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AN ANALYSIS ON THE SAVING AND INVESTMENT AVENUES OF EMERGING GENERATIONS: GEN Z AND MILLENNIALS IN INDORE

Pooja Sachdeva*

ABSTRACT

Finance plays a crucial role in economic sustainability and individual financial well-being. Saving and investment are fundamental components of financial management, and investment behaviour varies across generational cohorts due to differences in socio-economic exposure, technological adaptability, and financial literacy levels. This study examines the saving and investment patterns of Generation Z (born 1996–2010) and Millennials (born 1981–1995) in Indore city. The study aims to analyse their preferred investment avenues, influencing social factors, impact of level of financial knowledge on investment decision and risk tolerance levels. Primary data were collected from 82 respondents using a structured questionnaire, and statistical tool ANOVA was applied for hypotheses testing. The findings revealed significant generational differences in investment preferences, particularly between traditional and modern investment avenues. Both generations demonstrated relatively high- risk tolerance. No significant impact of level of financial knowledge on their investment patterns was found. The study contributes to understanding generational financial behaviour within an emerging urban economy and offers implications for policymakers, financial institutions, and educators.

Keywords: *Finance, Investment and Saving Pattern, Gen Z and Millennials, Demographic Factors, Risk Tolerance Level, Investment, Financial Knowledge.*

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INTRODUCTION

It goes without saying that the process of savings is vital for securing financial well-being and stability in the future. Still, savings are not enough, especially for the purpose of wealth accumulation, since in case of inflation, the actual worth of money decreases over time. Therefore, an efficient way of investing becomes necessary in order to secure capital gains and hedge against inflation. People belonging to different generations show distinct approaches toward personal finance depending on various factors, such as technological background, financial history, preference in life styles, and awareness about financial matters. Generation Z, born at the time of digitalization, usually opts for investing in technologies, such as crypto currency, robo advisory, P2P investing, and ESG investing. At the same time, a start-up approach is more appealing for this generation, which shows interest in crowdfunding opportunities.

Generation Y, experiencing economic events such as global financial crises and phases of digitalization, prefers more diversifying financial instruments, such as stock exchanges, mutual funds, ETF's, as well as occasional investments into fixed deposits, appreciating the possibility of professional management and investment structures.

Indore, one of India's dynamically developing cities, displays a wide range of financial practices among its inhabitants. The knowledge of financial behavior among young people allows for better formulation of policies related to financial inclusion and capital market development. Therefore, the target audience of this study includes Gen Z and Millennials.

REVIEW OF LITERATURE

Saputra (2024) identified that the millennial generation possesses a varied understanding of financial management, investment, and debt management. This demographic exhibits a combination of internal and external loci of control in financial management. Millennials generally demonstrate a strong interest in investing, recognizing the importance of investment for future wealth accumulation. The study revealed that many millennials are keen to capitalize on existing investment opportunities, such as stocks, mutual funds, cryptocurrencies, and property. They are generally cognizant of the significance of savings and long-term financial planning. Sheeba et al. (2023) investigated the level of awareness

among millennials regarding their saving and investment patterns and personal credit management skills. Their financial management skills were assessed by examining their financial habits concerning savings patterns and the investment of saved funds.

Paramita and Paramita (2023) found that financial literacy negatively affects consumptive behaviour in millennials and Generation Z. Higher financial literacy correlates with reduced consumptive behaviour in these groups. They observed that lifestyle significantly influences consumptive behaviour, and individuals should be mindful of their behaviour, establish a priority list, and select an environment that supports non-consumptive behaviour. Financial planning among millennials and Generation Z remains unstable, underscoring the necessity of financial awareness due to their adaptability to technological advancements.

Usriyono and Sugeng (2023) studied that training programs, workshops, and seminars are required to conduct for creating awareness, overcome economic activity bias, and improve financial literacy. To overcome those biases, it needs to conduct training programs, workshops, and seminars that create awareness and the ability to recognize behavioural finance and cope with such behaviour. Shyamala and Mahesh (2022) considered savings and investment patterns of millennial is essential for success of the Indian economy and financial literacy is an important tool to have for millennials. According to them, young generation of today is more creative and technology savvy than the older generation socially and financially. From their point of view, the awareness about investment is lacking.

Meyyammai and Vinotha (2022) studied to know the investment preference among Gen X, Millennials and Gen Z. The main objective of the study was to find out whether the factor influences the investment decision across gender and age and to identify the most preferred investment avenues by the investors. Patil and Gokhale (2022) examined to determine the investment pattern of millennials along with that of Gen-Z and to make a comparative analysis of the same. Investing involves the expectation to gain or to experience any financial risks that may happen in the future. Keeping this in mind, the research aimed to look at what drives the decision-making process of both generations and if it's gender-specific as well.

Singh (2022) investigated the spectrum of millennial (Generation Y) investors' behavioural factors that affect investment decisions during a pandemic. The major findings revealed that

millennials (Generation Y) financially deal with more confusion and disagreements when dealing with various patterns of informed conduct or behaviour, in contrast to other generations. Susanto et al., (2022) studied the factors affecting interest in financial planning adoption by Millennials and Z generation. The results showed that the level of financial planning literacy and benefit expectancy had a significant effect on the adoption of financial planning and on the positive attitude towards financial planning. Harbola and Dubagunta (2022) found that this generation saves more than previous generations. However, these savings are usually not retirement-specific. Given this higher propensity to save but lower retirement-specific savings, it begs the question of whether this reflects a lack of suitable retirement schemes as one of the primary reasons for insufficient retirement funds in millennials' investment portfolios.

Bulut and Maraba (2021) stated that Generation Z has been growing in an era where technological advancement is fostered, and they are able to have access to effortless and rapid information through technological tools, like the Internet and smartphones. Like other generational cohorts, Generation Z has unique habits and personality traits because they experienced different social, economic, or historical circumstances depending on the time interval in which they were raised, and the perception of work and occupational habits is affected by those particular characteristics.

Dayana and Rodrigues (2021) examined the investment patterns of young Millennials in Bangalore City using primary data. The study found the most common source of investment advice chosen by the investor and the most relevant percentage of income invested. The study discovered that a financial planner can do a world of good to investors in achieving their financial goals, and investment avenues such as equity, commodity, and mutual funds need more awareness among the salaried class for tax exemption and future savings. Rosdiana (2020) studied the effects of the level of financial literacy, herding behaviour, risk aversion, and risk perception on investment decisions in the Generation Z and Millennial generations. Given the above phenomena, Generation Z and Millennials must have financial intelligence, namely, the ability to carry out financial planning and investment decision-making. This study aimed to measure the effects of financial literacy, herding behaviour, risk aversion, and risk perception on the investment decisions of Generation Z and Millennials.

RESEARCH GAP

Although numerous studies have explored financial literacy and generational investment behaviour, there is limited empirical evidence comparing Generation Z and Millennials within Tier-II urban economies like Indore.

OBJECTIVES

- To analyse the preferred investment avenues of Gen Z and Millennials.
- To examine social factors as key drivers influencing the investment decisions of Generation Z and Millennials.
- To analyse the risk tolerance levels among Generation Z and Millennials.
- To evaluate the impact of the level of financial knowledge on investment behaviour among Generation Z and Millennials.

RESEARCH METHODOLOGY

Primary data were collected through a structured self-designed questionnaire administered to students and working professionals in Indore**.** Secondary data were obtained from academic journals, research articles, and online databases. The motive of this study is to examine the Gen Z and Millennials' preferences of investment, their risk tolerance level and the social factors which affect their decision of investment and also evaluate the impact of the level of financial knowledge on investment behaviour among Generation Z and Millennials.

The Study*:* This study adopts a quantitative research design to examine the investment preferences of Gen Z and Millennials preferences of investment, the social factors influencing their decision, risk tolerance level and impact of level of financial knowledge on investment behaviour.

The Sample and Sampling Technique*:* Initially, data were collected from 123 respondents. After eliminating incomplete responses and performing data cleaning procedures, the final sample comprised 82 respondents. The sample includes students, private sector employees,

public sector employees, and self-employed individuals. A non-probability snowball sampling technique was adopted for data collection, wherein the respondents were requested initially to refer the other eligible participants within their networks. This approach was adopted to get the easier access to the target population.

Tools for Data Collection: Primary data were collected using a self-designed structured questionnaire. Additionally, secondary data were gathered from relevant research papers, academic journals, articles, online databases, websites, and books to support the theoretical framework of the study.

Tools for Data Analysis*:* The collected primary data were analysed using Analysis of Variance (ANOVA) through SPSS.

DATA ANALYSIS AND RESULT

H_{01}: There is no significant difference in the preferences of Generation Z and Millennials for investment avenues based on their investment proportion.

Summary

Groups	***Count***	***Sum***	***Average***	***Variance***
0-10%	83	857	10.3253	34.2222
10-20%	17	250	14.7059	4.34559
21-30%	8	117	14.625	7.69643
More than 30%	8	107	13.375	12.2679

ANOVA

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	395.426	3	131.809	4.89557	0.0031	2.68564
Within Groups	3015.5	112	26.9241			
Total	3410.92	115				

Interpretation:

ANOVA results ($F = 4.89557$, $p < 0.05$) indicate a statistically significant difference in investment preferences between Gen Z and Millennials.

The two generations differ in their preference for traditional investment avenues (such as real estate and fixed deposits) and modern investment options (bitcoin, Crypto currency), based on the proportion of their investments due to digital and technological driven environment.

2. **H_{02}:** There is no significant influence of social factor as key drivers of investment behaviour on the investment decisions of Generation Z and Millennial with respect to their proportion of investment.

Summary

Groups	*Count*	*Sum*	*Average*	*Variance*
0-10%	49	370	7.55	2.669218
10-20%	17	141	8.29	1.720588
21-30%	8	63	7.87	2.125
More than 30%	8	63	7.87	2.982143

Source of Variation	***SS***	***df***	***MS***	***F***	***P-value***	***F crit***
Between Groups	7.1957	3	2.39	0.977463	0.407794	2.721783
Within Groups	191.4019	78	2.45			
Total	198.5976	81				

ANOVA

Interpretation:

Since $p > 0.05$, no statistically significant difference was found.

The social factors, such as peer influence, friends do not significantly affect the investment decisions of Generation Z and Millennials in terms of their investment proportion as other factors such as market-related factors, financial considerations and income level plays influential role.

3. $\mathbf{H_{03}}$: There is no significant difference between Generation Z and Millennials in the frequency of reviewing their investment portfolios with respect to the risk tolerance level in their investment decisions.

Summary

Groups	***Count***	***Sum***	***Average***	***Variance***
Only when necessary	21	189	9	2.5
Annually	4	33	8.25	2.916667
Half-yearly	9	84	9.33	0.75
Quarterly	18	176	9.77	4.300654
Monthly	30	284	9.46	3.154023

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	11.11125	4	2.777812	0.932689	0.449579	2.490447
Within Groups	229.3278	77	2.978283			
Total	240.439	81				

Interpretation

No significant difference was found ($p > 0.05$). Generation Z and Millennials exhibit similar portfolio review behaviour despite relatively high risk tolerance levels as both the groups are influenced by real-time market updates, and easy access to investment applications.

4. **H_{04}:** There is no significant impact of the level of financial knowledge on shaping investment behaviour among Generation Z and Millennials.

Summary

Groups	*Count*	*Sum*	*Average*	*Variance*
Basic	49	212	4.326531	0.34949
Intermediate	28	115	4.107143	0.691799
Advanced	5	23	4.6	0.3

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.443479	2	0.72174	1.555555	0.217467	3.11226
Within Groups	36.65408	79	0.463976			
Total	38.09756	81				

Interpretation:

No significant statistical impact was observed ($p > 0.05$).

This indicates that respondents with basic, intermediate, or advanced financial knowledge did not differ significantly in their investment patterns. The investment decisions among emerging generations may be driven more by market trends, digital platforms, social media exposure, and economic conditions rather than theoretical financial knowledge.

DISCUSSION

The result of the study confirms that the variables considered in this study are important to analyse the Saving and Investment Patterns of Gen Z and Millennials. $H_{01,}$ stated that there is no significant difference in the preferences of Generation Z and Millennials for investment avenues based on their investment proportion is not accepted indicating that Generation Z and Millennials exhibit significantly different preferences for investment avenues. The allocation from their monthly income really affects their preferences. Generation Z and Millennials might prioritize different types of investments, with one generation showing a stronger preference for traditional investment options like real estate and fixed deposits, mutual fund while the other may lean more toward modern investment methods, such as, cryptocurrencies, Exchange-Traded Funds (ETFs) and Real Estate Crowdfunding or tech-driven platforms.

H_{02} is accepted indicating there is no significant influence of social factors as a key drivers on the investment decisions of Gen Z and Millennials such as family's financial habits, peer influence do not affect their investment decisions as both the generations tend to consider market trends and economic conditions before making investment choices.

H_{03} is accepted which implies that both Generation Z and Millennials exhibit a higher risk tolerance in their investment choices. Despite this, they review their portfolios with similar frequency. Reviewing their investment portfolios does not affect their level of risk tolerance. Gen Z and Millennials remain calm during market fluctuations and they are willing to take risk which has been found in the study. H_{04} stated there is no impact of level of financial knowledge on shaping investment behaviours among Generation Z and Millennials based is also accepted. This outcome suggests that participants gain some theoretical knowledge but it does not translate more into practical changes in their investment decisions. Moreover, the

financial knowledge alone may not be a sufficient determinant of investment behaviour. Access to online investment tools and fintech applications may reduce the dependency on deep financial knowledge for making investment decisions.

