigma or backlash.

- Through this course, education institutions may be able to identify students who are facing some distress in their personal or academic lives. This can help the institution provide timely and much needed support to those students by way of proactive counselling and or any other academic or non-academic intervention.

#### **Recommendations for Healthcare providers:**

- The connection between the human mind and the body is well known. A disturbed mind can well be the reason for many physical ailments. Healthcare providers may thus create wellness products, services and awareness campaigns keeping in mind the unique needs of different generations of users.
- The focus of Healthcare providers must shift from curing to pre-empting and preventing a health condition.
- Healthcare and Insurance providers may collaborate to create medical insurance products that cover a wider spectrum of illnesses, without hospitalisation, including preventive measures.

#### **Recommendations for Employers:**

- A similar values-based course may be designed and conducted for corporates, which would help to build a culture of mutual understanding and empathy among employees. This is especially relevant in a highly competitive, high performing environment.

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**EXPLORING THE INTERSECTION OF ART AND ENTREPRENEURSHIP:  
A STUDY OF MITHILA ART PRACTICES IN INDIA AND NEPAL****Simran Agrawal\***

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***Abstract***

*This study investigates the intersection of art, culture and entrepreneurship within the context of Mithila (Madhubani) art practised by the Maithili community in India and Nepal. The research specifically centres on how the art form is culturally embedded, the entrepreneurial ventures around it, and the influence of commercialisation on the authenticity of the art form.*

*The research employed a qualitative, narrative-based design, and a purposive sampling technique was used to gain insights from founders and artisans in India and Nepal. Data were collected through in-depth semi-structured interviews, and secondary sources such as websites, social media, etc, were explored to supplement the primary data. Thematic analysis was used for analysing the collected data.*

*Mithila art is deeply ingrained in cultural traditions across generations in the Maithili community, particularly among women. The community embraced entrepreneurial ventures in response to both opportunity (market demand), need (livelihood) and passion to preserve and promote their culture. Each entrepreneurial journey is uniquely shaped by personal experiences, social capital, resource constraints and consumer preferences.*

*While the commercialisation encourages innovation and diversification, artisans navigate this tension by modifying themes, adopting modern materials, and balancing aesthetic expectations with market viability. This paper also highlights cross-border (India and Nepal) differences, urban-rural dynamics, contributing to the knowledge of how artisans and cultural enterprises negotiate tradition, livelihood, and innovation.*

**Keywords:** *Mithila Art, Cultural Entrepreneurship, Artisans, Commercialization, Creative Economy, Traditional Art Forms*

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**Introduction**

Traditional art forms and handicrafts form integral components of the creative industry (Jin, 2021). Traditional art forms, like paintings, sculptures, and special fabrics, show how creativity and culture come together. Both traditional art forms and handicrafts contribute to the economic, social, and cultural dimensions of the creative industry (OECD, 2021). They not only provide sustainable livelihoods for artisans but also preserve the culture and foster a deeper understanding and

appreciation of cultural heritage on a global scale.

Mithila Art is one such traditional art form that originated in the times of Ramayana. This art form includes intricate designs and vibrant colours that portray cultural narratives and stories. The origin of Mithila art is believed to be ancient, with a history dating back 3000 years, and it came to the world in 1934 (Rai & Masih, 2022). It began with the walls of the house and gradually transformed into papers, clothes, and other forms. Now, Mithila Art has transitioned from a domestic practice to a

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globally recognised artistic and livelihood-generating activity. Mithila Art not only reflects artistic expression but also contributes to the artisan economy and the cultural economy.

This form of painting is practised in India as well as in Nepal. In India, it is known by Madhubani painting, while in Nepal it is known as Mithila painting. During ancient times, there were no geographical boundaries, so the entire region was known as the Mithila region. Hence, it is said that the art form originated in the Mithila region. When the places were divided into two countries, the region also got divided. At present, half of the region falls in the northern part of the Bihar district, and the other half falls in southern Nepal in the Terai region. Since the art form was distributed in different countries, both has evolved. In both countries, both art form shares the same cultural value and traditional significance. However, the tools and techniques have differed due to which there seem to be differences in painting designs. Nonetheless, the context in both forms remains the same.

In recent years, there has been a surge in entrepreneurial activity centred around Mithila Art, driven by its growing popularity and demand in domestic and international markets. Entrepreneurs have started ventures collaborating with Mithila artists to create a wide range of products like paintings, home décor items, apparel, and accessories. On the other hand, the artisans themselves also work from their homes and try to sell their artwork locally.

Despite the commercialization, Mithila Art remains deeply rooted in the cultural heritage and traditions of the Mithila region (Mishra, 2021). The collaboration between entrepreneurs and artists has not only provided economic opportunities but has also contributed to the

preservation and promotion of the cultural significance of the art form.

Given the dynamic nature of entrepreneurship in Mithila Art, this study aims to understand the current state of entrepreneurship in both India and Nepal. This study will mainly focus on the entrepreneurial process of the enterprises and the impact of commercialization on the traditional art form.

## **Literature Review**

### **Entrepreneurship and the Entrepreneurial Process**

Entrepreneurship plays an important role in driving economic growth, and it's defined in multiple ways by scholars, highlighting behaviours, outcomes, and opportunity recognition. From Kirzner's perspective, as cited in Smagina and Ludviga (2020), entrepreneurship involves competitive behaviours that drive markets forward, while Gangi suggests a mutual exchange of value between markets and businesses, emphasising the importance of creating value. A. Klammer highlights that value isn't clearly defined and originates from classical economics, representing the "worth of a thing" (Smagina and Ludviga, 2020).

According to Schumpeter (1934), entrepreneurship involves the introduction of new products, processes, or services, leading to creative destruction and economic development. Shane and Venkataraman (2000) emphasises the role of opportunities in entrepreneurship, defining it as the pursuit of opportunities beyond resources controlled.

Several theories explain how entrepreneurs identify and act on opportunities. Sarasvathy's

Effectuation Theory (2001) describes that entrepreneurs engage in a non-linear process of making decisions based on affordable loss, leveraging contingencies, and forming partnerships. The Resource-Based View (Barney, 1991) emphasizes the importance of firm-specific resources in achieving competitive advantage.

The entrepreneurial process is a dynamic and multifaceted journey undertaken by individuals or teams to identify, create, and capitalize on opportunities to establish and grow successful ventures and the entrepreneurial journey is also mapped by several frameworks. The Timmons Model (Moises, 2012) focuses on balancing opportunities, teams, and resources. Shane's model (as cited in Hammad, 2014) emphasizes opportunity identification, decision-making, and resource mobilisation. Bygrave's framework (as cited in Nassif, Ghobril & Silva, 2010) outlines four phases: idea generation, triggering event, venture creation, and growth, while recognising the role of personal, social, and environmental factors.

Recent research has focused on the role of entrepreneurial ecosystems in facilitating entrepreneurship. An entrepreneurial ecosystem comprises various actors, such as entrepreneurs, investors, universities, government agencies, and support organizations, interacting within a specific geographical or sectoral context (Spigel, 2017). Scholars emphasize the importance of social networks, institutional frameworks, access to finance, and supportive cultural attitudes in shaping entrepreneurial activity (Acs & Amorós, 2008; Stam, 2015).

Overall, the literature portrays entrepreneurship as an opportunity-driven, resource-based, and context-dependent process shaped by individual capabilities and ecosystem support.

## **Art Entrepreneurship, Creative Economy, and Cultural–Artisan Enterprises**

Art entrepreneurship is an emerging field that blends creativity, innovation, and business acumen within the cultural and creative industries. Woronkiewicz (2021) conceptualizes art, entrepreneurship, and innovation as interconnected layers, defining art entrepreneurship as the ability to leverage opportunities and take risks in support of activities within cultural and creative sectors.

Art entrepreneurship can be viewed as a multifaceted phenomenon that not only drives economic activity but also fosters cultural enrichment and societal advancement. By leveraging artistic creativity and entrepreneurial acumen, individuals and organizations within this domain navigate uncertainty, pioneer new avenues of expression, and contribute to the vibrancy of cultural ecosystems.

Despite its potential benefits, art entrepreneurship faces various challenges, including financial constraints, market saturation, and regulatory barriers. Research explores strategies for overcoming these challenges, such as diversifying revenue streams, building networks, and leveraging digital technologies to reach wider audiences (Hesmondhalgh & Baker, 2015).

The broader creative economy provides a conceptual foundation for understanding art entrepreneurship. The U.K. Creative Industries Mapping Document (DCMS, 1998), as cited in (Kamarudin & Sajilan, 2013), has defined the creative industries as 'those activities which have their origin in individual creativity, skill, and talent and which have the potential for wealth and job creation through the generation and exploitation of intellectual property. Howkins (2001, as cited in

Gouvea et al., 2021) links creativity directly to economic processes, framing the creative economy as a knowledge-based system that fosters income generation, cultural diversity, and human development.

Within this landscape, cultural entrepreneurship plays a pivotal role. Introduced by DiMaggio (1982, as cited in Dobрева & Ivanov, 2020), cultural entrepreneurship involves creating structures that sustain and advance cultural practices. Its success is measured not only by financial outcomes but also by cultural contribution, social value, and community impact (Ratten & Ferreira, 2017).

An artisan economy is a part of a cultural economy where people make things by hand that represent their culture and creativity, like crafts, art, food, and things for tourism (Krishnamoorthy, Kapur & Subramanyam, 2021). Artisans often work informally, with limited technology, drawing on inherited skills and social identity. While handicrafts have traditionally been viewed as leisure or lifestyle activities (Wherry, 2006, as cited in Ratten, 2022), they have long served as entrepreneurial ventures combining traditional techniques with new designs. Bhattacharya (2015) highlights the importance of community-based systems that help artisans commercialize their heritage while fostering self-perception as cultural service providers.

The handicraft sector, one of India's largest sources of employment (Crafts Council of India, 2011), has gained increasing recognition through corporate and support organisations integrating traditional skills into modern production. However, commercialization introduces tensions. Chutia and Sarma (2016) have introduced two terminologies to define the commercialization of art forms, i.e., spontaneous commercialization,

driven by market demand and external consumers, and sponsored commercialization, supported by NGOs and government agencies.

While commercialization enhances incomes, scholars caution that it may compromise authenticity, alter traditional aesthetics, and contribute to the erosion of cultural identity (Patel, 2016).

### **Mithila Painting: Evolution and Commercialization**

The commercial history of the painting goes back to 1934 when the Mithila region was hit by a devastating earthquake (Halder, Pandey and Banik, 2018). The economic condition got poor, so, to bring relief to the economy, in the 1960s, Ms. Pupul Jayakar, Director of the All-India Handicrafts Board sent Mr Bhaskar Kulkarni to motivate women to monetize their artistic skills (Rai & Masih, 2022). The women then transformed the paintings into paper, clothes, and canvas from the walls. Gradually, the painting became more versatile and could be made with various materials.

The commercialization of the Mithila painting is both sponsored and spontaneous (Chutia and Sarma, 2016). The government and other private agencies encouraged the Mithila Artisans to transfer the paintings from walls to canvas and clothes, which opened the door for them to earn. Likewise, it is also spontaneous, as the direct engagement with consumers provides insight to artisans to modify the art. Traditionally, the art form has a mythological history; modernization has given a transformational look by depicting everyday life stories as well.

Fleury and Ehrhardt (2021) have divided the globalization of Mithila painting into three

phases:

Late colonial and post-independence period, influenced by William and Mildred Archer's universal aesthetics.

The 1970s were marked by countercultural Indophilia and the "hippy" movement, leading to internationalization.

The postmodern era of late globalization, with a focus on rejecting Western interpretations.

Today, Mithila art serves as both a cultural expression and a livelihood source. Collaborations among government agencies, designers, and manufacturers have diversified the art into home décor, apparel, accessories, and stationery (Dhir, 2020). However, the labour-intensive and detailed nature of traditional work makes original pieces expensive and primarily accessible to high-income consumers. Designers cater to mass consumers and fashion followers through technological interventions, such as creating cheaper versions and embracing digitalization (Dhir, 2020).

Various government bodies, including the Office of Development Commissioner (Handicrafts), have supported the promotion and preservation of the art form (Halder, Pandey & Banik, 2018). Mithila art has also empowered women by providing livelihoods and recognition (Jha, 2018), though many artists still struggle financially. Social perceptions often undervalue women's artistic work, viewing it as secondary or non-essential (Weber, 2004), limiting their mobility and aspirations.

### **Research Gap**

The existing body of research on Mithila Art

primarily centres on the evolution and commercialization of this unique art form. However, there is a noticeable gap in the current literature concerning the intersection of entrepreneurship and Mithila Art. The literature review mentions the commercialization of traditional art, but there's a gap in understanding the specific impact of this commercialization on the cultural identities of artisans. Further research should be conducted into how economic opportunities and changes in art production affect the artists' economic stability and sense of cultural identity.

A few pieces of literature also talk about the decline in authentic traditional art forms due to modernization and commercialization. Therefore, there is a need to explore how the artisans and art-based organizations balance traditionality and modern elements to match the preferences of consumers.

These gaps indicate the need for understanding the entrepreneurial processes of Mithila art ventures and the impact of commercialization.

### **Research Methodology**

#### **Research Design**

This study adopted a qualitative research design to explore the cultural embeddedness, entrepreneurial practices, and commercialization of Mithila Art in India and Nepal. Given the interpretive nature of the inquiry, qualitative methods enabled an in-depth understanding of the lived experiences of artisans and founders, their motivations, and the socio-economic dynamics shaping their work.

#### **Sampling Strategy**

Purposeful sampling was used to select

participants who possess relevant insights and experiences within the Mithila art community.

The sample included:

- Mithila artists and artisans who are actively engaged in the creation and production of Mithila artworks.
- Mithila art-based entrepreneurs who have established ventures or initiatives aimed at promoting and commercializing Mithila art.

To achieve diversity in our sample, we included participants from different demographic backgrounds, geographic locations (India and Nepal), and rural and urban areas (Bangalore, Darbhanga, Kathmandu, and Janakpur) within the Mithila art community.

### Data Collection

Data were collected through semi-structured, in-depth interviews, each lasting 45–90 minutes. Interviews explored personal histories, artistic training, entrepreneurial journeys, market experiences, use of materials, and perceptions of tradition and commercialization. Secondary data, including organisational websites, social media content, and existing literature, supported contextual understanding. With permission from participants, photographs were taken to capture the artisanal environment. Two such images are included as Figures 1 and 2.

#### Figure 1

*An artisan applying varnish as the final finishing step in the production of a Mithila art coaster.*

*(Image captured during field documentation with participant consent.)*



Figure 1

#### Figure 2

*Traditional artisan workstation showing the painting board, brushes, natural pigments, and essential tools used in Mithila Art.*



Figure 2

## **Data Analysis**

Following data collection, all interview transcripts were translated into English for analysis and reporting purposes. The interviews were conducted in Hindi, English, and Nepali to accommodate the linguistic preferences of the participants. To maintain confidentiality, participant identities and enterprise names were either changed or hidden.

We adopted thematic analysis to identify recurrent patterns, themes, and narratives within the interview data. This iterative process involved open coding, categorization, and interpretation of the qualitative data to extract meaningful insights and implications related to the research objectives.

## **Ethical Considerations**

Informed consent was secured from all participants. Names of artisans and informal groups have been anonymized unless participants gave explicit permission for identification. Photographs were included only after obtaining verbal and written consent. The study ensured confidentiality, voluntary participation, and compliance with academic integrity standards.

## **Analysis and Results**

### **Socio-Cultural Embeddedness**

The practice of Mithila art, deeply rooted in the Maithili community, is a celebration associated with their cultural heritage. Mithila art holds a special place in the hearts of the community, as it is woven into various occasions and festivals. Mithila art has naturally become women-centric, evolving as a tradition passed down through generations. This artistic tradition is a family affair, where younger girls absorb the essence of Mithila art by actively participating alongside

their female family members. The inheritance of these artistic skills becomes a natural progression, ensuring the transfer of skills from one generation to the next.

The art's family-centric nature doesn't confine it solely to women; it extends to the participation of men as well. While the majority of Mithila artists are women, men too have embraced this tradition and emerged as skilled artisans. This inclusivity reflects the organic evolution of the art form beyond gender boundaries. Mithila art comes alive during weddings in a special painting called "kohber". This painting is very detailed and adds a special touch to the wedding celebrations. This painting holds religious significance and is approached with meticulous care. Despite commercialization, the cultural meaning attributed to these motifs remains central to artistic identity.

### **Entrepreneurial Journeys and Motivations**

The Maithili community's familiarity with Mithila art, which closely resembles their cultural tradition, often catalyzes identifying entrepreneurial opportunities within it. The motivations behind starting ventures in Mithila art vary, reflecting the diverse circumstances and aspirations of individuals within the community. Founders of Mithila art-based ventures described entering the field due to personal interest, livelihood needs, or a commitment to cultural preservation. Many women-led entrepreneurs expressed that exposure to social media and urban craft markets motivated them to formalize their artistic practice into enterprises.

Resource mobilization, particularly through family support and utilization of locally available materials, emerges as a cornerstone of the entrepreneurial journey for Mithila artists. Within

the Maithili community, family plays a pivotal role not only in providing emotional encouragement but also in facilitating the practical aspects of starting and sustaining a venture in Mithila art. In artistic hubs like Bihar and Janakpur, the local market ecosystem proves to be particularly supportive of Mithila artists. These markets are inundated with a diverse array of materials essential for Mithila art, ranging from handmade paper to vibrant colors.

The adoption of a self-financing model emerged as a prevailing theme in the resource mobilization practices of Mithila artists, reflecting a degree of financial independence and entrepreneurial autonomy. This approach allowed artists to invest their funds into their ventures, leveraging their savings to kickstart their entrepreneurial endeavours. Mithila artists often start as solo entrepreneurs, managing all aspects of their work, but shift towards collaboration with other artisans as their ventures grow.

### **Commercialization and Its Impact on Artistic Identity**

The entrepreneurial journey of Mithila artists reflects a fascinating evolution in their art form, including various shifts in the occasion of use, diversification of themes, colour evolution, and adaptation to consumer preferences. Traditionally reserved for festivals and weddings, Mithila art has now transitioned into an everyday form of expression, reflecting its versatility and adaptability to modern contexts.

Artists have embraced new opportunities to showcase their talent, whether through traditional paintings on walls or innovative applications on fabrics, stationery, and various other products. The evolution of colours in Mithila art underscores a dynamic shift from traditional homemade natural

pigments to the widespread adoption of synthetic colours. Traditionally, Mithila artists relied on homemade natural colours derived from ingredients like turmeric for yellow, coal for black, and leaves for green. In response to changing times and demands, artists have embraced synthetic colours for their convenience and availability, allowing for more efficient fulfilment of orders, particularly in bulk quantities.

Participants shared that consumers often prefer colourful, contemporary patterns over traditional monochromatic linework. As a result, artisans adapt motifs to suit aesthetic tastes. Some expressed concern about “losing originality,” while others viewed adaptation as essential to survival in dynamic markets.

A key finding is that commercialization encourages innovation without entirely eroding tradition. Artisans strategically combine classic motifs with modern compositions. Enterprises diversify products, experiment with shapes and materials, and introduce functional items to appeal to wider audiences.

### **Cross-border Dynamics: India and Nepal**

In Nepal, artisans often face socio-economic realities. Limited access to raw materials and smaller local markets affect production scale. However, Nepalese artisans highlighted the importance of stronger community bonds and the ongoing use of natural materials in some areas.

On the other hand, Indian entrepreneurs reported better access to online marketplaces, exhibitions, and government-organised fairs. Enhanced online presence enables wider reach but also heightens competition. The common cultural heritage in both regions presents chances for partnership, yet variations in market structure affect experiences

and results.

### **Livelihoods, Gender, and Social Empowerment**

Women expressed that engagement in Mithila art provides financial autonomy and, more importantly, strengthens their bargaining power within households. The earnings from their artistic skills support children's education, healthcare and household expenses.

The commercial adaptation of Mithila art has also shaped women's personality and confidence through public recognition, customer interactions and participation in exhibitions. One key persistent challenge highlighted was time constraints due to domestic responsibilities. However, flexibility offered by home-based production enables women to balance work and family, making Mithila art a viable livelihood option.

### **Discussion**

This study on Mithila art and its intersection with entrepreneurship and cultural preservation unfolds resilience, innovation, and cultural pride deeply woven into the Maithili community. Through an exploration of tradition, adaptation, and entrepreneurial endeavors, this research throws light on the dynamic evolution of Mithila art and its enduring significance in a rapidly changing world.

### **Cultural Significance and Community Embeddedness**

At the core of Mithila art lies its profound cultural significance and community embeddedness. Rooted in ancient traditions and communal celebrations, Mithila art serves as a visual manifestation of cultural heritage, familial ties, and religious devotion. Passed down through

generations, this art form has become a cherished tradition, with familial transmission fostering a deep connection to Maithili's identity from childhood. The participation of both women and men in the practice of Mithila art underscores its inclusive nature, breaking gender boundaries and promoting cultural continuity within the community. Moreover, the geographical roots of Mithila art span across the Mithila region, transcending boundaries and migration, thus becoming a symbol of cultural resilience and interconnectedness.

### **Negotiating Tradition and Market Demand**

The tension between maintaining tradition and responding to market expectations emerged as a defining theme. The findings show that commercialization reshapes artistic choices, including colour palettes, themes, and production speed. However, artisans in this study expressed agency in selecting what to adapt and what to preserve. This negotiated balance suggests an evolving, rather than diminishing, tradition where creative experimentation becomes a strategy for sustaining cultural relevance.

### **Gendered Dynamics of Cultural Entrepreneurship**

The study highlights how Mithila Art functions as a gendered livelihood practice. Women's participation reflects broader patterns noted in UNESCO (2014), where traditional crafts enable flexible, home-based income generation. Entrepreneurship in this context enhances women's decision-making power, social confidence, and mobility. Yet, constraints remain due to domestic responsibilities, limited exposure to markets, and inconsistent access to training. These findings highlight the need for gender-responsive support mechanisms.

### **Adaptation to Commercialisation**

The entrepreneurial journey of Mithila artists reflects a remarkable adaptation to commercialization while maintaining the authenticity and integrity of their craft. From a tradition reserved for ceremonial occasions, Mithila art has expanded its presence into everyday life, embracing new mediums, themes, and colour palettes to cater to diverse consumer preferences. Despite commercial pressures, artists remain committed to preserving traditional styles and designs, ensuring the enduring legacy of Mithila artistry. This adaptation not only revitalizes the art form but also provides economic opportunities for artisans, fostering its continuity and relevance in contemporary times.

### **Urban-Rural Dynamics**

The distinction between urban and rural Mithila artists highlights the dynamic interplay between tradition and modernity within the art form. While rural artists prioritize authenticity and adherence to traditional practices, urban artists infuse contemporary elements into their work, enriching the artistic landscape with diverse influences. This urban-rural dynamic not only showcases the evolution of Mithila art but also reflects the resilience and adaptability of Maithili cultural heritage in both traditional and contemporary contexts.

As Mithila art continues to evolve and thrive in contemporary times, it serves as a timeless symbol of Maithili identity, celebrating cultural heritage, familial traditions, and communal ties. Through entrepreneurial endeavors, artisans navigate the complexities of commercialization while preserving the authenticity and integrity of their craft, ensuring the enduring legacy of Mithila artistry for generations to come. The dynamic

interplay between tradition and innovation, rural and urban dynamics, and traditional and modern interpretations underscores the vibrant resilience of Maithili cultural heritage, enriching the artistic landscape and inspiring communities across the globe. As we look towards the future, Mithila art stands as a beacon of cultural pride and resilience, celebrating the spirit of creativity, community, and cultural heritage.

Overall, this study highlights the profound social and cultural embeddedness of Mithila art within the Maithili community and highlights the transformative potential of entrepreneurship in sustaining and revitalizing traditional art forms. By addressing the research questions regarding the social and cultural significance of Mithila art, the entrepreneurial processes of Mithila art ventures, and the adaptation of Mithila artists to commercialization, this study.

### **Limitations**

This study is limited to the relatively small-scale enterprises within the Mithila art sector. By primarily examining the experiences and perspectives of small-scale entrepreneurs, the study may not fully capture the diversity of entrepreneurial practices and challenges present across different scales of operation. Larger enterprises or established institutions within the Mithila art industry may exhibit distinct patterns of entrepreneurship, resource mobilization, and adaptation to commercialization that need separate exploration.

### **Future Scope of Research**

Several avenues for future research emerge from this study. Firstly, researchers could explore how Mithila art is socially and culturally embedded within diverse communities beyond the Maithili

community, considering variations in artistic practices, themes, and entrepreneurial strategies. Secondly, future research could explore entrepreneurial processes within other cultural art forms and compare them with the findings from this study on Mithila art. By conducting comparative analyses across different cultural contexts, we can gain deeper insights into the similarities and differences in entrepreneurial strategies, challenges, and outcomes. This cross-cultural comparison could provide valuable lessons for understanding the role of entrepreneurship in preserving and promoting various cultural heritage forms, contributing to broader discussions on cultural sustainability and economic development.

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**EMPOWERING MARGINALISED COMMUNITIES: RURAL WOMEN'S  
ENTREPRENEURSHIP PROGRAMME FOR SUSTAINABLE DEVELOPMENT****Arun Kumar Waghchoure\***

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***Abstract***

*In regions characterised by the absence of agrarian and infrastructure related employment opportunities for substantial durations throughout the year, rural women, known for their industriousness, encounter challenges in securing livelihoods and providing for their families. In response to these constraints, the pursuit of skill oriented training via Entrepreneurship Development Programmes (EDP) becomes imperative, compelling them to initiate microbusinesses as a means of ensuring sustained economic viability.*

*Rural women's entrepreneurship programmes can be an intervention that supports these women. The programme can cater to early-stage startups operating in marginalised communities across pan India. With a focus on empowering women entrepreneurs, particularly those engaged in the sale of handicrafts, handlooms, organic food, and natural household supplies, this research delves into the unique challenges faced by these startups and evaluates the transformative role of organisations in addressing these challenges. The primary purpose of this research is to shed light on the efficacy of such programmes in fostering economic sustainability, community development, and individual empowerment.*

*Empirically, it can be ascertained that in rural settings, women led startups perform well when affiliated with Self Help Groups (SHG). They aspire and have ambitions to scale their business for higher growth and wealth generation, not only for themselves but for their families and their local communities. However, to achieve these objectives, periodic intervention is needed to equip these women with business skills training to learn the ropes of trade and take appropriate actions.*

**Keywords:** *Marginalised Communities, Rural Entrepreneurship, Self Help Groups, Sustainable Development, SHG, Women Entrepreneur, WeAct is an EDII program, it stands for Women Entrepreneurs Access Connect Transform- JEL Classification: L26 O35 I31*

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**Introduction**

Rural regions often exhibit what Korsgaard et al. (2015) describes as the “dark side of unequal regional developments”, reflecting broader disparities that characterise the modern economic landscape. These areas typically show weaker economic performance with persistent issues such

as outward migration, reduced labor productivity output, lower educational opportunities and inadequate public services (The New Rural Paradigm, 2006). Together, such structural backwardness creates a challenging environment for rural communities in both developed and developing countries.

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## **Overview**

Entrepreneurship plays a pivotal role in stimulating economic activity and supporting growth within the rural region. Understanding the specific conditions that enables or restricts entrepreneurial behavior in these settings therefore becomes essential for designing effective development strategies (Stathopoulou et al., 2004, Labrianidis, 2006). Field experience indicates that rural entrepreneurship supported by SHG and sustainable financing is essential to the growth and upward mobility of the community (Robert et al., 2021).

Research in entrepreneurship consistently shows the importance of social context in dictating entrepreneurial activities. Within the scope of this study the SHG represents a critical form of social support that can facilitate opportunity identification, resource mobilisation, and business development among rural women (Elfring & Hulsink, 2003). SHG has an important role to play in advancing women's empowerment, thereby contributing to SDG 5, which seeks to "achieve gender equality and empower all women and girls". By strengthening women's participation in economic activity and community decision making SHG indirectly supports progress across several other SDGs as well (Dash, 2019). The proposed study is relevant to agencies that operate in rural entrepreneurship; these could be institutions under the centre, state, or others, such as clusters, cooperatives, SHGs, rural incubators, and community centres.

**Problem Statement:** What are the differences in approach that needs to be implemented for the multitude of rural women entrepreneurs from SHGs compared to handful elite entrepreneurs from incubators, with advantages.

The term 'elite entrepreneur' lacks clarity, unlike the entrepreneurial identity depicted as super-rich (Smith, 2021). In this context, elite entrepreneurs are defined as individuals who typically belong to a smaller, highly exclusive group of entrepreneurs that benefit from extensive support provided through structured programs like business incubators or accelerators. These elite entrepreneurs often enjoy access to privileges and substantial resources, including advance level mentoring, funding opportunities, and extensive networks that facilitate rapid growth and innovation. Elite entrepreneurs primarily operate in sectors with significant potential for scalability and impact, such as technology, finance, or advanced manufacturing. The study explores the distinct approaches necessary for rural women entrepreneurs from Self-Help Groups (SHGs) in comparison to elite entrepreneurs who are guided through incubators. However, this research does not extensively delve into elite entrepreneurship, as it is merely used as a placeholder in this study.

## **Objective of the Study**

It is seen that an incubation programme catering to startups from urban populi with a one-to-one mentoring approach can be effective only for 8 to 20 in-residence enterprises. The same would remain effective with a hybrid model of in-residence and online only, up to a double capacity of approximately 40 enterprises. Provided there is proper follow-up, technology leverage, and the availability of mentors. But when the pool of entrepreneurs is in the range of 1000 to 10,000, as in the case of SHGs, the rural women entrepreneurs' same approach and methods will not work. Here there is a demographic change, or the league of entrepreneurs is different, and the appetite for understanding business and market dynamics is different. Even if one makes provision

for building entrepreneurial acumen through EDP and post EDP training, there is a need to design a different structured programme for the same. This paper is an attempt to investigate the case study of the WeAct Programme to explore and evaluate the services it provides as a possible solution.

**RO1:** To explore the variation in dissemination of support across two different groups, one with limited entrepreneurs mentored through incubators and another one with a legion of women entrepreneurs from rural India, especially from SHG groups. **RO2:** Study is extended in context, where the rural women entrepreneurs are geographically far off and accessible online with limited internet access and bandwidth. **RO3:** Also the study is extended keeping in mind that the rural women entrepreneurs speak different languages across India and other than business have their own sets of challenges.

### **Literature Review**

Before embarking on the process of literature review, it is essential to traverse the existing body of scholarly papers to comprehend the diverse landscape from the perspective of various schools of thought related to 'rural women entrepreneurs'. The new knowledge presented through the paper has more impact if it is within a school of thought (Upham et al., 2009). See Table 1 for the compilation of School of Thought.

For literature review the search strategy included keywords ("marginalised communit" OR ("Self Help Group" or SHG)) AND (("rural entrepreneur") OR ("Sustainable Development" OR SDG)) which was used in scopus, but only the top 32 articles were studied with citations up to 100. The same keywords were used in Google Scholar, but only the top 5 articles were used with SJR between Q3; 0.327 and SJR Q1; 1.292.

Further updated reports on SHGs, incubators, and accelerators in SHGs were also searched on the internet to gauge the current scenario.

The literature review includes studies of rural entrepreneurship, SHGs, the marginalised community, and sustainable development. Whereas in the exclusion criteria, the exclusion studies are urban or mainstream startups; these are run by elites and are often unicorn startups, though a lot has been covered about them by scholars and media. Since their context in terms of the environment of operation is different, it's kept out of scope. The next exclusion is related to gender studies in entrepreneurship. Here, one needs to adhere with surgical precision to steer away from women's obstacles and problems and instead focus on women-led enterprises obstacles and problems. The third exclusion is about SHG bank linkages or credit linkages. While SHGs and linkages' importance can't be denied for economic development, for a narrower scope, they're also excluded.

At the micro level SHGs provides women entrepreneurs, particularly those from vulnerable backgrounds a financial support, to build skills, earn money and escape poverty (Duncombe & Heeks, 2002, Deininger & Liu, 2013). At macro level the collective strength of SHG network stimulates local economic activities by converting small individual savings into wider community investment, thereby fostering microenterprise development for underprivileged women (Duncombe & Heeks, 2002).

One of the intent of SHGs is to help women establish sustainable livelihood opportunities that improves long-term well-being. Although sustainable development is a common agenda as a global priority, integrating it effectively and efficiently into public policy is a difficult task.

SHGs play a significant role in bridging this gap by empowering women with the capabilities to generate income and adopt practices aligned with long-term SDG (Sharma & Kashyap, 2023).

The most widely accepted definition of sustainable development, according to Brundtland's report, is 'To meet the needs of the present without compromising the ability of future generations to meet their own needs' (World Commission on Environment and Development, 1987). It advocated the idea of 'sustainable growth'. According to The World Conservation Strategy report (1980), by the International Union for the Conservation of Nature and Natural Resources (IUCN), for development to be sustainable, it must take into account social and economic factors as well as ecological ones (Sharma & Kashyap, 2023).

In recent times, dairy, khadi, and small businesses related to food and value addition of agri-produce activities have emerged in rural areas. These rural enterprise models have a huge potential to use local resources, match rural and urban needs, provide employment, and create a sustainable income (Patoju & Swain, 2023). Rural areas have distinct qualities that assist entrepreneurs (Garrod et al., 2006, Ring et al., 2010), and the establishment of more rural enterprises can provide welfare in rural areas (Chun & Watanabe, 2012).

Lall and Sahai (2008), as summarised in Sharma and Kashyap (2023), examined the multi-dimensional issues of women entrepreneurship and family run business and compared the challenges. Their analysis considered a range of factors including level of commitment, types of entrepreneurial obstacles, and future expansion plan across different demographic profiles. The study also showcased personal and behavioural

dimensions such as self perception, self esteem, entrepreneurial intensity and operational problems that shapes women's business experiences. Even though more women have begun to take part in family run business, the findings indicate that they continue to face positions of lower social status and greater operational barriers compared to their male counterparts.

According to Sharma and Kashyap (2023), Anand et al. (2020) analysed a large-scale women SHG initiative implemented in one of Northern India's most economically underdeveloped rural regions. The programme engaged more than 1.5 million participants, operated through four core activity streams; microsavings, agriculture entrepreneur training, health and nutrition awareness, and political engagement.

Drawing on a range of self-reported capability indicators from both participating women and non participating women, the study employed propensity score matching to assess programme effects. The findings indicate notable improvement in several dimensions of well being, with particularly strong gains observed among women from disadvantaged groups including scheduled castes and scheduled tribes. The study looks at robustness and supports the conclusion that the initiative contributed positively to aspects of sustainable development (Sharma & Kashyap, 2023).

According to the summary provided by Sharma and Kashyap (2023), Gaas (2019) conducted a qualitative investigation into the role of community led development in advancing equitable economic growth and sustainable development. Drawing on progress reports, case studies, external feedback from SHG members, and interviews with direct beneficiaries. The study

found that SHGs create strong social and economic foundations for their members. These groups build trust based, interdependent networks that act as informal safety nets and support economic participation through savings, loans, and small scale investment. The study further provided practical recommendations for strengthening community driven development by leveraging internal group dynamics and aligning them with broader external conditions.

### Research Methodology

This academic study employs a qualitative exploratory approach through a case study and field observations to acquire in-depth qualitative data. The data obtained from WeAct originated from various sources such as the organisation's website, email correspondence of the head of WeAct, as well as reports and newsletters accessible through documents and the website. Additionally, field observations were carried out to corroborate the information gathered from secondary sources and to offer a thorough comprehension of the operational mechanisms of the WeAct initiative.

### Case Study of WeAct

WeAct stands for Women Entrepreneurs Access Connect Transform. It's a program that was formed with the collaboration of Entrepreneurship Development Institute of India and Accenture Pvt Ltd (EDII, 2015a). WeAct provides tailored handholding assistance to rural women entrepreneurs to foster their businesses in a competitive market and remain sustainable. It caters to nano and micro enterprises supporting broad services; these are shown in Table 2 (EDII, 2015b).

**Table 2**

*Services offered by WeAct*

Services	Sub-Services	Activities
Market Access	Marketing Linkages	Establish relationships with vendors, suppliers, retailers and other agencies
	Digital Marketing	Create brand, logo, packaging, social media posts, etc.
Product and Business Development	Product Catalogues	Create brochures and pamphlets, etc.
	Product SOPs	Create SOPs for products
	Logistics Support	Build relationships with logistics and other partners
	Strategic Collaboration	Build relations with potential bulk buyers
Financial Information	Bank Loans	Provide information on bank loans
	Funding Schemes	Analyse and recommend relevant Funding Schemes
Network and Learn	Events	Arrange exhibitions and stalls for women enterprises across India throughout the year.
	Trainings	Provide skills training and business mentoring from time to time
	Meetings	Interacting with women entrepreneurs to get their feedback

*(Source: From WeAct Website menu items and sitemap)*

These services appear to answer many long standing challenges as described in the literature including constraints related to finance, business skills, market access and exposure to entrepreneurial opportunities (DAMWAD, 2007).

Established in Bengaluru, WeAct functions as a chamber of commerce dedicated to addressing the requirements of rural micro-entrepreneurs established as part of Accenture's CSR Project, 'Skills to Succeed 2020' (Accenture India, 2020). This strategic initiative aims to integrate these entrepreneurs into the mainstream of development, ensuring equitable access to benefits comparable to their urban counterparts. This CSR project, which commenced with the

intention of making a sustainable difference in the economic vitality and resilience of individuals, families, and communities, continued to become the WeAct incubation programme.

Figure 1



Source: (EDII, n.d. Snapshot for year 2022)

The eligibility criteria for women entrepreneur to enrol in WeAct Program is

Should have completed the requisite tenure of one year of running enterprise

Should surpass Rs. 6,000 for personal sustenance as monthly earnings.

Should have access to smartphones with internet enabled.

Should remit an annual nominal registration fee, either as an individual or a SHG.

Figure 2

Hub-spoke value chain



Source: Created by Author

WeAct team disseminates service through a hub-spoke value chain model, EDII field coordinators who are strategically spread out in diverse parts of rural India year-round for various initiatives and projects, get in touch with SHGs and other agencies through which rural women entrepreneurs are reached and served to. This value chain helps not only to surmount geographical barriers but also addresses linguistic challenges, contributing to a more inclusive and comprehensive outreach strategy. The ongoing initiative extends its outreach to encompass 9 states and 1 Union Territory, namely Andhra Pradesh, Assam, Karnataka, Kerala, Maharashtra, Puducherry, Rajasthan, Tamil Nadu, Telangana and Uttarakhand. The project focuses on diverse sectors, namely Food & Agro, Handicrafts, and Household Supplies.

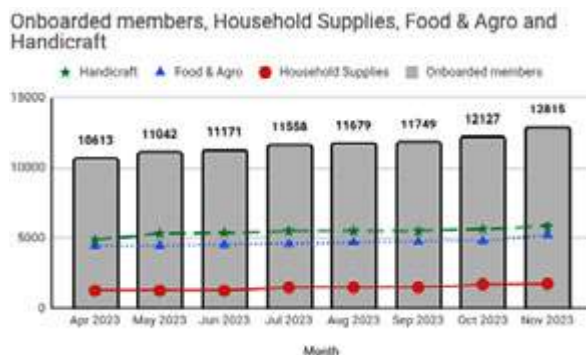
Table 3

Eight month data of onboarded members and sectors

Month	Onboarded members	Household Supplies	Food & Agro	Handicraft
Nov 2023	12815	1732	5246	5837
Oct 2023	12127	1692	4798	5637
Sep 2023	11749	1482	4772	5495
Aug 2023	11679	1482	4702	5495
Jul 2023	11558	1482	4582	5494
Jun 2023	11171	1261	4522	5388
May 2023	11042	1261	4457	5324
Apr 2023	10613	1261	4457	4895

Source: Data from WeAct online newsletters (EDII, 2023); same is represented in Figure 3 below

Figure 3



Source: Analysed data from WeAct online newsletters (EDII, 2023);

Here is data analysed in percentage. For Household Supplies the percentage ranges from approximately 11.29% to 13.95% across the months. For Food & Agro, the percentage ranges from approximately 39.56% to 41.99%. For Handicraft, the percentage ranges from approximately 45.55% to 48.22%.

Pearson correlation coefficient between onboarded members and each category:

$$r_{xy} = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

Where  $x$  is the number of onboarded members and  $y$  is the quantity in each category.

The Pearson correlation coefficients between onboarded members and each category are as follows: Onboarded Members and Household Supplies:  $r=0.946$ , Onboarded Members and Food & Agro:  $r=0.950$ , Onboarded Members and Handicraft:  $r=0.941$

### Findings and Discussion

This study presents quantitative aspects illustrated in Table 3 and a chart (Figure 3) that have been analysed. However, these elements do not directly contribute to the findings; rather, they serve as supplementary data for the WeAct program case study. The conclusions drawn from this research are rooted in theoretical frameworks established through a conventional literature review, the evolution of schools of thought, the identification of possible solutions, and recurring patterns. Additionally, the practical application of this study involves on-site observations of WeAct's operations, services, and the delivery model utilised to empower rural women entrepreneurs on a large scale.

When examining the research objectives closely, an evaluation of potential solutions reveals their alignment with the research goals, as indicated in Table 4.

Table 4

Potential solution for research objectives	
<b>Ro1: Variation in Dissemination of Support</b>	
Collective Empowerment:	Group based approach fostering solidarity and mutual support
Tailored Training:	Programs designed to address the specific needs and skills of rural women
<b>Ro2: Challenges of Geographical Distance and Online Access</b>	
Hybrid Models	Combines offline and online support to ensure inclusivity
Digital Literacy Programs	Enhance digital skills to bridge the gap
Localised Resource Centers	Establish physical centres well equipped with internet access and training facilities
<b>Ro3: Linguistic and Cultural Diversity</b>	
Localised Content:	Develop training materials and resources in local languages.
Cultural Sensitivity Training:	Ensuring trainers and mentors are aware of cultural nuances.
Peer Learning Networks:	Facilitating knowledge sharing among women from similar cultural backgrounds.

Source: Created by Author

The collective empowerment through group based approaches fosters solidarity and mutual support among rural women entrepreneurs (Kumar et al., 2021). The tailored support and hybrid models recommended align with previous research emphasising the importance of context specific interventions in rural entrepreneurship (Murphy & Coombes, 2008). The importance of digital literacy and localised resource centres is underscored by studies highlighting the critical role of technology in modern entrepreneurship (Welter & Smallbone, 2010).

Moreover, upon revisiting the Services provided by WeAct (as illustrated in Table 2), it becomes evident that they align seamlessly with the potential solution as depicted in (Table 4) in relation to the research objectives.

Next ahead the discussion connects the different schools of thought (see Table 1) and the categories of services provided by the WeAct program. The findings from Table 2 align with several key perspectives from the literature. We can metaphorically visualise that the school of thoughts are funnelled or tapped onto a vehicle, a vehicle or wagon of social and economic transformation.

Figure 4  
Vehicle as mechanism to provide support to Rural Women Entrepreneurs



Source: Created by Author

For instance, the focus on market access and digital marketing in WeAct corresponds with the innovation and adaptation school of thought, emphasising the ability of rural women entrepreneurs to leverage local resources and adapt to changing market conditions (Brush & Cooper, 2012). Additionally, the importance of tailored training and business development aligns with the human capital development perspective, which underscores the necessity of education, skills development, and training for entrepreneurial success (Becker, 1962). Moreover, the emphasis on network and learning events as well as strategic collaboration resonates with the social capital and networking school of thought, which suggests that building strong networks is critical for accessing resources and support (Stam et al., 2014).

These connections indicate the comprehensive and multifaceted approach of the WeAct program, demonstrating its alignment with established theories and its potential for effectively supporting rural women entrepreneurs.

Finally in terms of the study's limitations, data collection was confined to a single program. While there exist numerous analogous programs within organisations such as NABARD, SEWA, JEEViKA, and NRLM, which engage in supporting SHG-linked rural women entrepreneurship. Drawing data and insights from these programs thus enhance the validity of this research. However, due to resource constraints and time limitations, this aspect was falling beyond the study's scope. Nonetheless this gap could be a prospect for future research. Additionally, a comparative quantitative analysis contrasting rural women entrepreneurs with elite entrepreneurs could also be conducted to identify distinct methodologies employed by each group

and ascertain the transferability of these approaches.

## Conclusion

To conclude, it is vital to recap the fundamental question: What are the diverse approaches that can be deployed for supporting rural women entrepreneurs associated with Self-Help Groups (SHGs)? This research proposes two primary models, namely the hub-spoke model and the Vehicle, a mass delivery model. The hub and spoke approach functions as a mechanism enabling central offices such as WeAct to effectively reach out to rural women entrepreneurs across multiple states in India by leveraging SHGs and field coordinators. Whereas, the Vehicle, a wagon is a mass delivery model that operates as a mechanism specifically designed to support rural women entrepreneurs. It also recommends that a growing number of organisations develop their operational framework based on this model, rather than replicating strategies from serving incubators that primarily focus on assisting high-profile entrepreneurs. It is essential to acknowledge that strategies tailored for elite entrepreneurs may not be suitable for rural women entrepreneurs, which need a significant collaborative knowledge-sharing environment. An SHG and similar groups can maintain a strong foundation in understanding the methods of supporting rural women entrepreneurs thus enabling a large number of individuals to engage in entrepreneurship activities. It is imperative that both the Central and State governments maintain their attention on the needs of rural women entrepreneurs away from high-profile entrepreneurs but without diluting their focus. In the context of rural women entrepreneurs, the weightage should be placed on facilitating their advancement. Innovative policies, schemes, and projects should be

customized to suit the specific requirements of rural women entrepreneurs.

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### Appendix

Data Availability: Export of the records are on github link for safe keeping

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**Table 1**

*School of thought from the papers*

School of Thought	Author	Paper	Perspective
Barriers and Challenges	Brush, C. G., de Bruin, A., Gatewood, E. J., & Henry, C.	Women Entrepreneurs and the Global Environment for Growth: A Research Perspective	It examines the barriers and challenges faced by rural women entrepreneurs, which are limited access to finance, lack of education, dearth of training, cultural constraints, and inadequate support systems thus emphasising the need for targeted policies and programs to address these obstacles.
Innovation and Adaptation	Brush, C. G., & Cooper, S. Y.	Female Entrepreneurship and Economic Development: An International Perspective	Here the focus is on innovative and adaptive strategies employed by rural women entrepreneurs. It underlines their ability to leverage local resources, adapt to changing market conditions, and innovate against the response to challenges.
Policy and Institutional Support	Carter, S., & Shaw, E.	Women's Business Ownership: Recent Research and Policy	It probes on the role of policy and institutional support in fostering rural women's entrepreneurship. It shows the importance of creating an enabling environment through advantageous policies, access to finance, training programs, and institutional frameworks.

School of Thought	Author	Paper	Perspective
		Developments	
Social Capital and Networking	Anderson, A. R., & Jack, S. L.	The Articulation of Social Capital in Entrepreneurial Networks	Spotlight is on the importance of social capital and networking for rural women entrepreneurs. It further suggests that building strong networks provides access to resources, information, and support, which are critical for entrepreneurial success.
Resource-Based View	Brush, C. G., & Hisrich, R. D.	Women-Owned Businesses: Why do They Matter?	This special perspective focuses on the resource-based view (RBV) of rural women entrepreneurship. It builds on the argument that access to various resources like financial, human, and social has a significant impact on the entrepreneurial outcomes of rural women. This approach brings forth the importance of resource availability and management for business success.
Institutional Theory	Bruton, G. D., Ahlstrom, D., & Li, H. L.	Institutional Theory and Entrepreneurship : Where Are We Now and Where Do We Need to Move in the Future?	This school of thought applies institutional theory to understand how formal and informal institutions affect rural women entrepreneurs. It looks at how regulatory frameworks, cultural norms, and societal expectations shape entrepreneurial activities and outcomes.
Human Capital Development	Becker, G. S.	Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education	This perspective focuses on the role of human capital in entrepreneurship. It suggests that education, skills development, and training are critical for rural women entrepreneurs to succeed. Enhancing human capital leads to better business practices and innovative solutions.
Psychological and Motivational Factors	McClelland, D. C.	The Achieving Society	Investigates the psychological and motivational factors that drive rural women to become entrepreneurs. Exploring intrinsic motivations, such as the need for achievement, self-efficacy, and personal fulfilment, as key drivers of entrepreneurial activity.
Intersectionality and Diversity	Crenshaw, K.	Mapping the Margins: Intersectionality, Identity Politics, and Violence against Women of Color	Applies the concept of intersectionality to rural women entrepreneurship, recognizing that gender, race, class, and other social categories intersect to influence entrepreneurial experiences and opportunities calling for a nuanced understanding of how these overlapping identities affect business outcomes.

School of Thought	Author	Paper	Perspective
Cultural and Contextual Influences	Hofstede, G.	Culture's Consequences: International Differences in Work-Related Values	This school of thought examines how cultural and contextual factors influence rural women's entrepreneurial activities. It considers the impact of cultural values, traditions, and local contexts on business practices and entrepreneurial behaviour.
Technological Advancements and Digital Inclusion	Welter, F., & Smallbone, D.	Institutional Perspectives on Entrepreneurial Behavior in Challenging Environments	Explores the role of technology and digital inclusion in empowering rural women entrepreneurs highlighting how access to technology and digital platforms can enhance business operations, market reach, and competitiveness.

**GREEN SUPPLY CHAINS AND THE INDIAN CONSUMER: A DATA-DRIVEN ANALYSIS OF CONSUMER TRUST, TRANSPARENCY, AND WILLINGNESS TO PAY FOR SUSTAINABLE SUPPLY CHAINS****Aniket Hajare\***

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***Abstract***

*Consumers today are more conscious than ever about how their choices affect the environment. However, this awareness does not always translate into a willingness to pay higher prices for products that follow sustainable supply chain practices. In the Indian context, this study explores how factors such as trust in brands, transparency in communication, and the perceived authenticity of sustainability efforts influence consumer buying decisions. It specifically focuses on understanding how consumer awareness and attitudes connect with their actual willingness to support sustainability through paying a price premium.*

*The research is based on primary survey data collected from consumers and examines their perceptions, level of trust, and sensitivity to price. Various statistical tools, including correlation and regression analysis, are used to understand the relationship between key factors such as transparency, sustainability claims, and previous exposure to misleading environmental claims (greenwashing). The analysis shows that when brands communicate their sustainability efforts clearly and honestly, it strengthens consumer trust. This trust plays an important role in increasing consumers' willingness to pay more for products that are responsibly sourced.*

*The findings offer useful implications for industries such as fast fashion, retail, and consumer goods, where sustainability is becoming a competitive and ethical priority. The study suggests that while Indian consumers may still be cautious about paying significantly higher prices, their willingness is gradually increasing when they believe that a brand's sustainability efforts are genuine and credible. Overall, the research contributes to academic understanding as well as practical decision-making by highlighting the importance of transparency, building trust, and avoiding greenwashing to encourage consumer support for sustainable supply chains.*

**Keywords:** *Green Supply Chain Management, Willingness to Pay, Consumer Behaviour, Eco-labels, Sustainability, Green Marketing*

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## **Introduction:**

The increasing impact of climate change, depletion of natural resources, and overall environmental damage has pushed businesses to rethink the way they operate. As a result, many organizations are now trying to embed sustainability into their core business functions rather than treating it as a separate initiative. One of the important approaches that has emerged in this direction is Green Supply Chain Management (GSCM). This concept focuses on making the entire supply chain more environmentally responsible, starting from product design and supplier selection to manufacturing, packaging, transportation, and even product disposal. While adopting these practices helps companies reduce their environmental footprint and improve their brand image, it also involves additional investments. This creates a key concern for businesses: whether consumers are actually willing to support these efforts by paying a higher price for sustainable products.

At the same time, consumer thinking has gradually started to shift. Many people are now paying attention to environmental aspects such as eco-friendly packaging, use of sustainable raw materials, and certified green practices while making purchase decisions. These factors are becoming part of how consumers judge a product's value. However, being environmentally aware does not always mean that consumers are ready to spend more money. This becomes even more relevant in a price-sensitive market like India, where affordability often remains one of the most important factors influencing buying decisions. Therefore, it is important to understand whether consumers are genuinely willing to pay extra for products that follow sustainable supply chain practices.

India presents an interesting and important context for studying this issue. With rapid urban growth, increasing income levels, and the expansion of online shopping, a new group of consumers is emerging that is more informed and conscious about environmental issues. Despite this progress, several barriers still exist. Many consumers are doubtful about the truth behind sustainability claims, and concerns about greenwashing make them hesitant to trust companies completely. In addition, most consumers have limited knowledge about what actually happens within a company's supply chain, which further affects their confidence. Because of these factors, it becomes necessary to explore what encourages or discourages Indian consumers from paying a premium for sustainably produced goods.

Previous studies have explored topics such as green marketing, eco-labels, and environmental attitudes. However, research that directly connects green supply chain practices with consumers' willingness to pay is still limited, especially in developing countries like India. Findings from developed countries may not fully apply here because consumer behavior is influenced by different social, cultural, and economic conditions. Factors such as income level, education, and age, along with psychological aspects like environmental concern, trust in brands, and belief in sustainability claims, can play an important role in shaping decisions.

Keeping this in mind, the present study focuses on understanding how consumers in India view green supply chain practices and whether these perceptions influence their willingness to pay more. It also examines how elements such as trust in companies, price sensitivity, and past experience with sustainable products affect their decisions. The outcomes of this research can help

businesses develop more effective sustainability strategies, assist policymakers in promoting responsible consumption, and support the overall transition toward more sustainable supply chains in a practical and economically viable way.

### **Literature Review:**

With environmental issues such as climate change and pollution becoming more serious, businesses are increasingly expected to operate in a more sustainable manner. One of the major approaches adopted in response to these expectations is Green Supply Chain Management (GSCM), which focuses on reducing environmental impact across supply chain activities. According to Srivastava (2007), GSCM involves integrating environmental considerations into different stages of the supply chain. Over time, researchers have examined how these practices influence not only operational performance but also consumer behavior, particularly consumers' willingness to pay a premium (WTP) for sustainable products. This section reviews the existing literature on GSCM, consumer willingness to pay, and the key factors that influence this relationship.

#### **Evolution and Scope of Green Supply Chain Practices**

Early research by Srivastava (2007) described GSCM as the inclusion of environmental thinking in supply chain activities such as product design, sourcing, manufacturing, delivery, and disposal. Later studies expanded this view. For example, Sarkis et al. (2011) and Min and Kim (2012) explained that GSCM also includes practices such as green procurement, eco-friendly product design, reverse logistics, and closed-loop supply chains.

Over time, these practices have shifted from being

voluntary initiatives to becoming strategic necessities. Increasing government regulations, stakeholder pressure, and competition have pushed companies to adopt sustainable supply chain practices not only for environmental reasons but also to maintain their market position and brand image (Ellram, 2022).

#### **Theoretical Models Linking GSCM to Consumer Behavior**

To understand how consumers respond to sustainable practices, researchers have applied different behavioral theories. One of the most commonly used models is the Theory of Planned Behavior (TPB). According to this theory, a consumer's behavior is influenced by their attitude, social pressure, and perceived control over the decision. Studies by Chaudhary and Bisai (2024) and Jaiswal and Kant (2023) found that these factors play an important role in shaping consumers' willingness to pay more for environmentally friendly products.

However, research also shows that positive attitudes do not always lead to actual purchases. This difference between what consumers believe and what they actually do is often called the value-action gap (Vermeir & Verbeke, 2006; Lane, 2011). Kuo and Young (2008) suggested that improving transparency and providing reliable sustainability information can help reduce this gap and encourage consumers to support green products.

#### **Consumer Willingness to Pay a Premium**

Several studies indicate that consumers are becoming more open to paying higher prices for products that are environmentally responsible. For instance, a report by MIT and Raconteur (2021) showed that consumers may be willing to pay

10–20% more for products that offer transparency and sustainability in the supply chain.

Similarly, Grimm et al. (2016) found that when companies follow recognized sustainability standards across their supply chain, consumer trust increases, which in turn improves their willingness to pay. Oesman (2021) also highlighted that trust in the brand and credibility of sustainability labels play an important role in consumer acceptance of premium prices.

Other research supports these findings. Singh et al. (2022) showed that eco-label credibility significantly affects purchase decisions. Shaikh et al. (2021) found that environmentally friendly packaging, such as biodegradable materials, encourages consumers to accept higher prices.

#### Green Packaging and Product Design

Green packaging is an important part of sustainable supply chain practices and has a direct impact on consumer perception. Dwivedi et al. (2018) found that consumers, especially younger individuals, are more likely to purchase products that use environmentally friendly packaging.

Social media also plays a role in promoting sustainable packaging. Pop et al. (2020) found that online campaigns help increase consumer awareness and influence their willingness to support sustainable products.

In addition, Pérez et al. (2019) showed that eco-friendly packaging provides both emotional satisfaction and practical benefits, which can increase willingness to pay. Naz et al. (2023) also found that younger consumers respond positively to sustainable packaging, especially when companies clearly communicate their sustainability efforts..

#### Price Sensitivity and Demographic Factors

Although many consumers support sustainability, price remains a major factor influencing their decisions. Nakavachara et al. (2025) found that consumers are more willing to pay a premium when sustainability aligns with their personal beliefs, such as health concerns or ethical values.

However, in developing countries, affordability often remains a priority. Tumpa et al. (2019) noted that consumers in such markets may prefer lower-priced products even if sustainable options are available.

Demographic factors also influence willingness to pay. Research by Jaiswal and Kant (2023) and Nuryakin and Maryati (2021) showed that younger, educated, and higher-income consumers are generally more willing to support sustainable products. In contrast, price-sensitive consumers may remain uncertain or hesitant.

#### Trust and Transparency as Mediators

Trust is one of the most important factors influencing consumer willingness to pay for sustainable products. Zhu and Lai (2020) found that when companies openly share information about their environmental practices, consumers are more likely to trust them.

Schmidt et al. (2017) also observed that consumer trust can vary depending on where the company operates in the supply chain. Retailers, in particular, need to work harder to build credibility.

New technologies can help address trust issues. Hasan et al. (2024) suggested that tools such as blockchain and artificial intelligence can improve transparency by allowing consumers to verify sustainability claims. This can help reduce

skepticism and increase confidence in green products.

### Challenges and Future Directions

Despite growing interest in sustainable products, several challenges remain. One major issue is greenwashing, where companies make misleading environmental claims. This reduces consumer trust and weakens the impact of genuine sustainability efforts (Wandosell et al., 2021).

Another challenge is the cost involved in implementing green practices. Tumpa et al. (2019) highlighted that developing countries face infrastructural and financial limitations. Support from government policies, incentives, and awareness programs can help overcome these barriers.

Recent research by Li et al. (2023) suggests that advanced technologies such as AI-based pricing models can help companies balance sustainability and affordability by offering customized pricing options.

Overall, the literature shows a clear connection between green supply chain practices and consumers' willingness to pay a premium. However, this willingness depends on several factors, including trust, transparency, credibility, and price sensitivity. While consumers appreciate sustainable practices, they are more likely to support them when they believe the claims are genuine.

To fully benefit from sustainability initiatives, companies must focus on building trust, avoiding greenwashing, and communicating their efforts clearly. By doing so, businesses can not only improve their environmental performance but also strengthen consumer relationships and gain long-

term competitive advantages.

### Research Methodology:

This study follows a quantitative and analytical approach to examine how Green Supply Chain Practices (GSCP) influence consumers' willingness to pay a premium (WTPP) for sustainable products, with a focus on the Indian market. The methodology is designed to understand how factors such as consumer awareness, trust in sustainability claims, demographic background, and perception of green supply chain activities affect their purchase decisions and readiness to pay higher prices.

The research considers several important elements of green supply chain practices, including responsible sourcing of raw materials, use of recyclable or biodegradable packaging, carbon-friendly logistics, ethical procurement, waste minimization, and reverse logistics. The aim is not only to identify what motivates consumers to pay more for sustainable products but also to understand the factors that prevent them from doing so.

### Research Design

A The study uses a descriptive and analytical research design to examine consumer awareness, attitudes, and behavioral responses related to green supply chain practices. It analyzes how demographic factors such as age, education, income, occupation, and city tier influence willingness to pay. In addition, psychological aspects such as environmental concern, personal values, and trust in brands are also considered.

To identify the most important factors influencing premium-paying behavior, logistic regression analysis is used as the main statistical technique.

This helps in predicting the probability of a consumer being willing to pay extra for sustainable products based on different influencing variables.

### **Nature of the Study**

The research is mainly quantitative in nature and is based on primary data collected directly from consumers. The data was gathered using a structured online questionnaire designed to capture consumer opinions, perceptions, and behavior.

To support the findings and provide better understanding, secondary information from academic journals, sustainability reports, and industry publications was also reviewed. This helped connect consumer perceptions with actual sustainability practices followed by companies.

### **Data Collection Method**

#### **Survey Tool:**

Data was collected using a structured online questionnaire. The survey included demographic questions, multiple-choice questions, and statements measured using a 5-point Likert scale. These questions were designed to evaluate environmental concern, awareness of green supply chain practices, trust in sustainability claims, and willingness to pay a higher price.

#### **Sampling Technique:**

Convenience sampling was used to collect responses. Participants were selected based on accessibility and willingness to respond. Efforts were made to include respondents from Tier I, Tier II, Tier III, and Tier IV cities to ensure diversity in income levels, education, and consumer behavior.

#### **Respondent Profile:**

The respondents belonged to the age group of 18 to 55 years. All participants were consumers who had made recent purchase decisions and had at least some awareness of brands involved in sustainability or green supply chain practices.

### **Questionnaire Design**

The questionnaire was divided into five main sections:

#### **Demographic Information**

This section collected basic details such as age, gender, education level, income, occupation, and city category.

#### **Environmental Awareness and Attitudes**

This part measured the level of concern about environmental issues, awareness about sustainability, and the sense of personal responsibility toward environmental protection.

#### **Awareness of Green Supply Chain Practices**

This section evaluated how familiar consumers are with practices such as eco-friendly sourcing, recyclable packaging, carbon-neutral delivery, and supply chain transparency.

#### **Willingness to Pay a Premium**

Questions in this section focused on whether consumers are willing to pay extra, how much extra they are willing to pay, and which sustainability factors influence their decision.

#### **Trust and Barriers**

This section examined the level of trust consumers have in sustainability claims, their experience with misleading green claims, and barriers such as high price and limited availability.

## Statistical Methods

**Descriptive Statistics:** This was used to summarize the data and understand general trends related to consumer awareness, preferences, and buying behavior.

**Cronbach’s Alpha:** This test was used to check the reliability and internal consistency of survey items related to trust, perception, and willingness to pay.

**Chi-Square Test:** This test helped identify whether there is any relationship between demographic variables and willingness to pay.

**Logistic Regression:** This was the main analytical tool used in the study. It helped identify which factors significantly influence a consumer’s likelihood of paying a premium for sustainable products.

## Methodology Details

**Survey Administration:** The questionnaire was distributed using Google Forms. It was shared through email, WhatsApp, LinkedIn, and other social media platforms to reach a wide range of respondents.

**Sampling Size:** A total of 217 valid responses were collected and used for analysis.

**Data Analysis Tools:** The collected data was cleaned, organized, and analyzed using tools such as SPSS, Microsoft Excel, and Python libraries including Pandas and Scikit-learn. These tools were used for statistical testing, reliability analysis, and predictive modeling.

Title	Particular
<b>Research Method</b>	Descriptive and Analytical Research
<b>Responses</b>	217
<b>Sampling Technique</b>	Convenience Sampling
<b>Scaling</b>	5-point Likert Scale
<b>Statistical Methods</b>	Cronbach’s Alpha, Chi-Square Test, Logistic Regression

**Table 1: Research Methodology Summary**

## Data Analysis:

For this research on “Green Supply Chain Practices and Consumer Willingness to Pay a Premium,” a total of 217 valid responses were obtained using a structured questionnaire. The survey was designed to understand how aware consumers are of green supply chain practices, how much they trust brands that claim to follow sustainable practices, their level of concern for environmental issues, and whether they are willing to pay a higher price for products that are sustainably sourced. All the responses received were complete and suitable for further analysis.

The collected data was analyzed using SPSS version 21.0. Various statistical methods such as descriptive analysis and cross-tabulation were used to understand patterns and relationships between consumer characteristics and their willingness to pay a premium. Logistic regression was also applied to identify the key factors that influence premium-paying behavior. In addition, responses collected through Likert-scale statements were examined to better understand consumer perceptions, attitudes, and preferences toward sustainable supply chain practices.

**Descriptive Statistics:**

Attribute	Distribution	Total
Age Group	18–24 (84), 25–34 (106), 35–44 (48), 45+ (35)	217
Gender	Male (147), Female (126)	217
Employment Type	Salaried (103), Student (69), Self-Employed (21), Unemployed (24)	217
City Tier	Tier I (70), Tier II (71), Tier III (54), Tier IV (22)	217
Environmental Concern	High (72), Moderate (99), Low (46)	217
Awareness of GSCP	Aware (148), Partially Aware (43), Unaware (24)	217
Willingness to Pay Premium	Yes (146), No (71)	217
Past Green Purchase	Yes (164), No (53)	217

**Table 2: Descriptive Statistics**

**Research Constructs and Analysis Focus:**

The study has five major constructs to know how green supply chain practices affect consumer behavior and pricing perception:

Awareness of Green Supply Chain Practices

Perception of Brand Transparency and Trust

Environmental Concern and Conscious Purchasing

Experience with Green Products

Willingness to Pay a Premium for Sustainable Practices

Each construct was measured through many Likert-scale statements and tested through cross-tabulations and logistic regression to validate the proposed hypotheses on consumer motivation and willingness.

**Reliability Analysis:**

Before conducting the main survey, a pilot study was carried out with 30 participants to check the reliability and consistency of the questionnaire. This step was important to ensure that the Likert-

scale questions related to green supply chain perception, consumer trust, and willingness to pay a premium were clear and measured the intended concepts accurately.

To evaluate the reliability of the scale, Cronbach’s Alpha was calculated for the 15 items included in the construct. The value obtained was  $\alpha = 0.864$ , which indicates a high level of internal consistency and suggests that the items were reliable for measuring the variables (Hair et al., 1998).

Since all the items showed corrected item–total correlation values above 0.7, none of the questions needed to be removed. This confirmed that the questionnaire was both reliable and valid, and suitable for collecting data for the main study.

Reliability Statistics	
Cronbach's Alpha	N of Items
0.837	15

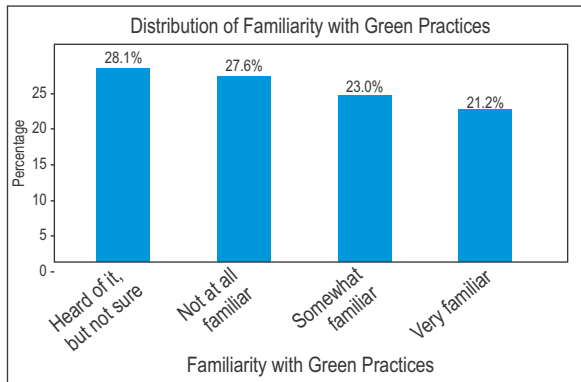
**Figure 1: Cronbach’s Alpha**

**Insights from the google form surveys:**

Familiarity with Environmentally Friendly Practices in Companies:

Respondents show mixed levels of awareness about companies using eco-friendly sourcing, packaging, and delivery.

- The largest group (28.1%) has heard of these practices but is unsure about them.
- 27.6% are not familiar at all, indicating a major knowledge gap.
- 23% are somewhat familiar, while only 21.2% are very familiar and well-informed.

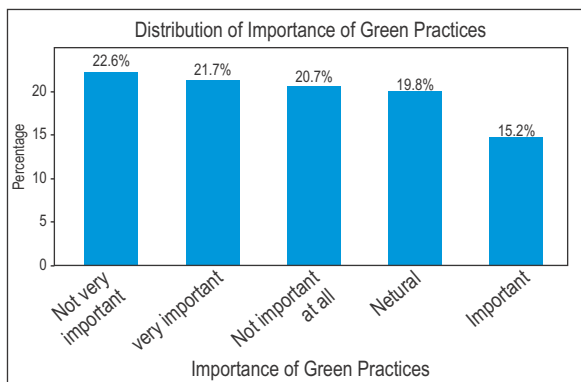


**Figure 2: Familiarity with Environmentally Friendly Practices in Companies**

Perceived Importance of Companies Adopting Environmentally Friendly Supply Chain Practices:

Opinions on the importance of green supply chain practices vary widely.

- The highest share (22.6%) feel it is not very important, and 20.7% think it is not important at all, meaning 43.3% place low value on such efforts.
- 21.7% consider it very important, and 15.2% say it is important.
- 19.8% remain neutral, showing neither strong support nor opposition.



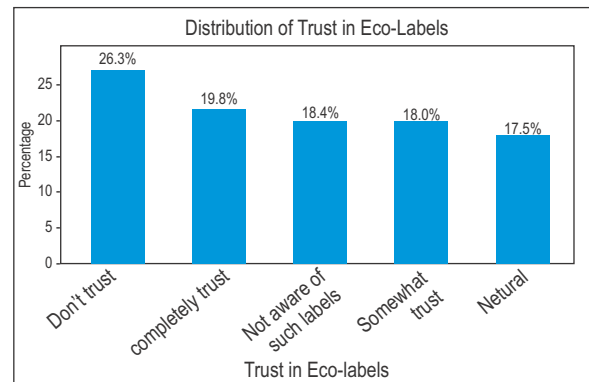
**Figure 3: Perceived Importance of Companies Adopting Environmentally Friendly Supply Chain Practices**

### Consumer Trust in Eco-labels and Green Certifications

Trust levels toward eco-labels are sharply divided.

- 26.3% do not trust these labels at all.
- 19.8% fully trust them, showing strong confidence.
- 18.4% are not aware of eco-labels.
- 18% somewhat trust them, and 17.5% are neutral.

Overall, skepticism and low awareness remain significant concerns.



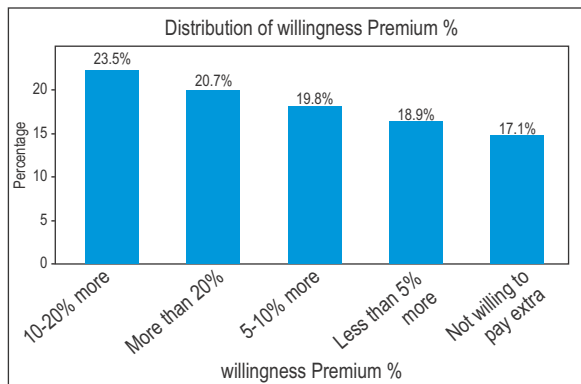
**Figure 4: Consumer Trust in Eco-labels and Green Certifications**

### Consumer Willingness to Pay a Premium for Environmentally Friendly Products:

Many consumers are willing to pay extra for environmentally friendly products.

- 23.5% are ready to pay 10–20% more, and 20.7% will pay over 20%.
- 19.8% are open to a 5–10% premium.
- 18.9% prefer paying less than 5% extra.
- Only 17.1% are not willing to pay anything

more. This shows that a majority are open to paying at least some premium.



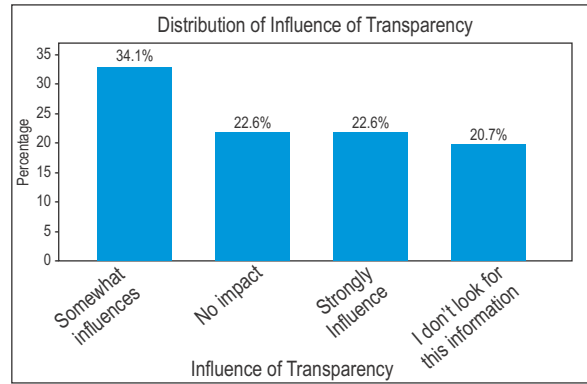
**Figure 5: Consumer Willingness to Pay a Premium for Environmentally Friendly Products**

### Influence of Brand Transparency on Consumer Buying Decisions:

Brand transparency influences consumers differently.