RECOMMENDATIONS

- There is a need to organise financial literacy programs in the form of workshops and seminars organized specifically targeted at Gen Z and Millennials to improve their practical knowledge about financial literacy on timely basis.
- Lack of awareness towards financial avenues may be a reason of not opting and investing in modern financial avenues. Thus, knowledge regarding new investment avenues should be taken by Gen Z and Millennials.
- In India, people are reluctant to invest in the financial avenues due to market fluctuations, however Millennials and Gen Z are taking steps towards it but factors like family's conservative thinking, and sometimes market trends affect their decision of investment therefore people should change their way of thinking and should move on for investment.

CONCLUSION

Investment plays a pivotal role in long-term financial sustainability, particularly in inflationary environments. The study confirms that both Generation Z and Millennials in Indore actively participated in investment activities, though with differing preferences. While Gen Z leans toward technologically advanced and innovative instruments, Millennials maintain a balanced approach combining traditional and modern options. The social factors do not significantly affect the investment decisions of Generation Z and Millennials in terms of their investment proportion. Risk tolerance levels are comparable across generations. No significant impact of level of financial knowledge on their investment patterns was found.

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INTERACTIVE SMART TECHNOLOGIES LEVERAGING TOURISM EXPERIENCES- A SECONDARY DATA ANALYSIS ON IMMERSIVE, INCLUSIVE, AND SUSTAINABLE TRAVEL INNOVATIONS

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ABSTRACT

Tourism 4.0 incorporates use of immersive technologies, like Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI) and the metaverse, redesigning the basket of offerings to travellers for enhanced experience. These interactive technologies have personalised the tourism experiences with sustainable and interactive practices, connecting visitors more profoundly with their selected destinations. In India, immersive digital technologies have brought tourism to life, with an emphasis on virtual access to our culturally-centred and ecologically-sensitive sites, thereby, minimising a physical impact and securing our heritage (Patel, 2023). The various researchers have explored the relevant research fields to give unbiased insights on role of integrative technologies for promoting environmental and cultural consciousness ethically. The research aims to investigate the recent studies in databases such as Google Scholar, Research Gate and other accessible online platforms to create deeper understanding on evolving prospects and challenges with immersive technologies in tourism fostering responsible tourism. The findings validate the co-creation ability of technology for engaging travellers for reshaping sustainable tourism experiences that comes with the limitation of high infrastructure and ethical costs.

Keywords: *Interactive Technologies, Digital Applications, Customer Experience, Sustainable Practices.*

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INTRODUCTION

The advent of new digital technologies is transforming multiple aspects of modern lifestyles, including the tourism sector, contributing significantly towards the fulfilment of Sustainable Development Goals (SDGs) in tourism. The rapid development of internet infrastructure, coupled with the widespread use of smart devices, has accelerated this transformation. The "Digital India" initiative by the government has been pivotal in promoting the adoption of digital tools and services (Government of India, 2023).

The term "Metaverse" is derived from the Greek word "meta," meaning "beyond," and "universe." It was firstly developed by Neal Stephenson in his science fiction novel called Snow Crash in 1992, which portrayed a fully fledged virtual world existing parallelly to the physical world. This phenomenon can be likened to the idea of "digital twin", as being a virtual overlay of the actual reality, combining the two types of worlds into one. Interactive technological devices like VR, AR, and Metaverse help create the value for human centred experience by creating value through technology driven immersive personalized tourists experience in virtual space, as users interact with each other via their avatars (Davis et al., 2009). Metaverse can be characterized as a huge virtual environment emerging as a result of integration between different digital media, augmented reality, and computer generated virtual space (Johnson, 2024). Virtual Reality (VR) is defined as a kind of technology that provides users with a digital simulation of a certain environment through immersive three-dimensional and 360-degree views of the tourist attraction sites, both cultural and nature related, but without any environmental intrusion (Mehta and Gupta, 2023; Lee, 2023). AR is a kind of overlaying digital world on the physical one providing visitors with additional information.

"Tourism Industry 4.0" refers to the application of such modern technologies as the Internet of Things (IoT), artificial intelligence (AI), big data analytics, virtual reality (VR), and augmented reality (AR) to make the process of running the tourism industry more efficient and sustainable (Smith and Brown, 2022). The state referred to as Tourism Industry 4.0 represents a condition in which the process of delivering services becomes smart tourism, with super-personalization and seamless convergence. Virtual tours, itinerary planning and service in real time are now enabled using interactive technologies that lead to an overall

enriched experience for a visitor and at the same time reducing environment foot print as well (Rao and Singh, 2023). The metaverse also offers the chance for tourists to participate in interactive events like cultural festivals or traditional activities that would preserve culture while avoiding the negatives of over-tourism (Mehta, 2024). Visitor engagement has been enhanced through technology yielding rich information about preferences and behaviour, which in turn enables tourist operators to make evidence- based decisions (Doe, 2023). A similar scenario is provided by smart destinations, where Industry 4.0 is mirrored, as destinations raise efficiencies in the number of tourists attending, allowing personalisation and customizations of their tourism products and services.

Buhalis and Karatay (2022) defined Metaverse as a convergence of digital and physical worlds, enriched with intelligent technology to enhance spaces, products and services. Within this immersive virtual space, users can interact, work and socialize using devices like MR (Mixed Reality) and VR (Virtual Reality) headsets and smart glasses. Metaverse is interoperable where users can move between different virtual platforms (e.g., Horizon World, Sandbox, Roblox) using platform-independent profiles, allowing for a broader range of social interactions and networking. This immersive digital world offers potential traveller's opportunities to virtually explore destinations, engage in cultural activities, participate in special tours or traditional events, and local marketplaces (Gupta and Patel, 2024). Recent technological inhibitions at famous tourists' destinations like TajMahal, Khajuraho, or AR enabled interactive museum visits, highlight how technology is being leveraged to encourage sustainable tourism and broaden creative accessibility (Government of India, 2023) while promoting responsible sustainable tourism practices (Patel and Verma, 2024). Increasing popularity of virtual tourism replicating major Indian festivals such as Diwali or Holi and cultural fests, interaction with the avatars of local artisans and heritage have curtailed the financial, physical, or geographical constraints or other limiting factors reducing environmental footprints and carbon emissions (UNWTO, 2023).

Recent Trends and Implications of Tourism 4.0- Interactive Technologies

The hospitality sector is embracing the technological trends in similar line with other industries and hotels developing virtual spaces to attract customers. It has transformed social connections within the tourism industry, enhancing interactions among consumers, peers and suppliers (Tsai et al., 2022). The Metaverse creates a collaborative space for co-creation,

especially in travel planning, by offering tools that stimulate travel inspiration and support decision-making through digital twins.

Virtual reality has been integrated with historical sites in India, like the TajMahal, the Khajuraho Temples, Humayun's Tomb and the temples of Mahabalipuram to offer immersive virtual tours. These virtual reality simulations offer a lifelike experience while highlighting the historical significance and stunning architecture of these locations. Egyptian Pyramids and the Vatican Museums have been turned into virtual reality experiences that encourage cultural tourism while providing visitors with insights on their heritage. The metaverse has been utilized by South Korea, India and the UK to promote festivals and cultural heritage like Durga Puja, Ganesh Chaturthi and Edinburgh Festival Fringe, individuals from all over the world can participate in the festivities, see cultural performances, and virtually chat with other guests. The Louvre Museum in Paris uses AR to help visitors navigate through exhibits while providing additional layers of content, including animations, background stories, and artist details, enriching the museum experience.

Several state tourism agencies in India have released Augmented Reality (AR) apps to improve visitors' experiences at historical sites. "My Heritage Walk" app from Maharashtra Tourism gives visitors in-depth multimedia information about particular attractions, strengthening their bond with the location with guided tour of the Ajanta and Ellora Caves and famous Ganesh Temples. By superimposing more information on exhibitions, the British Museum and the Louvre in Paris are able to provide digital guides that improve the tourist experience and provide for more interesting and educational trips. Maldives makes considerable use of Virtual Reality (VR) to promote opulent resorts, enabling prospective visitors to take virtual tours of the resort's amenities, beaches and villas. This improves consumer engagement and decision-making while also enhancing the destination's appeal. The destination managers are using digital technology to promote destination marketing and uniqueness giving a myopic glimpse into the destination's culture, landscapes such as Goa Tourism has leveraged VR to provide a virtual glimpse into its beaches, nightlife and cultural events to attract international visitors. The Archaeological Survey of India (ASI) has introduced AR-based apps at select heritage sites that allow tourists to view visual content in their preferred language, promoting inclusivity.

VR-based safaris are offered in a handful of India's key national parks and wildlife sanctuaries like Ranthambore and Kaziranga, where visitors can witness wildlife in the wild. These virtual safaris not only educate tourists about why it is important to save natural resources and endangered animals, but also provide a view into various biodiversity conservation projects. Travellers can observe legendary natural happenings or sight from age-old times to present day as they take place such as the Great Migration in African countries such as South Africa or Kenya.

VR enables travellers to personalized their trip by personalizing not only the itinerary in accordance to their own tastes, but also by taking the decision, thanks to the pre-travel virtual experiences (Johnson, 2023). The metaverse contributes to personalization through interaction with destination avatars to provide user cantered journeys (Kumar and Singh, 2024). Virtual tourism, in doing away with physical tourism, contributes to sustainability by limiting physical travel and, by extension, diminishing CO_2 emissions, as well as endangerment to sensitive ecosystems (Patel, 2023). AR also teaches tourists about sustainable travel

Virtual tourism offers a significant opportunity for those with physical disabilities or financial challenges to explore destinations virtually, promoting "accessible tourism" and enabling shared experiences without physical or geographical barriers (Smith, 2023). Augmented Reality (AR) tools enhance inclusivity by offering real-time translations, audio guides for the visually impaired, and other custom content, ensuring diverse groups have enriching experiences (Brown, 2024). Tourism service providers and operators have largely been using the interactive technologies such as Virtual Reality (VR) as a sensory tool for promoting the tourism destinations and experience virtually in sustainable way (Brown, 2023).

REVIEW OF LITERATURE

Díaz et al. (2020) studied the use of interactive technologies through a dynamic and interactive learning experience. The hybrid experience of learning from a remote location to cultural heritage sites, museums or difficult terrains will eliminate the physical and economical barriers. Buhalis et al. (2023), in their research, outlined the revolutionary power of metaverse in engaging the travellers with digital content pre and post travel pouring huge

economic outcomes for reaching wider audience while reducing the operating costs in long runs, however limited with the high infrastructure cost, privacy and data security concerns.

Chen et al. (2023) examined the drivers and barriers to the adoption of the metaverse in tourism, considering the perspectives of various stakeholders. Main factors may involve increased customer involvement, innovative marketing methods, and economic gains from the creation of digital experiences. For instance, Flavián et al. (2019) have studied the use of VR and AR technologies in tourism and stressed their ability to create immersive multi-sensory experiences. Chen et al. (2023) have found that the main motivational factors for adoption include increased customer participation, innovative marketing, and creation of new economic sources, even though there were some fears raised concerning the barriers to implementing such technologies. According to previous literature studies conducted by Flavián et al. (2019) and Flavián and Barta (2022), the use of VR/AR technologies can completely transform tourists' conduct by providing them with immersive experiences. They not only increase interactivity but also broaden the audience and business models for agencies.

In the same manner, Gajdošík et al. (2021) have looked into the evolution of smart tourism as a more personalized and data-oriented strategy for traveling. The economic implications for metaverse tourism licensing agreements were analyzed by Go and Kang (2023). Economic considerations aside, there is also the issue of sustainability that must be addressed. As noted by Dogru et al. (2021), technology can help reduce ecological harm, while Buhalis and Karatay (2022) have showcased how mixed reality technologies could attract Gen Zers and protect cultural heritage sites.

Further, examples include contributions that elaborate on the impact of digital technologies on social interactions and inclusion. Specifically, Fan et al. (2019) claim that the role of social networks in the metaverse is important in determining the destinations to visit and creating content generated by users. Likewise, Fenu and Pittarello (2018) suggest that using augmented reality allows more meaningful storytelling and culture preservation, while Rubio-Escuderos et al. (2021) emphasize the significance of inclusiveness by ensuring that travellers with disabilities gain access to a destination via virtual travel.

On the other hand, not many critical challenges are intact. Fricano et al. (2023) and Mondal (2023) warn about possible disruption of local economies through extensive substitution of physical travel and challenges in terms of hardware availability, which may result in further digital inequalities. Rasul et al. (2023) and Talwar et al. (2022) suggest that the application of VR technology can impact the way destinations' image is shaped and influence tourists' decisions about sustainable trips; nonetheless, they admit that integration of VR into existing tourism practices is complex. Similarly, Gursoy et al. (2024) conclude that although consumers are willing to apply metaverse to travel arrangements, the extent of adoption will largely depend on technological and infrastructure literacy.

Finally, Rauschnabel et al. (2022) and Yovcheva et al. (2014) acknowledge the potential of increased digital real-time interaction, but mention that excessive development expenses, unevenness of accessibility, and difficulties in the management of the technology continue to pose challenges. At the same time, Buhalis et al. (2023) and Go and Kang (2023) stressed the significance of having proper digital infrastructures, legal regulations, and security measures in the context of licensing problems. While Gursoy et al. (2024) and Rasul et al. (2023) noted improved opportunities associated with data-driven management and sustainability, limited quality of virtual content makes it difficult to capitalize on these features.