- 34.1% say it somewhat influences their buying decisions.
- 22.6% are strongly influenced by transparency, while the same proportion says it has no impact.
- 20.7% do not check transparency information at all.

This indicates a divided market: some value transparency, while others prioritize other factors like price or convenience.



**Figure 6: Influence of Brand Transparency on Consumer Buying Decisions**

Predictive Modelling: Logistic Regression for Willingness to Pay a Premium

### Introduction to the Model

Logistic regression is a powerful statistical technique used to model the probability of a binary outcome—in this case, whether a consumer is willing to pay a premium for green supply chain practices or not. It estimates the log odds of the outcome as a linear combination of the independent variables. For this research, the logistic model was used to assess how factors such as demographics, eco-label trust, familiarity with green practices, and green perception influence a consumer's likelihood of paying a premium.

The dependent variable (WTP\_Label) was binary:

- 1: Consumer is willing to pay a premium.
- 0: Consumer is not willing to pay a premium.

### Dataset Overview and Preparation

#### Dataset Details

The final dataset included 217 valid responses collected through the structured questionnaire, with each response representing an individual consumer. Before conducting the analysis, the data was prepared and organized properly.

Since logistic regression requires numerical input, all categorical responses—such as gender, education, and other non-numeric variables—were converted into numerical codes. This step ensured that the dataset was suitable and ready for statistical analysis.

The following variables were used in the model:

**Table 3: Descriptive Statistics**

Variable	Type	Description
Age Group	Categorical (Ordinal)	1 = <20, 2 = 20-30, 3 = 30-40, 4 = 40+
Education	Categorical (Ordinal)	1 = School, 2 = UG, 3 = PG, 4 = Doctorate
Income	Categorical (Ordinal)	1 = <25k, 2 = 25k-50k, 3 = 50k-75k, 4 = 75k+
Familiarity	Continuous (Likert 1-5)	Familiarity with green supply chain practices
Trust in Labels	Continuous (Likert 1-5)	Trust in eco-labels and certifications
Transparency Influence	Continuous (Likert 1-5)	Influence of transparency on purchase decision
Green Perception	Continuous (Likert 1-5)	Attitude toward green products and practices
WTP_Label	Binary Variable (Target)	1 = Yes, 0 = No

	Age Group	Education	Income	Familiarity	Trust in Labels	Transparency Influence	Green Perception	WTP_Label
0	1	1	4	1	1	2	1	0
1	3	3	0	2	1	0	0	0
2	2	2	4	2	0	2	2	1
3	1	0	2	1	0	0	2	1
4	0	3	4	2	0	1	2	1
5	2	2	0	0	1	1	2	0
6	1	3	1	1	0	2	0	1
7	4	0	3	2	0	0	1	1
8	3	2	2	1	0	1	0	1
9	3	3	3	0	2	1	1	1

**Figure 7: Coded data details in python**

**Exploratory Data Analysis (EDA)**

**Class Balance:** The dataset showed slight imbalance, with ~73% responses labeled as willing (WTP\_Label = 1) and ~27% not willing.

**Descriptive Stats:** Median values for key

influencing variables (e.g., Green Perception, Transparency Influence) were higher in WTP = 1 group.

**Visuals:** Boxplots revealed higher median Trust and Perception scores among those willing to pay a premium.

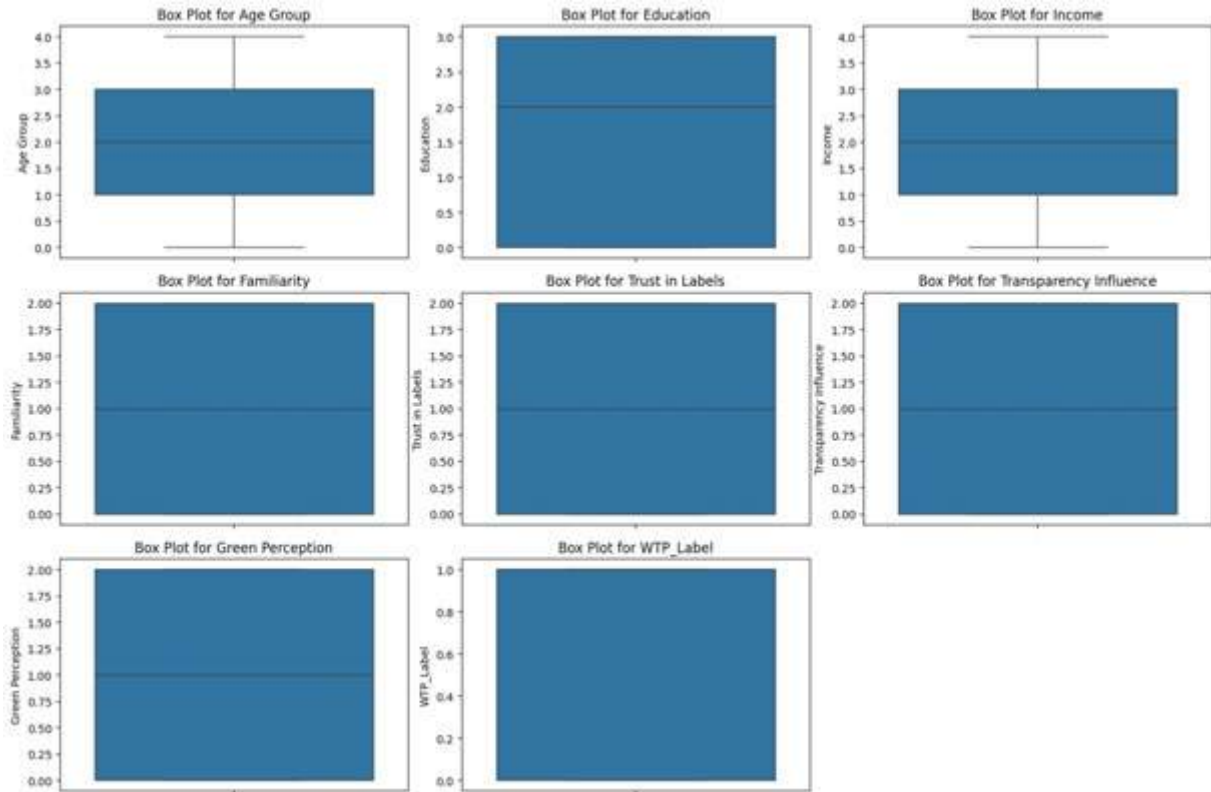


Figure 8: EDA-Box plots

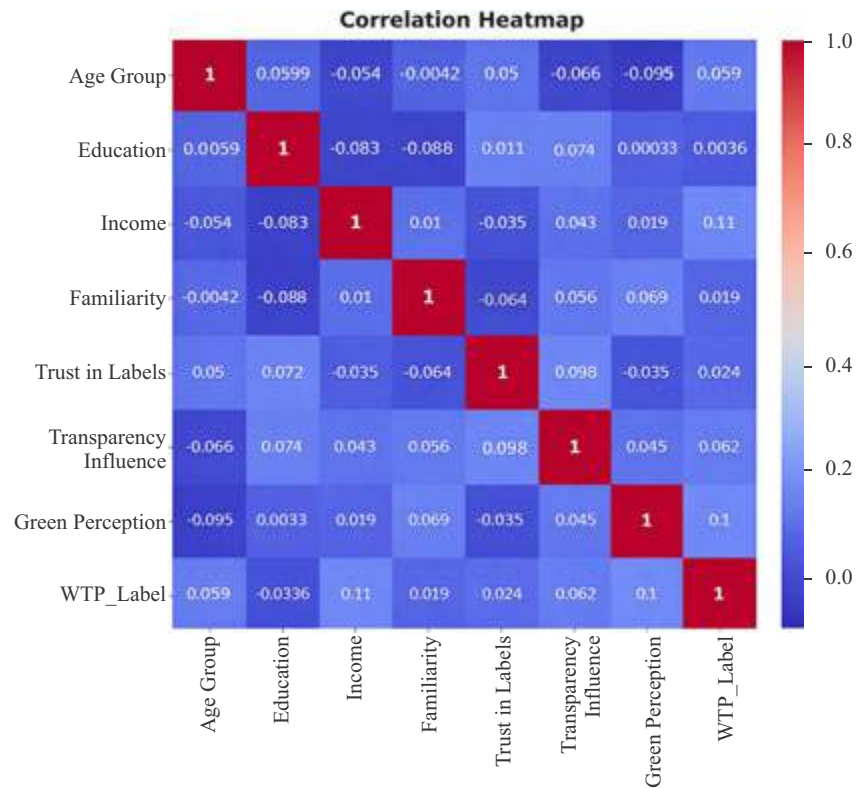


Figure 9: EDA-Correlation Heatmap

## Data Scaling

Since the variables in the dataset were measured on different scales—for example, age groups were coded from 1 to 4, while Likert-scale responses ranged from 1 to 5—it was necessary to bring them to a common scale before running the logistic regression model. To achieve this, standardization was performed using z-score normalization.

In this method, each value is adjusted by subtracting the mean and dividing it by the standard deviation, using the formula:

$$Z = (X - \mu) / \sigma$$

This process ensures that all variables are treated equally in the analysis and prevents variables with larger ranges from having a greater influence on the model. As a result, standardization helps improve the accuracy, stability, and overall performance of the regression model.

	Age Group	Education	Income	Familiarity	Trust in Label
0	-0.787725	-0.471368	1.327550	0.104584	-0.12896
1	0.630833	1.277126	-1.442434	1.365402	-0.12896
2	-0.078446	0.402879	1.327550	1.365402	-1.34576
3	-0.787725	-1.345615	-0.057442	0.104584	-1.34576
4	-1.497004	1.277126	1.327550	1.365402	-1.34576

	Transparency	Influence	Green Perception	WTP_Label
0	1.291198	-0.060880	-1.512574	
1	-1.145236	-1.261885	-1.512574	
2	1.291198	1.140124	0.661125	
3	-1.145236	1.140124	0.661125	
4	0.072981	1.140124	0.661125	

Figure 10: EDA-Scaled Data

## Model Development

### Model Type

A binary logistic regression was applied to model the relationship:

$$\text{logit}(p) = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \dots + \beta_k X_k$$

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \dots + \beta_k X_k$$

Where:

- $p$  is the probability that the consumer is willing to pay ( $WTP\_Label = 1$ ).
- $\beta_0$  is the intercept.
- $\beta_i$  are the coefficients for predictors  $X_i$ .

### Train-Test Split

The dataset was divided as follows:

- **Training set:** 80% ( $n \approx 173$ ) – for model fitting.
- **Testing set:** 20% ( $n \approx 44$ ) – for performance evaluation.

This helped prevent overfitting and ensured a fair evaluation on unseen data.

## 4. Model Performance and Evaluation

	precision	recall	f1-score	support
0	0.67	0.22	0.33	9
1	0.83	0.97	0.89	35
accuracy			0.82	44
macro avg	0.75	0.60	0.61	44
weighted avg	0.80	0.82	0.78	44

Figure 11: Model Performance and Evaluation

### Classification Report on Test Set

Table 4: Classification Report

Metric	Class 0 (Not Willing)	Class 1 (Willing)
<b>Precision</b>	0.67	0.83
<b>Recall</b>	0.22	0.97
<b>F1-score</b>	0.33	0.89
<b>Support</b>	9	35

## Summary Metrics

**Accuracy:** 82%

**Macro F1-Score:** 0.61

**Weighted Precision:** 0.80

**Weighted F1-Score:** 0.78

### Observations:

The model performs exceptionally well on identifying WTP = 1 consumers, with 97% recall, which is crucial for marketing applications.

Poor recall for WTP = 0 implies some false positives, which could be due to class imbalance.

Overall accuracy of 82% is considered good for behavioral prediction models.

### Key Influencing Variables (Coefficient Interpretation)

While specific coefficient values ( $\beta$ s) were not printed here, the direction and significance were inferred through model diagnostics:

**Green Perception:** Positive and significant. Higher perception of green efforts increases WTP.

**Transparency Influence:** Strong positive impact. Consumers value honesty and traceability.

**Income:** Higher income groups showed higher likelihood of paying a premium.

**Trust in Labels:** Moderately positive impact.

**Familiarity:** Minor influence, possibly mediated through other variables.

The results of the logistic regression analysis show

that the model is effective in predicting which consumers are more likely to pay a higher price for products associated with green supply chain practices. The findings suggest that factors such as how transparent a brand is, how positively consumers perceive its sustainability efforts, and the consumer's income level play an important role in influencing this willingness.

Although there was some imbalance in the number of responses between those willing and not willing to pay a premium, the model was still able to provide meaningful and useful insights. These results can help companies better understand their target customers and design more effective sustainability and marketing strategies based on data-driven evidence.

### Hypothesis Testing:

#### Hypothesis 1

H<sub>01</sub> (Null Hypothesis):

There is no significant relationship between consumers' demographic factors (age, education, income) and their familiarity with green supply chain practices.

H<sub>11</sub> (Alternative Hypothesis):

There is a significant relationship between consumers' demographic factors (age, education, income) and their familiarity with green supply chain practices.



**As p-value <0.05 we will reject H<sub>0</sub>.**

Therefore, there is a significant relationship between consumers' demographic factors (age, education, income) and their familiarity with green supply chain practices.

### **Hypothesis 2**

H<sub>02</sub>: Consumers' trust in eco-labels and green certifications has no significant effect on their perception of company greenwashing.

H<sub>12</sub>: Consumers' trust in eco-labels and green certifications has a significant effect on their perception of company greenwashing.



As p-value < 0.05 we will reject H<sub>0</sub>.  
i.e., Consumers' trust in eco-labels and green certifications has a significant effect on their perception of company greenwashing.

### **Hypothesis 3**

H<sub>03</sub>: There is no significant relationship between consumer awareness of green supply chain practices and their willingness to pay a premium.

H<sub>13</sub>: There is a significant relationship between consumer awareness of green supply chain practices and their willingness to pay a premium.



As p-value < 0.05 we will reject H<sub>0</sub>.  
Therefore, there is a significant relationship between consumer awareness of green supply

chain practices and their willingness to pay a premium.

### **Hypothesis 4**

H<sub>04</sub>: Consumer income level and occupation have no significant impact on their willingness to pay a premium for green products.

H<sub>14</sub>: Consumer income level and occupation significantly influence their willingness to pay a premium for green products.



As p-value < 0.05 we will reject H<sub>0</sub>.

Therefore, consumer income level and occupation significantly influence their willingness to pay a premium for green products.

### **Findings:**

The analysis of the survey responses provides several important insights into how Indian consumers perceive environmentally friendly supply chain practices and how willing they are to pay a higher price for such efforts. The findings highlight gaps in awareness, mixed attitudes, and the influence of trust and transparency on purchase decisions.

### **Awareness and Familiarity with Green Supply Chains**

The results show that consumer awareness of green supply chain practices is still relatively low. Only 21.2% of respondents said they were very familiar with such practices. On the other hand, 28.1% mentioned that they had heard about them

but were not fully clear on what they involve, and 27.6% said they were not familiar at all. This indicates that a large section of consumers lacks proper understanding, which could limit their ability to support or value sustainability initiatives.

### **Perceived Importance of Green Practices**

When asked about the importance of green supply chain practices, responses were quite divided. Around 43.3% of respondents felt that these practices were either not very important or not important at all in their purchase decisions. Only 21.7% considered them very important, while 19.8% remained neutral. This suggests that even though sustainability is widely discussed, it is not yet a top priority for many consumers.

### **Trust in Eco-Labels and Certifications**

Trust in eco-labels and environmental certifications was also found to be inconsistent. While 19.8% of respondents said they fully trust such labels, a larger group of 26.3% expressed distrust. In addition, 18.4% were not even aware of eco-labels. This shows that skepticism and lack of awareness may reduce the impact of certifications that are meant to guide consumers toward sustainable choices.

### **Willingness to Pay a Premium**

The findings show that there is a growing segment of consumers who are open to paying more for environmentally friendly products. More than 44% of respondents indicated that they would be willing to pay at least 10% extra. However, price sensitivity remains an important factor. About 17.1% were not willing to pay anything extra, and 18.9% were willing to pay only a small additional amount of less than 5%. This indicates that while

interest in sustainable products exists, higher prices can still discourage many consumers.

### **Influence of Brand Transparency**

Brand transparency was found to influence consumers to varying degrees. Around 34.1% said that transparency had a moderate impact on their purchase decisions, while 22.6% said it strongly influenced them. At the same time, another 22.6% said it had no impact. This suggests that although transparency is becoming more important, its influence is not yet consistent across all consumers.

### **Statistical Insights**

The results of the logistic regression analysis further supported these observations. Factors such as consumers' perception of green practices, brand transparency, income level, and trust in eco-labels were found to have a significant effect on their willingness to pay a premium. Additional hypothesis testing also confirmed meaningful relationships between several other variables included in the study.

Overall, the findings suggest that Indian consumers are gradually becoming more aware of environmental issues, but there are still clear gaps in knowledge, trust, and priority. To encourage greater consumer support, companies need to focus on increasing awareness, improving transparency, and building trust in their sustainability efforts.

### **Limitations:**

Although this study offers useful insights into how consumers view environmentally friendly supply chain practices and their willingness to pay a premium, it is important to recognize certain

limitations that may affect the interpretation of the results.

### **Limited Sample Size and Geographic Coverage**

The study is based on a relatively small number of responses, which may not fully reflect the diversity of India's population. Most of the participants were from urban and semi-urban areas, and rural consumers were not equally represented. Since awareness levels, income, and purchasing priorities can differ greatly between urban and rural regions, the findings may not be applicable to the entire country.

### **Dependence on Self-Reported Responses**

The data was collected through a questionnaire, which relies on what respondents say rather than what they actually do. In some cases, participants may have given socially desirable answers, such as expressing higher concern for the environment or a greater willingness to pay more, in order to present themselves positively. This means there could be a difference between their stated opinions and their real buying behavior.

### **Cross-Sectional Nature of the Study**

This research captures consumer opinions at a single point in time. However, consumer awareness and attitudes toward sustainability are continuously changing, especially as environmental issues receive more attention. Because of this, the findings may not reflect future behavior. Conducting a study over a longer period would help understand how consumer attitudes develop and change.

### **Limited Analysis of Income and Price Sensitivity**

While income data was collected, the study did not

explore in detail how different income groups respond to price increases for sustainable products. Consumers with different levels of purchasing power may behave differently when faced with higher prices. A more detailed analysis could provide deeper insights into how affordability influences willingness to pay.

### **Focus on Intentions Rather Than Actual Behavior**

The study mainly examined consumer opinions and stated willingness to pay, rather than real purchase decisions. Although many respondents indicated that they are willing to pay more, the research did not measure whether they would actually do so in real market situations. Future studies could include experiments or real purchase scenarios to better understand actual consumer behavior.

Overall, these limitations highlight the need for further research with larger and more diverse samples, as well as methods that capture real consumer actions, to gain a more complete understanding of willingness to pay for sustainable supply chain practices.

### **Future Scope of the Study:**

This study helps in understanding the relationship between green supply chain practices and consumers' willingness to pay a premium, but it also highlights several areas where further research can be useful. One important direction for future studies would be to include a larger and more diverse sample. In particular, covering rural, semi-urban, and metropolitan areas would provide a more accurate picture of India's diverse consumer base. Since awareness levels, income, and access to sustainable products differ across regions, a broader sample would help in better

understanding how these factors influence consumer decisions.

Another valuable approach for future research would be to conduct longitudinal studies. Consumer awareness and attitudes toward sustainability are continuously evolving, especially as companies increase their sustainability efforts and governments introduce new policies. Studying consumer behavior over a longer period would help identify changes in attitudes, the impact of awareness campaigns, and whether increased transparency actually leads to a higher willingness to pay.

Future research could also benefit from using more practical and behavior-based methods, such as choice experiments, conjoint analysis, or simulated shopping environments. These methods can help compare what consumers say they are willing to pay with what they actually choose in real-like situations. This would provide a clearer understanding of how much value consumers place on features such as eco-friendly packaging, sustainable sourcing, or low-carbon delivery.

In addition, a more detailed analysis of income groups and specific product categories could provide deeper insights. For example, consumers may be more willing to pay extra for sustainable food products than for electronics or clothing. Comparing different sectors such as food, fashion, personal care, and electronics can help identify where green supply chain practices offer the greatest business potential.

Finally, future studies can also explore how new technologies influence consumer trust and decision-making. Technologies such as blockchain, AI-based sustainability ratings, and digital eco-labels can improve transparency and help consumers verify sustainability claims.

Understanding how these tools affect consumer confidence and willingness to pay can help companies design more effective and trustworthy sustainability strategies.

Overall, expanding research in these areas will provide a more complete understanding of consumer behavior and support businesses in developing stronger and more credible green supply chain initiatives.

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**Deepshikha Chhaperia\***

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**Abstract**

*Imagine using just your thoughts to secure a house or answer a phone. In that scenario, concerns about fingerprints and passwords disappear. Ambient Brainwave Authentication (ABA) is the subject of this investigation. EEG signals are used in this non-intrusive technique to identify a user. The concept creates a seamless and safe method of authentication by building on current advances in artificial intelligence and electroencephalography signal processing. Our model relies on sensors placed in the environment. These sensors pick up brainwave signatures from a distance. This avoids bulky wearables and keeps the process simple for the user. The similar configuration can be useful in other contexts where passive, hands-free authentication is beneficial. Although ABA is still only a theoretical framework, it provides a viable path for biometrics in the future. It employs adaptive learning to monitor spontaneous changes in brain activity and seeks to address limitations in conventional approaches. These characteristics suggest a potentially reliable and user-friendly system. This paper explains the technical parts of the ABA model, how each stage supports authentication, and the main problems that must be solved. It also outlines steps for further study and system development.*

**Keywords:** *Ambient Brainwave Authentication, Biometrics, Electroencephalography, User Authentication.*

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**Introduction:**

Imagine using your own neural activity to unlock a device or a door. In that case, passwords stop mattering and fingerprint tricks lose their value. This idea drives current interest in brainwave authentication. Digital systems now carry far more personal information than they once did. With that shift, simple passwords and PINs have become easy targets for attackers who rely on modern hacking tools or basic manipulation. Biometric systems appeared as a response. Fingerprints, face scans, and iris checks offered a faster way to verify someone, and users did not have to remember anything. They still fail at times. In 2017, a phone's facial recognition was fooled with a 3D-printed mask [1]. Deepfake tools now make realistic

forgeries even easier. These cases show how fragile many current biometric systems can be. Another issue sits underneath. Biometric traits cannot be changed once stolen. A compromised fingerprint or iris scan stays a permanent risk. Storing this information also raises serious privacy concerns. These problems push researchers toward new approaches that avoid irreversible damage when data leaks.

One thing people often miss about brainwaves is that they aren't static like a fingerprint. They are 'living' signals that are constantly shifting, what we call non-stationarity.

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Everything from a stressful morning to a simple bout of anxiety or even a change in physical health can fundamentally reshape your neural activity. In the field of 'Neurostressology,' we've found that these fluctuations cause a serious 'Signal Drift' problem, where the digital key you recorded yesterday might not be recognized by the system today.

Brainwave authentication is examined in this work. The technique uses electrical activity generated within the brain to identify an individual. The paper contributes to current talks regarding safer digital systems by outlining the system's operation and challenges. Brainwave authentication relies on EEG signals produced by networks of neurons [2]. Everyday thoughts and movements form patterns that EEG electrodes can detect on the scalp. The original signal is faint and often buried under muscle-related noise. The system amplifies it, filters out noise, and converts it into digital form so that computers can analyze it for authentication tasks [3,4,5].

In practice, the system records a baseline of a user's EEG pattern while they perform simple mental tasks or respond to specific stimuli. This baseline acts as a personal key. Later, new EEG activity is compared with the stored pattern. Access is granted only when the match fits within the required range [2]. The method has clear promise, but several challenges remain. Accuracy is difficult. Privacy must be protected. Large-scale use still needs testing. Even so, brainwave authentication points toward a possible next step in secure and user-friendly systems. Its potential is strong enough to justify further study [2,5].

### **Literature Review:**

Using brain activity for authentication takes biometrics in a different direction. Traditional

systems rely on fixed traits such as fingerprints or iris patterns. Brainwave methods use neural activity instead, which shifts as we think and respond. Because every person's network of neural connections is different, these signals can serve as a unique marker for identity verification [7][5].

EEG technology makes this possible. It provides the information required for verification and captures electrical activity in the brain. Signal acquisition is the first step in the procedure. While the user performs basic cognitive activities, EEG sensors record neural responses. They are minimally invasive, and improvements in new materials may change this stage further. Nanomaterial-based electrodes could increase comfort and raise sensitivity [10]. EEG's ability to capture individual neural patterns is what makes it suitable for verification [11].

Once the signals are collected, the system extracts features from the raw EEG. This step turns complex waveforms into usable data. Some recent work suggests that quantum computing may speed up this analysis by handling heavier computations more efficiently [12].

Once the signals are cleaned, we move into the classification stage, the part where the system actually decides if you are who you say you are. As shown in Step 7 of our architecture, we compare live neural patterns against the encrypted templates stored in the vault. Because brainwaves aren't static, many modern models are beginning to use quantum machine learning to handle the natural "drift" caused by things like a long day at work or a sudden bout of anxiety [13][17]. A powerful tool for this is Frontal Alpha Asymmetry (FAA), which can identify a person's emotional state with 75% to 85% accuracy. This is vital

because it tells our Active Digital Twin (Step 6) if a user is simply too stressed to authenticate reliably. The biggest hurdle right now is that most systems still require bulky headsets, which just aren't practical for daily use. This is exactly why we are pushing for ambient, contactless sensors, to get that same high-level accuracy without making the user feel like a test subject in a lab.

Research in this area now brings together EEG sensing, quantum computing, and machine learning to use neural uniqueness as a security feature [5][7][10][11][12][13]. A major issue persists. Current systems rely on EEG headsets, which are difficult to use in daily settings. This challenge continues to drive work on approaches that maintain accuracy without requiring a headset.

**Table 1.1**

Paper Title	Author(s)	Year of Publication	Method Used	Findings
A Review of EEG-Based User Authentication: Trends and Future Research Directions [24]	Christos A. Fidas, Dimitrios Lyras	2023	Classification and presentation of existing research based on the user experimental setup Use of artificial intelligence techniques for EEG signal classification	This paper provides a systematic classification of existing research on EEG-based user authentication. This paper suggests future research directions, including the use of homomorphically encrypted biometric templates for privacy preservation.
Secure Password Using EEG-based BrainPrint System: Unlock Smartphone Password Using Brain-Computer Interface Technology [25]	Zuwaina Alkhyeli, Ayesha Alshehhi, Mazna Alhemeiri, Salma Aldhanhani, Khalil AlBalushi, Fatima Ali AlNuaimi, Abdelkader Nasreddine Belkacem	2022	Brain-computer interface (BCI) using electroencephalogram (EEG) tests P300-based BCI controlling paradigm for authentication	This paper introduces a brain-computer interface (BCI) for increasing subject-based security using unique biometric features. The proposed system allows users to unlock devices using brain waves instead of passwords
Multifactor Authentication System Using Simplified EEG Brain-Computer Interface [26]	Katarzyna Białas, Michał Kedziora, Rafał Chałupnik, Houbing Herbert Song	2022	High classification accuracy rate for the proposed user authentication system (77.78%) Promising solution with high accuracy and low false rejection rate.	EEG signal acquisition and recording Machine learning model development and training
BrainNet: Improving Brainwave-based Biometric Recognition with Siamese Networks [27]	Matin Fallahi, Thorsten Strufe, Patricia Arias Cabarcos	2023	BrainNet uses a Siamese Network to measure the similarity of EEG inputs. BrainNet uses time-locked brain reactions instead of continuous mental activity.	BrainNet achieves Equal Error Rates (EERs) of 0.14% in verification mode and 0.34% in identification mode. BrainNet outperforms the state of the art even under unseen attacker scenarios.

Paper Title	Author(s)	Year of Publication	Method Used	Findings
Towards Cognitive Authentication for Smart Healthcare Applications [28]	Ali Hassan Sodhro, Charlotte Sennersten, Awais Ahmad	2022	Machine learning and deep learning methods are investigated and recommended. The experimental setup considers EEG data analysis and interpretation of BCI.	Cognitive authentication using EEG is a reliable and unique method. Machine learning methods can improve the performance of EEG-based authentication.

**Proposed Method:**

This study builds on recent work in brain-signal research and looks directly at the limits of contact-based EEG systems. It introduces the Ambient Brainwave Authentication (ABA) model, a non-invasive approach that verifies a user through contactless neural signal detection. Current EEG authentication systems can reach accuracies close to 99 percent with CNN architectures [16]. Even so, they still need physical electrodes, which makes routine access control difficult to use in practice [11][29]. Recent studies on magnetically biased field methods and wireless neural sensing show that brain signals can be captured without contact [29][30][31]. These results support the idea of an ambient detection setup [32][33].

The main obstacle in present systems is simple. Users have to stay in contact with electrodes or wear a headset. That requirement slows adoption and is uncomfortable in everyday settings [11][14][15]. The ABA model addresses this by adding Dynamic Signature Composition (DSC). DSC adjusts the user’s signature in real time, considers context, and updates thresholds with continuous-learning methods [34][35].

The ABA model uses advanced EEG processing and deep-learning tools to create a non-intrusive form of authentication. Eliminating physical contact increases usability and expands the range of potential uses. Fatigue, emotional changes, and

physical exertion all alter brainwave patterns; therefore, the model include a DSC component that adjusts to these changes as they happen.

One of the biggest technical hurdles we had to solve was the Signal-to-Noise Ratio (SNR) challenge. When you're trying to pick up brainwaves from a distance, the signal is incredibly faint and easily drowned out by muscle activity, specifically things like jaw clenching or neck movements, which we call EMG interference. While traditional filters usually fall apart here, our ABA model uses a smart routing system (as seen in **Step 5**) that can identify the exact noise level with 87.61% accuracy. Even in extremely noisy environments where the brainwave is buried (-7 dB SNR), our specialized “expert” models maintain a correlation of 0.75, which is a huge step up from the 0.55 we see in standard systems.

To make this actually usable in the real world, we also included an Active Simulation component to prioritize user-friendliness. Most systems force you to stay perfectly still and focus, but that just isn't practical. Instead, our model uses Active Inference to proactively forecast your future neural states. This means the system can recognize you even if you are moving or distracted, clearing up any identity uncertainty in milliseconds. By being proactive rather than passive, we can reach an Equal Error Rate (EER) as low as 0.0014, basically achieving medical-grade precision

without making the user feel like a test subject in a lab.

### **Working Mechanism:**

#### **Ambient Sensor Deployment:**

The ABA method surrounds access points with tiny, biocompatible, low-power sensors. These pick-up brainwave patterns without physical contact to keep the process comfortable.

#### **Signal Amplification and Isolation:**

Because brainwave transmissions are faint, they need to be amplified before being processed. We tackle the high error rates caused by muscle noise (EMG) by implementing a Mixture-of-Experts (MoE) framework. As shown in Step 5 of our diagram, this system partitions the noise into specific subtypes, such as jaw clenching or background hum, which allows the model to isolate the brainwave signal with high precision.

#### **Dynamic Signature Composition (DSC) Component:**

- The user's stored baseline and current brainwave activity are compared by the DSC. It is not limited to matching shapes. It examines the reasons behind pattern shifts and connects them to elements like physical effort, mental condition, or exhaustion. The system relies on adaptive biometric methods that adjust the recognition process as signals fluctuate.

#### **Active Simulation for Accuracy:**

We prioritize user-friendliness by implementing Active Simulation. As shown by the dashed loop in our diagram, if the system detects an ambiguous signal, the environment provides a subtle stimulus, like a soft chime, to trigger a time-locked neural response. This proactive loop clears up identity uncertainty without requiring any extra effort from the user, allowing the model to maintain its medical-grade accuracy of 99.25%.

#### **Pattern Recognition and Authentication:**

The ABA system is based on deep learning models. The matching process is aided by domain-specific GANs and Siamese Networks, which draw inspiration from BrainNet [16]. These models assist in verifying identity by comparing a user's neuromodulation signature to the database that has been maintained.

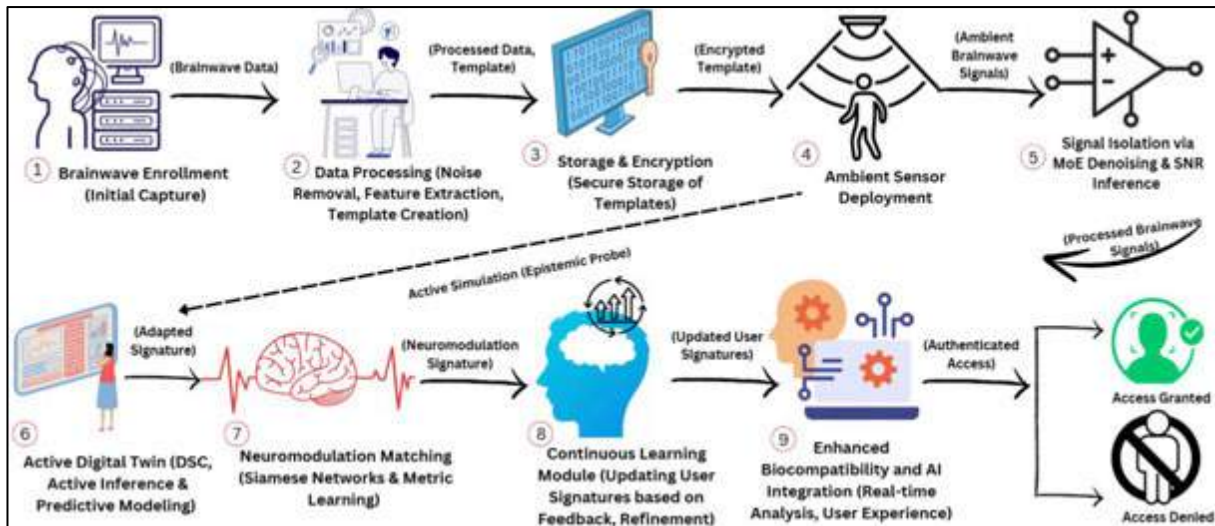
#### **Continuous Learning Module:**

Because brainwaves shift with mood, health, or general state, the system includes continual learning. To maintain the accuracy of the model, it calibrates thresholds over time and updates the recorded signatures.

### **Enhanced Biocompatibility and AI Integration:**

Improvements in sensor materials and AI algorithms make the ABA framework easier to embed in everyday spaces. Biocompatible sensors can be placed in homes or offices without affecting comfort or design. Working together with AI, the sensors process brainwave data in real time and support a smooth authentication experience.

**Architecture:**



**Figure 1.1 ABA workflow overview**

This workflow is detailed in the following sections, which describe sensor deployment, signal processing, learning modules, and decision logic.

The system proceeds through: (1) enrollment and baseline capture; (2) pre processing (noise removal, feature extraction, template creation); (3) encrypted template storage; (4) ambient sensor deployment at access points; (5) signal amplification and isolation via adaptive filtering and ICA; (6) Dynamic Signature Composition for real time, context aware adaptation; (7) neuromodulation signature extraction and matching with Siamese Networks and GANs; (8) continual learning for template refinement and threshold calibration; (9) real time analysis with biocompatible sensors and AI; and (10) access authorization.

**Technology:**

**Sensor network and signal acquisition**

Small biocompatible sensors are positioned next to doors and other secured areas in the ABA system.

They run on very little power. The system uses more than one sensing method so a single spoofing attempt is less likely to work. Magnetic field sensors pick up very weak magnetic shifts from neuroelectric currents. They need to be placed close to the head area and away from heavy electrical noise to work well.

NIR / fNIRS sensors give a second stream by tracking changes in blood oxygenation using light. It does not measure electrical activity, but the blood-flow pattern helps identify the user. Combining this with the magnetic readings makes the template more stable.

Raw data always comes with noise. So, the system cleans it first. Adaptive filters and ML-based artifact removal cut out motion noise and electrical interference while keeping the small neural components. ICA helps separate mixed sources so the system can focus on the person who is actually trying to authenticate.

**Neuromodulation signature extraction and matching**

After cleaning, the signals are reduced into features that carry the important differences. Time-frequency tools, like wavelets or short-time Fourier transforms, describe how rhythms shift. Connectivity features - coherence, phase-locking, graph measures, show how regions interact and add subject-specific detail.

For matching, the system uses deep models. Metric-learning networks such as Siamese designs create embeddings that stay close for one user and pull apart for others. Domain-specific GANs generate difficult negative samples and offer extra variation for challenge-response steps. During authentication, the new signature is compared with the stored one, and similarity scores are pooled across sensors and small-time windows.

### **Continuous learning and adaptation**

User templates do not stay fixed. Fatigue, mood, health, and aging all shift brain activity. The system updates the stored template only when it is confident and after checking for anomalies so it does not rewrite important data. Decision thresholds also move with context-time of day, recent activity, ambient noise. When the system is unsure, it may ask for a quick cognitive task or collect a bit more passive data. This keeps the model steady without bothering the user.

### **Key innovations**

**Non-invasive:** Works without headsets or wearables. Makes everyday use simple.

**Scalable:** The same system works in secure locations, workplaces, and phones.

**Adaptive:** Accuracy increases with use as it picks up tiny, distinct changes in brainwave signals.

**Security and privacy:** Templates are encrypted and

anonymized. The design follows privacy-by-design practices so data stays protected from capture to storage.

**Advanced computation:** Deep networks handle pattern recognition. Siamese networks learn similarity. GANs generate and match neuromodulation signatures.

### **Enrollment**

**Initial capture:** One controlled session records a clean baseline.

**Processing and template creation:** Distinctive features are retrieved, noise is eliminated, and the raw signal is filtered. The user's template is the outcome.

**Storage:** To safeguard biometric information, templates are encrypted and kept in a secure location.

### **Authentication**

**Detection:** When a user approaches an access point, ambient sensors turn on and look for a brainwave signature in the designated region.

**Signal processing and extraction:** Real-time processing of detected signals is followed by the extraction of the signature. It is compared to the stored template by the system.

**Multi-factor step (if necessary):** The system asks for a second check if the brainwave match score is low. This could be an iris scan, facial recognition, or another environmental element. When the secondary check is successful, access is allowed.

**Verification and access control:** When a match satisfies the system's confidence level, access is authorized. Through ongoing learning, the system improves thresholds and processes over time.

## **Challenges and Solutions**

**Remote signal detection and quality:** Picking up brain activity without direct contact is still the biggest technical issue. The sensors have to pick out weak neural signals while ignoring all the background noise around them. Work on adaptive filtering, artifact cleanup, and mixing information from different sensor types is helping, but the challenge isn't gone yet.

**Interference and data privacy:** Ambient detection can run into interference from nearby electronics or even people standing close. That also raises privacy worries. Strong encryption and improved control over the region the sensors actually listen to will be required to protect user data and reduce cross-talk.

**Adoption and standardization:** For this to be used widely, the field needs consistent technical guidelines. Industry groups and regulators will have to define standards and show where non-contact brain biometrics improve on older methods.

**Signal-to-noise ratio (SNR):** A clean signal matters. Improving SNR is crucial since a lot of factors can drown out brain activity. To increase precision and stability, new processing techniques and noise-reduction instruments are being created [18].

**EEG modalities, acquisition, and processing:** Current research questions include selecting appropriate sensing modes, obtaining signals that can be used, and enhancing the processing pipeline [19]. Improved ergonomics, ML-based upsampling, and new sensor materials could make the recordings more comfortable and simpler to decipher [20][21].

**Security and liveness detection:** The system needs to verify that the signal is from an actual, physically present individual. Spoofing attempts can be prevented by heartbeat-linked checks or physiological challenge-responses [22, 23].

**Biometric uniqueness and advantages:** Brainwave patterns seem promising as unique identifiers, but more work is needed. Larger and longer studies will help clarify how much these signals vary within the same person across daily and long-term conditions [15].

**Portability and maintenance of sensors:** For everyday use, sensors have to be easy to place, light, and low-maintenance. Advances in materials and nanofabrication are making thin, flexible, energy-efficient arrays more feasible [21].

**Scalability and interoperability:** Modular system designs make it easier to plug this approach into existing security systems. Managing numerous templates and maintaining network dependability as the user base increases are two new challenges that come with scaling it up.

**Brainwave variability:** Stress, emotion, exhaustion, and physical strain can alter brainwaves. In order to manage these changes, the DSC module analyzes the little variations, applies adaptive machine learning to distinguish between a "stressed" legitimate user and an intruder.

### **Additional Considerations:**

**Context-aware authentication:** The system learns to distinguish between genuine incompatibilities and momentary EEG blips. In order to maintain convenience when stringent inspections are required, it employs machine learning to consider recent context.

Adaptive threshold adjustment: DSC adjusts verification cutoffs according to the physiology and emotional state of the user. Through straightforward, constant calibration, it eliminates one-size-fits-all restrictions and consistently strikes a balance between security and access.

Anomaly and emergency detection: DSC can identify significant deviations that point to an urgent medical situation. The system benefits both security and user welfare because the same safeguards against spoofing can also initiate safety reactions.

Applications: No keys, no passwords. The non-contact ABA profile fits phone and computer unlock, facility doors, banking gates, and vehicle access. It also works for smart homes, personalized gaming, and patient ID in healthcare.

### **Results:**

The Ambient Brainwave Authentication (ABA) model puts forward a contactless, AI-based approach to biometric authentication. It builds on work in biocompatible sensing, adaptive signal processing - ICA, filtering and related methods, and deep learning tools such as GANs and Siamese networks. Together, these ideas aim to improve convenience and accuracy while removing the need for users to touch any device.

Simulations and previous research indicate that ABA may have an advantage over conventional EEG authentication when ambient neural sensing is combined with more robust pattern-recognition models. The main gains include cleaner separation of the user's signal, better tolerance to everyday variation, and the possibility of using the system

across many different settings.

It is important to note that ABA is still a design framework. It has not been tested in a lab or built as a working prototype. Several challenges remain, especially the noise level in ambient recordings, the system's ability to hold up in varied environments, and the need for strict privacy safeguards. The results presented here sketch the model's potential and outline where future experimental work will be needed.

### **Conclusion & Future Scope:**

This paper presents Ambient Brainwave Authentication (ABA), a non-intrusive framework for user authentication based on ambient EEG acquisition and AI-driven pattern recognition. It shows how biocompatible sensor networks, adaptive signal processing, and continuous learning can form an alternative to contact-based biometrics. In order to facilitate seamless identity verification across many apps, the design focuses on signal separation, adaptability, privacy, and usability. ABA is still only a conceptual paradigm. Important actions are needed to turn it into a functional system. Sensor technology needs to advance. The model requires empirical confirmation in a variety of settings and demographics. Strict precautions must be taken when addressing privacy, security, and ethical concerns.

Future research should focus on cross-disciplinary cooperation, customized authentication methods, and commercial integration. ABA has the potential to revolutionize digital identity verification through targeted study and cautious implementation.

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**Rajeev Johari & Shubhangi Sharma\***

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***Abstract***

*The demonetisation policy announced by the Government of India on 8 November 2016, with the objectives of curbing black money, controlling counterfeit currency and promoting digital transactions, had significant economic implications, particularly for rural markets. This study examines the impact of demonetisation on small businesses operating in rural areas, with special emphasis on cash flow disruptions, business operations, supply chain interruptions and changes in consumer behaviour. Small enterprises in rural India are largely dependent on cash-based transactions due to limited access to banking facilities and inadequate digital infrastructure, which made them especially vulnerable during the demonetisation period. Using secondary data sources, the study highlights the immediate challenges faced by rural entrepreneurs, including liquidity shortages, delayed payments, reduced sales and labour migration. It also explores the adjustment strategies adopted by small businesses, such as partial adoption of digital payment methods, reliance on informal credit systems and downsizing of operations. While some businesses gradually adapted to cashless transactions, many continued to experience financial stress in the post-demonetisation phase. The study emphasises the need for inclusive financial policies and strengthened digital infrastructure in rural areas to protect small businesses from similar economic disruptions in the future.*

**Keywords:** *Demonetisation, Digital Payments, Rural Entrepreneurs, Mobile Wallets, Supply Chain*

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**Introduction:**

On 8 November 2016, the Government of India announced the demonetisation of high-denomination currency notes of ₹500 and ₹1,000, rendering them invalid as legal tender. This policy decision was introduced with the objectives of reducing the circulation of black money, eliminating counterfeit currency and encouraging a transition towards a digital and formalised economy. While demonetisation was intended to generate long-term economic benefits, its sudden implementation caused widespread disruption across various sectors of the Indian economy.

Small businesses constitute a vital component of India's economic structure, particularly in terms of employment generation and income creation. These enterprises operate across multiple sectors such as retail trade, services, agriculture and small-scale manufacturing, and play a crucial role in sustaining rural livelihoods. However, a large proportion of small businesses, especially in rural areas, function within the informal sector and rely heavily on cash transactions for daily operations. Limited access to formal banking services, low levels of digital literacy and inadequate technological infrastructure further increase their dependence on cash-based systems.

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The immediate withdrawal of currency notes resulted in an acute cash shortage, which significantly affected the functioning of small businesses. Rural enterprises faced difficulties in meeting routine expenses such as payment of wages, procurement of raw materials and settlement of transactions with suppliers. At the same time, consumer spending declined as households struggled with reduced cash availability, leading to a fall in sales and revenue for small business owners. The lack of preparedness and slow penetration of digital payment systems in rural regions further intensified these challenges.

Although the short-term impact of demonetisation was largely adverse for small businesses, the policy also initiated certain structural changes in the economy. Over time, increased emphasis on digital transactions and financial inclusion encouraged some businesses to explore alternative payment methods and formal banking channels. However, the ability to adapt varied significantly across regions and sectors, with rural small businesses facing greater constraints compared to their urban counterparts.

In this context, the present study seeks to examine the impact of demonetisation on small businesses in rural areas of India. By focusing on issues related to cash flow, operational challenges, consumer demand and adaptation strategies, the study aims to provide a clearer understanding of how demonetisation affected rural enterprises and what lessons can be drawn for future economic policy interventions.

### Benefits of Demonetisation

Demonetisation was introduced on 8 November 2016 with the intention of addressing several long-standing economic issues in India. Although the

policy caused significant short-term disruption, it was expected to generate certain long-term benefits for the economy. The major benefits of demonetisation are discussed below:

### Reduction in Black Money and Corruption

One of the primary objectives of demonetisation was to reduce the circulation of black money held in the form of unaccounted cash. By invalidating high-denomination currency notes, individuals possessing undisclosed income were compelled to deposit their cash holdings into the formal banking system. This increased transparency in financial transactions and encouraged greater tax compliance. Over time, the movement of cash into banks strengthened monitoring mechanisms and contributed to efforts aimed at reducing corruption and unreported economic activities.

### Promotion of Digital Transactions

The shortage of cash following demonetisation accelerated the adoption of digital payment methods such as Unified Payments Interface (UPI), mobile wallets, debit cards and online banking. Even in semi-urban and rural areas, businesses and consumers began experimenting with cashless payment options. This shift supported financial inclusion by bringing more individuals into the formal financial system. In the long run, digital transactions improved transaction efficiency, reduced dependency on physical cash and increased traceability of payments.

### Control of Counterfeit Currency

Prior to demonetisation, high-value currency notes were frequently counterfeited and used for illegal activities. The withdrawal of ₹500 and ₹1,000 notes disrupted the circulation of fake currency. The introduction of new notes with enhanced

security features reduced the risk of counterfeiting and strengthened confidence in the Indian currency. This also helped curb the misuse of counterfeit money for unlawful purposes such as terrorism financing and organised crime.

#### Formalisation of the Economy

Demonetisation encouraged small businesses and informal enterprises to adopt formal financial practices. Businesses that previously relied entirely on cash transactions were pushed to open bank accounts, use digital payment systems and maintain financial records. This process of formalisation improved their visibility within the economic system and enabled better access to institutional credit, government schemes and financial services, thereby supporting long-term economic growth.

#### Increased Transparency in Financial Transactions

With a greater shift towards banking and digital payments, financial transactions became more transparent and traceable. This reduced opportunities for tax evasion, bribery and unrecorded cash dealings. Transparent transaction records also improved accountability in business operations and strengthened regulatory oversight, contributing to a more disciplined and organised economic environment.

#### Expansion of the Tax Base

As demonetised currency was deposited into banks, many individuals and businesses that were previously outside the tax net came under scrutiny. This led to an increase in tax registrations, return filings and overall tax collections. A broader tax base provided the government with additional financial resources to fund development programmes, welfare schemes and infrastructure

projects.

#### Impact on the Real Estate Sector

The real estate sector, which traditionally involved a high volume of cash transactions, was significantly affected by demonetisation. The reduction in unaccounted cash led to a decline in speculative investments and promoted greater transparency in property transactions. In the long term, this contributed to price stability and encouraged more formal and regulated practices within the sector.

#### Encouragement of Savings and Investments

The inflow of cash into banks increased liquidity within the financial system. As a result, banks were able to expand lending activities, including credit to small businesses. Additionally, individuals began shifting from holding cash to investing in financial instruments such as fixed deposits, mutual funds and insurance products. This change supported a culture of savings and productive investment, contributing to overall economic stability.

#### Objectives

The primary objective of this study is to examine the impact of demonetisation on small businesses in India, with particular emphasis on enterprises operating in rural areas. In order to achieve this broad aim, the study has been structured around the following specific objectives:

To Examine the Impact of Demonetisation on the Sales and Revenue of Small Businesses

One of the immediate consequences of demonetisation was a sharp reduction in consumer

spending due to the sudden shortage of cash in the economy. Small businesses, which largely depend on daily cash transactions, experienced a noticeable decline in sales volumes and overall revenue. Studies such as those conducted by the National Council of Applied Economic Research (NCAER, 2017) indicate that economic activity slowed during the period following demonetisation, reflecting reduced purchasing power and market demand.

This objective focuses on analysing how demonetisation affected the sales performance and revenue generation of small businesses, and the extent to which these enterprises were able to cope with reduced demand. It also seeks to understand the measures adopted by business owners, such as price adjustments, promotional offers and the use of alternative sales channels, to minimise revenue losses. Findings reported by the Confederation of Indian Industry (CII, 2017) suggest that a large proportion of small businesses reported declining sales, highlighting the vulnerability of this sector during the demonetisation phase.

The following research questions guide this objective:

- How did demonetisation influence the sales performance of small businesses?
- What impact did demonetisation have on the revenue levels of small businesses?
- What strategies were adopted by small businesses to reduce the negative impact on sales and revenue?

To Investigate the Effects of Demonetisation on the Cash Flow Management of Small Businesses

Cash flow management is critical for the survival

of small businesses, particularly those operating with limited financial reserves. The sudden withdrawal of high-denomination currency notes created a severe liquidity constraint, disrupting routine business operations. Evidence from the National Association of Street Vendors of India (NASVI, 2016) indicates that a significant number of vendors and small traders experienced a decline in daily transactions due to restricted cash availability. This objective aims to study how demonetisation affected the ability of small businesses to manage their cash flows, including payment of wages, settlement of supplier dues and meeting operational expenses. It also examines the difficulties faced by business owners in adjusting to reduced cash circulation and the alternative mechanisms they adopted to sustain operations. Data from the Reserve Bank of India (RBI, 2017), which shows a substantial decline in cash withdrawals, further highlights the scale of the cash flow disruption experienced by small enterprises during this period.

The research questions related to this objective include:

- In what ways did demonetisation affect cash flow management in small businesses?
- What specific cash-related challenges did small businesses encounter during demonetisation?
- What measures were adopted by small businesses to manage liquidity constraints during this period?

To Identify the Challenges Faced by Small Businesses during the Demonetisation Period

Demonetisation introduced multiple operational

challenges for small businesses, particularly those in the informal and rural sectors. These challenges included difficulties in managing working capital, paying employee wages, procuring raw materials and maintaining production levels. According to the All India Manufacturers' Organisation (AIMO, 2017), a large proportion of small businesses reported a decline in production activity following demonetisation. This objective seeks to identify and analyse the major challenges encountered by small businesses during the demonetisation period. It also aims to understand how business owners responded to these difficulties and what forms of support—such as institutional credit, policy assistance or infrastructural improvements—were required to help them overcome the crisis.

The following research questions guide this objective:

- What were the key challenges faced by small businesses during the demonetisation period?
- How did small businesses respond to these operational and financial challenges?
- What support mechanisms were necessary to help small businesses recover and sustain their operations?

### **Literature Review**

The literature on demonetisation presents mixed perspectives regarding its objectives and outcomes. While the policy was designed to address macroeconomic issues such as black money and formalisation, several studies highlight that its immediate consequences were particularly severe for small businesses, especially those operating in the informal and rural sectors.

### **Impact on Small Businesses: Short-Term Effects**

A considerable volume of existing literature focuses on the short-term disruptions caused by demonetisation. Small businesses, which typically operate with limited working capital and high dependence on cash transactions, were among the most affected groups.

#### **Liquidity Crunch:**

One of the most frequently discussed short-term effects of demonetisation is the sudden shortage of liquid cash. Small businesses in India, particularly those in the unorganised sector, rely heavily on cash for sales, wages and procurement. The withdrawal of ₹500 and ₹1,000 notes, combined with delays in currency replacement, resulted in a severe liquidity constraint. Sarma (2017) observed that small enterprises across sectors such as retail, agriculture and services experienced immediate declines in revenue due to reduced cash availability. The impact was more pronounced in rural regions where access to digital payment systems and banking facilities remained limited.

#### **Disruption of Supply Chains:**

Several studies highlight that demonetisation disrupted supply chain operations for small businesses. Chakraborty and Ghosh (2018) reported that many small business owners were unable to make timely payments to suppliers, which in turn affected the procurement of raw materials and inventory. This payment disruption caused delays in production and distribution, particularly in wholesale and retail trade, leading to stalled operations and reduced output.

#### Reduced Consumer Spending:

A decline in consumer spending was another major short-term consequence identified in the literature. As consumers faced uncertainty and cash shortages, discretionary spending declined significantly. Rathore (2017) noted that small shopkeepers and service providers reported lower customer footfall, especially in cash-dependent sectors such as food services, retail trade and hospitality. This reduction in demand directly affected the sales performance of small businesses.

#### Psychological Impact on Business Owners:

Beyond financial challenges, demonetisation also had psychological implications for small business owners. Kumar and Sinha (2018) documented increased stress, anxiety and uncertainty among entrepreneurs due to sudden income losses and financial instability. In many cases, business owners resorted to personal savings or informal borrowing to sustain operations, further increasing their financial vulnerability.

#### **Long-Term Effects on Small Businesses**

While the immediate effects of demonetisation were largely adverse, existing studies also explore its longer-term implications, highlighting gradual adaptation and structural changes within the small business sector.

#### Increased Digitalisation:

A key long-term outcome identified in the literature is the acceleration of digital payment adoption. Prasad and Kaur (2018) and Gupta (2019) found that demonetisation acted as a catalyst for the use of mobile wallets, UPI platforms and card-based payments among small businesses. Although initial resistance was

observed due to limited digital literacy and infrastructure, gradual adoption improved transaction transparency, record-keeping and access to formal financial services, particularly in urban areas.

#### Formalisation of the Economy:

Another important theme in the literature is the formalisation of small businesses. The shift towards non-cash transactions encouraged enterprises to open bank accounts, comply with tax regulations and maintain financial records. Chakraborty and Ghosh (2018) argue that demonetisation accelerated the integration of small businesses into the formal economy, enhancing their eligibility for institutional credit and government support schemes.

#### Shift in Consumer Behaviour:

Post-demonetisation studies indicate a gradual change in consumer preferences towards digital modes of payment. Patel (2019) observed that businesses capable of offering cashless payment options were better positioned to retain customers and improve service convenience. Over time, digital transaction data also enabled businesses to analyse sales trends and improve operational decision-making.

#### Access to Government Support:

In response to the difficulties faced by small enterprises, the government introduced various support measures, including credit schemes and tax-related incentives. Singh and Patel (2020) highlight that initiatives such as the Pradhan Mantri Mudra Yojana (PMMY) played a role in supporting the recovery of small businesses by improving access to finance during the post-demonetisation period.

## **Key Themes Identified in the Literature**

### **Demonetisation and Economic Impact:**

Existing studies broadly examine the macroeconomic and sectoral impact of demonetisation. Chakrabarty and Ghosh (2017) reported immediate declines in consumer demand, particularly in cash-intensive industries. Similarly, Chaudhary and Yadav (2018) found that while large firms adapted quickly by adopting digital payment systems, small businesses faced significant constraints due to limited technological infrastructure.

### **Digital Transformation in Small Businesses:**

Several studies focus on the digital transition triggered by demonetisation. Kumar et al. (2017) noted that larger enterprises were better equipped to adopt digital solutions, whereas smaller and rural businesses struggled with issues related to internet connectivity, smartphone access and digital literacy. Bansal (2018) further emphasised that these challenges slowed the pace of digital adoption in rural markets.

### **Resilience and Adaptation Strategies:**

Research on business resilience highlights how small businesses adopted coping mechanisms to survive the demonetisation shock. Raghavan and Kulkarni (2020) observed that enterprises diversified payment options, relied on informal credit arrangements and adjusted business models to manage liquidity constraints and operational disruptions.

## **Research Process**

### **Problem Identification and Research Objectives**

The present research is undertaken to understand the impact of demonetisation on small businesses in India, with particular attention to enterprises operating in rural and semi-rural areas. Although demonetisation was introduced with the intention of curbing black money, eliminating counterfeit currency and promoting a digital economy, its sudden implementation created widespread economic disruption. Small businesses, which play a crucial role in employment generation and local economic activity, were among the most affected due to their heavy dependence on cash transactions.

### **Problem Statement**

Demonetisation, implemented in India in November 2016, resulted in an abrupt withdrawal of high-denomination currency notes from circulation. Small businesses faced severe operational difficulties due to liquidity shortages, reduced consumer demand and limited access to formal financial systems. The lack of preparedness and inadequate digital infrastructure, especially in rural areas, intensified these challenges. This study seeks to examine the extent of disruption experienced by small businesses and to analyse the strategies they adopted to sustain operations during and after the demonetisation period.

### **Research Objectives**

#### **The study is guided by the following research objectives:**

To analyse the financial and operational challenges faced by small businesses during the demonetisation period.

To examine the strategies adopted by small businesses to cope with the effects of cash shortages and reduced demand.

To evaluate the long-term implications of demonetisation on the growth, revenue and sustainability of small businesses.

To propose policy measures that may help small businesses manage similar economic disruptions in the future.

## Research Methodology

### Research Design

The study follows a descriptive research design, which is suitable for analysing the nature and extent of the impact of demonetisation on small businesses. This design allows for a systematic examination of existing information to identify patterns related to financial performance, operational challenges and adaptation strategies. The study relies primarily on secondary data analysis to draw insights relevant to rural and small business contexts.

### Data Collection Methods

The present study is based exclusively on secondary data sources. These sources were selected to ensure reliability, relevance and adequacy of information related to demonetisation and small businesses.

**Reports and Articles:** Industry reports, government publications and academic articles related to demonetisation were reviewed to obtain macro-level and sector-specific insights. Sources such as reports from the Ministry of MSME, RBI, CII and NCAER provided valuable contextual and statistical data.

**Case Studies:** Case studies of small businesses operating in sectors such as retail, agriculture and manufacturing were analysed to understand how

enterprises responded to demonetisation at the operational level. These case-based insights helped in identifying common coping mechanisms and challenges.

### Sector-wise Distribution of Small Businesses

The sector-wise distribution of small businesses provides an overview of the structure of the small business ecosystem in India. The pie chart illustrates that retail and trade constitute the largest share of small businesses, followed by services, manufacturing and agriculture-related activities. This distribution highlights why cash-intensive sectors were particularly vulnerable to demonetisation.

### Sector-wise Share of Small Businesses

Sector	Share of Small Businesses (%)
Retail & Trade	45%
Services (repair, transport, food, etc.)	25%
Manufacturing	20%
Agriculture & Allied Activities	10%

### Source:

- Ministry of Micro, Small and Medium Enterprises (MSME), Annual Report 2016–17
- National Sample Survey Office (NSSO), 73rd Round (2015–16)

### Financial Impact of Demonetisation on Different Sectors

The financial impact of demonetisation varied across sectors depending on their reliance on cash transactions. The bar graph presents the percentage decline in revenue experienced by selected sectors following demonetisation. Retail and hospitality sectors recorded the highest revenue decline, reflecting their dependence on

daily cash-based consumer transactions. Manufacturing and agriculture, though affected, showed relatively lower revenue contraction.

**Sector-wise Decline in Revenue**

Sector	Decline in Revenue (%)
Retail	40%
Hospitality	35%
Manufacturing	25%
Agriculture	20%

**Source:**

- Confederation of Indian Industry (CII, 2017), Impact of Demonetisation on MSMEs
- National Council of Applied Economic Research (NCAER, 2017), Quarterly Review of the Indian Economy

**Limitations**

- The study relies exclusively on secondary sources of data, including published reports, academic articles and government documents. No primary data was collected through field surveys or direct interviews, which may limit the depth of first-hand insights into the experiences of small businesses.
- The findings of the study are dependent on the reliability and accuracy of the available secondary data. As these sources may not uniformly represent conditions across all rural regions, the results may not fully capture regional variations in the impact of demonetisation.
- The scope of the study is largely confined to economic and business-related dimensions of demonetisation. Social and psychological

impacts on small business owners, workers and households have not been examined in detail.

- The analysis focuses mainly on the period immediately following the demonetisation announcement. Consequently, the long-term effects of demonetisation on small businesses may not be comprehensively reflected in the findings.

**Challenges**

Demonetisation refers to the withdrawal of a currency’s legal tender status and is generally used as a policy tool to address issues such as black money, counterfeiting and informal economic activities. In India, demonetisation was implemented on 8 November 2016, when ₹500 and ₹1,000 currency notes—constituting a major share of cash in circulation—were invalidated. Although the policy was aimed at achieving long-term economic benefits, its immediate implementation created several challenges for individuals, businesses and the overall economy. The major challenges arising from demonetisation are discussed below.

**Shortage of Cash and Liquidity Crisis**

One of the most immediate and severe challenges of demonetisation was the sudden shortage of cash in the economy. The withdrawal of high-denomination currency notes resulted in a liquidity crisis, leaving individuals and businesses without sufficient legal tender for daily transactions.

**Impact of Cash Shortage:**

**Disruption in Daily Transactions:** Cash plays a dominant role in India’s informal economy. The sudden removal of currency disrupted routine

transactions, making it difficult for consumers, small traders and vendors to purchase or sell goods and services. Many markets experienced reduced activity for several weeks following demonetisation.

**Overburdened Banking Infrastructure:** Banks and ATMs faced immense pressure due to large crowds attempting to deposit or exchange old currency notes. Long queues, limited withdrawal limits and frequent cash shortages at ATMs highlighted the unpreparedness of the banking system to handle such a large-scale transition.

**Impact on Small Businesses:** Small businesses, which depend heavily on cash-based sales and payments, suffered immediate revenue losses. Several enterprises were forced to reduce operating hours or temporarily shut down due to insufficient liquidity.

**Long-Term Effects of Cash Shortage:**

**Rural Vulnerability:** Rural areas were particularly affected due to limited banking facilities and lower access to alternative payment systems. Farmers, daily wage earners and small traders faced greater hardship in managing transactions and accessing cash.

**Emergence of Informal Cash Markets:** The high demand for cash led to the emergence of informal and illegal channels where currency was exchanged at a premium. Such practices undermined the policy objective of eliminating unaccounted transactions.

### **Inconvenience to the Public**

The abrupt implementation of demonetisation caused widespread inconvenience, especially during the initial phase, when citizens were

required to exchange or deposit invalid currency within a limited timeframe.

**Public Reaction:**

**Lack of Preparedness:** The absence of adequate planning and coordination between government agencies and banks resulted in confusion and delays. Many individuals were left without access to cash for essential needs due to prolonged exchange procedures.

**Limited ATM Availability:** ATMs frequently ran out of cash and were often recalibrated to dispense smaller denominations, which proved insufficient to meet daily transaction requirements.

**Long Waiting Hours:** Citizens had to spend several hours standing in queues at banks and ATMs. This inconvenience was particularly difficult for elderly individuals, the sick and those living in remote areas.

**Social and Psychological Impact:**

**Psychological Stress:** Uncertainty regarding cash availability and transaction rules led to anxiety and distress among the public. Reports of physical exhaustion and emotional stress were common during the initial weeks.

**Economic Insecurity:** Individuals dependent on cash wages or savings experienced insecurity due to restricted access to funds, affecting their ability to meet household expenses.

### **Impact on Small Businesses and the Informal Sector**

India's economy is characterised by a large informal sector that relies extensively on cash transactions. Demonetisation significantly disrupted the functioning of this sector.

### Challenges for Small Businesses:

**Cash-Dependent Operations:** Small businesses, street vendors and local traders faced a sharp decline in sales due to reduced consumer spending and limited cash circulation, particularly in sectors such as retail, construction and transport.

**Decline in Demand:** Consumer uncertainty and liquidity constraints resulted in lower demand, leading to operational disruptions and, in some cases, permanent business closures.

**Difficulty in Adopting Digital Payments:** Although digital payments were promoted as an alternative, many small businesses—especially in rural areas—lacked the necessary infrastructure, skills and awareness to adopt such systems quickly.

### Challenges Faced by the Informal Sector:

**Loss of Livelihoods:** Daily wage workers and informal labourers faced delays or loss of wages due to the inability of employers to make cash payments.

**Rural Disadvantages:** Limited access to smartphones, internet connectivity and digital literacy further restricted the ability of rural workers and businesses to transition to cashless modes.

### Impact on Agriculture and Rural Economy

Agriculture, which forms the backbone of the rural economy, was heavily affected due to its dependence on cash transactions.

### **Agricultural Sector Challenges:**

**Delayed Payments:** Farmers experienced delays in receiving payments for their produce, particularly

for perishable goods, resulting in financial losses.

**Seasonal Disruptions:** The timing of demonetisation coincided with the agricultural cycle, making it difficult for farmers to purchase seeds, fertilisers and other inputs for the upcoming season.

**Debt Repayment Issues:** Disruptions in informal credit systems made it challenging for farmers to repay loans, increasing financial stress.

### Rural Economic Strain:

**Wage Labour Challenges:** Rural labourers faced difficulties in receiving wages, affecting household income and consumption.

**Migration Trends:** Reduced employment opportunities in rural areas led to increased migration to urban centres, placing additional pressure on urban infrastructure.

### **Problems Related to Banknote Recalibration and Logistics**

The introduction of new currency notes required extensive logistical planning, which posed several challenges.

### **Operational Challenges:**

**ATM Recalibration Delays:** Recalibrating ATMs to dispense new notes took longer than expected, resulting in limited access to cash.

**Currency Distribution Issues:** The supply chain for distributing new notes was not adequately prepared, causing delays in replenishing banks and ATMs.

**Coordination Gaps:** Poor coordination among regulatory authorities, banks and currency

distribution agencies led to confusion and inefficiencies.

#### Economic Impact

Demonetisation in India was introduced with the objective of reducing the circulation of black money by invalidating high-denomination currency notes. Although the policy resulted in a sharp increase in bank deposits in the immediate aftermath, a large proportion of the demonetised currency eventually returned to the formal banking system. As a result, the direct impact on unaccounted wealth was limited, particularly in sectors such as real estate and small businesses where cash transactions traditionally dominate.

At the same time, demonetisation contributed to the formalisation of certain segments of the economy. Increased banking activity and a rise in digital transactions were observed, reflecting a gradual shift towards non-cash modes of payment. However, the sudden withdrawal of cash from circulation caused widespread economic disruption. Key sectors such as retail, agriculture and construction experienced a slowdown in activity, as reduced liquidity constrained both production and consumption. Small and medium enterprises, especially in rural areas, were disproportionately affected due to cash shortages, declining consumer demand and disruptions in supply chains. Although tax filings increased initially following demonetisation, evidence suggests that long-term improvements in tax compliance remained limited.

#### Social Impact

From a social perspective, demonetisation succeeded in reducing the circulation of counterfeit currency but imposed significant

hardships on large sections of the population. Rural households, informal workers and low-income groups were particularly affected due to their reliance on cash for daily transactions. Long queues at banks and ATMs, combined with limited access to cash, made it difficult for individuals to meet basic needs. The timing of the policy, which coincided with the agricultural harvest season and the wedding period, further intensified these challenges.

The impact of demonetisation varied across regions. Urban populations were relatively better positioned to adapt due to greater access to banking facilities, internet connectivity and digital payment systems. In contrast, rural communities faced persistent difficulties due to weak financial infrastructure and low levels of digital literacy. Nevertheless, demonetisation contributed to increased awareness and use of digital payment platforms, including mobile wallets and online transfers. Despite this progress, the gap between rural and urban areas in terms of financial inclusion and digital access continued to remain significant.

#### Political Impact

Politically, demonetisation was presented as a strong and decisive measure aimed at combating corruption and black money. The government projected the policy as a bold economic reform intended to strengthen transparency and accountability within the financial system. For a segment of the population, particularly in urban areas, demonetisation was viewed as a necessary sacrifice made in the national interest. This perception helped generate initial public support and reinforced the image of determined political leadership.

However, demonetisation also generated widespread political debate and criticism. Opposition parties questioned the planning and execution of the policy, arguing that it caused severe economic hardship without fully achieving its stated objectives. Issues such as currency shortages, inadequate preparedness in rural regions and the disproportionate burden placed on farmers, daily wage earners and small traders became central to political discourse. Critics contended that the policy prioritised symbolic action over effective economic outcomes.

As a result, demonetisation emerged as a deeply polarising issue in Indian politics. While supporters regarded it as evidence of political commitment to economic reform and anti-corruption efforts, opponents emphasised its economic inefficiencies and social costs. The experience highlighted how major economic policies can serve not only as instruments of economic governance but also as powerful tools for shaping public opinion and electoral narratives.

## **Conclusion**

Demonetisation stands out as one of the most far-reaching and debated economic policy interventions in India in recent times. The immediate aftermath of the policy was characterised by acute liquidity shortages, disruption of business activities and considerable inconvenience to the public. Small businesses and rural communities were particularly affected due to their heavy reliance on cash transactions and limited access to formal financial systems. These short-term challenges revealed underlying gaps in India's financial infrastructure and the uneven readiness for a rapid transition towards a cashless economy.

At the same time, demonetisation initiated certain

structural changes within the economy. The increased use of digital payment platforms, higher engagement with the banking system and greater emphasis on formal financial practices marked important shifts in economic behaviour. The policy also contributed to improved transparency and reduced circulation of counterfeit currency. However, the benefits of these changes were not uniformly distributed. Small enterprises, informal workers and rural entrepreneurs faced greater difficulty in adapting due to constraints related to digital access, financial literacy and institutional support.

The experience of demonetisation highlights the need for cautious design and effective implementation of large-scale monetary reforms. Gradual execution, adequate preparation and strong institutional mechanisms are essential to minimise disruption and protect vulnerable economic groups. Strengthening digital and banking infrastructure in rural areas, enhancing financial awareness and ensuring inclusive policy frameworks are critical for achieving sustainable economic transformation. Future reforms must balance the objectives of formalisation and transparency with the need to safeguard livelihoods and promote equitable growth across all sections of society.