Some of the additional challenges relate to development costs and trustworthiness of user-generated content. In particular, Monaco and Sacchi (2023) draw attention to the problem of controlling the accuracy of the material available online and guaranteeing safety of travelers' personal data. According to Schiopu et al. (2022), maintaining customer interest will require updating the available content regularly, ensuring adequate device availability, and providing stable network connections.

Moreover, the issues of accessibility and involvement are pertinent. Flavián et al. (2019) observe that while transitioning to the metaverse will require considerable investments to overcome the digital gap, there is an ongoing preference for more tangible experiences. When speaking of the role of metaverse in travel marketing, Cheah and Shimul (2023) recognize the potential of immersive storytelling, but warn about the associated risks related to data breaches and ethical questions concerning manipulations with digital content. Dhelim et al. (2022) also point out that these technologies have the potential to increase sources of revenue

and promote sustainable travel via virtual travel, which depends on innovative marketing techniques. Finally, according to Xu et al. (2017), gamification will facilitate users' engagement and increase awareness about environmental protection. The transition to metaverse technology comes at a price and poses several challenges associated with uncertain prospects and the need for substantial financial investment. However, certain conditions facilitating adoption can be distinguished.

RESEARCH OBJECTIVES

- To identify key themes and sub-themes in virtual/metaverse tourism based on recent scholarly literature.
- To assess perceived benefits (such as enhance user engagement and accessibility) and challenges of immersive technologies (AR/VR/MR) in Indian tourism based on secondary sources.

RESEARCH DESIGN

This research follows a qualitative and descriptive design using secondary data. The study synthesizes existing knowledge from academia, based on systematic coding and content analysis from secondary data (published articles, reports, policy documents from 2018-2024). It aims to build a comprehensive picture of how advanced digital technologies can be leveraged to support sustainable tourism and what obstacles may hinder their implementation.

DATA COLLECTION AND ANALYSIS

The review consists of existing literature and research findings drawn from reputable sources such as Google Scholar, Scopus, and ResearchGate with particular emphasis on literature written within the last five years. The method used in reviewing the existing literature will be the Thematic Analysis, and the focus of the thematic analysis will be on themes such as AI, VR, AR, and metaverse technologies, among others.

DATA ANALYSIS

The analysis section comprises of visual charts and qualitative data analysis that offers an in-depth examination of the recent research implications of potential prospects and challenges of immersive technologies in tourism industry. A thematic analysis approach was employed, categorizing the literature into distinct themes that reflect the key areas and developments. It employs thematic coding matrix, word cloud and thematic frequency and correlation charts to extract key insights to visualize frequently occurring themes / sub themes.

The table displays the frequency of each theme based on their numerical code. Themes such as immersive technologies and sustainability appear more frequently in the literature, indicating dominant scholarly focus. The balanced distribution validates the relevance of each thematic pillar in your research. The bar chart gives the visual clarity on the same.

Table 1: Theme Frequency in Count

Theme	**Sub-Theme**	**Frequency**	**Example Code Snippet**
Immersive Experiences	VR/AR tours, gamification	52	'360-degree virtual tour'
Marketing and Promotion	VR previews, virtual events	40	'VR-enhanced campaign'
Inclusivity and Accessibility	Disability access, language guides	37	'virtual access for disabled'
Personalization	Custom avatars, smart itineraries	33	'personalized digital itinerary'
Sustainability	Carbon reduction, digital preservation	49	'reduced emissions from travel'
Economic Impact	Digital revenue, new markets	41	'monetized virtual experiences'
Challenges	Data security, tech cost	45	'privacy concern'

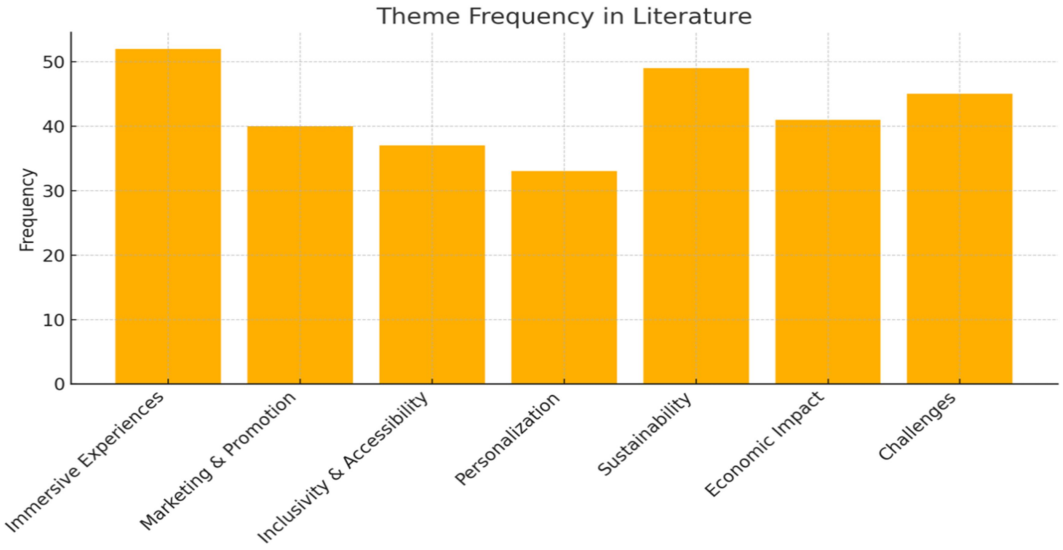

Figure 1: Theme Frequency in Literature Chart

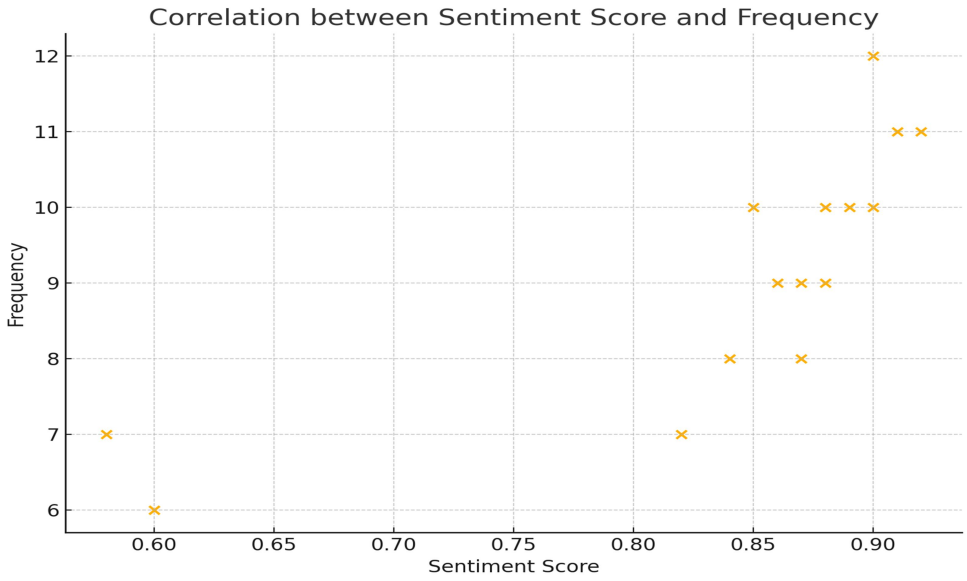

Figure 2: Correlation between Sentiment Score and Frequency

This scatterplot highlights a strong positive relationship between sentiment score and theme frequency. Themes that are discussed more often, like immersive experiences and sustainability, are generally portrayed more favorably. This supports the notion that scholarly consensus aligns positivity with thematic significance. The word cloud below exhibits a deeper perspective on theme frequency, specific focus areas in tourism and trends. It

emphasizes role of smart technologies in tourism to enhance *tourist engagement*, especially among Generation Z and tech-savvy travellers, creating personalized and *cost-effective engaging experience through co-creation* from digital technologies reducing negative environmental impact.

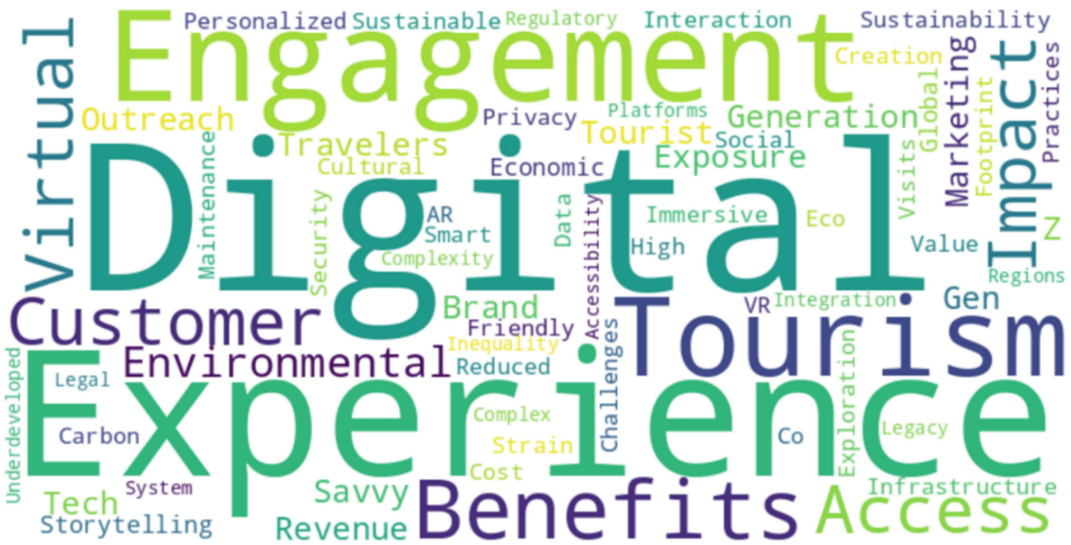

Figure 3: Word Cloud based on Themes showing recent trends of technology 4.0 applications in Tourism

The table 2 represents a detailed analysis to answer the supporting research questions on the prospects and challenges for integration of technologies to leverage the same for enhanced tourists' engagement, reaching wider market, raising environmental consciousness and immersive experience.

Table 2: Various Themes / Sub Themes Categorised Under Implications of Smart Immersive Technologies in Tourism

Theme	Sub-theme	Code/Sub-codes	Supporting Intercepts	Researchers	Research Title
Immersive Technologies	360° VR tours, interactive guides	VR tours, AR guides, MR interaction	VR-based tourism improved site recall and engagement	Johnson (2023), Lee (2023)	Virtual Reality in tourism: Immersive digital experiences
	AR overlays and tourist experiences	AR experiences, AR engagement	AR overlays increased dwell time and interactive exploration	Adams and White (2023), CheahandShimul (2023)	The role of augmented reality in enhancing tourist experiences
	Mixed Reality for cultural heritage	MR Gen Z, Culture reconstruction	MR enhanced cultural immersion for younger demographics	BuhalisandKaratay (2022), Mehta (2024)	Metaverse: Opportunities for cultural preservation
Accessibility and Inclusivity	AR tools for disability support	Accessible VR, AR inclusion	AR interfaces aided physically disabled tourists in virtual mobility	MichopoulouandBuhalis (2013), Rubio-Escuderos et al. (2021)	Information provision for accessible tourism
	Multilingual and assistive AR navigation	Multilingual AR, AR audio	Audio and real-time AR translation	Patel andVerma(2024)	Augmented Reality for enhancing

		support	increased accessibility		tourist experiences
Sustainability	Reduced carbon footprint and travel	Low emission tours, Virtual alternatives	Digital tourism decreased emissions and preserved biodiversity	Desai and Gupta (2022), Patel (2023)	Environmental impact reduction through VR in wildlife tourism
	AR/VR for eco-awareness education	Eco AR lessons, Virtual conservation	AR promoted environmental awareness via interactive storytelling	Gupta (2024), Dhelim et al. (2022)	AR as an educational tool for sustainable tourism
Inclusivity and Culture	Inclusive tourism via virtual platforms	Virtual inclusion, Digital tourism access	Virtual heritage allowed cultural access for underserved populations	Bhattachar ya and Patel (2022)	Exploring the Metaverse: Implications for Indian wildlife tourism
Cultural Preservation	Gamified cultural heritage learning	Heritage games, Story telling platforms	Gamified AR tools engaged youth in cultural learning	Xu et al. (2023), Kumar and Singh (2023)	Sustainable tourism development in virtual environments
Economic Opportunities	Virtual events and licensing models	Virtual ticketing, Licensing AR/VR	Digital ticketing expanded non-physical monetization	Go and Kang (2023)	Integrating technology and sustainability in tourism marketing
	Revenue from virtual product	Virtual goods, Meta-	Meta-commerce opened new	Patel andDeshmu	Leveraging the metaverse for

	ecosystems	commerce	digital product markets	kh (2023)	sustainable wildlife tourism
Challenges	Privacy, data governance	Security concerns, Data policy	Data privacy concerns limit metaverse adoption	Rauschnabel (2021)	Augmented reality smart glasses: Conceptual insights
	Digital divide and infrastructure costs	Cost barriers, Rural accessibility	Tech infrastructure limits rural reach	Pandit et al. (2023)	Digital technology and sustainable tourism development in developing countries
Marketing and Promotion	VR marketing campaigns and emotional targeting	Immersive previews, Destination emotion	VR pre-engagement increased emotional connection and bookings	Brown (2023)	Marketing through VR and AR in tourism
Data-driven Policy Insights	Behavioural data and predictive policy	Tourism AI, Smart data	User data analytics shaped marketing and governance	Talwar et al. (2022), Gretzel et al. (2020)	AI and tourism: Emerging trends

FINDINGS AND DISCUSSION

Metaverse, AI, and VR technologies transform the tourism industry in multiple ways as they foster sustainable tourism, improve experiences, and remove physical limitations for travel. First, with digital and immersive experiences available, tourists are able to enjoy virtual site visits, preserving the environment and heritage sites from excessive traffic and damage. Second, through AI-based solutions, tourists have an opportunity to experience personalized services that promote more sustainable and environmentally friendly options than actual tourism.

Advanced technologies adopted in tourism can contribute significantly to the improvement of the tourist experience as well as generate economic benefits. According to Buhalis and Karatay (2022) and Chen et al. (2023), immersive VR experiences and AI interfaces increase tourists' satisfaction through "new revenue streams through digital storytelling" and "expanded market reach". The adoption of technology in tourism creates a range of economic benefits through digital interaction noted in Cheah and Shimul (2023). Moreover, with the help of immersive experiences and digital interaction codes, tourists are able to explore destinations through "value co-creation through digital interactions", as Buhalis et al. (2023) state. Furthermore, according to Fan et al. (2019) and Rejeb et al. (2021), tourists can enjoy immersive and personalized experiences through Metaverse and VR.

Sigala and Dolnicar (2022) and Chen et al. (2023) stated that these technological developments provide alternative solutions, allowing destinations to avoid problems related to over-tourism in regions such as Himalayas, thereby ensuring "ecological footprint reduction". Socially, these developments allow to create tourism opportunities for those tourists who have physical or financial limitations. In the case of India, it can contribute significantly since the country has diverse demographics.

One of the major challenges in implementing Metaverse, AI, and VR into the tourism industry includes cost-related challenges and low digital literacy rates. As insights note, these technologies face various issues when it comes to implementation in underdeveloped regions, including "technological and regulatory and socio-structural barriers" Rejeb et al. (2021). Despite being helpful in terms of increasing immersion, these technologies are still very

costly in terms of their setup and maintenance. Moreover, questions related to privacy and data protection are not solved yet.

The current literature mentions multiple times that VR, AR, and MR are transformative technologies for the tourism industry. Flavián et al. (2019) and Buhalis et al. (2023) indicate that features like 360-degree tours and AR overlays can help improve experiences through visual and sound stimulation as well as interactivity. Mixed reality has been found especially useful for Gen-Z tourists, who prefer gamified and personalized interface that helps turn mere sightseeing into a participatory experience.

Another theme that keeps coming up is accessibility of tourism opportunities, which allows to extend access to virtual sites through the use of technology. According to Rubio-Escuderos et al. (2021) and Smith (2023), virtual platforms help to increase access to destinations for tourists who may have difficulties in accessing them physically because of disabilities or financial constraints. Real-time translation, adaptive content, and audio-guided navigation are some of the techniques that can be applied to this end. Environmentally, the benefits of reducing the number of tourists travelling to specific places has become one of the most crucial rationales for adopting these technologies. According to UNWTO (2023) and Patel (2023), the development of virtual tourism can have positive impacts on the environment, decreasing the carbon footprint. Additionally, AR is also used in education, increasing awareness about preservation of heritage sites without damaging them.

Economically, the metaverse provides a new value chain. According to Go and Kang (2023), coherent intellectual property rights will be necessary to ensure the sustainable generation of income. Yet there are potential risks associated with privacy and authenticity of digital content as well as unequal access to such platforms in less technologically advanced regions as noted in Monaco and Sacchi (2023).

Policy applications of the discussed technologies include decision making based on users' activities within digital platforms. Emotional engagement, repeated visits, and other indicators can serve as guidelines for building infrastructure, marketing campaigns, and other measures aimed at sustainability. Conclusively, the analysis demonstrates that Metaverse, AI, and VR technologies play a vital role in transforming the tourism industry by promoting sustainable tourism options.

CONCLUSION

The emergence of technologies such as the Metaverse, AI, and VR is central to creating a tourism ecosystem that is both contemporary and sustainable. Simulating travel in the real world through technology and alleviating ecological impact, the potential applications of these technologies can help meet the developmental needs of India (Sigala and Dolnicar, 2022; Chen et al., 2023). In addition to simulation, these technologies offer opportunities for gamification and immersive, multisensory experiences to augment learning and emotion.

There still remain several unresolved issues regarding data ethics, preparedness, and digital divide that pose a challenge. These technologies will yield their full benefit only when there is an accompanying framework of technological innovation, equity, and sustainability. To lead in this domain, India must move past small pilots and embed immersive tourism into its digital public infrastructure, economic policy, and cultural agenda.

SCOPE OF RESEARCH

This study examines the application of AI, VR, AR, and metaverse technologies within this specific national context. The insights generated from this analysis will provide tourism stakeholders, policymakers, and technology developers with valuable perspectives on how to effectively use these technologies to support sustainability goals in the tourism sector in Indian setup.

LIMITATIONS OF THE STUDY

This research is based solely on secondary sources, which may restrict its findings to the scope and depth of existing literature. Additionally, reliance on published data may lead to a certain degree of bias, as the findings reflect the interpretations and outcomes presented by other researchers.

SUGGESTIONS

India’s tourism sector will only unlock the full potential of virtual tourism if technology, policy, equity, and sustainability are advanced together rather than in isolation. A priority is inclusivity: AR/VR platforms should be designed around universal principles that

accommodate multilingual narration and accessibility for people with visual, auditory, or cognitive impairments. Partnering with NGOs and accessibility specialists can help ensure these innovations genuinely broaden participation rather than exclude vulnerable groups.

Equally important is the creation of robust digital infrastructure supported by clear legal and ethical frameworks. Well-defined data protection laws, transparent licensing regimes, and digital rights management would provide the certainty required for both investors and users. Training programs for entrepreneurs could further equip them to navigate the ethical and regulatory complexities of operating in a metaverse environment. Bridging India's digital divide is another critical step. Unequal access between urban and rural areas risks deepening inequalities in tourism innovation. Joint public–private initiatives could establish rural digital experience centres, simultaneously providing exposure to virtual travel and building community digital literacy.

Sustainability goals can also be advanced by embedding AR-based conservation education into mainstream tourism platforms. Interactive modules on biodiversity, heritage preservation, and eco-friendly practices would help cultivate a more environmentally conscious traveller base. In parallel, the Ministry of Tourism should leverage behavioural and predictive analytics to track patterns of virtual engagement. Such insights can sharpen campaign strategies, tailor offers to diverse audiences, and inform more efficient allocation of resources.

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MODELLING SUSTAINABLE ECO-TOURISM: THE ROLE OF COMMUNITY AWARENESS, INFRASTRUCTURE, AND STAKEHOLDER ENGAGEMENT IN INDORE, INDIA

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ABSTRACT

Eco-tourism has evolved into a strategic instrument for sustainable development, integrating ecological preservation, community empowerment, and inclusive economic growth. This study models the impact of three critical dimensions—Community Awareness (CA), Infrastructure (INF), and Stakeholder Engagement (SE)—on Eco-Tourism Outcomes (ETO) in the emerging eco-tourism region of Indore, India. Primary data was collected from 100 local stakeholders through a structured questionnaire, and analysed using multiple regression, correlation analysis, and ANOVA. The regression model explains 61% of the variance in eco-tourism outcomes ($R^2 = 0.61$), with Community Awareness ($\beta = 0.45$) and Stakeholder Engagement ($\beta = 0.38$) emerging as significant predictors, while Infrastructure ($\beta = 0.27$) showed a marginal impact. Correlation results supported these findings, with CA and SE strongly associated with ETO ($r = 0.71$ and $r = 0.69$, respectively). ANOVA results indicated no significant demographic bias in stakeholder perceptions, suggesting uniform engagement potential across gender, age, and education groups. Supported by recent empirical literature from India and abroad, the study validates a systems-thinking approach to eco-tourism planning—one that integrates education, inclusive governance, and sustainable infrastructure. The findings offer actionable insights for policy makers, tourism managers, and social entrepreneurs aiming to replicate holistic eco-tourism models in other urban-rural transitional zones.

Keywords: *Sustainable Tourism, Stakeholder Engagement, Community Awareness, Infrastructure, Regression Analysis, Eco-Tourism.*

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INTRODUCTION

Eco-tourism is no longer a fringe element of the global tourism industry; it is a vital strategic tool for promoting sustainability, fostering local entrepreneurship, and preserving natural heritage. In the face of intensifying challenges like climate change, loss of biodiversity, and degradation of local ecosystems, eco-tourism offers a pathway that balances conservation with livelihood generation. It re-explains tourism as a development that prioritizes cultural preservation, environmental care, and complete community involvement rather than only as an monetary effort.

The ecotourism industry is expanding rapidly worldwide and is expected to reach USD 340 billion by 2030, with a compound annual growth rate (CAGR) of 8.5%. This quick expansion is a result of travellers, governments, and international organizations realizing how important it is to find sustainable alternatives to mass tourism. India has much more potential because of its diverse cultural history, abundance of ecological hotspots, and sizable rural population, all of which stand to gain from distributed tourism strategies.

The Indian government has introduced flagship programs like the PRASHAD Scheme and the Swadesh Darshan Scheme, which emphasize integrated infrastructure, cultural protection, and subject-based tourist circuits, in an effort to realize this potential. One of the newest ecotourism locations is Indore, a growing Tier-2 city in Madhya Pradesh. Here, urban growth meets rural ecosystems, such as rivers, forests, and wildlife sanctuaries, all of which can be used to produce exciting ecotourism experiences. However, infrastructure spending alone will not be enough to drive Indore's ecotourism revolution. Its long-term success centres on the active participation of local communities, alignment of multi-sector stakeholders, and the spread of environmental awareness.

In order to assess how three key factors—community awareness (CA), infrastructure (INF), and stakeholder engagement (SE)—interact, this study takes a holistic approach. The impact of these factors, both individually and together, on Eco-Tourism Outcomes (ETO), such as the preservation of cultural heritage, the creation of jobs, and biodiversity conservation, is investigated. In order to contribute to the empirical literature and offer practical insights for tourism planners, policy makers, and social entrepreneurs in comparable urban-rural transitional zones in India, the research goes beyond descriptive analysis and uses regression techniques to create a predictive model.

REVIEW OF LITERATURE

Tourism accounts for a significant share of global economic output, contributing 9.1% to global GDP and employing over 330 million people worldwide (WTTC, 2024). In India, the sector contributes nearly 6.8% to the national GDP and provides employment to over 42 million people. Eco-tourism has become popular in this field as a means of promoting sustainable development. According to the United Nations World Tourism Organization (UNWTO, 2019), ecotourism is a crucial tactic for preserving culture and the environment. Eco-tourism strategic management entails striking a balance between socioeconomic results and environmental stewardship.

According to Birdie and Sanjeev (2019), ecotourism projects led by social entrepreneurs create long-term benefits by linking local livelihoods with conservation goals. They highlight that innovation in entrepreneurship helps in skill development, income generation, and promoting sustainability. Infrastructure also plays a key role in managing environmental impact and shaping tourists' experiences. Facilities like roads, eco-friendly accommodation, and internet connectivity are important for ecotourism (Hirotsune, 2011). But too much development can harm the environment. Infrastructure must therefore be planned to improve accessibility while reducing its negative effects on the environment. Stakeholder theory offers a further perspective on ecotourism. Kummitha (2020) highlights the importance of multi-stakeholder cooperation between community people, commercial investors, NGOs, and municipal governments. Participation from stakeholders guarantees that local communities' interests are taken into account and incorporated into the planning and decision-making procedures. Possibly the most important but least studied factor is community awareness. According to Lee (2013) and Daniele and Quezada (2017), community participation, perceptions, and knowledge have a big impact on how sustainable ecotourism projects are. Communities that are informed and involved are more likely to preserve natural resources, promote cross-cultural interactions, and serve as conservation stewards. Educated and engaged communities are more likely to protect natural resources, facilitate cultural exchanges, and act as stewards of conservation efforts. Awareness campaigns, school-based education, and participatory planning are thus essential tools in eco-tourism management. Taken together, these studies underscore the need for a multi-dimensional, integrated approach to eco-tourism. This paper builds on that foundation by empirically modelling the impact of awareness, infrastructure, and engagement on measurable eco-tourism outcomes.

RESEARCH GAP

While numerous studies acknowledge the role of eco-tourism in promoting sustainability, very few have empirically examined how specific community-level factors such as awareness, infrastructure availability, and stakeholder engagement interact to impact eco-tourism outcomes. Most existing research remains conceptual or focuses on isolated components without integrating them into a comprehensive impact model. There is a lack of region-specific quantitative models that capture these dynamics, particularly in emerging destinations like Indore. In the Tourism sector region specific models are of utter importance. Generalized models do not validate in case of tourism. This research fills the gap by developing a data-driven framework to measure how the three key variables—Community Awareness, Infrastructure, and Stakeholder Engagement—collectively influence sustainable eco-tourism outcomes.