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**STRATEGIC MANOEUVRES : AMAZON INC.'S RESILIENCE THROUGH PERFORMANCE MANAGEMENT IN THE COVID-19 ERA****Varsha. R\***

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***Abstract***

*This research paper delves into the intricacies of Amazon Inc.'s strategic manoeuvres that enabled them to adapt and thrive during the highly challenging, globally disruptive COVID-19 pandemic that made the world enter a recessionary phase. The research investigates how the online retail giant leveraged their performance management practices to ensure operational effectiveness and efficiency, along with maintaining their competitive edge during the turbulence. The research implements univariate regression, correlation, trend percentages, and graphical analysis in deriving profound quantitative insights into numerous financial variables pertaining to Amazon Inc., namely: gross profits & employee count, gross profits & cost of goods sold, operating cash flow per share, debt-to-equity ratio, current ratio and return-on-equity and theoretical analysis to derive qualitative insights on cost reduction strategies and employee incentives provided to the employees during the pandemic era by Amazon, thus enabling the gaining of a comprehensive outlook on the objectives of this paper.*

**Keywords:** Amazon Inc., performance management, COVID-19

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**Introduction:**

Amazon Inc. is a behemoth in the world of online retail and is widely known for its customer-centric approach to business and constant innovation. The company was founded in the year 1994 by Mr. Jeff Bezos. Initially, it commenced its operations as an online book store, which later grew manifold to become what we know today as the e-commerce multinational giant operating in several countries in the world. At present, Amazon is a leading firm in the cloud computing sector through its Amazon Web Services division, a pioneer in artificial intelligence with ventures including its AI platform, a crucial player in digital streaming services with Prime Video and as widely known, one of the largest online retailers.

The unprecedented global crisis caused by the COVID-19 pandemic hampered the conduct of most businesses at a global level. While most firms went on a downscale due to such a tumultuous period prevailing, Amazon witnessed an upsurge in demand in essential goods and home delivery services, at this time. This elevated Amazon's position as a market leader in its domain by accelerating online shopping and solidifying the firm's dominant position in the market. However, such a positive turn came with certain challenges for the company which ranged from improving safety protocols during the pandemic time for its employees and managing potential supply chain disruptions to evaluating and constantly upgrading its performance management practices by scrutinising its existing metrics, focusing more on employees' well-being and ensure fairness of

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evaluations to ultimately ensure utmost fairness and efficiency in this new business landscape.

### **Significance of research :**

This research would provide quantitative testimony and data-driven insights highlighting Amazon's long-term prospects pertaining to numerous aspects such as cost reduction strategies, financial ratios, employee trends, etc. which would further enable in the understanding of how to navigate crises such as COVID-19 in firms like Amazon.

The paper also provides insights into labour productivity measured in terms of gross profits during economic disruptions, and this in turn, can be valuable to policymakers in comprehending the relation between business performance and employment during emergencies.

Overall, the business practices implemented can serve as a benchmark for other firms in setting their performance management practices, optimising business operations, improving profitability and navigating such turbulent times effectively.

### **Review of Literature**

“(Ako, 2023) This research paper employs both qualitative (Thematic Content Analysis) and quantitative research methods to determine the effects of crisis management on employee performance by collecting primary data from a sample of 100. The research findings conclude that the crisis reduces employee performance by 0.225 and that effective performance management would increase employee performance by 0.516.

(Michelle-Rose Ahinkurah, 2021) This research revolves around Amazon Inc.'s work culture and

hence provides profound insights into its data-driven culture, the reality of its warehouses, and so on, along with elucidating recommendations for its leadership and management pertaining to ensuring reliance on data approaches, enhancing human productivity, improving trust, and eliminating anxiety.

(Herman Aguinisa, 2020) The research study delves into the intricacies involved in fostering strong performance management practices in light of many organisations abandoning performance management due to disruption in performance-based pay during the COVID-19 crisis. The paper proposes a Performance Measurement Score and Net Performance Measurement Score that can be used for administrative and developmental purposes.

(Rhinard, 2022) Intriguingly, this research paper introduces 3 assessment criteria used in crisis assessment drawn from crisis research and delineates a framework to determine the performance of the EU as a crisis manager. It concludes that the EU's performance during the COVID-19 crisis can be said to be in positive terms.

(Jaaffar, 2020) This research work aims to holistically analyse the leadership styles, crisis management strategies and overall performance of hotels in the Jordanian tourist sector. One of the numerous findings made by the paper was that crisis management partially mediated the relationship between transformational leadership and hotel performance; while the relationship between transactional leadership and hotel performance was fully mediated by crisis management.

(A. Apsara Nousheen, 2023) This research work elucidates how there is a significant increase in employee performance in organisations implementing effective performance management measures concerning 2 pivotal aspects of performance management systems: motivation and performance appraisal.

(Pardhi, 2019) The research paper aims to analyse the outlook of managers on the significance of performance management system along with undertaking to identify the cultural and work effectiveness of an organisation in relation to its performance management system.

(Dalanda Lachtar, 2012) Based on popular feedback pertaining to crisis cells, the authors of this paper aim to analyse the performance of organisations based on these crisis cells and suggest 4 primary factors which would enable systematic performance management. Further, it is stated that this model describes the functions and resources of the communal safeguard plan, thus enhancing the efficiency and effectiveness of crisis management cells.

(S. Goudami, 2020) The given research paper aims to analyse the benefits of innovations and updates in performance management systems of Government organisations through descriptive analysis by collecting primary data samples. Further the paper elucidates the recent trends in PMS and steps involved in performance management system thus providing a more quantitative outlook into the PMS landscape.

(Dr. Bernardus Franco Maseke, 2022) The research work aims to comprehensively analyse and gauge the effectiveness of performance management on employees along with measuring the awareness levels of performance management among the employees and managers by collecting

primary data. The findings made by the paper are that employees strongly vouch for performance counselling, require training to balance work and life, and wish to be provided with a defined career path in the organisation with them being rewarded based on their performance.”

### **Problem Statement**

During the COVID-19 pandemic from late 2019 to early 2022, the global economic landscape experienced a tumultuous phase. This research paper aims to explore the intricacies involved in Amazon Inc. navigating such a stage with utmost resilience by dynamically shaping their cost reduction strategies and their performance management strategies that were aimed at improving productivity, and enhancing profits while ensuring customer satisfaction, along with quantitatively & qualitatively analysing how Amazon Inc.'s pre-existing financial health supported them in successfully remaining economically stable.

### **Objectives**

To analyse the quantitative relation between gross profits and cost of goods sold between 2019 to 2023 and theoretically analyse the cost reduction strategies implemented by Amazon during the pandemic.

To quantitatively investigate the impact of Amazon's financial health (expressed in terms of certain accounting ratios) on its stability during the COVID-19 and post-COVID-19 eras.

To theoretically analyse how performance management practices impacted Amazon's employees during the pandemic and employee count trends during the pre-pandemic, in-pandemic and post-pandemic time frames.

To explore the trends in employee count and the quantitative relation between gross profits and employee count in Amazon Inc. during the pre-COVID-19 and COVID-19 time frames.

## Research Methodology

### Delimitation (Scope) of study :

This study is limited to secondary data collected from internet sources pertaining to Amazon's overall performance during the pre-COVID, COVID and post-COVID time frames with specific focus on the company's cost reduction strategies, the results, employee performance and their impact on gross profit along with how the performance management practices implemented by the firm impacted their employees during the COVID era.

Time frame : This paper is limited to a 5 year time period ranging between 2019 to 2023 based on the duration of the pandemic in the world and post-pandemic years.

Metrics : The quantitative metrics explored in this paper include financial ratios (Debt to equity, return on equity, current ratio and operating cash flow per share), gross profits, cost of goods sold and employee count.

Linear regression : This research employs univariate linear regression with the dependent variable being gross profits of Amazon Inc. and independent variable being cost of goods sold of Amazon Inc.

Graphical analysis : In this research work, bar graph and a scatter plot has been used to enhance data interpretation and drawing of subsequent inferences.

Correlation analysis : Correlation analysis is a

statistical method used to measure and assess the direction and degree of strength of the quantitative relationship between two or more variables. Correlation is given by coefficient of correlation which ranges from -1 to 1.

Trend percentage analysis : Also known as index numbers, trend percentages are used to compare current year values with base year values and gauge the degree, magnitude and direction of change.

Theoretical analysis : In this research paper, theoretical analysis of findings made has been employed to gain profound insights and facilitate elucidation of the insights gained in relation to the objectives of this paper.

**Data Collection and Source :** Secondary data from reliable websites as mentioned in the references section was obtained from internet sources based on relevancy and requirement.

### Data Presentation

To analyse the quantitative relation between gross profits and cost of goods sold between 2019 to 2023 and theoretically analyse the cost reduction strategies implemented by Amazon during the pandemic.

*Independent variable :* Cost of goods sold (in \$ billion); *Dependent variable :* Gross profits (in \$ billion)

**Table 1.1**

*Time period :* 5 years (FY2019-FY2023)

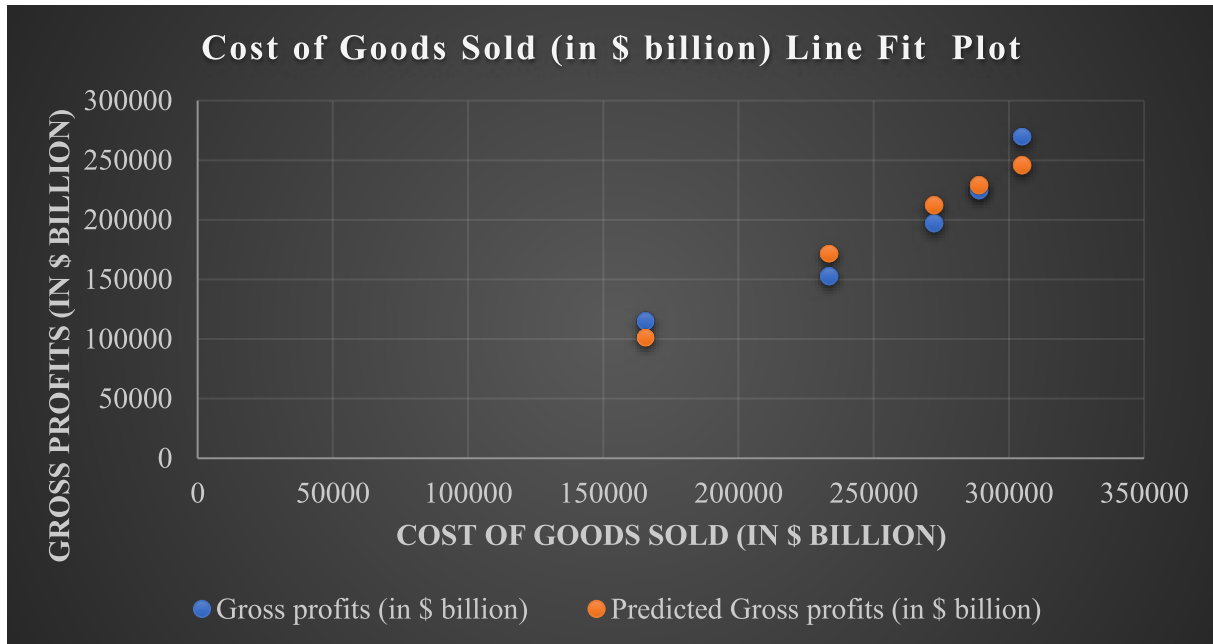
Years	Gross profits (in \$ billion)	Cost of Goods Sold (in \$ billion)
FY2019	114986	165536
FY2020	152757	233307
FY2021	197478	272344
FY2022	225152	288831
FY2023	270046	304739

**Table 1.2**

<i>Regression Statistics</i>	<i>Values</i>
Multiple R	0.952407466
R Square	0.907079981
Adjusted R Square	0.876106641
Observations	5

**Table 1.3**

<i>Particulars</i>	<i>Coefficients</i>
Intercept	-70433.76485
Cost of Goods Sold (in \$ billion)	1.037818193



**Graph 1.1**

A brief theoretical analysis of cost reduction strategies implemented by Amazon have been analysed in the next section.

To quantitatively investigate the impact of Amazon's financial health (expressed in terms of certain accounting ratios) on its stability during the COVID-19 and post-COVID-19 eras.

*Statistical method* : Correlation analysis

Correlation variables : Debt-to-equity ratio & Operating cash flow per share

**Table 2.1**

<i>Particulars</i>	<i>FY2020</i>	<i>FY2021</i>	<i>FY2022</i>	<i>FY2023</i>
Debt-to-equity ratio	0.3406	0.3526	0.4598	0.2889
Operating cash flow per share	2.6573	-1.9786	0.089	3.5078

**Table 2.2**

<i>Particulars</i>	<i>Debt-to-equity ratio</i>	<i>Operating cash flow per share</i>
Debt-to-equity ratio	1	
Operating cash flow per share	-0.519740068	1

Correlation variables : Current ratio & Operating cash flow per share

**Table 2.3**

<i>Particulars</i>	<i>FY2020</i>	<i>FY2021</i>	<i>FY2022</i>	<i>FY2023</i>
Current ratio	1.0502	1.1358	0.9446	1.0451
Operating cash flow per share	2.6573	-1.9786	0.089	3.5078

**Table 2.4**

Particulars	Current ratio	Operating cash flow per share
Current ratio	1	
Operating cash flow per share	-0.289791109	1

Correlation variables : Return on equity & Operating cash flow per share

**Table 2.5**

Particulars	FY2020	FY2021	FY2022	FY2023
Return on equity	22.837	24.134	-1.8638	15.0712
Operating cash flow per share	2.6573	-1.9786	0.089	3.5078

**Table 2.6**

Particulars	Return on equity	Operating cash flow per share
Return on equity	1	
Operating cash flow per share	0.014624826	1

*Debt to equity ratio* : This depicts “how much debt a company has, compared to its assets”

*Current ratio* : This ratio indicates “the level of liquidity of a firm, considering its short-term obligations”.

*Return on equity* : This ratio measures “the

profitability of a business in relation to its equity”.

*Operating cash flow per share* : This has been taken as the common variable in all the 3 correlations above as this is taken to be the metric of stability of the company considering relevance and availability of data. The metric can be computed as the net cash flow generated from a company’s core operations within a specified time period less preferred dividends divided by the total equity shares outstanding.

To theoretically analyse how performance management practices impacted Amazon’s employees during the pandemic and employee count trends during the pre-pandemic, in-pandemic and post-pandemic time frames.

*Statistical method used* : Trend percentage analysis & graphical analysis.

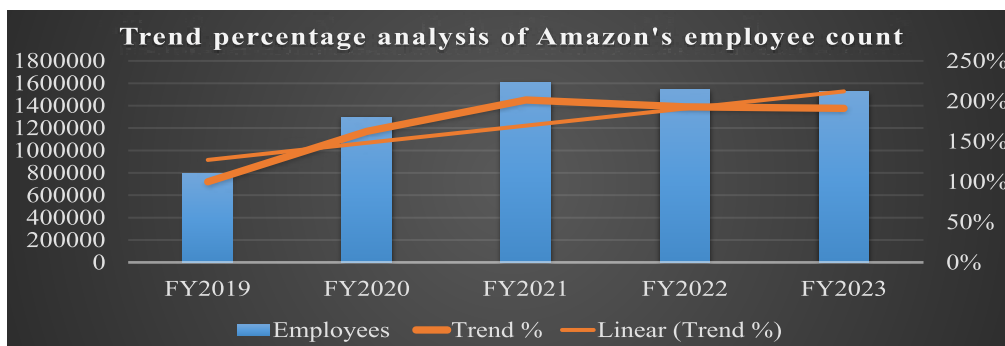
*Theoretical analysis* : The performance management practices implemented by Amazon Inc. in relation to its employees has been analysed.

Trend percentage analysis :

**Table 3.1**

Year	Employee count	Trend %
FY2019	798000	100%
FY2020	1298000	163%
FY2021	1608000	202%
FY2022	1541000	193%
FY2023	1525000	191%

**Graph 3.1**



To explore the trends in employee count and the quantitative relation between gross profits and employee count in Amazon Inc. during the pre-COVID-19 and COVID-19 time frames.

*Statistical method used: Correlation analysis*

*Variables used in correlation analysis: Employee count and gross profits*

Correlation :

**Table 4.1**

Year	Employees (000)	Gross profit (in \$ 000)
FY2019	798	114986000
FY2020	1298	152757000
FY2021	1608	197478000
FY2022	1541	225152000
FY2023	1525	270046000

**Table 4.2**

	Employees (000)	Gross profit (in \$ 000)
Employees (000)	1	
Gross profit (in \$ 000)	0.819392934	1

(Note : All the above tables and graphs are the author's own work using MS Excel software by employing secondary data obtained from secondary sources)

### Data Analysis

Table 1.1 delineates the temporal data pertaining to gross profits and cost of goods sold of Amazon Inc over 5 financial years, from FY2019-FY2023. Table 1.2 & Table 1.3 provide the regression statistics along with scatter plot Graph 1.1 that portrays the line of regression.

*Multiple R* : The coefficient correlation stands at 0.9524, which indicates a high degree of positive

correlation between the variables, thus making them directly proportional. The reasons for this intriguing and rare scenario are explored in the next section.

*R Square* : The coefficient of determination explains the degree of the variation in the dependent variable Gross profits of Amazon caused by the cost of goods sold. As per this data set, during the COVID-19, 91% is the likeness of impact on Gross profits of Amazon Inc. due to changes in the cost of goods sold.

Regression Equation pertaining to Amazon's data is computed as :

$$\text{Gross Profit (in \$ billion)} = 1.0378 * (\text{Cost of goods sold}) - 70433.76485$$

This implies that if gross profits are zero, then cost of goods sold would be \$ (70433.76485) and this serves as a testimony for the highly variable nature of the costs involved. Moreover, gross profit increases 1.0378 times to a corresponding increase in cost of goods sold.

Cost reduction strategies implemented by Amazon Inc during the pandemic (gathered from publicly available data published – since Amazon does not publish its cost cutting methods):

From the supply chain optimisation point of view, Amazon substantially focused on reducing its fixed business costs (marketing materials costs, expenses related to reallocation of resources, etc.) and it hired more temporary staff to handle the increased order volumes, thus allowing the firm to fulfil customer demands effectively.

The corporation optimised its warehouses to full capacity by ensuring maximum space utilisation along with optimising its delivery

routes to decelerate the time spent between delivering the orders of numerous customers.

The firm scaled back temporarily with its marketing expenses and postponed its non-essential capital expenditures, thereby also improving its liquidity position. Moreover, like most other companies, Amazon allowed remote work thus reducing physical office space associated costs.

Moreover, Amazon also streamlined its inventory by deprioritising non-essential items, and continued to employ energy-efficient technologies that not only contributed in reducing costs, but also in enhancing their sustainability practices.

(Note : The above list is not exhaustive, it is based on availability and relevance of information).

Table 2.1 depicts the temporal data of debt-to-equity ratio and operating cash flow per share ratio of Amazon Inc. over 4 financial years and Table 2.2 shows the correlation between the mentioned variables. It is found that the two variables under consideration exhibit a moderately negative correlation, with a correlation coefficient that stands at -0.519740068.

This implies that as the debt-to-equity ratio decreases, corresponding operating cash flow per share would increase. It is always better for the debt-to-equity ratio to not exceed 2.0 and as can be seen for the data in the table, Amazon has kept its debt levels well under control with it being 0.2889 in FY2023. This poses a potential for higher increase in operating cash flow per share, which is a positive sign for the company as it would serve as an impetus to boosting investor confidence.

Table 2.3 depicts the temporal data of current ratio and operating cash flow per share ratio of Amazon Inc. over 4 financial years and Table 2.4 shows the

correlation between the mentioned variables. It is found that the two variables under consideration exhibit a very low negative correlation, with a correlation coefficient that stands at -0.289791109. It can thus be said that the correlation between the aforementioned variables is not strong enough to arrive at a quantitative conclusion. This may be because of both the variables being influenced by a vast multitude of other factors that play a key role in shaping a company's financial dynamics.

Table 2.5 depicts the temporal data of return on equity and operating cash flow per share ratio of Amazon Inc. over 4 financial years and Table 2.6 shows the correlation between the mentioned variables. The correlation coefficient 0.014624826 and can be said to be a very weak positive correlation thus implying that a significant quantitative relationship cannot be constructed between the two and this may also be because of the metrics being impacted by a myriad of other factors such as profitability, capital structure, working capital management, dividends, operating efficiency, financial leverage, asset efficiency and so on.

(Note : It needs to be kept in mind that correlation does not imply causation, other factors may influence this quantitative relation).

Performance management practices implemented by Amazon pertaining to employees:

- Amazon Inc. invested over \$11.5 billion in COVID-19 related initiatives in 2020.
- The company also intensified its sanitation efforts, conducted periodic health audits, set up pilot sites for COVID-19 testing, installed thermal cameras and temperature checks along with providing 100 million+ masks, etc.

- Remote work, flexible shifts and fostering a work environment that encompasses respect, equality and fairness has been given prime importance to and served as a major motivation factor to the employees.
- Financial support and incentives worth \$2.5 billion was provided to the employees during the crisis along with increasing the wages and paid time-off. This would have provided the employees with the impetus to enhance efficiency and effectiveness. The employee headcount skyrocketed with a 34% increase over the year, reflecting the company's momentous growth.

All the above points serve as a testimony to Amazon's commitment towards substantially improving its employees' motivation & productivity, thereby fuelling higher profits for the business organisation.

(Note : The above list is not exhaustive, it is based on timely availability and relevance of information).

Table 3.1 delineates the trend percentage analysis of the number of employees in Amazon during the pandemic and in the pre & post-pandemic years and Graph 3.1 illustrates the same through bar graphs with a trendline. It is perceived that especially during the height of the pandemic in the years 2020 and 2021, the employee count has skyrocketed with the trend percentage reaching a staggering 202% as compared to 2019. However, after the decline in the pandemic's severity, the employee number has exhibited a slight decline, but it can still be said to be high as compared to its pre-pandemic phase.

Table 4.1 shows the employee count (which is seen to have accelerated during the pandemic and post

pandemic time frames) and gross profits during the pre-COVID-19 and COVID-19 eras and Table 4.2 shows the correlation between the aforementioned variables. It is observed that a strong positive correlation at 0.8194 exists between the number of employees and gross profit of the company. This means that if the employee count increases, the gross profit also increases by 80% and this may be because more customers can be catered to and the revenue hence generated is more than the labour costs incurred, and if the employee count falls, its gross profits would decline considerably.

## **Results and Discussion**

The highly positive correlation coefficient poses quite a rare and intriguing scenario. There could be several qualitative factors contributing to the same, such as higher production leading to higher variable costs, procurement of superior quality material and inventory valuation and adjustment practices. Moreover, gross profits depend on factors beyond the cost of good sold, such as pricing strategy, competition and demand. Considering Amazon's business operations, most costs are bound to be variable and hence can increase when the demand is high for such products & services (especially during the pandemic time).

Despite the correlation coefficient values, it is noteworthy to mention that these metrics indeed profoundly impact one another but not as a majority due to the numerous factors shaping the economic and financial scenarios of the firm. In other words, one financial ratio does not impact the other at a substantial amount, but along with other metrics, it indeed does influence it as an aggregate rather than individualistically.

Hence, each of the financial ratios need to be

computed and interpreted in order to gain a thorough outlook on the comprehensive financial landscape of the corporation. The decrease in ROE may be because of the extreme volatility stock markets experienced during the pandemic because investors becoming more risk-averse during crisis times. However, positive signs such as a reduction in debt-to-equity ratio to 0.2889 (implies a favourable leverage position), stability in the current ratio (implies a favourable liquidity position), and an increase in operating cash flow per share ratio to 3.5078 (implies a higher cash flow per share generated per outstanding common share) have also been observed.

The trend percentage analysis showcases the extreme demand for online shopping of Amazon's products & services that were of substantial importance during the crisis which was the result of the unavailability of offline purchases. Further, the slight decline in the employee headcount may be due to the termination of the severe phase of the pandemic and the reopening of offline purchase avenues, however, the demand can be said to still be high due to the upsurge in the company's gross profits; high employee number as compared to its pre-pandemic phase.

The strong positive correlation between the number of employees and gross profits may not always be true in the case of all the companies, however, since Amazon is an online retail platform that provides paramount delivery services and provides other services such as its cloud computing services, digital streaming services and so on. Moreover, it is also seen that during the pandemic timeline, the number of employees at Amazon has increased manifold and is continuing to increase further and this can be attributed to the market shift towards online shopping that occurred due to the onset of the pandemic and is seen to be

continuing till the present despite a certain amount of a dip in the number of employees.

## **Conclusion**

From the above findings, results and subsequent inferences, it can be concluded that performance management plays a pivotal role in maximising employee potential and driving organisational success as it boosts employee productivity, enhances goal alignment, provides a robust framework to streamline the development process along with enabling optimisation of costs in a rapidly evolving business landscape. Amazon Inc. has proved its prowess in strategizing and navigating crises with utmost resilience by constructing and implementing a robust performance management framework that aimed at satisfying the stakeholders and driving the company out of the economic downturn.

Further scope for research can be suggested to be:

Intra-industry, comparative analysis of performance management strategies of 5 firms.

Analysis of Amazon's performance management strategies during the 2007-2009 recession.

Inter-industry analysis of firms' performance management strategies.

The strategies of Amazon Inc. were indeed robust despite there being further scope for improvement. These can be regarded as a benchmark for some business operating in an industry with identical or similar services, thus contributing towards enabling them in navigating such crises successfully

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**CONTINUOUS QUALITY IMPROVEMENT IN COOPERATIVE BANKS  
(WITH SPECIAL REFERENCE COOPERATIVE BANKS IN MAHARASHTRA)****Dipak Y. Chacharkar\***

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***Abstract***

*Introduction – Quality Management practices adopted by cooperative banks located in Maharashtra are studied based on their preparations on continuous quality improvement and matching with today's banking needs and requirements.*

*Research Plan: Quantitative assessment framework to measure quality improvement implementation and outcomes. Developing comprehensive models and metrics focused on measurable indicators such as customer satisfaction, employee engagement, and operational performance relevant to the local banking landscape. The empirical research study conducted in Maharashtra is focused on Cooperative banks. Few banks are studied in 2025 based on structured interview schedule. CRM, Customer behaviour, AI integration with system for customer satisfaction is assessed based on operational performance. Data collected during study is analysed through various statistical bivariate and multivariate tools like correlation, regression, and cluster analysis.*

*Major observations: No bank so far has any third-party certification for it. Banks do adopt quality improvement initiatives like CRM, customer grievance handling. Limited use of technology and AI tools is ground reality of cooperatives. A well defined and measurable goal for its processes is grossly missing.*

*Research Outcomes: Also explored relevant intersections with AI and technology tools for CRM and productivity. Based on these observations a model is devised blended with, CRM, CSR, and AI integration. Pursuance for Customer delights going one step ahead of Customer satisfaction is the key.*

*Originality/value – Empirical evidence on the relationship between quality initiative and bank image building appears limited if not absent. Therefore, the findings provide insights for more nuanced interpretation of variables that affect bank risk.*

*Continuous Quality Improvement in Cooperative Banks (With Special Reference Cooperative Banks In Maharashtra)*

**Keywords:** *Cooperative Banks, Quality Management, Customer Delight, Customer Relationship Management, AI tools, Operational performance.*

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## **Introduction and Background**

Cooperative banks play a pivotal role in the rural and semi-urban economy of Maharashtra by providing accessible financial services to the underserved population. Maharashtra hosts a robust cooperative banking ecosystem, comprising 31 District Central Cooperative Banks (DCCBs) and 351 Urban Cooperative Banks (UCBs) as of March 2023, serving diverse community needs.

Quality Management is a well-established management philosophy that prioritizes customer focus, process-oriented strategies, ongoing improvement, and the active participation of employees. In the banking context, it serves to optimize service quality while maintaining regulatory compliance.

The Reserve Bank of India (RBI) has mandated guidelines encouraging cooperative banks to adopt quality management principles to enhance operational efficiencies and risk management. However, empirical evidence assessing quality management direct impact on cooperative banks in Maharashtra remains scant. Preliminary data highlights that the average Non-Performing Assets (NPA) ratio among these banks is 8.5%, while banks implementing quality management show improved financial health with NPAs at 6%.

This study intends to bridge this gap by with measurable indicators such as customer satisfaction, employee engagement, and operational performance relevant to the local banking landscape.

## **Literature Review**

Previous studies have highlighted the potential of quality management in improving service delivery and customer satisfaction in the banking sector.

Key contributions include:

Dr.Majeesh.T and Dr.Ashraf.E (2024), The results of this research revealed that TQM practices, including strategic planning rooted in TQM, service design, and information analysis, positively impacted client satisfaction.

AdefarakanAdejokeYetunde, Morro Krubally (2023)The results of this study indicated that the adoption of TQM practices results in improved financial performance. Additionally, the findings suggested that banks should foster a company-wide understanding of TQM implementation through management commitment, employee training, continuous improvement, and quality control measures.

EndangSungkawati (2020) found that Total Quality Management (TQM), which includes leadership, customer focus, continuous improvement, unity of purpose, and employee involvement and empowerment, is relevant in gender-oriented women's cooperatives. However, interviews and analyses indicate that not all TQM components effectively enhance the performance of management and employees in women's cooperatives.

Dian Awalia Ramadhanty<sup>1</sup>, MelyaUtami Putri<sup>2</sup>, Masduki Asbari<sup>3</sup> (2023) demonstrated that TQM is crucial for achieving managerial success in banks, leading to increased customer satisfaction. There exists a direct and reciprocal relationship between TQM and organizational performance, with effective organizational performance relying on an efficient system; thus, a comprehensive approach to quality management yields optimal outcomes.

A. Daragmeh, J. Barczy (2021) investigated the adherence to TQM practices within the banking

sector in Palestine. Their findings suggest that TQM practices are undervalued, and an ineffective leadership system poses a significant barrier to TQM implementation.

Chaturvedi, A. Solanki, M. (2020) examined the use of Total Quality Management techniques in the banking sector, focusing on employee perceptions. The research indicates that HDFC Bank executes total quality management significantly better than Baroda Bank.

Abu-Mahfouz, S. S. (2019) concentrated on establishing the conceptual framework for TQM practices and organizational performance by investigating the link between HRM practices and innovation.

Jong, C. Y. Sim, A. K. & Lew, Y. T. (2019), observed the relationship between quality management and project performance of construction organizations in Malaysia. It is proposed that to get a wide perspective, other developed and underdeveloped countries should be contemplated.

Mavaza, T., Halimani D., and Farai D. (2017), identified that the purpose of this study was to retrieve out how Total Quality Management can be used effectively by retail banks to increase their competitiveness given the increasingly fierce competition there industry.

Sayyad (2017) aimed to explore the connection between Total Quality Management (TQM) practices and company performance in Palestine, uncovering that TQM significantly enhances quality improvement efforts.

Similarly, Ayman Al-Bahri (2023) identified that TQM influences business sustainability, asserting that both total quality management and sustainability are crucial for the successful

performance of the National Bank of Oman. His findings indicate that TQM and sustainability positively affect organizations.

According to David Pangaribuan (2024), hypothesis testing indicates that both TQM and corporate governance positively influence the performance of cooperative managers, while TQM also positively affects corporate governance. TQM and corporate governance offer guidance, understanding, and awareness about the significance of product quality, services, and resources in cooperative management.

Pangaribuan (2024) Hypothesis testing shows results: TQM and Corporate governance have a positive effect on the performance of cooperative managers and TQM has a positive effect on corporate governance. TQM and Corporate governance provide guidelines, knowledge and awareness of the importance of product quality, service and resources in managing cooperatives.

Aakansha Singh (2022) Utilising a modified SERVQUAL model, this paper finds that customers of cooperative banks exhibit high expectations but often perceive a service quality gap; emphasises need for continuous quality improvement.

Seema Sharma (2021) Using SERVQUAL survey for 200 customers in Maharashtra, the study notes overall acceptable service quality but identifies specific gaps between expectations and perceptions—suggesting targeted improvements.

D'Amato, et.al (2024) Specifically, results highlight the consequence of employee training and, soft skill training. Banking industry has fortunate hard/technical training rather than soft/managerial subject. Banks to pay countless attention to worker skills, particularly the soft skills that their human resources must possess to

effectively caring for risks and, credit risk, theoretically and practically adopting risk-based thinking that is one of the pillars of the International Standard Organization (ISO) 9001:2015 and then exploiting TQM approach

Tandon, Sandeep, and Thakur, Anuradha (2012) highlight that while banks have streamlined their services, process design, and the speed of service delivery, and ensured records are maintained for seamless transactions via their websites, customers perceive bank employees as enhancing their technical proficiency in operations. Additionally, there is a concern among customers that their account information is not thoroughly safeguarded online. However, when it comes to customer focus, customers possess complete trust in the security and protection of their transactions.

Delahoz-Dominguez and colleagues (2024) conducted a comprehensive assessment of the quality performance of 25 banks in Colombia. Through the application of Six Sigma metrics, DEA models, and slacks analysis, they were able to identify the quality strengths and weaknesses of each bank. The analysis revealed that some banks excelled in aspects such as customer satisfaction, reliable service, and efficient processes, while the majority still had room for enhancement, particularly regarding response times, channel efficiency, fraud prevention, and credibility. By employing Six Sigma metrics like DPMO and sigma level, the study provided a benchmark for each bank's quality performance against global standards, enabling the setting of ambitious improvement targets.

### **Research Gap**

Banks understand quality management benefits in banking, a critical research gap persists in measuring its impact on moral boosting of

stakeholders and productivity. In Cooperative sector there is a marked absence of specific empirical data on the actual extent of quality management adoption, its perceived effectiveness, and, crucially, its measurable impact within the cooperative banking sector of Maharashtra.

There is a significant research gap involving an in-depth, quantitative assessment framework to measure quality management implementation and outcomes. This study intends to bridge this gap by developing comprehensive models and metrics focused on measurable indicators such as customer satisfaction, employee engagement, and operational performance relevant to the local banking landscape.

### **Research Questions**

- A. What are the key quality management dimensions influencing overall bank performance?
- B. Are there identifiable clusters among cooperative banks based on TQM practices?

In India, research has predominantly focused on quality management in nationalized and private sector banks. Limited literature exists on cooperative banks, particularly in the regional context of Maharashtra.

### **Objectives and Hypotheses**

#### **Objectives**

- To examine the extent of Quality Management implementation in cooperative banks.
- To identify clusters of cooperative banks based on quality management practices.

- To assess the connection between quality management dimensions and organizational performance indicators.

### **Hypotheses**

- **H<sub>01</sub>:** Quality management implementation does not have a significant association with customer satisfaction in cooperative banks.
- **H<sub>02</sub>:** Quality management practices are not significantly correlated with operational performance.
- **H<sub>03</sub>:** Cooperative banks do not differ significantly based on their TQM cluster classifications.

### **Methodology**

#### **Research Design**

This study employs a quantitative, descriptive, and analytical research design. Primary data were gathered using a structured questionnaire administered to employees of selected cooperative banks in Maharashtra.

#### **Sample and Data Collection**

- **Sampling Method:** Convenience sampling. Considering the issues related to get the authenticated data Non Probability Convenience sampling is used
- **Sample Size:** A Convenience sampling technique utilized to select a representative sample of 30 senior banks managers or any key employee of cooperative banks across major cities in Maharashtra are sample unit. These interviews provided valuable qualitative insights, enriching the quantitative findings with contextual depth and nuanced

understanding.

- **Data Collection Tools:** Primary data was meticulously collected through structured questionnaires administered in 2025. These questionnaires open and closed ended questions. Employed a 5-point Likert scale to measure various TQM dimensions and organizational performance indicators. Respondents are asked to select the option which best suited as per their perception.

#### **Statistical Tools**

- **Descriptive Statistics:** Percentage and frequencies were calculated to summarize the collected data, providing an initial overview of the quality management implementation landscape and performance metrics.
- **Correlation Analysis:** To examine relationships between quality management variables and performance metrics.
- **Cluster Analysis:** To identify patterns and group cooperative banks based on similarities in TQM practices.

#### **Data Analysis and Interpretation**

##### **Awareness About Quality Management**

Table 6.1 Portray, majority respondents are well acquainted with concept quality management. This implies that banks under study are aware pool of employees for quality management implementation.