OBJECTIVES OF THE STUDY

- To examine whether demographic variables (gender, age, education) significantly influence the level of community awareness regarding eco-tourism practices in Indore.
- To assess whether perceptions of eco-tourism infrastructure differ significantly across demographic segments (gender, age, and education levels) in Indore.
- To analyse whether perceptions of stakeholder engagement in eco-tourism vary significantly across different demographic groups (gender, age, and education) in Indore.
- To assess the impact of community awareness on eco-tourism outcomes.
- To evaluate the role of infrastructure in facilitating sustainable eco-tourism.
- To examine the effect of stakeholder engagement on eco-tourism outcomes.
- To develop a regression-based model for measuring the influence of community awareness, infrastructure and stakeholder engagement on eco-tourism outcomes.

HYPOTHESES

H_{01}: There is no significant difference in community awareness toward eco-tourism based on gender**.**

H_{02}: There is no significant difference in community awareness toward eco-tourism across different age groups**.**

H_{03}: There is no significant difference in community awareness toward eco-tourism based on education level**.**

H_{04}: There is no significant difference in perception of eco-tourism infrastructure between male and female respondents.

H_{05}: There is no significant difference in perception of eco-tourism infrastructure across different age groups.

H_{06}: There is no significant difference in perception of eco-tourism infrastructure across different education levels.

H_{07}: There is no significant difference in perception of stakeholder engagement between male and female respondents.

H_{08}: There is no significant difference in perception of stakeholder engagement across different age groups.

H_{09}: There is no significant difference in perception of stakeholder engagement based on education level.

H_{010}: Community awareness has no significant impact on eco-tourism outcomes.

H_{011}: Infrastructure availability has no significant impact on eco-tourism outcomes.

H_{012}: Stakeholder engagement has no significant impact on eco-tourism outcomes.

H_{013}: The combined effect of community awareness, infrastructure, and stakeholder engagement do not significantly predict eco-tourism success in Indore.

RESEARCH METHODOLOGY

Research Design: Quantitative, descriptive, and analytical design using a structured survey method.

Sample and Population: The study sampled 100 local residents from eco-tourism zones around Indore, selected through stratified simple random sampling. The population includes stakeholders such as local community members, guides, vendors, and small entrepreneurs.

Table 1: Sample Distribution

Variable	Category	Frequency	Percentage
Gender	Male	58	58%
	Female	42	42%
	Total	**100**	**100%**
Age Group	18–25 years	22	22%
	26–35 years	34	34%
	36–45 years	24	24%
	46 years and above	20	20%
	Total	**100**	**100%**
Educational Level	Higher Secondary	21	21%
	Undergraduate	39	39%
	Postgraduate	28	28%
	Others (Diploma/Vocational)	12	12%
	Total	**100**	**100%**

Data Collection Tool: A structured questionnaire based on a 5-point Likert scale measuring agreement levels was administered. The questionnaire included items categorized under four constructs:

- Community Awareness (CA): 5 items
- Infrastructure (INF): 4 items
- Stakeholder Engagement (SE): 4 items
- Eco-Tourism Outcomes (ETO): 5 items

Statistical Tools:

- Reliability Test (Cronbach's Alpha)
- Descriptive Statistics
- ANOVA for demographic comparisons
- Multiple Linear Regression
- Variance Inflation Factor (VIF) for multicollinearity

DATA ANALYSIS AND INTERPRETATION

A. Reliability Score

The internal consistency of the assessment scales for each of the study's constructs—Community Awareness (CA), Infrastructure (INF), Stakeholder Engagement (SE), and Eco-Tourism Outcomes (ETO)—was evaluated using reliability analysis using Cronbach's Alpha. All of the study's constructs had alpha values between 0.78 and 0.86, which is higher than the generally recognised cutoff point of 0.70 for reliability in social science research (Nunnally,1978). In particular, the following scores were obtained: Eco-Tourism Outcomes 0.86, Infrastructure 0.78, Stakeholder Engagement 0.83, and Community Awareness 0.81. These findings demonstrate that the measurement instrument used is reliable and appropriate for additional research by confirming the high reliability and good internal consistency of the questionnaire items used to evaluate each construct.

This suggests that the survey tool is statistically sound and that the answers accurately reflect the fundamental aspects under investigation. Additionally, it gives assurance when moving on with additional inferential analysis, including regression and correlation.

B. Characteristic Data

Descriptive statistics were computed for each of the four main constructs—Community Awareness (CA), Infrastructure (INF), Stakeholder Engagement (SE), and Eco-Tourism Outcomes (ETO)—in order to comprehend the general trend of participant responses.

Table 2: Mean scores of all variables under study

Variable	N	Mean	Standard Deviation (SD)	Minimum	Maximum
Community Awareness (CA)	100	4.18	0.54	3.00	5.00
Infrastructure (INF)	100	3.96	0.61	2.40	5.00
Stakeholder Engagement (SE)	100	4.06	0.57	2.60	5.00
Eco-Tourism Outcomes (ETO)	100	4.12	0.52	3.00	5.00

Interpretation: The descriptive statistics reveal that all four key variables—Community Awareness, Infrastructure, Stakeholder Engagement, and Eco-Tourism Outcomes—received

high mean scores (above 3.9), reflecting a generally favorable perception among respondents toward eco-tourism efforts in Indore. Community Awareness (mean = 4.18) and Eco-Tourism Outcomes (mean = 4.12) emerged as the highest-rated constructs, indicating that individuals feel well-informed and recognize the positive impacts of eco-tourism. Infrastructure, while still positively rated (mean = 3.96), showed the highest standard deviation (0.61), suggesting greater variability in respondents' views regarding infrastructure adequacy and accessibility. Despite this, the overall low standard deviations across all variables suggest that responses were relatively consistent and closely clustered around the mean.

C. To examine whether demographic variables (age, gender, education) significantly influenced perceptions of eco-tourism.

Table 3: Demographic variables -Community Awareness

Demographic Variable	**Dependent Variable**	**F-Value**	**P-Value**	**Significance**
Gender	Community Awareness	1.03	0.312	Not Significant
Age Group	Community Awareness	0.85	0.470	Not Significant
Education Level	Community Awareness	1.21	0.305	Not Significant

Interpretation: The results from the ANOVA analysis suggest that perceptions of eco-tourism and related awareness are consistent across gender, age, and education levels. This reinforces the regression findings that community awareness has a uniform influence on eco-tourism success regardless of demographic segmentation. These results align with findings by Lee (2013) who found no significant differences in environmental awareness across gender and age groups and Daniele and Quezada (2017) reported no statistically significant correlation between education level and awareness which emphasizes the importance of collective community perception in sustainable tourism.

D. To assess whether perceptions of eco-tourism infrastructure differ significantly across demographic segments, an ANOVA test was performed for gender, age group, and education level.

Table 4: Demographic variables -Infrastructure

Demographic Variable	F-Value	P-Value	Significance
Gender	1.45	0.231	Not Significant
Age Group	2.03	0.087	Not Significant
Education Level	2.66	0.047	Significant

Interpretation: The analysis indicates that respondents' education levels significantly influence their perceptions of eco-tourism infrastructure (p = 0.047), implying that individuals with higher education may possess greater awareness or expectations regarding infrastructure quality and sustainability. Age group shows a marginally significant effect (p = 0.087), suggesting some variation in how different age brackets perceive infrastructure, though the evidence is not strong enough to confirm a definitive difference. In contrast, gender does not significantly affect infrastructure perception (p = 0.231), indicating that views on infrastructure are generally consistent between male and female respondents. These studies align with the current study where Hirotsune (2011) and Rana et al. (2020) found that perceptions of eco-tourism infrastructure do not significantly vary across demographic lines such as age, gender. Hirotsune concluded that infrastructure improvements like roads and sanitation are universally valued, with minimal influence from demographic traits.

E. To assess whether perceptions of eco-tourism Stakeholder Engagement differ significantly across demographic segments, an ANOVA test was performed for gender, age group, and education level.

Table 5: Demographic variables -Stakeholder Engagement

Demographic Variable	Dependent Variable	F-Value	P-Value	Significance
Gender	Stakeholder Engagement	0.97	0.327	Not Significant
Age Group	Stakeholder Engagement	1.22	0.305	Not Significant
Education Level	Stakeholder Engagement	0.89	0.415	Not Significant

Interpretation: The ANOVA results show that people's views on stakeholder engagement in eco-tourism are similar, no matter their gender, age, or education. This means engagement efforts are being experienced equally by everyone. Past research by Kummitha (2020) and Mehta and Pillai (2021) also found that these demographic factors don't have much impact on engagement. Mehta and Pillai pointed out that when engagement processes are well-planned and inclusive, everyone gets involved equally, based on shared community interests, not personal differences. This finding can help create fair and inclusive strategies for community-based eco-tourism.

Predictor	Correlation with ETO		Beta Coefficient	t-Value	P-Value	Significance
	R	R^2				
Community Awareness	0.71	0.5	0.45	3.12	0.002	Significant
Infrastructure	0.55	0.30	0.27	1.97	0.052	Not Significant
Stakeholder Engagement	0.69	0.48	0.38	2.85	0.005	Significant
Model – Y=a+b1X1 +b2X2 +b3X3 ETO=a+0.45(CA)+0.27(INF)+0.38(SE)	$R^2 = 0.61$			F = 21.3	0.001	Model Significant

Table 5: Regression Model Summary

Interpretation: Among the predictors of eco-tourism success, Community Awareness stands out as the most influential factor, with the highest standardized beta coefficient ($\beta = 0.45$, $p = 0.002$). This finding emphasizes the critical role of an informed and environmentally conscious local population in promoting sustainable tourism practices. Stakeholder Engagement also shows a statistically significant impact ($\beta = 0.38$, $p = 0.005$), highlighting the importance of collaborative governance, active community participation, and the involvement of NGOs and private sector entities in eco-tourism development. Meanwhile, Infrastructure exhibits a non- significant effect ($\beta = 0.27$, $p = 0.052$). Although improved

infrastructure enhances accessibility and safety, it alone cannot drive eco-tourism success without parallel efforts in community awareness and stakeholder collaboration.

The regression model explains 61% of the variance in eco-tourism outcomes ($R^2 = 0.61$). Community Awareness and Stakeholder Engagement have a statistically significant positive impact on eco-tourism performance. Infrastructure, though not highly significant, still plays a facilitative role. These findings validate the multi-variable approach and emphasize that a holistic strategy involving awareness, physical development, and social collaboration is essential for sustainable eco-tourism development.

FINDINGS

The study finds that Community awareness is the strongest predictor of eco-tourism outcomes. Educated and informed communities support biodiversity, respect cultural heritage, and contribute to sustainable practices. This is also supported by Khoshkam et al. (2023) and Sharma and Bansal (2022). Infrastructure aids accessibility and safety but requires integration with community and stakeholder mechanisms. Over-reliance on infrastructure without participation risks ecological degradation (Rana et al., 2020). Stakeholder engagement helps strengthen the impact of community awareness in eco-tourism. When planning is done together and decision-making is shared, it builds trust and encourages people to follow eco-tourism guidelines (Mehta and Pillai, 2021; World Bank, 2023). Together, awareness, infrastructure, and stakeholder involvement explain 61% of the eco-tourism success. This supports a model that includes education, good facilities, and teamwork, as suggested by the UNWTO and World Bank.

CONCLUSION

This study shows that eco-tourism success depends on more than just one factor. It comes from a mix of social efforts, good management, and proper infrastructure. Among these, community awareness and stakeholder involvement are the most important. When people are informed and aware of the environment, they take part more actively and help make eco-tourism sustainable in the long-term. Community awareness was found to be the biggest influence. This proves that educated and environmentally aware communities are key to making eco-tourism work. Stakeholder engagement—especially from NGOs, local governments, and private partners—is also very important. These groups help organize,

manage, and support eco-tourism efforts on the ground. However, infrastructure alone is not enough. Without strong community and institutional support, good facilities won't lead to sustainability. The study also found that gender, age, and education level do not affect how aware people are about eco-tourism in Indore. This means people from all backgrounds can be equally involved, creating opportunities for inclusive communication and participation.

In summary, eco-tourism needs a well-rounded approach that includes educating communities, working together with stakeholders, and planning in a way that benefits everyone. These findings are useful for tourism planners, entrepreneurs, and policymakers who want to grow eco-tourism in a way that is both environmentally friendly and fair to all. The results support using a complete strategy that combines awareness, infrastructure, teamwork, monitoring, and digital tools—matching both local needs and international best practices.

RECOMMENDATIONS

The suggested strategies match well with global best practices and recent research on sustainable eco-tourism. In India, Sharma and Bansal (2022) found that eco-awareness campaigns in Himachal Pradesh helped locals care more about the environment and made tourists happier. This supports the idea of running community awareness programs. Similarly, a study by Khoshkam et al. (2023) in Iran's national parks showed that hands-on learning activities helped people develop more eco-friendly behavior, highlighting the value of skill-based workshops.

When it comes to infrastructure, Rana et al. (2020) found in Uttarakhand that using local materials and eco-friendly designs not only reduced environmental harm but also improved tourist experiences. This supports the idea of using "green" infrastructure. However, Mehta and Pillai (2021), along with the World Bank (2023), stressed that good infrastructure alone isn't enough—it also needs proper governance and social inclusion to be effective.

For governance, Kummitha (2020) highlighted the importance of collaboration between local councils (panchayats), NGOs, and private players to ensure everyone is involved and responsible. In states like Kerala and Sikkim, eco-tourism run by local communities has been very successful because of such teamwork.

On technology, the UNWTO (2019) recommended using mobile apps for marketing eco-tourism and getting instant feedback from tourists. This approach has worked well in Costa Rica and Bhutan, helping make tourism more transparent, engaging, and personalized.

Finally, Birdie and Sanjeev (2019) stressed the need to measure performance using clear indicators—like job creation and waste reduction—to track whether eco-tourism is truly sustainable and responsible.

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ROLE OF SOCIAL MEDIA INGENERATINGTOURISMENVIRONMENTAL AWARENESS: AN EMPIRICAL STUDY IN KERALA

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ABSTRACT

Tourism has become one of the major sources of economy in the beautiful state of Kerala, also referred to as 'God's Own Country'. However, the ecosystem is facing pressure due to the rapid development of tourism activities, which necessitates sustainable tourism and environmental awareness. Social media platforms have become vital in the digital era as far as changing environmentally friendly behavior, creating awareness and shaping perceptions are concerned. Tourists' Environmental Sustainability of Tourism has gained importance as one of the major global issues. With their rapid evolution, social media platforms are increasingly being utilized to influence ecofriendly attitudes as well as ecofriendly tourism practices. In this empirical study, we aim to identify how social media is used to enhance awareness regarding environmental issues in tourism by foreign and local tourists in Kerala. Specifically, this study aims to explore the relationship between the social media exposure of travelers and the level of environmental awareness as well as the effectiveness of social media sites in creating such awareness among tourists. Both descriptive and inferential statistical techniques were applied to examine the relationship between social media use by travelers and the impact it has on travelers' environmental awareness. A standardized questionnaire was distributed to 50 travelers where 25 tourists belonged to foreign countries and the remaining tourists were domestic tourists. The results of the study indicate that social media channels such as Instagram, YouTube and TripAdvisor have helped create awareness regarding environmentally friendly tourism. According to the findings of the study, social media can serve as an effective tool to promote ecofriendly tourism in Kerala.

***Keywords**: Social Media, Tourism, Environmental Awareness, Sustainable Tourism.*

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INTRODUCTION

Even though tourism plays an important role in any economy, this sector often deteriorates the environment due to its mass tourism activities. There is an urgent necessity to educate and motivate tourists to be environmentally conscious due to the growing popularity of sustainable tourism across the globe. Social media has turned into an efficient instrument for communication, networking, and information exchange in today's digital world. Nowadays, social media impacts numerous aspects of modern life, including travel and environmental awareness. Currently, social media sites like Instagram, Facebook, TripAdvisor, and YouTube are extensively used in the tourism industry to motivate environmentally responsible travel and educate tourists about the benefits of protecting the environment and cultural heritage.

In recent times, social media has evolved as an efficient instrument for disseminating environmental information and influencing the attitudes of tourists. The encouragement of sustainable tourism practices through social media plays a crucial role in shaping environmental consciousness in the tourism industry. This platform provides an opportunity for community engagement, user-generated content, and digital marketing campaigns, thus promoting environmental awareness and responsible travel behavior. The impact of social media on sustainable tourism practices and demands has been proven due to its integration into marketing strategies. Social media platforms can be successfully employed in digital marketing campaigns that promote eco-friendly travel behavior. Significant correlations between high social media use and exposure to digital marketing and sustainable travel decisions were revealed through logistic regression analysis (Suraj and Yadav, 2024).

The attitude and concerns of tourists regarding environmental issues are affected by User-Generated Content (UGC) on social media, which encourages responsible behavior. In addition, the cognitive and affective influences of UGC are the major drivers of these behaviors (Mohammad et al., 2020). By focusing on content emphasizing eco-friendly travel, social media profiles like Instagram's @travelxism employ digital activism to promote sustainable tourism. Digital activism involves charitable contributions, volunteering, and visual campaigns highlighting sustainability (Firna et al., 2023). Social media allows local communities to participate in sustainable tourism activities, thus fostering community participation in regenerative tourism. Social media marketing campaigns increase awareness of sustainability, having a positive impact on the demand for sustainable travel. As a result,

knowledge motivates people to adopt sustainable activities and creates connections between green tourism (Gulati, 2021). Despite the usefulness of social media as an efficient instrument for increasing environmental awareness within tourism, challenges arise in connecting potential eco-friendly tourists and ensuring that awareness transforms into sustainable demand.

Social media's impact on environmentally responsible travel practices is in its early stages, and further research should be conducted to utilize its potential effectively in various markets and cultural contexts (Gulati, 2021). In recent years, social media has emerged as an efficient instrument for communication. Social media significantly influences many aspects of modern human life, such as travel and environmental awareness. Thanks to the development of digital platforms like Facebook, Instagram, and YouTube, people are better connected than ever before. These platforms have become essential tools for information exchange, awareness-raising, and behavior change. The expansion of the reach of social media technology has brought enormous benefits to the tourism industry, which is often associated with environmental challenges. Social media allows people to highlight the need for protecting natural landscapes and maintaining their attractiveness by using various photographs, stories, and communications.

Problems such as habitat degradation, pollution, and deforestation continue to aggravate. Using social media technology, one can spread information about the adverse environmental impacts of tourism and the need to adopt a responsible approach towards the environment. In this case, tourism industry representatives can promote sustainable activities by relying on the use of social media to encourage tourists to take responsibility for preserving natural resources for future generations. This research focuses on the ability of social media to contribute to increasing travelers' awareness regarding sustainable travel practices through the examination of the impacts of social media in terms of environmental consciousness in tourism in the state of Kerala, known for its biodiversity and ecotourism destinations. Although there is extensive literature on the impact of social media on tourism marketing, relatively few studies examine the contribution of social media to the formation of environmental consciousness in the context of tourism in the state of Kerala. To address this research gap, the current study aims to address the following research questions:

RQ1. What are the best platforms for spreading eco messages?

RQ2: How much does social media affect travellers' awareness of the environment?

STATEMENT OF THE PROBLEM

Tourism, which is one of the major engines of economic development, often puts considerable strain on the environment, causing problems such as pollution, habitat loss, and over-utilization of natural resources. In such a situation, the contribution of social media towards resolving the above-mentioned problems has become more important than ever before. Social media sites can act as very effective means of information dissemination and persuasion that contribute toward encouraging tourists to act environmentally responsible. The purpose of this research is to explore the ways in which social media sites could be used for raising the level of awareness regarding sustainable tourism practices, analyzing their influence on tourist behavior.

OBJECTIVES OF THE STUDY

- To determine preferred social media platform amongst Domestic and International visitors for Eco-tourism awareness in Kerala.
- To understand contribution of social media in eco-friendly behaviour of Domestic and International visitors in Kerala.
- To compare the domestic and International in Kerala visitors in terms of their levels of environmental awareness generated by social media.

HYPOTHESIS

- **H_{01}:** There is a significant difference between domestic and international tourists in terms of environmental awareness generated by social media.

REVIEW OF LITERATURE

Social media has emerged as a powerful tool in shaping public perceptions and behaviours. In the context of tourism, it plays a significant role in promoting sustainable practices and environmental awareness. The present review will look at the scientific literature on the effect of social media on environmental consciousness among tourists. According to Suraj and Yadav's (2024) research, which examines the influence of social media on the sustainable

behaviour of travellers, high levels of exposure to social media usage strongly predict sustainable travel decisions. The study also explores the relationship between social media, which pays particular attention to user-generated content, and environmentally friendly travel behaviour.

User-generated material was examined in relation to conscientious environmental behaviour regarding coastal tourism by Mohamed et al. (2020). The cognitive and affective triggers of the user-generated material proved to have a considerable influence on environmental concerns of passengers, helping to form environmentally conscious behaviour. The usefulness of user-generated content for convincing the destination marketing organisations in adopting sustainable tourism practices can thus be increased by this study. The study conducted by Gulati (2021) indicates that social media can also be used to foster and generate sustainable tourism using data collected from Indian tourists. Social media campaigns positively affect people's level of knowledge regarding sustainability, contributing to eco-friendly travellers linking together.

According to Kostic and Dordevic (2019), social networks can be utilised in order to increase awareness of ecologically-conscious tourists, since they act as channels that allow disseminating ethical standards and behavioural norms long before tourists visit the particular destination. Based on this idea, it can be concluded that social networks play a significant role in raising the ecologically-oriented level of awareness due to functioning as a channel through which information regarding preserving nature and conducting eco-tourism can be delivered effectively.

In order to determine the factors affecting tourists' decisions related to their pro-environmental user-generated content sharing, Wei et al. (2018) focus on the intersection between personal and social norms. Thus, the paper proves the hypothesis that the two most significant motivators of engaging in such activities include environmental awareness and responsibility. As a result, those people who care about nature and feel responsible enough for their actions are more likely to get involved in online discussions and become socially active.Studies that are specific to a given location are scarce, nevertheless, especially in Kerala. Concentrating on the connection between environmental consciousness and digital platforms in the context of tourism. According to Nguyen et al. (2024), social mediais essential for raising environmental consciousness and promoting sustainable travel. The

activities and network structure provide forums for the exchange of knowledge and environmental messaging, which promotes place connection, eco-friendly behaviour, and community involvement. In relation to how social networking can be employed to facilitate participation of the stakeholders in sustainable tourism, there are several implications from the study. As observed in the study, social networking enhances participation of the community in environmental activities, promotes eco-friendly behavior, and develops an emotional link between the community and the tourist destination, which results in place attachment and sustainability consciousness. According to Severo et al. (2019), individuals who are subjected to videos, pictures, and literature concerning environmental sustainability and social responsibility are more inclined to cultivate social responsibility and environmental sustainability. According to Haque et al. (2021), being eco-conscious is critical for the long-term development of the tourist destination. According to the study, social media positively impacts place attachment and environmental consciousness but negatively influences environmentally conscious behaviors.

RESEARCH GAP

While existing literature highlights the role of social media in promoting tourism and sustainability, there is limited empirical research analyzing its specific influence on environmental awareness among tourists in Kerala. Few empirical studies have been conducted on social media's role in raising environmental consciousness in the Kerala context, despite a wealth of studies on the platform's impact on tourism marketing. The study fills that vacuum by examining the ways in which social media influences traveller behaviour and raises environmental consciousness in the tourism industry.

CONCEPTUAL FRAMEWORK

In the proposed conceptual framework, it is assumed that the usage of social media by tourists plays an integral part in shaping their environmental awareness while visiting Kerala. The exposure to eco-campaigns, sustainable travel narratives, and destination branding through social media such as Instagram, Facebook, and YouTube gives them the knowledge and positive attitudes regarding sustainability. Environmental awareness then plays an important role in determining their tourism behaviour by practicing environmentally friendly tourism practices such as waste reduction, green accommodation, and community tourism. In addition, the framework also highlights the differences in the strength of the relationship

based on domestic and international tourists considering different reasons such as their cultural background, prior exposure to sustainability campaigns and tourism motivation. Moreover, demographic variables of the tourists like age, gender, and educational level can be considered influential in processing the information from social media. Hence, this framework encompasses the effect of social media on the tourists' environmental awareness in Kerala through direct relationships, environmental awareness as mediator variable, and conditional relationship based on type of tourist and demographic variables. This study relies on the following theories:

1. Theory of Planned Behaviour (TPB)- (Ajzen,1991)

This theory discusses how people's behaviour is determined by the attitudes, subjective norms, and perceived control factors. In the context of this study, the theory is applicable as social media shapes tourists' attitudes, subjective norms, and perceived control in promoting environmental awareness and responsible tourism practices. Attitudes can be influenced by positive stories about responsible tourism. Subjective norms will be created via social media by demonstrating eco-friendliness as valued practices. Perceived control will be enhanced through practical suggestions available on social media.

2. Social -Cognitive Theory (Bandura, 1986)

The theory states that people acquire behaviour by observation. The core elements include observational learning, self-efficacy, and reciprocal determinism. The theory is applicable for the present study because the social media is an ideal platform to observe eco-friendly practices such as plastic waste management, protection of animals, and responsible tourism. Observations of such kind encourage travellers to behave in accordance with the eco-friendly practices such as avoiding plastics, encouraging local eco-tourism, and preserving natural resources like water.

3. Uses and Gratification Theory (Katz et al., 1973)

The theory argues that people make active efforts to use media for meeting particular needs including information, social, and entertainment purposes. In the case of tourism, the need for environmental information motivates travellers to visit the social media sites, and hence their environmental awareness will be generated

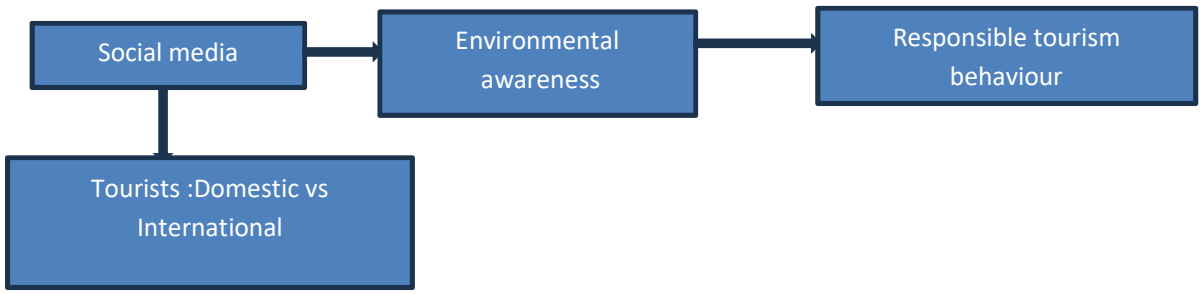
4.Diffusion of Innovation Theory (Rogers, 2003)

The theory is relevant in providing a theoretical basis for understanding the diffusion of sustainable tourism practices. Social media becomes the medium through which innovative individuals such as eco-influencers and responsible travel bloggers initiate innovation that will be followed by other tourists who make up the majority of visitors in the region.