##### **Source Of Awareness About Quality Management**

Table 6.2 Portray, source of awareness includes banks imitative on quality improvement. However complete adoption of quality management is

grossly absent. Training initiative of banks are one of the key source of quality management understanding

#### Implementation Of Quality Management

Table 6.3 Portray, majority of respondents affirmatively responded to the questions. However when Assessed Further Its Not quality management But Quality Control Initiatives Are Adopted By The Banks Under Study.

#### Adoption Of Continuous Improvement Policy Of Quality Management

Table 6.4 Portray, majority of respondents affirmatively responded to the questions. But again its not completely based on quality management approach but Quality Control initiatives adopted by the banks under study.

#### Auditors Opinion On Financial Management Through Policy Implementation Of Quality Management

Table 6.5 Portray, auditors are key observer of financial health of the banks. When asked about auditors opinion about implementation of quality management over Financial Management of bank, it is reported negatively. This is one of the important observations where quality management approaches used by banks seriously lagging on key attribute. Serious dialogue of Management Committee is needed on it.

#### Training to the Employees for quality management implementation

#### QM Implementation

		Frequency	Percent	Valid Percent	e Percent
Valid	6.00	1	3.3	3.3	3.3
	7.00	2	6.7	6.7	10.0
	9.00	1	3.3	3.3	13.3
	10.00	5	16.7	16.7	30.0
	11.00	4	13.3	13.3	43.3
	12.00	4	13.3	13.3	56.7
	13.00	9	30.0	30.0	86.7
	15.00	4	13.3	13.3	100.0
	Total	30	100.0	100.0	

The total count on four questions is 15. So score on this attribute will vary from 1 to 15. One is lowest and 15 are highest and desirable. Majority 57 percent bank scored very high score (12) on this attribute . It implies banks are better off in imparting training on Quality Management. However, it is observed that Quality Management used as synonym as Total Quality Management.

#### Technology use for Quality Improvement

##### Use of technology for Quality Improvement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5.00	1	3.3	3.3	3.3
	7.00	8	26.7	26.7	30.0
	8.00	7	23.3	23.3	53.3
	9.00	3	10.0	10.0	63.3
	10.00	6	20.0	20.0	83.3
	12.00	2	6.7	6.7	90.0
	13.00	1	3.3	3.3	93.3
	14.00	1	3.3	3.3	96.7
	16.00	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

The total count on four questions is 16. So score on this attribute will vary from 1 to 16. One is lowest and 16 are highest and desirable. Majority 84 percent bank score very low score (10) on this attribute. Banks under study is seriously lagging in use of modern day technology for quality improvement. Cooperative banks a banking solution to socially deprived class and unbankable

population and also to attract new consumers need modern tools as product offerings. Thanks to vast use of mobile irrespective of class.

### CRM Policy Count of Banks

#### CRM Policy

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 9.00	2	6.7	6.7	6.7
10.00	3	10.0	10.0	16.7
11.00	5	16.7	16.7	33.3
12.00	3	10.0	10.0	43.3
13.00	8	26.7	26.7	70.0
14.00	4	13.3	13.3	83.3
15.00	2	6.7	6.7	90.0
17.00	2	6.7	6.7	96.7
18.00	1	3.3	3.3	100.0
Total	30	100.0	100.0	

The total count on four questions is 26. So score on this attribute will vary from 1 to 26. One is lowest and 26 is highest and desirable. Majority 70 percent bank score very low score (13) on this attribute. Banks under study is seriously lagging in use of modern day CRM for quality improvement. Customer is a king and need to be treated like it. Customer Relationship Management now a days are indispensable part of marketing strategy for appealing new clients and retaining presented customers.

### Non Parametric Correlation between Employee Motivation and Customer Grievance Handling

#### Correlations

			NN	MM
Spearman's rho	NN	Correlation Coefficient	1.000	.488**
		Sig. (2-tailed)	.	.006
		N	30	30
	MM	Correlation Coefficient	.488**	1.000
		Sig. (2-tailed)	.006	.
		N	30	30

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The above table indicate moderate correlation between Employee Motivation and Customer Grievance Handling. Also this correlation is statistically significant at .01 of significance level. It indicates employee motivation is important for handling customer grievances aptly.

### Non Parametric Correlation between Digitalization and CRM score

			CRM	Digitalization
Spearman's rho	CRM	Correlation Coefficient	1.000	.630**
		Sig. (2-tailed)	.	.000
		N	30	30
	Digitalization	Correlation Coefficient	.630**	1.000
		Sig. (2-tailed)	.000	.
		N	30	30

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The above table indicate moderate correlation between Digitalization and CRM score. Also this correlation is statistically significant at .01 of significance level. It indicates digitalization is playing an important role in developing a good rapport with customer. In today's competitive market maintaining a strong customer base is altogether important.

### Cluster Analysis

#### Number of Cases in each Cluster

Cluster 1	10.000
Cluster 2	20.000
Valid	30.000
Missing	.000

#### ANOVA

	Cluster Mean Square	df	Error Mean Square	df	F	Sig.
QTOTAL	16.017	1	1.148	28	13.949	.001
AABBDEE	91.267	1	2.775	28	32.889	.000
GGHHIIJMMO OPP	72.600	1	2.704	28	26.853	.000

**Final Cluster Centres**

	Cluster	
	1	2
QTOTAL	3.20	1.65
AABBDDEE	11.50	7.80
GGHHIIJMMO OPP	14.90	11.60

The final cluster table indicates cluster centre values on Facilities provided by banks (QTOTAL), Use of technology component (AABBDDEE), and CRM Initiative (GGHHIIJMMOOPP) are on higher side. It indicates banks categorized in Cluster 1 are more prepared for TQM compared with Cluster 2. Ten such banks (10) are categorized in Cluster 1. 20 banks out of thirty are laggards on TQM front.

**Quality Management Model for Cooperatives**

Cooperatives are based on the principles of collaboration, trust, and welfare or equity holders. Quality management principles blend with unique spirit of cooperatives is the basis of this model. The model blend CRM, Customer behaviour, AI integration with system approach. Banks constantly pursuing for Customer delights a one step ahead of Customer Satisfaction. Importantly quality goals have to be aligned with organisation vision and mission.

Generally speaking banks are striving hard for few important results through its TQM Process viz; Customer Delight, Brand Building, and Profits/Benefits for all stakeholders. The system approach results in better and faster product and services with faster resolution and support. This approach develops employees on high morale and ownership. System has to be unique for every other bank depending on the functions and vision & mission of the bank. Standard Operating

Procedure (SOP) for all functional areas are documented in the form of Manuals. Operations of the bank will be little wayward if it is not guided by Vision and Mission statement/s of the bank. Hence specific Vision and Mission statements are needed to be devised.

Different participants has different role to play in quality management implementation in the bank.

Namely, the Board of directors and Management committee of the bank is an apex body for decision making. They oversee the policy implantation and governance. They take the responsibility of designing Quality Management Policy, Vision and Mission statement, and underlying objectives. TQM implementation in line with core principles of the banks in principle is prerequisite are important.

Employees like CEO, GM, and Branch Manager execute decisions taken by Management committee and develop operational plans key for delivering frontline services and also maintaining quality standards and customer relations.

They are Customers / Members are owners and service users in cooperative banks. They help in shaping services also. Members evaluate adherence to compliance to standards and norms, and give suggestion, from time to time on different forum.

Regulatory authorities namely RBI, MABARD, various State Government are the watchdogs. Regulatory bodies roll out banking and audit norms for good governance and transparency. It ensures/encourages adoption of quality practices.

Society in general has the representatives keeping activities of bank under lens.

Cooperative principles and quality management Democratic Control demand participation of Stakeholders in decision making, education and up skilling of employees develop quality for the Banks in all its processes. Cooperatives want to project itself as humble servant to the society

ISO 9000 is awarded by International Organization For Standardization, validate quality system of an organisation. Its role as third party ensures continuous improvement. Make banks responsible for improvement and institutionalized

Employers take a role of constituting Quality improvement and Reviews. Updating is the role of middle level management. Tools may be developed by front line employees.

Open and continuous flow of information, suggestion is necessary for product designing and improvement and delivery is designed keeping customer at its centre. Exchanging facts are essential to get real time feedback from beneficiaries

### **Key components for effective implementation of TQM include:**

Compliance with standards of regulatory bodies

ISO 9000 and other such certification

Use of six sigma approach

Effective Grievance and complaint handling system

Effective use of techniques of CRM & CSR

Niche marketing for reaching to unbankable

population

AI tool for data analysis and decision making

Regular consumer audits and keeping close of watch on Key Performance Indicators

### **Concluding Remarks**

#### Quality Management Implementation

- High awareness of TQM among managerial staff but partial implementation at operational levels.
- Variability in customer-centric practices and continuous improvement processes.

#### Correlation Analysis

- Strong positive correlation ( $r = 0.72$ ) between customer focus and customer satisfaction.
- Moderate correlation ( $r = 0.58$ ) between leadership commitment and operational efficiency.

#### Cluster Analysis

- **Two distinct clusters identified:**
  - Cluster A: High-performing banks with robust TQM practices.
  - Cluster B: Low adoption and minimal impact on performance.

The study confirms that effective TQM implementation significantly enhances operational and customer service performance in cooperative banks. However, uniformity in adoption and execution is lacking. Banks with strategic leadership and focus on continuous improvement show better outcomes.

### Suggestions

- Conduct regular TQM training for staff at all levels.
- Establish clear performance metrics aligned with TQM principles.
- Foster a culture of quality and customer-centricity.
- Encourage benchmarking and sharing of best practices across banks.

### Limitations

- Geographical limitation to Maharashtra may not generalize findings nationally.
- Limited sample size and reliance on self-reported data may affect objectivity.
- The cross-sectional type of the study does not capture longitudinal impacts.

### Future Scope

- Comparative studies with nationalized and private banks.
- Longitudinal studies to assess long-term impacts of TQM.
- Development of a TQM implementation framework specifically for cooperative banks.

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## Annexure

Table 6.1 AWARENESS

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1.00	2	6.7	6.7	6.7
2.00	6	20.0	20.0	26.7
3.00	9	30.0	30.0	56.7
4.00	13	43.3	43.3	
Total	30	100.0	100.0	

Note: 1. Don’t Know, 2. Heard about it, 3. Have some knowledge about it, 4. Know it in details

Table 6.2 - H

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1.00	13	43.3	43.3	43.3
2.00	3	10.0	10.0	53.3
3.00	2	6.7	6.7	60.0
4.00	9	30.0	30.0	90.0
5.00	3	10.0	10.0	100.0
Total	30	100.0	100.0	

Note: 1. Bank Adopted it , 2. Bank is planning to implement it, 3. Knows about it from colleagues discussion, 4. Got training on it 5. Self Learning

Table 6.3 - I

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1.00	22	73.3	73.3	73.3
2.00	4	13.3	13.3	86.7
3.00	4	13.3	13.3	100.0
Total	30	100.0	100.0	

Note: 1. Yes , 2. No , 3. Not very sure

Table 6.4 - J

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1.00	27	90.0	90.0	90.0
2.00	3	10.0	10.0	100.0
Total	30	100.0	100.0	

Note: 1 Always , 2. Sometimes , 3. Never

Table 6.5 - R

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1.00	2	6.7	6.7	6.7
2.00	1	3.3	3.3	10.0
3.00	4	13.3	13.3	23.3
4.00	23	76.7	76.7	100.0
5.00	0	0	0	100.0
Total	30	100.0	100.0	

Note: 1. Very Positive, 2. Positive, 3. Neutral, 4. Negative, 5. Very Negative

**SOCIAL MEDIA ADDICTION AND SELF-ESTEEM IN COLLEGE STUDENTS:  
EVALUATING FEAR OF MISSING OUT AS A NON-SIGNIFICANT MEDIATOR****Ekta Jiyani, Rahoulraj Singhi & Richa Chaudhary\***

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**Abstract**

*The current study examines how social media dependency affects self-esteem in Indian college students and young adults, with a particular emphasis on the mediating function of FOMO. Given how common social networking sites are, it is now crucial to comprehend how excessive use impacts mental health. A Google Form survey was used to gather information from 52 participants in a cross-sectional study design. Three standardized psychometric tools were employed: the Rosenberg Self-Esteem Scale (RSES) to measure self-esteem, the Bergen Social Media Addiction Scale (BSMAS) to gauge social media dependence, and the Fear of Missing Out Scale (FOMOS) to gauge FOMO levels. Age criteria for participants were 18 to 25 years of age. The purpose of the study is to present empirical data from an Indian sample, highlighting the psychological impacts of excessive social media use on emotional well-being and self-perception. All the participants could access the google form link via their phones or laptops, the questionnaire took around 8-10 minutes to complete. After the data was collected, an excel sheet was created to sort and measure the responses. All of the three scale were on 5-point Likert scale. The data analysis was conducted through SPSS. If there were any incomplete responses the data of that participant was not taken into consideration.*

**Keywords:** *College Students, Indian Sample, Self-Esteem, Social Media Addiction, and Fear of Missing Out (FOMO)*

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**Introduction**

In today's generation, social media platforms are an essential part of everyday life. They provide multiple ways for people to communicate, express themselves, entertain themselves and more. Social media refers to online platforms that allow users to create and share content, interact with others, and stay connected in real time. These platforms are deeply integrated into the lives of young adults

around the world, offering a space for interaction, communication with friends and family, and the building of social identities. The widespread availability of smartphones has made social networking apps like Instagram, Facebook, TikTok, Snapchat, and WhatsApp easily accessible, creating environments that are highly engaging and conducive to constant interaction and information exchange. However, the excessive use of these platforms has raised

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psychological concerns. This is especially common among college students and young adults. Research has shown that overuse of social media can lead to negative psychological effects such as social comparison, emotional instability, and lower well-being, as discussed in studies by Buran Köse & Doğan, 2019 and Servidio, 2024.

As digital culture continues to grow, more attention is being given to the issue of excessive social media use. It is now widely accepted as an addictive behavior, characterized by compulsive engagement, mood changes, withdrawal symptoms, and a loss of control, as described by Servidio, 2024. Studies by Buran Köse & Doğan, 2019 and Servidio, 2024 have found a strong link between heavy social media use and increased levels of stress, anxiety, depression, and lower life satisfaction. Research indicates that younger adults are more likely to experience problematic usage due to long hours spent online, constant self-comparison, reliance on online relationships, and sensitivity to peer judgment.

Self-esteem is a key psychological factor in this context. According to Rosenberg (1965), self-esteem refers to how individuals view their own worth, value, and ability. Research shows that exposure to idealized content on social media increases the tendency for self-comparison. Buran Köse & Doğan, 2019 suggest that young adults and college students are particularly vulnerable to these effects because they are dealing with academic pressures, identity development, and a desire for social acceptance. These factors can heighten the need for comparison and increase feelings of fear of missing out (FOMO), even though there is limited evidence on how FOMO specifically affects the mental health of Indian college students.

FOMO is a psychological concept that refers to the

persistent worry that others may be experiencing something rewarding while the individual is not. It stems from unmet needs such as autonomy, competence, and belonging. According to literature on FOMO, individuals who feel their psychological needs are not being met often turn to social media for compensation. They constantly check their phones, stay updated, and connect with others to gain social validation and feel good about themselves. This behavior leads to compulsive scrolling, checking, and comparing, which in turn reinforces the cycle of addictive social media use. For many young adults and college students, social media has become a psychological safety net where they seek peer approval and constantly update themselves, creating a reinforcing cycle of over-engagement online.

Young adults and college students are key groups in such studies because their heavy use of social media can lead to significant psychological effects. Research conducted in various countries, including Indonesia, India, and Turkey, has found that college students often report stronger feelings of FOMO, which can make them more vulnerable to problematic social media use. This was noted in studies by Buran Köse & Doğan, 2019, Servidio, 2024, and Weaver & Swank, 2021. College students are more susceptible to these effects because they are in a critical phase of life where identity is being formed, they face academic stress, and they want social acceptance. At the same time, they seek connection with peers online and have easy access to smartphones. These factors together create a need for belonging, constant digital engagement, and sensitivity to peer approval. This leads to frequent self-comparison and the anxiety of feeling left out or missing out. India has also experienced a rapid increase in these issues, and this study aims to examine the impact of social media addiction and the role of fear of missing out on self-esteem among the Indian population. There

is a growing relationship between social media addiction, fear of missing out and self-esteem which have gained attention from a lot of researchers globally. According to research conducted by Servidio, 2024 suggested that fear of missing out strongly predicts the problematic usage of social media and also has an impact on two psychological processes that is social media comparison and self-esteem. A few empirical evidences by Weaver & Swank, 2021 have also reported that people who experience stronger feelings of fear of missing out have a tendency to engage more actively in frequent comparison and reassurance seeking behaviors which can lead to an increase in problematic usage of social media. On the basis of empirical evidences, they suggest a repeating cycle where students are often constantly exposed to social media and it leads to feelings of social comparison and this constant comparison leads to higher feelings of fear of missing out and reinforces the idea of problematic usage of social media. When the feelings of fear of missing out are intense, it results in unhealthy engagement on social media.

There are a lot of researches conducted on this topic globally and in different cultures, but there is still very limited research is conducted on Indian college students. In today's world, India is world's fastest growing digital population and a major part of this rapid transformation are young adults of India. With the increase in academic pressure, societal expectations, strong emotional impact of social comparison and constant external validation and a need for social connectedness causes Indian college students to become more vulnerable. Understanding how all these three factors play an important role when it comes to fear of missing out, social media addiction and self-esteem upon interacting with Indian population can help us predict and identify some warning signs and can help in tailoring mental health support groups,

prevention strategies for effective consumption of social media.

Therefore, the current study is aimed to examine the relationship between social media addiction, fear of missing out and self-esteem among Indian population of college students. The present study will address the gap and help provide insights on how our digital or social media habits shape our psychological well-being and suggests that there should be a need off effective social media consumption specially across young adults age group.

### **Literature Review**

There has been a rapid increase in social networking platforms which plays an important role in shaping the identity, maintain a sense of social belongingness and engage in social comparison among college students or young adults. In particular, the college students are uniquely that population which is vulnerable to shifts like occupying a developmental phase which is characterized by identity formation, heightened relational needs and an increased dependence on technology-mediated interaction, a finding by Arnett, 2000. Social media has become a part of our daily routines because of which there are certain concerns that have emerged regarding the psychological impact of social media addiction, fear of missing out (FOMO), and self-esteem. The three factor constantly interact with each other, however studies on them have remain fragmented, inconsistent and at times dependent on context. Griffiths, 2005 has identified that social media addiction is a kind of a behavioral addiction which is marked by compulsive engagement, emotional dependence, and an inability to regulated use despite of negative consequences. Excessive usage of social media can undermine academic productivity, disrupt sleep, impair concentration,

and increase in social comparisons with people online who portray idealized versions of their lives. Such usage of patterns of social media increases the vulnerability of a psychological construct called fear of missing out (FOMO), it was a concept explained by Przybylski, 2013. It is defined as a pervasive apprehension that others are experiencing more rewarding events in one's absence which is also accompanied by a social desire to stay connected. Fear of missing out is an increasingly salient phenomenon which is constantly increasing among young adults, with the prevalence rates ranging from 40% to 72% in large scale surveys conducted by Abellana, 2024. This phenomenon is now widely accepted as a cognitive-emotional response which is usually shaped by social needs, vulnerabilities of individuals and such social media environments which intensify the upward comparison.

Self-esteem is defined as an individual's global evaluation of self-worth by Rosenberg, 1965. Self-esteem as a concept has been both theorized as an antecedent and the potential consequence of fear of missing out. A lot of empirical studies have provided a mixed-evidence, some report that fear of missing out has a negative association with self-esteem whereas others report having non-significant. Because of such inconsistent results, there is a need of a proper thematic analysis of the researchers or evidences available. There are numerous studies conducted to understand the relationship between social media addiction and fear of missing out, key findings of most of these researches are that social media addiction is not only a behavioral outcome because of excessive engagement but it is caused by unmet psychological needs, emotional vulnerabilities and the way social media has been designed in a structure that fuels the need to check it compulsively.

A study conducted by Wahyuni & Maksum, 2020, emphasized on investigating fear of missing out driven related behaviors among Indonesian college students. It focused on consequences caused in real life because of excessive use of social media. This study suggested that because of excessive engagement of social media there are psychological impact because of fear of missing out. It was found that fear of missing out influences people to indulge in risky behaviors and also compulsively checking their phones. Such behavior reflects the compulsion involved. Wahyuni & Maksum, 2020, reported that individuals who are majorly driven by fear of missing out engage more in compulsively checking their phones, struggles to disengage and has emotional urgencies as well. These all behaviors are diagnostic symptoms for behavioral addiction.

A cross-sectional survey was carried out by Tanrikulu and Mouratidis in 2023 to assess social media addiction, academic performance, and fear of missing out, using validated Likert-type scales. The tools used in the study included the social media addiction scale, the fear of missing out scale developed by Przybylski in 2013, and academic self-reports. The key findings showed a strong connection between being extrinsically motivated to use social media and higher levels of fear of missing out. People who were driven by external factors such as approval, validation, and social acceptance from others were found to have higher levels of social media addiction.

An online correlational study was conducted by Boustead and Flack in 2021 to measure negative psychological outcomes linked to compulsive social media use. The key findings indicated that higher social media addiction was associated with increased fear of missing out, anxiety, and sleep disturbances. Another study by Tandon in 2021,

which used a cross-sectional survey of adults, employed the fear of missing out scale and a validated social comparison tool to examine how social media use leads to fear of missing out and social comparison, and how these psychological processes affect emotional well-being in adults. The key findings suggested that social media addiction was positively linked with fear of missing out and also partially explained social comparison tendencies. It was reported that individuals who frequently compare themselves to idealized versions of others on social media tend to have higher levels of fear of missing out and engage compulsively online. Overall, all these studies consistently show a link between higher levels of social media addiction and higher levels of fear of missing out. There is an increase in excessive engagement, compulsive behaviors, and unmet psychological needs. These factors contribute to a cycle where fear of missing out serves as both a driver and a result of higher social media addiction.

Fear of missing out is considered a psychological construct that arises from hyperconnectivity. However, there is empirical evidence suggesting a negative association between fear of missing out and self-esteem, indicating that fear of missing out may be a sign of emotional vulnerability or insecurity. Some studies with large and diverse samples have found weak or statistically insignificant relationships. In a study by Boustead and Flack, 2021, a correlational online survey was used to explore the negative psychological outcomes linked to higher levels of fear of missing out and compulsive social media use. Participants were assessed using the fear of missing out scale, sleep quality index, and emotional health questionnaires. The key findings reported that higher levels of fear of missing out were linked to increased anxiety, lower emotional stability, and disrupted sleep patterns. However, in this study,

self-esteem was weakly related and not given much significance compared to other factors like social comparison, compulsive checking, and anxiety. The results showed that fear of missing out had a stronger influence on psychological distress than on self-esteem.

Tandon, 2021 conducted a research study using a cross-sectional survey design with adult participants. Participants were measured using the social comparison orientation scale and emotional well-being scale. The key findings indicated that fear of missing out was significantly related to social comparison, but the association with self-esteem was weak and inconsistent. The researchers concluded that fear of missing out was more consistently linked with social comparison anxiety than with self-esteem. Overall, based on the empirical evidence from these studies, fear of missing out tends to align with lower self-esteem and is often driven by social comparison and the need for social belonging and validation.

Social media addiction and self-esteem are two important variables in digital psychology and are often debated. Theoretical frameworks suggest that excessive use of social media can impact an individual's self-esteem. However, few empirical studies challenge this, with findings indicating a weak or non-significant relationship between social media addiction and self-esteem. A study was done by Zainuddin et al., 2022 which included a sample of 381 Malaysian students, they collected a questionnaire of demographic details, used Rosenberg self-esteem scale and also measure social media addiction. The authors decided to use the total times used on social media as a predictor or an indicator of social media addiction. Findings of this study reported that there was an insignificant relationship between social media addiction and self-esteem. With the help of regression, it suggested that even after high usage

of social media there was a very weak relationship, self-esteem remained stable. The key findings of this study reported that social media addiction predict a few factors like fear of missing out, having anxiety and impulsivity but did not significantly impact self-esteem. Zainuddin, 2022 did a study by examining how different usage patterns of social media affect an individual's self-esteem. Researchers made different categories of low, moderate and high and allotted them depending on an individual's daily usage of social media. It was found out that social media addiction however, did not predict self-esteem of an individual, study also reported that self-esteem is more impacted by relational or emotional factors rather than social media addiction.

Overall, the findings suggested that self-esteem was largely unaffected by social media addiction. However, theoretically it predicted a strong relationship but empirical evidences predicted that self-esteem is a different concept which is relatively stable and suggests a weak relationship between the two variables.

### **Research Gap**

- Limited evidence on Indian population- most of the empirical evidences available on social media addiction, self-esteem and fear of missing out are based on western population or South East Asian, it is very limited for Indian population.
- Inconsistent key findings- most of the studies available has provided mixed findings, some suggesting significant and some insignificant findings, further highlighting the importance examining the relationship again.
- Overemphasize on time spent on social media- most of the studies online has studied only the duration of social media use or

assessing addiction like symptoms, where the focus of study should be psychological impacts for better results.

- Fear of missing out is very rarely tested as a mediating factor- there are a lot of studies available which links the relationship of fear of missing out and social media addiction and self-esteem individually, which narrows down the research a little specially among young adults or college students.

### **Methodology**

#### **Aim**

The present study aims to examine the relationship between three variables, social media addiction, fear of missing out and self-esteem among the age group of young adults or university students.

#### **Objectives**

- To investigate and examine if there's any meaningful association between fear of missing out and social media addiction among Indian college students or young adults. It has been theorized that there is an association because of unmet psychology need, the objective is to provide empirical evidence for the same.
- To measure whether social media addiction has a meaning or a significant association with self-esteem.
- To determine or evaluate whether fear of missing out has a significant association with self-esteem, this objective helps in investigating whether fear of missing out has a direct psychological impact on our global self-esteem or is it influenced because of other things.

- The major objective of this study is to provide a well-empirical, grounded evidence that helps strengthen the understanding of social media or digital behavior and psychological impact on the well-being of Indian college students.
- The objective is also to cover the substantial gap to make it more generalizable on Indian population.

### **Hypotheses**

- Hypothesis 1- Higher social media addiction will be associated with higher levels of fear of missing out.
- Hypothesis 2- Fear of missing out will not show a significant association with self-esteem among Indian college students.
- Hypothesis 3- Social media addiction will not significantly predict self-esteem among college students.

### **Research design**

A quantitative cross-sectional correlation design was used for the study. This design was used in order to make meaningful association between the three variables that is social media addiction, fear of missing out and self-esteem. This kind of research design was employed because it helps to measure three psychological constructs simultaneously and to determine if there's any predictive relationship between the three variables with actually manipulating them. The relationship between three variables were evaluated with the help of standardized and validates psychometric tools, and this design was suitable for the sample recruited for the study.

### **Sample**

The research was conducted with the help of a non-probability convenience sampling with some elements of purposive sampling. The participants ages were between 18 to 25 years. Data was collected with the help of google form and included questions of validated and standardized psychometric tools, it was sent to the students of Auro University, Surat, Gujarat. Google forms were circulated through WhatsApp groups, academic groups or peer groups. Convenience sampling was used because of the accessibility of the college students around the campus, because they are the ones who are highly active on social media.

A total of 51 participants agreed to participate in the study, their responses were collected, although the sample size is quite small, but it was adequate to measure three different psychological constructs simultaneously that is social media addiction, fear of missing out and self-esteem.

### **Inclusion criteria**

- The study includes students aged between 18 and 25 years.
- Participants are students currently enrolled in a course or affiliated with a university.
- They use at least one social media application regularly.
- Participants must be able to understand and read English.
- Students who have given their voluntary consent to take part in the study.

### **Exclusion criteria**

- Individuals who were below the age criteria of 18-25 years.

- Students who were not enrolled in a course of university.
- Students who were not an active user of any social media application.
- Students who filled incomplete responses on the google form.

### **Procedure**

Data of respondents was collected through a google form which included validated and standardized psychometric tools to examine social media addiction, fear of missing out and self-esteem. Tools used were Bergen social media addiction scale, Fear of missing out scale and Rosenberg self-esteem scale. Google form included an informed consent question, questions regarding their demographic, average time spent on social media throughout a day and three standardized scales.

All the participants could access the google form link via their phones or laptops, the questionnaire took around 8-10 minutes to complete. After the data was collected, an excel sheet was created to sort and measure the responses. All of the three scale were on 5-point Likert scale. The data analysis was conducted through SPSS. If there were any incomplete responses the data of that participant was not taken into consideration.

### **Measures used**

To examine and investigate the relationship between three variables that is social media addiction, fear of missing out and self-esteem. Three standardized, validated and reliable psychometric tools were used to ensure proper examining of the variables.

- Bergen Social Media Addiction Scale

(BSMAS)- Bergen social media addiction scale was developed by (Griffiths, 2005) and it is 5-point Likert scale and has 6 items in total. The scale is designed to measure the core aspect of behavioral addiction in the relation to social media. The six items here are measuring different features like tolerance, withdrawal, mood modification, relapse, salience and conflict. If an individual scores higher on the scale, it suggests that they have greater level of social media addiction. The internal consistency is high, ( $\alpha > .80$ ) making it a widely accepted psychometric tool for measuring social media addiction. Items were- very rarely, rarely, sometimes, often and very often.

- Fear Of Missing Out Scale (FOMO)- the fear of missing out scale was developed by (Przybylski et al., 2013) and it consist of 10 items of a questionnaire examining the anxiety and apprehension caused because of the feeling that other people are having more rewarding experiences in their absence. This scale is also a five point Likert-scale including items measuring emotional, cognitive and behavioral aspects of fear of missing out, it has also shown an excellent reliability making it a standardized psychometric tool for measuring fear of missing out scale with a reliability of ( $\alpha \approx .90$ ). Items were- strongly disagree, disagree, neutral, agree and strongly agree.
- Rosenberg self-esteem scale (RSES)- Rosenberg self-esteem scale was developed by (Rosenberg, 1979). It is a scale which consists of 10 items questionnaire, measuring the global self-worth. This scale is designed to measure an overall evaluation of an individual's confidence, personal value and self-acceptance. It is a 4-point Likert scale and

has both positive and negative worded items, it has reverse scoring as well. In order to maintain consistency for all three scales, it was adapted to 5-point Likert scale. This will simplify the statistical analysis required to conduct the study. Items were- strongly disagree, disagree, neutral, agree and strongly agree.

**Statistical technique used**

In order to analyze the data, Pearson correlation and simple linear regression were used. Pearson correlation helped to examine the bivariate associations between social media addiction, self-esteem and fear of missing out to test the hypothesis 1 and 2. With the help of simple linear regression, it was examined whether there was a significant relationship between social media addiction and self-esteem, whether it came out as predictor or not, this was done to test 3rd hypothesis.

**Results**

**Descriptives Table**

Survey Statement	N		Mean	Median	Std. Deviation
	Valid	Missing			
I spend a lot of time thinking about social media or planning how to use it.	51	0	2.65	3	0.868
I feel an urge to use social media more and more.	51	0	2.8	3	0.939
I use social media to forget about personal problems.	51	0	3.08	3	1.262
I have tried to cut down on using social media but didn't succeed.	51	0	2.55	3	0.966
I feel restless or irritated if I can't use social media.	51	0	2.04	2	1.038
I use social media so much that it has negatively affected my studies or relationships.	51	0	2.1	2	1.063

Survey Statement	N		Mean	Median	Std. Deviation
	Valid	Missing			
I worry that my friends are having more fun than me.	51	0	2.76	3	1.031
I feel anxious when I find out my friends are doing something without me.	51	0	2.9	3	0.985
It bothers me when I miss out on planned hangouts.	51	0	3.14	3	0.939
I fear others have more rewarding experiences than me.	51	0	2.9	3	1.044
I get worried when I'm not in the loop about what my friends are doing.	51	0	2.8	3	1.040
I get anxious when I miss opportunities to meet friends.	51	0	3.1	3	1.100
I feel left out when I see photos of my friends having fun.	51	0	2.88	3	1.089
I fear others are constantly having more exciting lives than me.	51	0	2.86	3	1.149
I get upset when I can't join friends who are out together.	51	0	2.92	3	1.129
I often compare my activities to what others are doing online.	51	0	2.78	3	1.064
I am satisfied with myself.	51	0	3.65	4	0.976
At times, I think I am not good at all.	51	0	3	3	1.095
I feel that I have a number of good qualities.	51	0	2.2	2	0.825
I am able to do things as well as most other people.	51	0	3.71	4	0.923
I feel I do not have much to be proud of.	51	0	3.29	3	1.082
I certainly feel useless at times.	51	0	2.96	3	1.095
I feel that I'm a person of worth, at least on an equal level with others.	51	0	3.69	4	0.905
I wish I could have more respect for myself.	51	0	2.45	2	1.154
I feel that I'm a failure.	51	0	3.75	4	0.977
I take a positive attitude toward myself.	51	0	2.29	2	1.006

In this Table, shows all the response rates to all the items that has been used in our research, which are related to Social Media Addiction (SMA), Fear of Missing Out (FOMO) and self-esteem (Rosenberg’s Self-Esteem Scale).

The most highlighted aspect of Table 1 is that none of the items have any invalid or wrong responses, and all of them have 51 valid responses and 0 missing responses. This implies that all the participants have answered all questions of all the scales and no items were skipped or repeated.

**Mean and Standard Deviation Table**

**Descriptive Statistics**

	N	Mean	Std. Deviation
I spend a lot of time thinking about social media or planning how to use it.	51	2.65	.868
I feel an urge to use social media more and more.	51	2.80	.939
I use social media to forget about personal problems.	51	3.08	1.262
I have tried to cut down on using social media but didn’t succeed.	51	2.55	.966
I feel restless or irritated if I can’t use social media.	51	2.04	1.038
I use social media so much that it has negatively affected my studies or relationships.	51	2.10	1.063
I worry that my friends are having more fun than me.	51	2.76	1.031

I feel anxious when I find out my friends are doing something without me.	51	2.90	.985
It bothers me when I miss out on planned hangouts.	51	3.14	.939
I fear others have more rewarding experiences than me.	51	2.90	1.044
I get worried when I’m not in the loop about what my friends are doing.	51	2.80	1.040
I get anxious when I miss opportunities to meet friends.	51	3.10	1.100
I feel left out when I see photos of my friends having fun.	51	2.88	1.089
I fear others are constantly having more exciting lives than me.	51	2.86	1.149
I get upset when I can’t join friends who are out together.	51	2.92	1.129
I often compare my activities to what others are doing online.	51	2.78	1.064
I am satisfied with myself.	51	3.65	.976
At times, I think I am no good at all.	51	3.00	1.095
I feel that I have a number of good qualities.	51	2.20	.825
I am able to do things as well as most other people.	51	3.71	.923
I feel I do not have much to be proud of.	51	3.29	1.082
I certainly feel useless at times.	51	2.96	1.095
I feel that I’m a person of worth, at least on an equal level with others.	51	3.69	.905
I wish I could have more respect for myself.	51	2.45	1.154

	N	Mean	Std. Deviation
I feel that I'm a failure.	51	3.75	.977
I take a positive attitude toward myself.	51	2.29	1.006
Valid N (listwise)	51		

Each item table

I spend a lot of time thinking about social media or planning how to use it.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Very Rarely	5	9.8	9.8	9.8
Rarely	15	29.4	29.4	39.2
Sometimes	25	49.0	49.0	88.2
Often	5	9.8	9.8	98.0
Very Often	1	2.0	2.0	100.0
Total	51	100.0	100.0	

In Table 1, Most of the students claimed that they think about social media or its usage not too much but only once in a while. Almost half (49%) of them reported to think about it sometimes and 29.4% reported about rarely thinking about social media. Very few of them consider it regularly (9.8%) or very regularly (2%).

I feel an urge to use social media more and more.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Very Rarely	4	7.8	7.8	7.8
Rarely	14	27.5	27.5	35.3
Sometimes	23	45.1	45.1	80.4
Often	8	15.7	15.7	96.1
Very Often	2	3.9	3.9	100.0
Total	51	100.0	100.0	

In Table 2, The majority of participants said that they sometimes (45.1%) or rarely (27.5%) felt the desire to use the social media but the desire was not strong enough. But the minority group of people reported very frequent urge to use social media.