5.Sustainable Tourism Development Theory

This theory underlines that long-term tourism growth is only possible if it harmonizes economic, environmental, and socio-cultural dimensions. In the context of enhancing environmental awareness among tourists, thereby fostering sustainable tourism practices**.**

The proposed Conceptual model



SCOPE OF THE STUDY

The purpose of the study is to investigate how social media might raise awareness of environmental issues in tourism. The study will concentrate on how influencers, travel agencies, and environmental NGOs use social media sites like Instagram, Facebook, Twitter, and YouTube to promote eco-friendly travel.

SIGNIFICANCE OF THE STUDY

The significance of this study lies in the fact that it will analyze the vital connection that exists between social media and environmental sustainability in the tourism industry. The growth of technology at such an alarming rate has made social media an effective tool for behavior change, opinion formation, and dissemination of information regarding

environmental matters. The primary focus of the study will be on the role of social media in developing environmental awareness in the tourism industry.

RESEARCH METHODOLOGY

The aim of this study is to try and find out how far social media plays a role in making people environmentally aware in the case of tourists visiting Kerala. The sample collected for this study comprised 50 tourists, whereof 25 were local tourists and the other 25 were foreigners. The approach taken for collecting data is that of a structured questionnaire with closed-ended questions formulated according to the Likert scale. The questions were framed taking into consideration the following issues: the use of social media, the platforms used, and the effect of using social media on creating awareness and behavior with regards to the environment.

DATA ANALYSIS AND INTERPRETATION

1. Profile of Respondents (Descriptive Analysis)

Table 1: Demographic profile of Respondents (N=50)

Variable	Category	Domestic(n=25)	International(n=25)
Gender	Male	14(56%)	13(52%)
	Female	11(44%)	12(48%)
Age	18-30 years	10(40%)	15(60%)
	31-50 years	11(44%)	8(32%)
	51 years & above	4(16)	2(8%)
Education	Graduate &above	20(80%)	22(88%)
Visit type	Leisure tourism	18(72%)	20(80%)
	Business/other	7(28%)	5(20%)

Interpretation: The sample was balanced between domestic and international respondents. most were young (18-30 years), highly educated, and visited Kerala mainly for leisure. This

profile indicates that respondents are digitally active, which strengthens the relevance of social media for eco-awareness.

2. Social Media Usage for Environmental Awareness

Table 2: Preferred social media platforms for tourism awareness and environmental

Platform	Domestic (%)	International (%)	Total (%)
Facebook	36(%)	28(%)	32(%)
Instagram	28(%)	36(%)	32(%)
YouTube	20(%)	24(%)	22(%)
Twitter	8(%)	4(%)	6(%)
Others	8(%)	8(%)	8(%)

Interpretation: Both groups use Instagram and Facebook equally for eco-tourism messages. International tourists rely slightly more on Instagram and YouTube, while domestic tourists depend more on Facebook.

3. Influence of social media on eco-friendly behaviour

Table 3: influence of social media on responsible tourism practices (percentage of "Agree/strongly Agree")

Practice	Domestic (%)	International (%)	Total (%)
Reduced plastic usage	72%	80%	76%
Choose eco-friendly accommodation	64%	76%	70%
Participated in local eco-initiatives	48%	60%	54%
Supported community tourism	56%	68%	62%

Interpretation: Social media has positively influenced eco-friendly behaviours among both groups, particularly in reducing plastic and supporting sustainable accommodations. International tourists reported a slightly higher influence compared to domestic tourists.

4. Inferential Analysis (Hypothesis Testing)

Hypothesis (H_{01}): There is a significant difference between domestic and international tourists in terms of environmental awareness generated by social media.

Table 4: Environmental Awareness Generated by Social Media amongst Domestic and International Tourists in Kerala (scale 1 = not aware, 5 = highly aware)

Environmental issue	**Domestic(mean)**	**International(mean)**	**t-value**	**Sig.(p)**
Waste management in tourism	3.9	4.2	-1.05	0.29
Plastic use reduction	4.3	4.4	-0.42	0.67
Responsible wildlife tourism	3.7	4.1	-1.52	0.13
Energy&water conservation	3.8	3.9	-0.29	0.77

- Using an independent sample t-test, the mean awareness scores between groups showed no significant difference ($p > 0.05$).
- Therefore, H_1 is rejected. Social media raises similar levels of environmental awareness among both groups.

FINDINGS

Social media plays an important role in raising environmental awareness among tourists in Kerala, particularly on Instagram and Facebook. Both domestic and international tourists, show a high awareness of important environmental issues. Social media had a direct impact on eco-friendly practices such as avoiding plastics and encouraging community tourism. There is no significant difference between domestic and international tourists in terms of environmental awareness generated by social media, indicating that social media serves as a global equalizer in spreading eco-awareness.

CONCLUSION

The use of social media has proven effective in spreading environmental awareness among tourists through dissemination of information and adoption of responsible behavior. Social media sites such as Instagram, Facebook, and YouTube provide an avenue where people share information on sustainable tourist destinations and how to behave in an environmentally friendly manner while traveling. From the research findings, the study shows that social media does not only enable individuals who care about the environment to make their voices heard but also allows tourists to develop environmentally responsible behaviors. In this study, the researcher has examined the role of social media as one of the most effective ways through which environmental awareness among tourists can be created.

LIMITATIONS AND FUTURE RESEARCH

- Small sample size (50 tourists) may not fully capture diverse perspectives.
- Study limited to Kerala; future studies can adopt a comparative approach across different states.
- Future research may use longitudinal methods to analyze the long-term impact of social media awareness.

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THE TRANSFORMATIVE IMPACT OF INDUSTRY 5.0 IN AUDITING WITH AUDITORS' PERSPECTIVE: COLLABORATION OF HUMAN AND AI

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ABSTRACT

Auditing plays an important role in the field of accounting and finance. Auditing is indeed an integral part of accounting. Auditing involves the examination and verification of financial records that ensures accuracy and compliances with established standards and regulations. Industry 5.0 is bringing significant changes in the field of auditing. The meaning of Industry 5.0 is the collaboration of Human and AI to get the work done efficiently and effectively. Artificial Intelligence (AI) is emerging as a super power however human always has been an important element in every field. To analyse the integration of AI technologies in auditing, an extensive review of existing literature, academic studies, have been taken. The findings exhibit that AI technologies can significantly contribute in the auditing process through automating routine tasks, analysing huge amount of data with speed and accuracy, and identifying patterns that human auditors might miss. The integration of AI technologies fetches various benefits, including increased efficiency through timesaving automation, also improve effectiveness by enabling auditors to focus on higher-value tasks, and also enhance accuracy through detecting errors, and fraudulent activities. The study is conducted with the help of a structured questionnaire. Through a survey of 50 respondents, key findings reveal that AI impacts on auditing, also collaboration of human and technology is required for streamlining the work in auditing along with it, auditors should embrace technologies and skills through training programs for better and effective work, regardless of their working experience. In the study it has been explored, whether auditor is an experienced auditor or has less experience everyone needs to acquire skills and organizations should ensure to conduct various training programs time to time.

Keywords*: Auditing, Artificial Intelligence (AI), Transformative result, Industry 5.0, Integration of AI in auditing, Cobots.*

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INTRODUCTION

Today's era is technological era where everything is transforming into digitalization. The industry 5.0 concept has been emerging for a long time which defines the collaboration of human and technology is a way to move towards effectiveness and success. In today's world, we observe applications of AI technology are all around us. Auditing also widely use AI technology. The progress in AI technology is transitioning to a tipping point where some new innovation or development could potentially change how a profession or discipline is being practiced and perceived all over the world.

Human and technology collaboration can get work done efficiently, accurately and without many errors. Decision can also be taken easily with the help of technology. Nothing can be done only with technology but on the other side this is also true that human being also needs technology to work faster and without any anomalies or errors. Technology is also time saving tool in order to accomplish auditing tasks. Human auditors will be able to provide higher value-added services, such as advisory roles and strategic planning, data analysis by leveraging the efficiencies provided by AI. AI ensures consistency and standardization in audit work, reducing Irregularity and also focuses on improving the quality of audits. The main purpose of Industry 5.0 is to unite the work of humans and robots which is known as cobot it is a great way to achieve better and personalized results in auditing. Industry 5.0 is trying to transform auditing into a more efficient, accurate, and strategic function. It is ultimately contributing to better financial governance along with decision making.

This study explores how AI technology has influenced Accounting and Audit profession significantly and in upcoming years will be shaping the society. There is need for adoption of technology greatly along with human collaboration. Human has brain and human can control the things when situations are against the society, therefore there is need of industry 5.0 which consists of man and technology collaboration. The concept of man-made machine is able to think, analyse and then execute effectively for better outcomes. Moreover, AI can handle huge amounts of data, also provides auditors deeper insights and a more extensive understanding of the organizations they assess.

REVIEW OF LITERATURE

Adebiyi (2023) has explored that there is a constant need for adaptation to the changing professional environment to increase effectiveness and proficiency in the corporate area leading to managing big data analysis, and higher financial, accounting, and auditing demands.

Candratio et al. (2023) has concluded that the identification of problems as a consequence of technological advances in the financial statement auditor profession, is described below. In the era of society 5.0, many auditors were replaced by artificial intelligence or robotic staff. Nakano (2022) explored fewer human resources are needed in a financial report audit process.

Jayalakshmi et al. (2023) found, this progress is actually a threat to the profession of financial statement auditors. The need for human resources to become auditors is reduced. Alsmady (2022) studied that only auditors who have high qualifications will win the competition, according to the needs of the 5.0 society era. Furthermore, the scope of the audit will expand across countries, because the form of transactions is already online between countries, even between continents.

Nurwulan and Maulida (2023) stated that the audit process was carried out remotely during COVID 19 or what is known as a remote audit. The results of this study proved that remote audits have the same audit quality as field audits as before. The difference is efficiency in terms of time and in terms of allocated costs. This research recommended that future audits continue to be developed, but it is more effective when carried out remotely, using the artificial intelligence.

Carlin et al. (2022) explained that information technology and its impact on audit quality and automation remains a growing topic, especially in the pandemic period which has caused more changes in financial audit planning and risk assessment. Auditors are forced to conduct remote audits and use information technology more than in previous years.

Knechel et al. (2021) elucidated that AI's emphasis on tasks such as decision making, prediction, and anomaly detection indicates a potential displacement of white-collar jobs, contrasting with the displacement of unskilled manual labor by previous technologies. In focusing on the audit sector, we provide preliminary evidence that this displacement is

occurring at the firm level, suggesting that audit firms' increased reliance on technology may be a mechanism contributing to the trends of increased departures and turnover among auditors.

Ham et al. (2021) concentrated on office-level AI job postings to characterize the evolution of audit firms' demand for AI skills. In contrast, our study emphasizes the actual hiring of AI employees. By analyzing real employees' profiles, roles, locations, skills, and job histories, our research is the first to offer an overview of the AI workforce in audit firms, detailing its composition, organizational structure, and applications within the firm.

Ham et al. (2021) provide a complementary investigation to ours, utilizing job postings data to examine the evolution of audit firms' demand for AI workers in recent years. Conversely, our resume data enable us to capture how AI is currently being integrated into the audit process. Al-Hashedi and Magalingam (2021) employed to identify fraud in various financial applications. Christ et al. (2021) provided evidence of enhanced audit quality facilitated by technology-enabled inventory audits.

Acemoglu et al. (2022) asserted that AI is associated conducted a review of extensive research related to detecting financial fraud, including bank fraud, insurance fraud, financial statement fraud, and cryptocurrency fraud, from 2009 to 2019, highlighting that 34 data mining techniques were with some job replacement at individual establishments but not at the aggregate occupation or industry level, suggesting that AI has no discernible aggregate effects on labor to date.

Avares et al. (2022) conducted fieldwork to analyze the impact of Industry 4.0 technologies on the auditing profession. This study elucidated that digital transformation and the adoption of new technologies provided by Industry 4.0 serve as aids to management and auditing professionals.

Satyawan and Iswati (2023) interpreted the humanistic philosophy of Confucius in the context of integrating AI into the auditing of financial statements. Their findings indicate that auditors, endowed with cognitive, moral, and ethical abilities, can collaborate with AI without fearing the complete replacement of their profession. However, auditors should be cautious of excessive reliance on AI, ensuring that high-tech-assisted audit objectives work in harmony without eliminating the humanistic elements of skepticism and professional judgment that AI lacks.

Existing studies have extensively examined the impact of technological advancements, AI and digital transformation on auditing professions. Some studies highlighted on technological developments and emergence of Industry 5.0, use of big data analytics, automation and AI driven audit processes. Some has focussed on the operational transformation within auditing practices. Limited research has empirically examined how industry 5.0 specifically influences the collaboration between human auditors and AI in enhancing job opportunities within the auditing profession. Therefore, the present study attempts to bridge the gap by analysing the impact of industry 5.0 on the auditing profession, examining the collaborative role of human auditors and AI in creating new job opportunities and assessing whether auditors work experience significantly influences the need for training and skill development for adopting AI assisted auditing.

OBJECTIVES

- To analyse the impact of the industry 5.0 in the Auditing profession.
- To study the significance of collaboration between human auditors and AI in enhancing job opportunities in auditing.
- To determine whether working experience significantly influences the need for training programs and skills to adopt AI assistance in auditing.