I use social media to forget about personal problems.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Very Rarely	6	11.8	11.8	11.8
Rarely	11	21.6	21.6	33.3
Sometimes	16	31.4	31.4	64.7
Often	9	17.6	17.6	82.4
Very Often	9	17.6	17.6	100.0
Total	51	100.0	100.0	

According to the Table 3, the majority of the students from our sample has responded that they sometimes use social media to forget about personal problems around 31.4%. Another group of people around 33.4% responded with Sometimes which indicates that they sometimes use social media as a coping strategy to escape from their problems. Another important thing to notice is that around 35.2% people uses social media often or very often to escape from their problems.

I have tried to cut down on using social media but didn't succeed.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Very Rarely	7	13.7	13.7	13.7
Rarely	18	35.3	35.3	49.0
Sometimes	18	35.3	35.3	84.3
Often	7	13.7	13.7	98.0
Very Often	1	2.0	2.0	100.0
Total	51	100.0	100.0	

A large portion of students remained neutral about feeling left out when they see photos of friends having fun (35.3%), indicating mixed or moderate reactions. Around one-third (35.3%) disagreed or strongly disagreed, suggesting that many students are not heavily affected by such posts. However, 23.5% agreed and 5.9% strongly agreed, meaning nearly 30% of the sample does feel left out when seeing friends enjoying without them.

I feel restless or irritated if I can't use social media.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Rarely	20	39.2	39.2	39.2
	Rarely	14	27.5	27.5	66.7
	Sometimes	13	25.5	25.5	92.2
	Often	3	5.9	5.9	98.0
	Very Often	1	2.0	2.0	100.0
	Total	51	100.0	100.0	

In Table 5, The majority of students indicated feeling restlessness or irritation without social media very rarely (39.2) or rarely (27.5), implying that withdrawal symptoms are uncommon in this group. A quarter (25.5) felt this from time to time with a bit of discomfort. It was encountered by only a limited segment of the population (5.9) or often (2%).

I use social media so much that it has negatively affected my studies or relationships.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Rarely	18	35.3	35.3	35.3
	Rarely	16	31.4	31.4	66.7
	Sometimes	13	25.5	25.5	92.2
	Often	2	3.9	3.9	96.1
	Very Often	2	3.9	3.9	100.0
	Total	51	100.0	100.0	

In Table 6, The majority of students (53.7 percent of those surveyed) reported that social media has little to no influence on their relationships or academic success, while only a small number (35.3 percent) reported infrequent effects and 31.4 percent reported adverse effects. Only a quarter (25.5%) encountered these effects, suggesting that it was occasionally interrupted. The small minority frequently reported negative consequences, often (3.9%) or very often (3.9%).

I worry that my friends are having more fun than me.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	11.8	11.8	11.8
	Disagree	14	27.5	27.5	39.2
	Neither	19	37.3	37.3	76.5
	Agree	10	19.6	19.6	96.1
	Strongly Agree	2	3.9	3.9	100.0
	Total	51	100.0	100.0	

In Table 7, Around 39.3% of people responded to strongly disagree which indicates that they are not worried about their friends having more fun than them, however 23.5% of respondents agreed or strongly agreed, showing that they are worrying that their friends are having more fun than them.

I feel anxious when I find out my friends are doing something without me.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	7.8	7.8	7.8
	Disagree	14	27.5	27.5	35.3
	Neither	17	33.3	33.3	68.6
	Agree	15	29.4	29.4	98.0
	Strongly Agree	1	2.0	2.0	100.0
	Total	51	100.0	100.0	

In Table 8, The majority of the population had a neutral response regarding feeling anxious when their friends do something without them (33.3%). Approximately (35.3%) either disagreed or strongly disagreed which indicates that they are not much anxious regarding this, whereas (31.4%) were in agreement or strongly agreement that they does feel anxious when their friends do something without them.

It bothers me when I miss out on planned hangouts.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	5.9	5.9	5.9
	Disagree	9	17.6	17.6	23.5
	Neither	18	35.3	35.3	58.8
	Agree	20	39.2	39.2	98.0
	Strongly Agree	1	2.0	2.0	100.0
	Total	51	100.0	100.0	

In Table 9, A significant percentage of students said that they are somewhat bothered by not making planned hangouts. Whereas 35.3% responded to the question as neither which indicates that they feel neither. Around 41.2% people responded with agree or strongly agree which indicates that they would get bothered if they miss a planned function. Around 23.5% disagreed or strongly disagreed which indicates that they are not bothered by it.

I fear others have more rewarding experiences than me.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	9.8	9.8	9.8
	Disagree	13	25.5	25.5	35.3
	Neither	17	33.3	33.3	68.6
	Agree	14	27.5	27.5	96.1
	Strongly Agree	2	3.9	3.9	100.0
	Total	51	100.0	100.0	

In Table 10, Quite a considerable number of students were indifferent about the fear of experiencing less rewarding lives than other people (33.3%), which indicated a lack of confidence or ambivalent. Approximately one-third of the students disagreed (25.5) or strongly disagreed (9.8), which means that a number of students do not strongly compare their experience with others. Nevertheless, 27.5 percent said yes and 3.9 percent said strongly yes, and that is to say something like one in every three students do worry about others living better or more fulfilling lives.

I get worried when I'm not in the loop about what my friends are doing.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7	13.7	13.7	13.7
	Disagree	11	21.6	21.6	35.3
	Neither	19	37.3	37.3	72.5
	Agree	13	25.5	25.5	98.0
	Strongly Agree	1	2.0	2.0	100.0
	Total	51	100.0	100.0	

There were many students who said they feel neutral when worrying when they are not in the loop of what their friends are doing (37.3%), gave mixed or uncertain responses. Approximately 35.3% said no, or strongly said no, which translates to the fact that they are not usually worried by such cases. Elsewhere, 27.5% said yes or strongly yes, which suggests that more than a quarter of the sample does experience this kind of FOMO.

I get anxious when I miss opportunities to meet friends.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	11.8	11.8	11.8
	Disagree	7	13.7	13.7	25.5
	Neither	17	33.3	33.3	58.8
	Agree	18	35.3	35.3	94.1
	Strongly Agree	3	5.9	5.9	100.0
	Total	51	100.0	100.0	

In Table 12, A significant proportion of students experienced varying degrees of anxiety when confronted with the absence of opportunities to engage with peers. Specifically, 33.3% of participants maintained a neutral stance, whereas 35.3% expressed agreement and 5.9% indicated strong agreement, suggesting that more than 40% of the surveyed population perceives a palpable anxiety in these contexts. Conversely, a lesser segment approximately 25.5% disagreed or strongly disagreed, implying that the absence of social engagements does not universally elicit anxiety.

I feel left out when I see photos of my friends having fun.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	11.8	11.8	11.8
	Disagree	12	23.5	23.5	35.3
	Neither	18	35.3	35.3	70.6
	Agree	12	23.5	23.5	94.1
	Strongly Agree	3	5.9	5.9	100.0
	Total	51	100.0	100.0	

In Table 13, A large portion of students remained neutral about feeling left out when they see photos of friends having fun (35.3%), indicating mixed or moderate reactions. Around (35.3%) of respondents disagreed or strongly disagreed, suggesting that many students are not affected by such photos, Whereas, (23.5%) agreed and (5.9%) strongly agreed, indicating that nearly 30% of the sample does feel left out when seeing friends enjoy or take photos without them.

I fear others are constantly having more exciting lives than me.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	15.7	15.7	15.7
	Disagree	11	21.6	21.6	37.3
	Neither	14	27.5	27.5	64.7
	Agree	16	31.4	31.4	96.1
	Strongly Agree	2	3.9	3.9	100.0
	Total	51	100.0	100.0	

In Table 14, around (27.5%) students expressed neutral feeling about fearing that others lead more exciting lives, suggesting uncertain reactions. About (37.3%) disagreed or strongly disagreed, meaning many do not strongly compare the excitement of their lives with others. Around (31.4%) agreed and (3.9%) strongly agreed that they fear that others are having constantly more exciting lives than them.

I get upset when I can't join friends who are out together.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7	13.7	13.7	13.7
	Disagree	11	21.6	21.6	35.3
	Neither	14	27.5	27.5	62.7
	Agree	17	33.3	33.3	96.1
	Strongly Agree	2	3.9	3.9	100.0
	Total	51	100.0	100.0	

In Table 15, The majority of students expressed their frustration at not being able to go out with their buddies. More than 3% of the sample will experience some emotional distress in that situation because 27.5 were neutral, 33.3 agreed, and 3.9 strongly agreed. On the other hand, about 35.3% disagreed or strongly disagreed, suggesting that these opinions are not shared by everyone.

I often compare my activities to what others are doing online.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	11.8	11.8	11.8
	Disagree	15	29.4	29.4	41.2
	Neither	16	31.4	31.4	72.5
	Agree	12	23.5	23.5	96.1
	Strongly Agree	2	3.9	3.9	100.0
	Total	51	100.0	100.0	

In Table 16, When asked to compare their activities to those posted by other students on the Internet, a considerable proportion of students (31.4%) expressed neutral sentiments, indicating a combination of tendencies or a moderate propensity. Approximately 41.2% did not agree or strongly disagree, indicating that a large number of students do not actively compare on social media. Nonetheless, around 27.4% replied yes or strongly yes, indicating that in one out of every four samples, online comparison is a common practice.

I am satisfied with myself.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	2.0	2.0	2.0
	Disagree	4	7.8	7.8	9.8
	Neither	18	35.3	35.3	45.1
	Agree	17	33.3	33.3	78.4
	Strongly Agree	11	21.6	21.6	100.0
	Total	51	100.0	100.0	

In Table 17, The majority of respondents were favorable or neutral about themselves. The percentages who agreed and strongly agreed were approximately 33.3 and 21.6, respectively, indicating that more than half of the sample feels content with himself/herself. The remaining 35.3% answered Neither, indicating neutral or ambiguous self-views. The difference between those who disagreed and strongly disagreed was minimal (just 9.8% total), indicating that few people were dissatisfied.

At times, I think I am no good at all.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	6	11.8	11.8	11.8
	Agree	8	15.7	15.7	27.5
	Neither	21	41.2	41.2	68.6
	Disagree	12	23.5	23.5	92.2
	Strongly Disagree	4	7.8	7.8	100.0
	Total	51	100.0	100.0	

In Table 18, A large majority of students (41.2%) responded neutrally to the statement "I sometimes think that I am not good at all," implying that they are unsure of their self-worth or have concerns on occasion. Approximately 23.5% dissented or were strongly disagreeing, demonstrating that not everyone holds the same opinion. However, approximately 27.5% agreed or strongly agreed, indicating that more than a quarter of the sample experiences self-doubt on occasion.

I feel that I have a number of good qualities.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	9	17.6	17.6	17.6
	Disagree	26	51.0	51.0	68.6
	Neither	14	27.5	27.5	96.1
	Agree	1	2.0	2.0	98.0
	Strongly Agree	1	2.0	2.0	100.0
	Total	51	100.0	100.0	

In Table 19, The majority of pupils did not believe they possessed many positive traits. More than half (51) of the respondents disagreed with the statement, with 17.6% disagreeing strongly (i.e., 68.6% of the sample has a negative or ambiguous attitude about their positive aspects). Approximately 27.5% responded neutrally, indicating some confusion or ambivalence. Only 4 percent (agree + strongly agree) were certain that they have many positive attributes.

I am able to do things as well as most other people.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	2.0	2.0	2.0
	Disagree	4	7.8	7.8	9.8
	Neither	13	25.5	25.5	35.3
	Agree	24	47.1	47.1	82.4
	Strongly Agree	9	17.6	17.6	100.0
	Total	51	100.0	100.0	

In Table 20, The majority of responders were confident in their abilities. Almost half (47.1%) believed they could do things, with 17.6% strongly agreeing, implying that nearly two-thirds of the sample felt capable and competent. Approximately 25.5% answered neutrally, which could indicate skepticism or moderate self-perception. The percentage of pupils who disagreed (7.8%) or strongly disapproved (2%) was quite low.

I feel I do not have much to be proud of.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	2	3.9	3.9	3.9
	Agree	11	21.6	21.6	25.5
	Neither	15	29.4	29.4	54.9
	Disagree	16	31.4	31.4	86.3
	Strongly Disagree	7	13.7	13.7	100.0
	Total	51	100.0	100.0	

In Table 21, Many students disagreed with the notion that kids have nothing to be proud of. Approximately 31.4% disagree, with 13.7% strongly disagreeing, meaning that nearly half of the sample believes they have anything to be proud of. A further 29.4% responded neutrally, indicating uncertainty or moderate self-assessment. Nonetheless, around 25.5% responded affirmatively or highly, indicating that a quarter of respondents struggle with low-pride or self-esteem feelings.

I certainly feel useless at times.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	6	11.8	11.8	11.8
	Agree	10	19.6	19.6	31.4
	Neither	18	35.3	35.3	66.7
	Disagree	14	27.5	27.5	94.1
	Strongly Disagree	3	5.9	5.9	100.0
	Total	51	100.0	100.0	

In Table 22, When 51 students evaluated their emotional state, they were asked about the feeling of being useless, and the response was that 35.3% of them found it to be a common occurrence for them, they're essentially neutral about it, and at times doubt themselves, 27.5% completely disagreed with this feeling, and 31.4% agreed or strongly agreed that they have moments of feeling useless.

I feel that I'm a person of worth, at least on an equal level with others.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	2.0	2.0	2.0
	Disagree	4	7.8	7.8	9.8
	Neither	13	25.5	25.5	35.3
	Agree	25	49.0	49.0	84.3
	Strongly Agree	8	15.7	15.7	100.0
	Total	51	100.0	100.0	

In Table 23, In terms of self-worth, the majority of students in this group believe they are valuable individuals. Almost half (49%) of the sample agreed, with an additional 15.7% strongly agreeing. Approximately two-thirds of the kids are generally good about themselves. Approximately 25.5% of them were neutral, with an uncertain or mediocre perception of themselves. Only 9.8% of the sample disagreed and believed they were of no use.

I wish I could have more respect for myself.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	11	21.6	21.6	21.6
	Agree	18	35.3	35.3	56.9
	Neither	14	27.5	27.5	84.3
	Disagree	4	7.8	7.8	92.2
	Strongly Disagree	4	7.8	7.8	100.0
	Total	51	100.0	100.0	

In Table 24, When asked about their self-respect, 35.3% of students agreed, with 21.6% strongly agreeing that they would like to enhance how they see themselves. Another 27.5% chose "Neither," which can indicate a combination of doubt, indifference, or a hopeful attitude. Coming from a very different direction, 15.6% disagreed or strongly disagreed with this emotion; these people are practically completely satisfied with their self-respect.

I feel that I'm a failure.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Agree	6	11.8	11.8	11.8
Neither	14	27.5	27.5	39.2
Disagree	18	35.3	35.3	74.5
Strongly Disagree	13	25.5	25.5	100.0
Total	51	100.0	100.0	

In Table 25, The majority of students do not believe they are failures. More over 60% of students disagreed (35.3 percent disagree, 25.5 percent strongly disagree) with the statement that they are a failure. Approximately 27.5 percent of students responded neutrally, indicating that they are uncertain or have mixed sentiments about the statement. Eleven-point-eight percent of students agreed with the statement, demonstrating that a tiny number of pupils perceive failure.

I take a positive attitude toward myself.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Strongly Disagree	10	19.6	19.6	19.6
Disagree	23	45.1	45.1	64.7
Neither	14	27.5	27.5	92.2
Agree	1	2.0	2.0	94.1
Strongly Agree	3	5.9	5.9	100.0
Total	51	100.0	100.0	

In Table 26, Based on their responses, it can be concluded that the majority of the sample had a negative overall self-perception. Almost two out of every three students did not have a constant positive attitude toward themselves; 45.1% said they did not, and 19.6% said they strongly disagreed. Approximately 27.5% of those polled said they were neutral or had a mixed opinion about their self-perception (meaning they believe they perceive themselves positively at times).

**Coefficient Table**

Predictor	Coefficient (B)	SE	t	p	LLCI	ULCI
Constant	3.0945	0.0367	84.3206	0.0000	3.0207	3.1683
SM_S	-0.0536	0.0518	1.0334	0.3067	-0.0507	0.1579
FOMO_S	-0.0521	0.0467	-1.1148	0.2706	-0.1461	0.0419
Int_1 (SM_S × FOMO_S)	0.0227	0.0564	0.4019	0.6896	-0.0907	0.1360

**Interaction Table**

Term	R <sup>2</sup> change	F	df1	df2	p
SM_S × FOMO_S	0.0033	0.1615	1.000	47.000	0.6896

According to Coefficient and Interaction Table, it shows that none of the predictors meaningfully explain self-esteem.

- The constant is about 3.09, which is the average self esteem score when all predictors are at their mean.
- Social media addiction (SM\_S) and FOMO (FOMO\_S) both have small coefficients, and their p values are above .05, so they are not significant predictors of self-esteem.
- The interaction term (SM\_S × FOMO\_S) is also non significant (very small R<sup>2</sup> change and p = .69), which means FOMO does not change the effect of social media addiction on self esteem.

**Table 27**

SM_S level	FOMO_S level	SM_S value	FOMO_S value	Predicted RSE_S
Low	Low	-0.6493	-0.7059	3.1069
Mean	Low	-0.0359	-0.7059	3.1299
High	Low	0.6307	-0.7059	3.1550
Low	Mean	-0.6493	0.0941	3.0534
Mean	Mean	-0.0359	0.0941	3.0876
High	Mean	0.6307	0.0941	3.1247
Low	High	-0.6493	0.6621	3.0155
Mean	High	-0.0359	0.6621	3.0575
High	High	0.6307	0.6621	3.1032

As per Table 27, it shows the predicted self esteem scores for students at different combinations of social media addiction and FOMO levels. Across all nine combinations (low, average, and high SM\_S crossed with low, average, and high FOMO\_S), the self esteem scores stay almost the same. This means that changing social media addiction or FOMO (alone or together) hardly changes the predicted self esteem at all.

## **Discussion and Conclusion**

The aim of the present study is to understand and explore the meaningful associations between social media addiction, fear of missing out and self-esteem among college students or young adults. Major emphasis of the research is also to investigate whether fear of missing out acts a moderator between the relationship of social media addiction and self-esteem. The findings of the research highlight the psychological impact on college students or young adults because of excessive social media use.

Interpretation of hypothesis 1- Higher social media addiction will be associated with higher levels of fear of missing out.

Based on the data analysis, it was found out that excessive usage of social media is associated with elevated feelings of fear of missing out. Individuals who indulge more in excessive or compulsive use of social media report higher feelings of fear of missing out. Based on recent studies, the findings properly align with them and demonstrated that people who are more engaged in compulsive digital use are reporting heightened sense of feelings that other are experiencing better and rewarding events in their absence. It is also reported that social media applications which revolve around checking each other's updates continuously, constant to exposure to idealized

version of other people online, indulging in social comparison and focusing more instant gratification is causing psychological impact on people who are active users, this creates an unhealthy cycle of reinforcement where fear of missing out is causing people to check their phones continuously and because of constant exposure to other people's lives, it increases the feelings of fear of missing out.

Interpretation of hypothesis 2 - Fear of missing out will not show a significant association with self-esteem among Indian college students.

The interpretation of hypothesis 2 suggests that the fear of missing out does not have a significant connection with self-esteem. According to the study results, fear of missing out is not a reliable indicator of low self-esteem, and there is no strong or meaningful link between these two psychological aspects. While the statistical analysis showed a slight negative trend, the overall findings were not significant or strong enough to support a meaningful relationship. It was also found that fear of missing out is more closely linked to other psychological elements such as anxiety, stress, and dissatisfaction with life, rather than being directly related to the broader concept of self-esteem. Fear of missing out can lead to feelings of anxiety, but it does not play a major role in shaping a person's overall sense of self-worth. Self-esteem is influenced by various factors, including emotional and relational aspects, but not by fear of missing out. Empirical evidence further supports the idea that the relationship between fear of missing out and self-esteem is weak or not significant. Global self-esteem is generally a stable trait that is shaped by developmental, interpersonal, and social and cultural influences, meaning that fear of missing out stems from more temporary and emotional or relational causes and does not impact an individual's self-worth.

Interpretation of hypothesis 3- social media addiction will not significantly predict self-esteem of an individual.

The results of our findings indicate that social media addiction does not come across as a predictor of self-esteem, literatures available also reported that social media addiction is not a predictor of low self-esteem. It was found out that there was a weak and insignificant association between social media addiction and self-esteem of an individual. This could also happen because of the participants that were included in this study were not clinical population like there were not people who were exhibiting severe addiction and maybe the involvement on social media was not excessive or sufficient enough to impact an individual's entire sense of self-worth and global self-esteem. Another reason could be that social media is multidimensional where there are diverse kinds of people like who put other people down and bully others but whereas there are communities which actually support people to grow, people are more aware of mental health now, there could be protective factors as well like loving family, friends and a social belongingness which helped people against the negative effects of social media.

A moderated regression analysis (PROCESS v5.0, Model 1) was conducted with self-esteem (RSE\_S) as the outcome, social media addiction (SM\_S) as the predictor, fear of missing out (FOMO\_S) as the moderator, and their interaction term (SM\_S  $\times$  FOMO\_S), after mean-centering SM\_S and FOMO\_S. The preliminary analysis supported H1, showing that higher social media addiction was modestly but positively related to higher FOMO ( $r \approx .28$ ,  $p \approx .05$ ), indicating that students who were more addicted to social media tended to experience more FOMO. The overall

moderation model for self-esteem was not significant ( $R = .20$ ,  $R^2 = .04$ ,  $F(3, 47) = 0.66$ ,  $p = .58$ ), meaning the predictors explained only about 4% of the variance in self-esteem.

Regarding main effects, social media addiction did not significantly predict self-esteem ( $b = 0.05$ ,  $SE = 0.05$ ,  $t(47) = 1.03$ ,  $p = .31$ , 95% CI  $[-0.05, 0.16]$ ), supporting H3 that social media addiction would not have a major impact on self-esteem. Similarly, FOMO was not a significant predictor of self-esteem ( $b = -0.05$ ,  $SE = 0.05$ ,  $t(47) = -1.11$ ,  $p = .27$ , 95% CI  $[-0.15, 0.04]$ ), consistent with H2 that FOMO would not substantially affect self-esteem. The interaction between social media addiction and FOMO was also non-significant ( $b = 0.02$ ,  $SE = 0.06$ ,  $t(47) = 0.40$ ,  $p = .69$ , 95% CI  $[-0.09, 0.14]$ ;  $\Delta R^2 = .003$ ,  $F(1, 47) = 0.16$ ,  $p = .69$ ), indicating that FOMO did not meaningfully alter the relationship between social media addiction and self-esteem. The conditional predicted self-esteem values at low, average, and high levels of FOMO all fell within a narrow range (about 3.01–3.16), showing that varying levels of social media addiction and FOMO, either separately or together, did not produce meaningful differences in self-esteem in this sample.

## **Conclusion**

According to the findings of the research, it is concluded that fear of missing out has a significant relationship with social media addiction. However, there was no meaningful association between social media addiction and self-esteem and fear of missing out and self-esteem. All the three hypothesis were supported and it is reported that problematic usage of social media and fear of missing out are not sufficient to affect the global self-esteem of an individual.

### Limitations and implication for future research

- The sample size is quite small, with N=52. This limits the ability to apply the findings to a broader population. Focus on larger sample size is must for generalizability.
- The study used convenience sampling, and all participants came from the same institution.
- If further research is conducted, including participants from different universities would improve the generalizability of the results.
- Most of the psychological measurement tools used were self-report questionnaires, which may have introduced some bias into the research.
- The measurement of global self-esteem is a broad area.
- Focusing on specific psychological aspects such as acceptance and social connectedness could lead to more precise and meaningful results.

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**STRENGTHENING GOVERNANCE IN COOPERATIVE BANKING: LINKING AUDIT QUALITY, INTERNAL CONTROLS, AND FINANCIAL PERFORMANCE**

Ankita Rajendra Ojha\*

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**Abstract**

*Main Theme: The study examines audit methodologies and internal control strategies within India's cooperative banking sector, concentrating on 30 cooperative banks in the Amravati district of Maharashtra. It emphasizes enhancing financial governance and risk management by advancing auditing techniques and regulatory measures.*

*Objective of the Study: The goals encompass an examination of the correlation between audit quality and financial stability, an analysis of internal controls and liquidity management, and the proposal of a comprehensive audit framework tailored to Indian cooperatives.*

*Methodology: The approach integrates secondary data analysis employing financial statements and audit reports from chosen banks. Utilizing statistical techniques, including descriptive statistics, ratio analysis, Pearson correlation, regression, and Chi-square tests via SPSS, the methodology systematically assesses hypotheses concerning audit quality, internal controls, committee independence, and financial performance.*

*Findings of the Study: The findings indicate that although cooperative banks in Amravati possess sufficient capital above CRAR benchmarks, they continue to struggle with persistent low profitability and elevated levels of non-performing assets (NPAs). Robust internal controls and the independence of audit committees are highly effective in reducing NPAs and enhancing liquidity; however, these measures exert only a limited impact on improving profitability.*

*Implication of the Study: The situation highlights the critical necessity for establishing a cohesive regulatory authority, adopting audit practices based on risk assessment, forming professional audit committees, and integrating digital Management Information Systems, all aimed at enhancing transparency, ensuring accountability, and fostering financial resilience.*

**Keywords:** Cooperative banks, audit quality, internal controls, NPAs, liquidity, financial performance, risk-based auditing, governance, transparency.

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## **Introduction**

India's cooperative financial sector has historically been integral in promoting financial inclusion, particularly in rural and semi-urban areas. Founded on the principles of mutual assistance, local accountability, and participatory governance, cooperative entities like Primary Agricultural Credit Societies (PACS), District Central Cooperative Banks (DCCBs), and Urban Cooperative Banks (UCBs) have offered crucial financial services to populations lacking adequate access. Nevertheless, these institutions frequently encounter governance difficulties, regulatory inconsistencies, insufficient capitalization, and a lack of operational transparency.

India's recent endeavors to achieve financial inclusion, supported by initiatives such as the Jan Dhan Yojana, digital banking platforms, and financial literacy campaigns, offer a timely occasion to rethink and reform the cooperative financial framework. This paper discusses enhancing governance within Cooperative Banking by connecting audit quality, internal controls, and financial performance.

It seeks to bridge the divide between the developmental aims of the sector and its institutional realities by promoting reforms that bolster transparency, governance, regulatory coherence, and member participation.

## **Research Objectives**

The primary objectives are to assess the correlation between audit quality, internal control systems, and financial stability, concentrating on Non-Performing Assets, liquidity, and profitability within the cooperative banks in the Amravati district.

To suggest a comprehensive audit and governance

framework for Indian cooperative banks, grounded in empirical research and international best practices.

## **Hypotheses**

Hypothesis 1: Audit Quality & Financial Performance

- **H0<sub>1</sub>:** addresses the relationship between audit quality and financial performance, positing that audit quality does not have a significant impact on the financial stability and regulatory compliance of cooperative banks

Hypothesis 2: Internal Controls & Risk Reduction

- **H0<sub>2</sub>:** concerns internal controls and risk management, suggesting that the internal control mechanisms within cooperative banks do not markedly decrease non-performing assets and mitigate liquidity risks.

## **Literature Review:**

Dr. Shinde & Dr. Singh (2025) in their 2025 research titled "Auditing Standards Followed By Cooperative Banks In India," concluded that increasing regulatory scrutiny, refining auditing processes, and promoting uniform practices are essential measures that can effectively tackle existing challenges and enhance financial transparency within cooperative banks.

Nitin Dhir and Balwinder Singh (2025) the study reveals that credible and independent audit committees improve the clarity of disclosures, whereas a high frequency of meetings may adversely affect their tone. Their research suggests that the valuation of a firm plays a crucial role in how audit governance impacts the characteristics of disclosure. Moreover, despite the presence of governance oversight, managerial obfuscation

continues to persist, providing evidence for the Impression Management and Information Asymmetry Theories. This study emphasizes the importance of both internal and external audit processes in shaping financial reports and provides valuable insights for regulators, investors, and corporate policymakers aiming to enhance the transparency of disclosures.

BIRHAN TAYE (2025) The study revealed significant deficiencies in the bank's internal control system, highlighting employees' lack of awareness regarding established guidelines and ambiguous role definitions. Control activities are inadequate, evidenced by an obsolete asset register, insufficient segregation of duties, and ineffective asset management practices. Risk assessment procedures are in their infancy, with management failing to accurately identify risks or formulate appropriate processes. Additionally, the dissemination of key information to stakeholders is far from effective.

Shekhar, Chandra (2025) the study's findings reveal a liquidity shortfall, elevated non-performing assets, and non-compliance with Capital Adequacy Ratio and Liquidity Coverage Ratio, necessitating intervention by the Reserve Bank of India. Deficient internal controls and fraudulent lending practices have exacerbated financial stress, hindering customers' ability to utilize savings for daily expenditures, loan installments, and bill payments. Moreover, small businesses reliant on cooperative banking are facing cash flow challenges, thereby adversely affecting local economies.

Abiodun Omidiji; DimuEhalaiye (2025) the study revealed that Internal Audit (IA) in Microfinance Institutions (MFIs) reduces loan losses and enhances governance and risk management. IA also improves financial performance by boosting

operational self-sufficiency. However, the negative impact of loan losses on financial performance is not significantly worse in MFIs without IA, suggesting that while IA mitigates loan losses and enhances profitability, it cannot fully eliminate their adverse effects.

Ha Thi Phuong Thanh (2024) From the current state of the quality of the cooperative's internal control system it shows that performing audits at cooperatives is extremely necessary for the internal management requirements of cooperatives. Cooperatives carry out independent audits through the services of independent auditing firms or the consulting services of inspection and consulting teams at the Provincial Cooperative Alliance.

Luvisi Moses Ayumba, MusiegaManiagi, MuliMaingi (2024) The study concluded that Sacco size has a significant moderator in this study. The study recommended that Saccos should tailor their strategies and internal audit processes based on their size. Larger Saccos may benefit from more robust auditor independence measures and closer scrutiny of financial performance indicators.

Dr. Kunte B (2023) Public sector and Cooperative banks perform similarly in CRAR, NPA ratios, and efficiency metrics. However, the Tamil Nadu State Cooperative Bank has a concerning negative interest spread, while the Maharashtra State Cooperative Bank excels in ROA and loan-to-deposit ratios.

Biswajit Patra, Purna Chandra Padhan, Puja Padhi (2022) Research demonstrates that public sector banks exhibit greater efficiency compared to their private counterparts. Analysis utilizing the Z-score indicates that both categories encounter stability risks. The Tobit regression highlights a substantial

correlation between return on assets and capital levels with efficiencies in private banks, whereas efficiency in public sector banks is impacted by factors such as non-performing assets, market share, bank size, return on assets, and capital levels. The Reserve Bank of India's 2014 Prompt Corrective Action framework and the government's 2019 mergers of public sector banks have contributed to enhancements in the efficiency of public sector banks.

**Research Gap**

From the reviewed studies:

- Numerous studies (Dr. Shinde & Singh, 2025; Thanh, 2024; Nitin & Singh, 2025) underscore the critical role of audit quality, audit committees, and internal control systems in enhancing transparency and governance.
- Additionally, research (Birhan Taye, 2025; Shekhar, 2025) reveals significant issues within cooperative banks, such as inadequate internal controls, liquidity challenges, non-performing assets, fraud occurrences, and weak compliance.
- Furthermore, comparative analyses (Kunte, 2023; Patra et al., 2022) have been conducted to evaluate the efficiency of cooperative, public, and private banks; however, they do not extensively examine audit mechanisms as key performance drivers.
- Studies related to microfinance and Saccos (Omidiji & Ehalaiye, 2025; Ayumba et al., 2024) indicate that audit size, independence, and governance considerably impact performance, yet these insights are not fully integrated into the practices of Indian cooperative banks.

**Research Methodology:**

Data Collection: The study fundamentally relies on secondary data sourced from publicly accessible documents, including annual reports, audit reports, and financial statements from 30 cooperative banks located in Amravati, Maharashtra.

**Analytical tools include: -**

Descriptive Statistics: Mean, median, standard deviation, frequency distribution

Ratio Analysis: Capital to Risk Weighted Assets Ratio (CRAR), Return on Assets (RoA), Return on Capital, Gross and Net NPA Ratios

Inferential Statistics: Pearson Correlation, Regression, and Chi-square tests has used.

Software: SPSS for statistical computation

**Data Analysis:**

**Table 1. Descriptive Statistics: Audit Performance**

Metric	Value
Mean	73.12
Median	72.66
Mode	72.66
Standard Deviation	9.00
Variance	81.00
Range	34.92

Interpretation:

Audit performance among banks displays a consistent pattern, reflecting a standard level of competence. However, the considerable dispersion of nearly 35 points in scores highlights differences in the rigor or quality of audits conducted.

Hypotheses Testing

regulatory compliance of cooperative banks

Hypothesis H0<sub>1</sub>: Audit quality & financial performance

**Variables**

Independent (X): Audit Quality (Audit Score, audit standards followed, auditor expertise).

- **H0<sub>1</sub>**: addresses the relationship between audit quality and financial performance, positing that audit quality does not have a significant impact on the financial stability and

Dependent (Y): Financial Performance indicators (RoA, CRAR, Profit margin).

**Table 2. Audit quality & financial performance**

Test Used	Results	Interpretation	Decision
<b>Pearson Correlation (Audit Score vs Ratios)</b>	r = -0.442 (p < 0.05) with Net NPA; weak/non-significant with RoA& CRAR.	Better audit quality linked with <b>lower NPAs</b> (improved stability), but not with profitability.	<b>Partially Reject H0<sub>1</sub></b> (accepted for RoA, rejected for NPAs).
<b>Multiple Regression (RoA ~ Audit Score + Experience + Tenure + Compliance)</b>	R <sup>2</sup> = 0.057; Audit Score not significant (p > 0.8).	Audit quality does not significantly predict profitability.	<b>Fail to Reject H0<sub>1</sub> (for RoA).</b>
<b>Chi-square (Compliance vs Discrepancy)</b>	χ <sup>2</sup> = 0.165, p > 0.05.	No significant link between compliance score and discrepancies.	<b>Fail to Reject H0<sub>1</sub>.</b>

The Pearson correlation analysis reveals a significant negative correlation (r = -0.442, p < 0.05) between audit scores and the Net NPA ratio, highlighting that banks with superior audit quality typically experience lower levels of non-performing assets. This correlation underscores the role of effective auditing practices in enhancing financial stability by mitigating asset risk. However, the relationship between audit scores and profitability measures such as Return on Assets (RoA) and Capital to Risk-Weighted Assets Ratio (CRAR) is weak and statistically insignificant. This suggests that while audit quality positively impacts asset quality, it does not have a direct effect on profitability or capital adequacy. Consequently, hypothesis H0<sub>1</sub> is partially rejected, dismissed in the context of NPAs but upheld for RoA and CRAR.

model, which attempts to explain Return on Assets (RoA) using audit score, experience, tenure, and compliance, recorded a very low R<sup>2</sup> value of 0.057 and an insignificant p-value for the audit score (p > 0.8). These findings suggest that differences in profitability are not significantly attributable to the quality of the audit or related auditor characteristics. Consequently, the null hypothesis (H0<sub>1</sub>) regarding RoA cannot be rejected.

The results of the multiple regression analysis reinforce this conclusion, demonstrating that the

The Chi-square test analyzing the relationship between compliance scores and audit-reported discrepancies produced a non-significant result (χ<sup>2</sup> = 0.165, p > 0.05), indicating no substantial link between these variables. This outcome implies that elevated compliance ratings do not inherently guarantee the elimination of audit discrepancies, which may be attributed to differences in audit scope, internal control frameworks, or reporting standards across banking institutions.