RESEARCH METHODOLOGY

The Study: An analytical research approach has been adopted for this study. The aim of this study is to examine the impact of Industry 5.0 on the auditing profession, with a focus on training programs required for adopting AI collaboration with human auditors.

Data Collection: Primary data has been used for this research. A self-developed questionnaire was used to collect data from auditors. The purpose of this study is to provide deeper insights into the impact of AI-human collaboration in auditing and to identify the skills required for auditors in the AI era.

The Sample: The sample consists of 104 respondents, comprising auditors from Indore (M.P.).

Tools for Data Collection: Primary data was collected through a self-designed questionnaire. Secondary data was gathered from various research papers, journals, publications, websites, and books.

Tools for Data Analysis: The collected data is analysed through ANOVA.

DATA ANALYSIS AND RESULT

H_{01}: There is no significant impact of Industry 5.0 on the auditing profession in terms of speed, accuracy, or integration of technology

SUMMARY

Groups	Count	Average	Variance
Consultant	14	15	17
Associate	20	17.5	1.71429
Senior Consultant	28	13.8235	3.27941
Manager	38	17.6	0.3
Assistant Manager	14	16	5.66667

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	104.806	4	26.2014	5.78188	0.00102	2.62605
Within Groups	167.671	37	4.53164			
Total	272.476	41				

ANOVA

Interpretation: H_{01} is rejected as F= 5.78188, P= 0.00<0.05 . There is a significant impact of Industry 5.0 on the auditing profession in terms of speed, accuracy, or integration of technology. The usage of AI in Industry 5.0 enhance speed of audit process and improve the accuracy of financial analysis and fraud detection and enable better integration of advanced technological systems in auditing practices.

H_{02}: The collaboration between human auditors and AI does not significantly enhance job opportunities in auditing, regardless of the auditors' qualification.

SUMMARY

Groups	Count	Average	Variance
CA	14	17	0.5
CIA	20	17.125	3.55357
CFA	18	17	0.66667
Masters	40	15.7778	7.12418
Other	12	17.25	2.91667

ANOVA

Source of Variation	SS	Df	MS	F	Pvalue	F crit
Between Groups	17.7401	4	4.43502	1.0209	0.40927	2.626052
Within Groups	160.736	37	4.34422			
Total	178.476	41				

Interpretation: Null hypothesis is not rejected as F=1.0209, P=0.40927>0.05. Since p value is more than 0.05, hence that the collaboration between human auditors and AI does not

significantly enhance job opportunities in auditing, regardless of the auditors' qualification. AI is primarily used as a supporting tool to excel productivity, improve efficiency, accuracy and data processing capabilities rather than to create additional employment opportunities.

H_{03}: Working experience does not significantly influence the need for training programs and skills to adopt AI assistance in auditing.

SUMMARY

Groups	*Count*	*Average*	*Variance*
Less than 1 year	24	11.20	4.4
1 -3 years	28	12.33	0.78788
4 -6 years	22	11.22	0.69444
7 -10 years	18	12.29	1.2381
More than 10 yrs	12	12.50	0.33333

ANOVA

Source of Variation	**SS**	**df**	**MS**	**F**	**P-value**	**F crit**
Between Groups	13.58	4	3.40	2.018	0.1120	2.62605
Within Groups	62.25	37	1.68			
Total	75.83	41				

Interpretation: H_{03} is not rejected as F= 2.018, P= 0.1120>0.05. Null hypothesis is accepted which exhibits that working experience does not significantly influence the need for training programs and skills to adopt AI assistance in auditing. As Ai based tools and digital audit systems

are relatively new in the auditing profession, both experienced and less experienced auditors need similar levels of training and upskilling to effectively understand and utilize these technologies.

DISCUSSION

The result of the study confirms that the variables considered in our study are important to analyse the transformative impact of industry 5.0 in auditing with Auditors' perspective and collaboration of human and AI. $H_{01,}$ aimed to study that there is no significant impact of Industry 5.0 on the auditing profession in terms of speed, accuracy, or integration of technology. The null hypothesis is rejected indicating the auditors can process large volumes of financial data more efficiently and conduct more reliable and timely audits.

H_{02} states, collaboration between human auditors and AI does not significantly enhance job opportunities in auditing, regardless of the auditors' qualification. Since null hypothesis is not rejected indicating that AI and automation tend to streamline routine task only. AI technologies assist auditors in data processing, anomaly detection and analysis; however their implementation does not necessarily leads to creation of additional roles within audit firms. Moreover, organizations may remain cautious about expanding job positions due to concerns that AI could replace certain traditional job functions.

H_{03} states that working experience does not significantly influence the need for training programs and skills to adopt AI assistance in auditing. Here null hypothesis is not rejected suggesting that auditors, regardless of their years of professional experience, requires similar levels of training to effectively adopt and utilize AI tools in auditing practices. The integration of AI technologies requires new digital skills that are not necessarily acquired through traditional auditing experience. Therefore, it is essential to design training programs that cater to auditors at all experience levels ensuring that both new and experienced professionals are adequately equipped to work efficiently with AI based auditing tools.

CONCLUSION

Artificial Intelligence has emerged as a transformative force in financial reporting and auditing, reshaping the way organizations manage and analyse financial data. It has made human work easier with the support of advanced technology. AI contributes to greater

efficiency and helps reduce errors. However, since technology lacks human judgment, human involvement remains essential for its effective control and application.

Industry 5.0 is emerging across various fields and emphasizes collaboration between humans and technology for better task implementation. The study finds that Industry 5.0 has a significant impact on auditing practices. In the future, as technology advances further, Industry 5.0 is expected to play an even more important role. Therefore, considering future requirements, the adoption of Industry 5.0 is essential. In auditing, Industry 5.0 enhances efficiency in processes such as assessment, verification, and analysis. It ensures that tasks are thoroughly analysed and verified, minimizing errors and operational hindrances. Due to the complexity and importance of these tasks, the integration of Industry 5.0 becomes necessary in the auditing profession.

The study also reveals that AI-human collaboration may not generate new employment opportunities unless employees are adequately trained and equipped with essential skills. Furthermore, the findings indicate a need for uniform and standardized training programs for all employees, regardless of their years of work experience. Auditors should take proactive steps toward skill enhancement, and organizations must invest in effective training programs to improve the overall quality of auditing practices.

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CASE STUDY

From Kitchen to Cart Through Mom's Kart

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ABSTRACT

This case study explores the entrepreneurial journey of Aman Porwal CEO, a 27-year-old innovator from Indore, India who founded MomsKart, an e-commerce platform dedicated to empowering homemakers by enabling them to monetize their culinary and craft skills. Inspired by his own mother's cooking and a research-backed understanding of the challenges faced by over 10 crore women engaged in local-scale businesses in India, Aman launched MomsKart in 2021 with a vision to bridge the gap between home-based women entrepreneurs and the growing demand for authentic, hygienic homemade products. It is a mission-driven venture aimed at empowering homemakers by transforming their culinary and artisanal talents into viable business opportunities. From humble beginnings inspired by his mother's home-cooked meals to winning a prestigious competition at IIM Ahmedabad, Aman's journey reflects the spirit of grassroots innovation. MomsKart operates in PAN India except North East states on a differentiated aggregator model, focusing exclusively on homemade food and artisanal goods. The platform manages the full logistics chain, provides seller training, and leverages digital marketing and influencer partnerships to drive customer engagement. Having completed four years since its inception, the organization now aims to scale up by increasing its network of sellers and buyers. This strategic shift, however, brings with it a significant challenge—broadening the platform while maintaining quality, engagement, and trust among stakeholders.

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Background

Aman Porwal, a 27-year-old entrepreneur, envisioned a unique business idea while pursuing his Bachelor of Engineering. Fueled by a passion for innovation and societal impact, Aman participated in several national and international competitions during his college years. His perseverance bore fruit when he won a prestigious competition hosted by IIM Ahmedabad, which proved to be the turning point in his entrepreneurial journey.

Inspiration Behind the Idea

Aman Porwal's entrepreneurial journey was deeply influenced by his active participation in various national-level competitions and innovation challenges during his college years. Platforms like Dare2Compete (now Unstop) exposed him to real-world problem-solving scenarios and pushed him to think beyond conventional business models. While participating in these events, Aman realized the gap between unique ideas and actual funding or implementation support. Many of his initial concepts, though innovative and well-received, struggled to gain momentum due to a lack of early-stage investor confidence and institutional backing.

Undeterred by initial rejections, Aman continued to refine his ideas and pitch in more competitive arenas. His persistence paid off when he won a prestigious entrepreneurship competition at IIM Ahmedabad, one of India's leading business institutes. This achievement marked a significant breakthrough — not only did it validate his concept on a national platform, but it also opened up new networks, funding opportunities, and mentorship avenues.

This turning point became the launchpad for his startup journey, reinforcing his belief that resilience and clarity of purpose can overcome systemic hurdles faced by early-stage entrepreneurs.

Challenges in Implementing Idea

Throughout his academic tenure, Aman noticed a recurring pattern – his mother's food was often praised not just at home but also among peers. This sparked the idea of bridging the gap between skilled home chefs, especially mothers, and the growing demand for hygienic, homemade food. A deep-dive research revealed a startling insight: India is home to over 10

crore women engaged in local-scale businesses. However, a majority of them struggle to achieve meaningful success due to:

- Lack of digital and business literacy
- Limited market access
- Absence of scalable platforms
- Minimal financial support and awareness

Birth of MomsKart

Combining his personal inspiration and research findings, Aman launched MomsKart – a platform aimed at connecting home-based women cooks, especially mothers, with a wider consumer base who value nutritious, authentic, and home-cooked meals. The startup model is simple yet powerful: empower women to turn their culinary skills into a sustainable business while ensuring customers get access to clean and tasty homemade food.

MomsKart: A Unique Business Model with a Distinct Niche

MomsKart operates on a differentiated business model focused exclusively on homemade food and products, primarily crafted by homemakers. While large e-commerce platforms like Amazon, Myntra, Meesho, Swiggy, and Zomato have ventured into similar spaces, their focus remains on commercial or restaurant-based offerings. In contrast, MomsKart uniquely caters to the homegrown segment, emphasizing authenticity, quality, and community empowerment. What sets MomsKart apart is its commitment to managing the entire logistics and supply chain for homemade goods — ranging from pickles, papads, cashew snacks, and wellness products to durable items like home décor, vases, and handicrafts.

By 2025, MomsKart has successfully empaneled 1,000 women sellers, with an ambitious goal of scaling to 5,000 by 2030. However, the journey is not without its challenges. The primary hurdles in seller onboarding include:

- Building trust among potential homemaker sellers
- Reaching rural and semi-urban areas
- Managing sustainable margins for both sellers and the platform

Despite these obstacles, MomsKart continues to lead in a relatively untapped niche with minimal direct competition, leveraging technology and social impact to redefine e-commerce.

Driving Buyer Engagement and Empowering Sellers through Digital Outreach

After successfully empaneling 1,000 sellers, one of the key challenges for MomsKart has been to attract and retain buyers who visit the website regularly and place orders as per their needs. To address this, the company has implemented a consistent digital marketing strategy across various social media platforms, resulting in an average of 1,000 daily website visits with a conversion rate of 10–15% & the sales of the company for past three years 22 Lakhs 45 Lakhs & 1.5Cr with a profit margin of 12%.

To further expand reach, MomsKart collaborates with social media influencers, leveraging their credibility and audience to promote the platform effectively. The founder remains highly committed to innovation and continues to introduce new strategies to boost customer engagement and seller productivity. In parallel, seller education and empowerment remain a core pillar of MomsKart's operations. The company has developed a dedicated Seller Learning Platform, which includes easy-to-understand training videos on topics such as:

- How to package products
- How to take and manage orders
- Product measurement and quality checks
- Labelling, registration, and licensing requirements

Sellers receive end-to-end training — right from onboarding to the final dispatch — ensuring quality control, consistency, and a seamless experience for both sellers and buyers.

Revenue Model and Operational Challenges

According to the founder, MomsKart is currently valued at approximately ₹6 crore, based on its projected sales, consistent customer growth, and anticipated future expansion. This valuation reflects both the platform's current performance and its potential to scale in the evolving homemade and artisanal goods market. MomsKart Pvt. Ltd., established in 2021, has shown remarkable growth in just five years. The company has secured funding of ₹15

lakhs from various venture capitalists, along with cloud credits from Amazon Web Services (AWS) to support its platform infrastructure and hosting needs.

The primary revenue streams for MomsKart include:

- Platform subscription fees from registered sellers
- A 5% Platform fee on each successful order
- Commission earnings from courier agencies on a per-order basis

While the model is financially sustainable, the company has faced certain operational challenges, especially related to logistics. One of the key issues has been incorrect or inadequate packaging by sellers, leading to increased courier costs and occasional damage to products. The durability of some goods, particularly fragile home decor items or perishables, also remains a concern. To address this, MomsKart has developed an automated logistics software that calculates optimal shipping costs by mapping pin code to pin code and selecting the most cost-effective option from partnered logistic providers. This system helps ensure reliable deliveries at reasonable rates while minimizing cost overruns.

Questions:

1. Is the current valuation of MomsKart (₹6 crore) justified? Calculate the approximate valuation using standard startup valuation techniques.
2. Should the founder consider equity dilution at this stage?
3. What are the available funding options for a private limited company like MomsKart?
4. How does MomsKart perform when analyzed through Porter's Five Forces model?