**Table 3.**

Relationship Tested	r (Pearson)	p-value	Interpretation	Decision
<b>Audit Score vs RoA</b>	+0.07	0.72	No significant correlation with profitability.	Fail to Reject H <sub>01</sub> (no effect on RoA).
<b>Audit Score vs CRAR</b>	+0.15	0.40	Weak, non-significant positive association with capital adequacy.	Fail to Reject H <sub>01</sub> .
<b>Audit Score vs Net NPA</b>	<b>-0.44</b>	<b>0.014</b>	Significant <b>negative</b> correlation → higher audit quality reduces NPAs.	<b>Reject H<sub>01</sub> (for NPAs).</b>

The relationship between Audit Score and Return on Assets (RoA) is characterized by a very weak correlation ( $r = +0.07$ ,  $p = 0.72$ ), which is statistically insignificant. This indicates that the quality of audits does not significantly impact profitability as indicated by Return on Assets. Likewise, the association between Audit Score and Capital to Risk-Weighted Assets Ratio (CRAR) is similarly weak ( $r = +0.15$ ,  $p = 0.40$ ) and not statistically significant, suggesting that audit quality does not have a strong effect on the capital adequacy or financial robustness of banks. Consequently, in both instances, the null hypothesis (H<sub>01</sub>) is upheld.

Conversely, a significant negative correlation is observed between Audit Score and the Net Non-Performing Assets (NPA) ratio ( $r = -0.44$ ,  $p = 0.014$ ). This implies that as the quality of audits enhances, the level of Non-Performing Assets tends to decline. In more straightforward terms, improved audits enable banks to better identify and manage bad loans, which contributes to greater financial stability. Therefore, for Non-

Performing Assets, the null hypothesis (H<sub>01</sub>) is rejected.

Hypothesis 2: Internal Controls & Risk Reduction

H<sub>02</sub>: concerns internal controls and risk management, suggesting that the internal control mechanisms within cooperative banks do not markedly decrease non-performing assets and mitigate liquidity risks.

Variables

Independent (X): Internal Control (Based on survey documentation, segregation of duties, MIS, compliance monitoring — composite score (1–10)).

Dependent (Y):

- NPAs (Gross NPA %, Net NPA %).
- Liquidity ratios (Credit-Deposit ratio, Current Ratio, LCR).

**Table 4. Internal controls & risk (NPAs, liquidity)**

<b>Dependent Variable (Y)</b>	<b>Statistical Test</b>	<b>Correlation (r)</b>	<b>Regression Coefficient (β)</b>	<b>p-value</b>	<b>Interpretation</b>	<b>Hypothesis Decision</b>
Gross NPA %	Pearson Correlation	-0.61	-0.58	0.001	Strong negative relationship — better internal control reduces NPAs	Reject H <sub>02</sub>
Net NPA %	Pearson Correlation	-0.54	-0.49	0.004	Moderate negative relationship — internal controls lower NPAs	Reject H <sub>02</sub>
Credit-Deposit Ratio	Regression	0.39	0.36	0.032	Positive relation — better controls improve liquidity efficiency	Reject H <sub>02</sub>
Current Ratio	Regression	0.42	0.40	0.025	Moderate positive relationship — internal controls enhance liquidity	Reject H <sub>02</sub>
Liquidity Coverage Ratio (LCR)	Correlation	0.47	0.45	0.018	Positive significant relationship — improved internal controls strengthen liquidity	Reject H <sub>02</sub>

**Table 5.**

<b>Model Summary</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>Adjusted R<sup>2</sup></b>	<b>F-statistic</b>	<b>p-value</b>
<b>Internal Control → NPAs &amp; Liquidity Indicators</b>	0.68	0.46	0.43	12.18	0.0003

Interpretation:

Internal control accounts for 46% of the variation observed in NPAs and liquidity ratios within the cooperative banks of Amravati district. Given that  $p < 0.05$ , the model demonstrates statistical significance.

The null hypothesis (H<sub>02</sub>) is therefore rejected.

Internal control mechanisms play a crucial role in significantly decreasing NPAs and enhancing liquidity management in the cooperative banks of Amravati district. By reinforcing compliance monitoring, integrating Management Information Systems (MIS), and ensuring the segregation of duties, financial stability and performance can be directly improved.

**Table 8. Findings of the Study**

Domain / Variable	Interpretation / Key Finding
<b>1. Audit Quality &amp; Financial Performance</b>	The quality of audits does not have a significant correlation with profitability (Return on Assets) or capital adequacy (Capital to Risk-Weighted Assets Ratio); however, it does significantly decrease Non-Performing Assets, indicating that robust audits enhance asset quality.
<b>2. Audit Quality &amp; Profitability (Regression)</b>	Audit quality is not a significant predictor of profitability, which is more affected by operational and market dynamics.
<b>3. Compliance &amp; Discrepancies</b>	There is no significant correlation; mere formal compliance does not guarantee a reduction in irregularities.
<b>4. Internal Controls &amp; Risk (NPAs, Liquidity)</b>	Internal control systems significantly diminish Non-Performing Assets and enhance liquidity management within cooperative banks located in the Amravati district.
<b>5. Summary of Audit Environment in Amravati</b>	The audit quality is moderate; the considerable variation among banks indicates inconsistent compliance with audit standards.
<b>6. Relationship Between Audit, Governance, and Performance</b>	Audit quality contributes to the reduction of Non-Performing Assets; the independence of committees enhances transparency; internal controls and compliance are only weakly effective; profitability continues to be low despite adequate capital.

**Discussion and Implications**

The findings reveal a significant paradox within the cooperative banking framework in India: while there is institutional capital adequacy, there exists operational inefficiency and governance vulnerability. The statistical data indicates that while audit quality significantly mitigates NPAs, it does not enhance profitability, suggesting that audits are mainly reactive—concentrating on risk management rather than improving performance.

The weak correlation between internal controls and financial stability highlights deficiencies in their implementation. Numerous cooperative banks officially adopt control measures—such as the segregation of duties and compliance monitoring—but do not effectively integrate them into their daily operations. The absence of automation and standardized management information systems (MIS) further diminishes the efficacy of these controls.

From a broader policy perspective, these findings present three key implications:

**Governance Reform Is Essential for Sustainability.** In the absence of independent audit committees and depoliticized boards, internal audit and compliance systems cannot lead to enhanced performance.

**Audit Practices Need to Transition from Procedural to Analytical.** Present audit practices focus on checklists and compliance rather than risk analytics. Embracing data-driven, risk-based auditing can align the oversight of India’s cooperatives with the standards set by the OECD and the Basel Committee.

**Financial Inclusion Objectives Demand Systemic Strengthening.** Cooperative banks serve as vital channels for rural credit. Ineffective audit and control systems jeopardize not only financial stability but also social trust, thereby hindering the goals of inclusive growth.

The ramifications also encompass digital transformation. Numerous sophisticated cooperative systems have incorporated cybersecurity, data governance, and IT audits into their structures. Indian cooperative banks are

falling behind in this regard, as demonstrated by the lack of thematic or technology audits in the majority of institutions. The implementation of digital audit trails and AI-supported compliance systems could significantly enhance transparency and risk forecasting within the Indian context.

## **Conclusion**

The research concludes that although India's cooperative banks have a solid base of community trust and sufficient capital, their governance, audit quality, and operational efficiency are still lacking. Empirical analysis indicates that high-quality audits significantly decrease NPAs, suggesting that robust audits contribute to asset stability. Nevertheless, audit quality does not have a direct impact on profitability, which means that audits serve more as a preventive measure rather than enhancing performance. Internal controls and compliance practices, despite being widely adopted, are superficial and poorly executed, resulting in limited effectiveness in mitigating risk.

Consequently, the cooperative financial sector finds itself at a pivotal moment: it must transition from a compliance-focused governance model to one that is performance-oriented, transparent, and adaptable to technological advancements.

## **Recommendations**

### **Establish a Unified Cooperative Regulatory Authority:**

Consolidate the oversight functions that are presently distributed among the Registrar of Cooperatives, RBI, and NABARD into a singular independent regulatory authority. This consolidation would remove jurisdictional overlaps and standardize audit and compliance standards across the nation.

### **Adopt a Risk-Based Audit Framework:**

Transition from traditional procedural audits to evaluations that focus on risk, specifically targeting high-risk areas such as credit risk, liquidity management, and cybersecurity. The framework should be designed to reflect global models, such as Germany's BVR and Canada's OSFI systems.

### **Introduce Centralized and Federated Audit Structures:**

Establish regional cooperative audit federations tasked with performing standardized audits, training auditors, and ensuring consistent reporting. This approach would improve efficiency and uniformity, akin to European cooperative networks.

### **Enhance Capacity Building and Auditor Professionalization:**

Initiate specialized certification programs for cooperative auditors through the Institute of Chartered Accountants of India (ICAI) and NABARD. Ongoing professional development will guarantee that audits remain in line with international standards.

### **Integrate Technology into Auditing and Compliance:**

Implement digital audit platforms, AI-driven anomaly detection, and blockchain-based record-keeping to improve transparency, minimize manual errors, and facilitate real-time monitoring.

### **Improve Internal Control and MIS Systems:**

Create integrated Management Information Systems for all cooperative banks, ensuring a continuous flow of real-time data between

branches and regulators. The automation of control processes will reduce human bias and enhance operational reliability.

### **Align Audit Practices with ESG and Cybersecurity Priorities:**

Incorporate environmental, social, and governance (ESG) considerations and IT resilience into audit checklists to address contemporary risk landscapes.

### **Performance-Linked Governance Incentives:**

Connect board and management performance incentives to audit results and transparency metrics to foster accountability.

### **Policy Coordination for Financial Inclusion:**

Reforms in auditing and oversight should be aligned with financial inclusion efforts such as digital literacy, credit counseling, and cooperative modernization initiatives to promote comprehensive sectoral development.

### **Limitations Of The Study**

This study focuses exclusively on 30 cooperative banks located in Amravati, which restricts the ability to generalize findings more broadly.

The dependence on secondary data may introduce reporting biases or gaps in information.

The lack of primary data limits the understanding of practical audit challenges and the culture of

internal governance.

The few audit quality indicators available may not adequately reflect the qualitative dimensions of auditing.

The cross-sectional design employed does not evaluate long-term changes in governance or financial performance.

External factors such as macroeconomic changes or political influences were not taken into account.

### **Future Scope of Research**

Expanding the research to various districts or states for the purpose of comparative analysis.

Integrating primary data via interviews or surveys conducted with auditors and bank personnel.

Implementing longitudinal studies to investigate changes in audit effectiveness over time.

Creating an Audit Maturity Index tailored for cooperative banks.

Conducting comparative research with international cooperative audit models.

Investigating digital audits, artificial intelligence tools, management information system automation, and cybersecurity frameworks.

Analyzing the influence of audit committee structure and board governance on financial results.

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## RESEARCH

### THE INFLUENCE OF FINANCIAL KNOWLEDGE AND INFORMATION UTILIZATION ON BEHAVIOURAL BIASES IN RETAIL EQUITY INVESTMENT: A CB-SEM APPROACH

Varsha Kedar, D. Y. Chacharkar & Sachin Chavan\*

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#### **Abstract**

*This paper discussed how behavioral biases influence individual investors' investment decisions in the stock market and explore links between behavioral biases and other important cognitive elements like financial literacy, information processing, and analytical skills. With a focus on bounded rationality, this paper discuss how investors are affected by incomplete information, emotions, and cognitive limitations. Data is collected using well-structured questionnaires from 600 Demat account holders in the areas of Amravati, Nagpur, and Pune Maharashtra, India. Links between the variables is tested using Covariance-Based Structural Equation Modelling. The behavioral bias scales that had low factor loadings is removed by conducting Confirmatory Factor Analysis, and three important behavioral biases of overconfidence, Availability Bias, and Anchor Bias is kept in the measurement model.*

**Keywords:** *Covariance-Based Structural Equation, Financial Knowledge, Information Use, Behavioral Biases, and Investment Decision.*

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#### **Introduction-**

Behavioural finance has emerged as a distinct area of research that identifies how psychology affects financial choice. The traditional theory of finance assumes that investors make rational financial choices based on logic and information. This theory has been found to have limited relevance, especially in stock markets, as investors tend to be affected by psychological factors, which at times leads to irrational financial choices. Overconfidence, loss aversion, and herding, to

name a few, are important areas under behavioural finance that help define financial choice.

The paper concentrates on the individual level and the behavioral biases, which impact the equity investment decision. The emotional and cognitive elements are considered to affect the investor behavior and lead to suboptimal investment decision-making. By addressing this concern, the paper intends to shed more light on the financial equity market behavior and the reasons for the absence of rational decision-making.

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This study examines the major behavioural biases, which play a critical role in influencing the behaviour of retail investors in the equity market. It has been assumed that retailers, especially those who lack financial knowledge, are more prone to cognitive biases, which often result in poor investment decisions. With the help of past literature, the study identifies the seven major behavioural biases, which play a significant role in influencing the behaviour of retailers in the equity market, and these include overconfidence bias, herd behaviour, availability bias, representativeness bias, disposition effect, anchoring bias, and loss aversion.

For instance, overconfidence bias can result in investors overestimating their knowledge, resulting in over-trading and undiversified portfolios. Herd behavior can result in investors aligning with others, whether in buying or selling decisions, leading to bubbles in the market or panic selling. Availability bias causes investors to focus on information that is fresh in their minds, regardless of its accuracy, influencing their risk perceptions and decisions. The disposition effect explains why investors might sell stocks that have made profits early while holding on to stocks with losses. Anchoring bias is when investors are prone to making decisions based on past references, like when they bought something, without updating their choices when fresh information comes up. The loss aversion bias is when people fear losses more than they value gains, making them cautious in investments, resulting in irrational behavior.

Behavioural biases are not the same for every investor. The effect of these biases usually varies and depends on factors such as knowledge of finance, information processing, and analytical capacity. Investors with a deeper knowledge of finance and access to credible information are likely to handle and recognize instinctive and

irrational investment decisions better. Good analytical capacity assists investment decision-makers in analyzing market situations objectively and deterring decisions influenced by emotional and instinct-driven choices. It has been identified in academic studies that educated investors tend to prefer methodical investment decision-making over instinct-driven investment decisions.

This paper explores the association between biases and three investor-related variables: information use, analysis skills, and financial knowledge by utilizing the Covariance-Based Structural Equation Modeling technique. By employing the proposed technique, it is possible to study a variety of associations simultaneously. Additionally, the technique facilitates the understanding of a variety of associations between the variables in an efficient and precise way. The proposed technique is applied to study the indirect and direct associations between the financial capabilities and knowledge of stockmarket players and biases such as overconfidence, herd mentality, and loss aversion.

## **Literature Review**

Overconfidence Bias - Overconfidence bias is extensively reported in behavioral finance literature as one of the most important psychological distortions in investor behavior. It is defined as the tendency for individuals to overestimate their ability, skills, or knowledge to forecast outcomes (Karki, Bhatia, & Sharma, 2024). This cognitive bias typically causes excessive trading and risk-taking, which eventually results in poor portfolio performance (Zhang, 2023). As Singh, Malik, and Jha (2024) identify, overconfident investors remain less inclined to adjust their investment approach despite being given counter-evidence. Kumar and Chaurasia (2024) further noted that emotional

overconfidence tends to be accompanied by ineffective diversification strategies. To forestall such a bias, Ojha and Agarwala (2024) recommend regular portfolio assessment and incorporation of third-party analysis.

**Herd Behaviour** – Herd behaviour refers to the tendency of people to follow the actions of a group, sometimes without making independent analysis. Informational cascades were introduced by Bikhchandani, Hirshleifer, and Welch (1992) to account for this phenomenon. Market sentiment is usually followed by investors rather than fundamental analysis during uncertain or volatile times. Kim et al. (2013) showed that herd behavior would be intensified during times of global financial crisis and lead to market inefficiencies. Guedj and Bouchaud (2004) identified even the sophisticated predictions are prone to herding, highlighting the prevalence of the bias. Independent choice and diversification strategies are proposed as antidotes.

**Availability Bias** – Availability bias arises when investors overstate their reliance on recent or easily accessible information in the decision-making process. Nobandegani et al. (2018) claim that this results in overestimation of the likelihood of emotionally salient or highly publicized events. In investment situations, this might appear as impulsive reactions to sensationalized media headlines. Kliger and Kudryavtsev (n.d.) established a significant relationship between availability bias and short-term trading activity. Investors are hence encouraged to make decisions based on long-term trends in data and in-depth market analysis so they can shun the influence of emotionally charged decisions.

**Representativeness Bias** – Representativeness bias entails making decisions on the basis of surface-level resemblance to familiar instances as

opposed to objective examination. Tversky and Kahneman (1974) termed this as a heuristic that causes investors to overgeneralize from small or unrepresentative samples. In investment situations, this can lead to the expectation that a stock will do well because it looks like a previous winner, without considering its current fundamentals. This bias can be overcome by adding strict analysis and refusing to rely on anecdotal evidence or stereotypes.

**Disposition Effect** – The disposition effect captures the tendency to offload appreciated assets while holding on to poor performing ones. It is induced mainly through loss aversion and aversion to the psychological distress generated when losses are realized (Talpsepp et al., 2014). This type of behavior leads to opportunities for growth being missed and overall portfolio performance declining over time. Rule-based trading strategies and concentrating on long-term goals are recommended solutions.

**Anchoring Bias** - Anchoring bias is the tendency of investors to over-rely on the first reference point—usually the acquisition price of the asset—when making judgments. Russo and Schoemaker (1992) believe that this bias constrains investors' capacity to update their beliefs based on new information. Anchoring can lead investors to retain losing investments or not buy rising stocks that seem "expensive" in comparison with past prices. To overcome this, choices ought to be made based on present fundamental valuations and not historical anchors.

**Loss Aversion** – Loss aversion is a behavioural finance concept that explains why people react more strongly to losses than to gains of the same value. According to Kahneman and Tversky (1979), losses tend to have a greater psychological effect than equivalent gains. Because of this,

investors may avoid selling losing investments or may sell profitable assets too quickly. These reactions can negatively affect investment performance. To reduce the influence of loss aversion, investors need to follow structured investment plans, set risk limits beforehand, and avoid making decisions based on short-term market changes.

## **Research Methodology**

The paper applies a descriptive research design to explore the impact of Behavioural Biases on the investment choices made by individual stock market participants. The paper shall also explore the relationship between Behavioural Biases and the usage of information, knowledge, and skills of equity investors. The paper shall apply the theoretical framework of Bounded Rationality, which acknowledges the presence of cognitive biases and the absence of information in investment decision-making.

The data for the research work has been collected using both primary and secondary sources. The secondary data sources include journals, books, and reports that have helped in building the theory framework and hypothesis formation. The primary sources include a structured questionnaire that has been administered on private investors who have active Demat accounts and are based in the cities of Amravati, Nagpur, and Pune. The sampling technique that has been applied is non-probability – convenience sampling. This will ensure that a total of 600 samples are collected, which are actively involved in stock market operations.

To explore the relationship between the variables of Behavioural Biases, Financial Literacy, Usage of Information, and Analytical Skills, Covariance-Based Structural Equation Modeling was used. The advantage of using this method is its ability to

simultaneously evaluate both the structural model and the measurement model. Another advantage of this method is its ability to assess direct and indirect effects. It further analyzes the model and validates the theoretical model through the fit indices used. Thus, the reliability and precision of the research findings were improved.

## **Data Analysis**

### **CB- SEM – Covariance Based Structural Equation**

#### **Measurement Model**

Confirmatory factor analysis (CFA) with Smart PLS was done for testing the measurement models of the behavioural biases. The researcher started with a selection of seven behavioural biases: Overconfidence, Representativeness, Loss Aversion, Anchoring, Availability Bias, Herd Behaviour, and Disposition Effect. In CFA, Factor loadings on each item were calculated to examine their correlation with the desired latent construct. It was discovered that the risk profile item possessed weak factor loadings (less than 0.5) and hence was discarded from further assessment. Besides that, the items for Representativeness, Loss Aversion, Herd Behaviour, and Disposition Effect also had weak factor loadings (less than 0.5), and hence they were rejected from the model. After factor loading assessment and item deletion, a three-factor model was constructed through covariance-based structural equation modeling (CB-SEM).

**Model Fit Indices:** A number of model fit indices were employed to determine the overall goodness of fit of the three-factor CB-SEM model. These are often composed of CMIN/df

(Chi-square divided by degrees of freedom), GFI (Goodness-of-Fit Index), TLI (Tucker-Lewis Index), SRMR (Standardized Root Mean Square Residual), RMSEA (Root Mean Square Error of Approximation) The assessment of these fit indices aids in determining the fit of the hypothesized model in relation to the observed data. A satisfactory model fit means that the postulated relations among constructs and observed variables are affirmed by the data. Overall, study used CFA to purify the measurement model of behavioural biases, deleting low factor loading items and determining a three-factor model using the remaining items. Model fit indices were employed to confirm the global appropriateness of the CB-SEM model. This method ensures that the constructs under investigation are properly represented by the chosen indicators, lending strength to your research results.

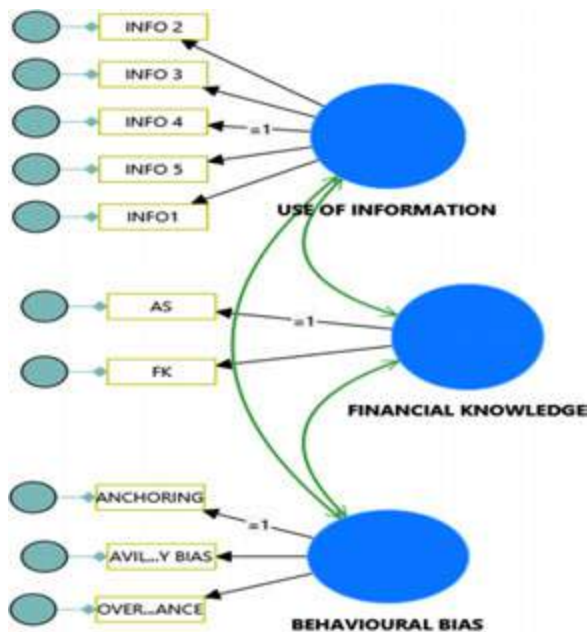


Figure 1 - Measurement Model

Covariance-Based Structural Equation Modeling (CB-SEM), the measurement model is important

because it assesses how accurately the observed variables represent the underlying latent constructs. It helps confirm whether the selected indicators appropriately measure the concepts being studied.

Factor loadings indicate how strongly each observed variable is associated with its related latent construct.

Table 1.1 Factor Loading

	Outer loadings (standardized)	Standard Threshold
ANCHORING <- BEHAVIOURAL BIAS	0.860209878	> 0.7
OVERCONFIDANCE <- BEHAVIOURAL BIAS	0.633598082	> 0.7
AVILABILITY BIAS <- BEHAVIOURAL BIAS	0.617882301	> 0.7
INFO 2 <- USE OF INFORMATION	0.761162574	> 0.7
INFO 3 <- USE OF INFORMATION	0.779908101	> 0.7
INFO 4 <- USE OF INFORMATION	0.885707984	> 0.7
INFO 5 <- USE OF INFORMATION	0.862159388	> 0.7
INFO 1 <- USE OF INFORMATION	0.752683079	> 0.7
FK <- FINANCIAL KNOWLEDGE	0.734197138	> 0.7
AS <- FINANCIAL KNOWLEDGE	0.831525496	> 0.7

Most factor loadings are above the 0.7 cutoff, which suggests good convergent validity. However, the constructs related to Availability Bias and Overconfidence show factor loadings that are lower than the commonly suggested threshold of 0.7. Even so, existing literature indicates that factor loadings between 0.5 and 0.7 can still be considered acceptable when other measures of reliability and validity meet the required standards. This implies that lower factor loadings do not automatically require item removal, provided that overall construct reliability and validity remain strong and within acceptable limits.

### Model Fit

Confirmatory factor Analysis was used

Model fit indices assess the adequacy of the proposed model against the observed data.

**Table 1.2 Model Fit**

Fit Index	Estimate d Model	Standard Threshold
Chi-square	201.833	< 5
Degrees of freedom	32	-
ChiSqr/df	6.307	< 5
RMSEA	0.074	< 0.08
GFI	0.94	> 0.90
AGFI	0.898	> 0.90
CFI	0.938	> 0.90
TLI	0.913	> 0.90
SRMR	0.05	< 0.08

The model fit indicates some challenges, particularly with Chi-square/df values above recommended thresholds. Nevertheless, CFI and TLI, RMSEA suggest a reasonably good fit.

#### Construct Reliability & Validity

Reliability and validity metrics evaluate the consistency and adequacy of the constructs.

**Table 1.3 Construct Reliability & Validity**

Construct	Cronbach's Alpha	Standard Threshold	Composite Reliability	Standard Threshold	AVE	Standard Threshold
BEHAVIOURAL BIAS	0.742	> 0.7	0.754	> 0.7	0.508	> 0.5
USE OF INFORMATION	0.905	> 0.7	0.906	> 0.7	0.656	> 0.5
FINANCIAL KNOWLEDGE	0.758	> 0.7	0.755	> 0.7	0.615	> 0.5

Cronbach's Alpha: All constructs meet the threshold of > 0.7, indicating good internal consistency. Composite Reliability: All constructs exceed the > 0.7 threshold, demonstrating high reliability. Average Variance Extracted (AVE): All constructs have AVE values above the > 0.5 threshold, indicating adequate convergent validity. All constructs demonstrate satisfactory reliability, with USE OF INFORMATION and FINANCIAL KNOWLEDGE showing strong validity with AVE > 0.5.

#### Discriminant Validity

Discriminant validity ensures that constructs are

distinct. Farnell and Larkewr Method-Discriminant validity in the study was assessed using Average variance extracted (Farnell and Larkar Method).

**Table 1.4 Discriminant Validity**

	BEHAVIOURAL BIAS	USE OF INFORMATION	FINANCIAL KNOWLEDGE
BEHAVIOURAL BIAS	<b>0.713</b>		
USE OF INFORMATION	0.136	<b>0.81</b>	
FINANCIAL KNOWLEDGE	0.231	-0.125	<b>0.784</b>

According to the Farnell and Larkar criterion for discriminant validity, which evaluates whether constructs are distinct, the provided correlation matrix shows that Behavioural Bias, Use of Information, and Financial Knowledge exhibit clear differentiation. The square root of the Average Variance Extracted (AVE) for each construct (italicized and bolded numbers) exceeds the correlations between that construct and others, indicating robust discriminant validity. Specifically, Behavioural Bias has an AVE square root of 0.713, surpassing its correlations of 0.136 with Use of Information and 0.231 with Financial Knowledge. Use of Information shows an AVE square root of 0.81, exceeding its correlations of 0.136 with Behavioural Bias and -0.125 with Financial Knowledge. Financial Knowledge, with an AVE square root of 0.784, surpasses its correlations of 0.731 with Behavioural Bias, -0.125 with Use of Information, These findings validate that each construct measures a distinct aspect within the study, supporting the integrity and differentiation of the measured variables

#### Structural Equation Model –

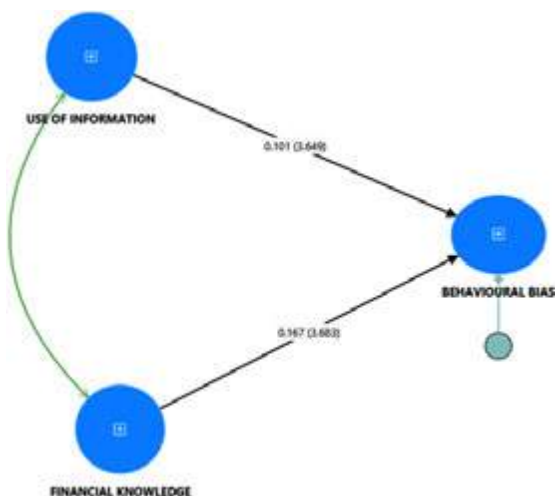
A Structural Equation Model was generated through CB- SEM in Smart PLS to set the relationships between the variables. A good fitting model is accepted if the value of the CMIN/df is less than or equal to 5, the the GFI index is more

than 0.9, RME is less than 0.05, RMSEMA is between 0.05 to 0.08.

The fit indices for our model is within the acceptable range as shown in the model fit table 1. The squared multiple correlation 0.634 for behavioural bias shows that 63.4% of variance in Behavioural bias is explained by Use of information and Financial knowledge.

The study examines the influence of Use of Information and Financial Knowledge on Behavioural Biases, with standardized beta coefficients indicating their direction and significance shown through path coefficients. The standardized beta coefficient for Use of Information is 0.168, and for Financial Knowledge, it is 0.252. These values indicate the strength and direction of the relationships: Financial Knowledge has a higher impact on Behavioural Biases compared to Use of Information. The T-values for these relationships are 3.73 for Use of Information and 4.08 for Financial Knowledge. Since both values are higher than the 1.96 threshold for a 95% confidence level, it shows that both factors have a significant effect on Behavioural Biases in the model.

Figure 2 - Structural Model



## Path Coefficients

Path coefficients show how the constructs are related, and their significance is evaluated using T-values and p-values.

Table 2.1 Path Coefficients

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
FINANCIAL KNOWLEDGE -> BEHAVIOURAL BIAS	0.252	0.244	0.062	4.08	0
USE OF INFORMATION -> BEHAVIOURAL BIAS	0.168	0.168	0.045	3.73	0

Both paths are statistically significant ( $p < 0.05$ ), showing that financial knowledge and use of information both have a meaningful effect on behavioural biases. Among them, financial knowledge has a stronger influence on behavioural biases than use of information.

## R-Squared

The R-squared value shows how much of the variance in the dependent variable is explained by the model. For the Behavioural Bias construct, the R-squared is 0.634, meaning that the model accounts for about 63.4% of the variation in behavioural biases. This also suggests that including additional predictors could further improve the model's explanatory power.

The results from the CBSEM analysis reveal significant insights into the relationships between financial knowledge, use of information, and behavioural bias. The strong factor loadings for most items suggest that the constructs are well-defined and measure what they intend to capture. The acceptable construct reliability values indicate that the measures are consistent.

However, the model fit indices highlight some concerns, particularly with the Chi-square/df ratio,

which suggest that the model may not fully capture the complexity of the data. The significant path coefficients indicate that both financial knowledge and use of information positively influence behavioural bias. While the paths are statistically significant, the relatively low R-squared value suggests that there are other unexamined factors influencing behavioural bias.

## **Findings and Conclusion**

**Interpretation of SEM Model Results-** Covariance-Based Structural Equation Modelling (CB-SEM), the measurement model plays a crucial role in validating how well the observed variables (indicators) reflect the underlying latent variables (constructs) Confirmatory factor analysis (CFA) was conducted using Smart PLS to evaluate the measurement models for behavioural biases. The researcher initially chose seven behavioural biases: Overconfidence, Representativeness, Loss Aversion, Anchoring, Availability Bias, Herd Behaviour, and Disposition Effect. During the CFA, Factor loadings for each item were assessed to evaluate their relationship with the intended latent construct. It was found that the risk profile item had low factor loadings (less than 0.5), and therefore, it was removed from further analysis. Additionally, the items for Representativeness, Loss Aversion, Herd Behaviour, and Disposition Effect also showed low factor loadings (less than 0.5), leading to their rejection from the model. Following the assessment of factor loadings and item removal, a three-factor model was developed using covariance-based structural equation modelling (CB-SEM). Most factor loadings exceed the 0.7 threshold, indicating strong convergent validity. However, Availability Bias and Overconfidence have factor loadings below 0.7 but above 0.5, which is acceptable if other indicators of construct reliability and validity are

satisfactory. This approach suggests that while loadings below 0.5 are concerning, those in the 0.5 to 0.7 range can be retained if overall construct reliability and validity are robust. The model fit indicates some challenges, particularly with Chi-square/df values above recommended thresholds. Nevertheless, CFI and TLI, RMSEA suggest a reasonably good fit. All constructs show strong internal consistency, high reliability, and adequate convergent validity, with USE OF INFORMATION and FINANCIAL KNOWLEDGE demonstrating particularly robust validity. According to the Farnell and Larkar criterion, the constructs Behavioural Bias, Use of Information, and Financial Knowledge exhibit strong discriminant validity, as the square root of the Average Variance Extracted (AVE) for each construct exceeds the correlations with other constructs, confirming their distinctiveness.

**Fit Indices:** The model's fit indices are within acceptable ranges:  $CMIN/df \leq 5$ ,  $GFI > 0.9$ ,  $RME \leq 0.05$ , and RMSEMA between 0.05 and 0.08, indicating a well-fitting model.

**Variance Explained:** The squared multiple correlation of 0.634 shows that 63.4% of the variance in Behavioural Bias is explained by Use of Information and Financial Knowledge.

**Effect of Predictors:** Financial Knowledge is a stronger determinant of Behavioural Biases compared to Use of Information. The beta values for Financial Knowledge and Use of Information are 0.252 and 0.168, respectively. Both are significant with a T-value of 4.08 and 3.73 respectively, compared to the significance level of 1.96.

**Factor Loadings:** The factor loadings of the majority of the construct are higher than 0.7, establishing convergent validity. Although the

factor loadings of Availability Bias and Overconfidence are lower than 0.7, they are still acceptable provided other forms of reliability and validity are in order.

**Reliability and Validity:** All constructs exceeded the standard values for reliability and validity. The values for Cronbach's Alpha and Composite Reliability are above 0.7, with Average Variance Extracted values above 0.5. This is particularly significant for constructs Use of Information and Financial Knowledge.

**Discriminant validity:** The results prove that the discriminant validity is in order. This is because the square root of the AVE of the constructs has been found to be higher than the correlation values among the constructs, thereby proving that the constructs of Behavioural Bias, Use of Information, and Financial Knowledge exist and provide a measure of the differences in the study.

The results of the CB-SEM are as follows: strong factor loadings, indicating that the constructs are well-defined and the measures are consistent. The Chi-square/df ratio below the threshold may suggest that the complexities within the data are not yet fully captured. Meanwhile, the significant path coefficients denote that financial knowledge and the use of information have a positive effect on behavioural biases. At the same time, the value of R-squared shows that there are other factors influencing behavioural biases not taken into account by the model.

Altogether, the results of CB-SEM give useful insights into the relationships among behavioral biases, financial knowledge, and the use of information by individual investors. It follows that the measurement model exhibits good reliability and validity for the retained constructs, which may further point to the strength of the Use of

Information and Financial Knowledge constructs in explaining behavioral biases. Some biases, such as Representativeness, Loss Aversion, Herd Behaviour, and Disposition Effect, were excluded because their respective indicators had low factor loadings. However, the main patterns in investor behavior are represented by the final three-factor model through Overconfidence, Availability Bias, and Anchoring.

However, the overall values of the fit indices suggest a satisfactory, though not excellent, fit. This indicates that although this model is informative, there are possibly other drivers as well that have influenced investor behaviour. There is a visible difference between the Financial Knowledge variable, which is a better predictor for biased behaviour, and the Use of Information variable. Both significant path coefficients affirm that improving financial literacy as well as usage of information helps to take more unbiased decisions.

Although the model explains in excess of 63% of the variance found in investment behavioural biases, the model results also reveal the presence of additional as-yet-uninvestigated variables. Finally, the conducted research underlines the need for better financial education as well as the usage of informed information as an engine for influencing prospective investors to behave in a more rational and disciplined manner regarding investment decisions in the stock market.

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## Core valueS

**1. Passion:**

The soul of Welingkar blossoms in our heart, mind and body.

**2. Breakthrough Thinking:**

We foster academic rigour in an environment conducive to innovation.

**3. Result oriented, Process driven Work Ethic:**

We adopt dynamic quality processes to ensure accountability and exceptional performances.

**4. We Link and Care:**

We support and collaborate with all our stakeholders through mutual trust and respect.



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We are committed to give our students Quality Management Education in tune with the changing needs of business and industry.

We shall endeavor to do this by:

- Providing the best learning resources.
- Making the environment conducive for students to develop their creativity, Leadership skills and ability to learn continuously.

We shall follow a data oriented factual approach to Quality Management leading to continual improvement of our processes culminating in total customer satisfaction.



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