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**IMPACT OF ENVIRONMENTAL EDUCATION IN ACCEPTANCE OF SUSTAINABLE LIFESTYLE
A CASE STUDY OF KALYAN-DOMBIVLI**

¹Ms.Bhakti Mhaskar and ²Dr. Prakash Dongre¹N.G. Acharya & D.K. Marathe College, Chembur (E)²J.M.Patel College of commerce, Goregaon (W)¹Bhaktimhaskar83@gmail.com and ²prakashdongre14@gmail.com**ABSTRACT**

A sustainable lifestyle means a way of living that minimizes the environmental impacts by making choices and practicing the activities that promote the well-being of the planet and society. It includes the practices that conserve the natural resources, reduce waste, and promote the ecological balance. The ultimate aim of a sustainable lifestyle is to ensure the long-term sustainability of future generations. Environmental education is one of the important factors that will have a positive impact in terms of increasing awareness of environmental issues, promoting sustainable activities, supporting policies, and fostering the responsibility of people to protect the environment.

As per UGC norms (2014), the environmental studies subject was made compulsory in all universities of India and affiliated colleges. The present paper is assessing the impact on environmental education (Environmental Studies subject) in accepting a sustainable lifestyle with special reference to the Kalyan-Dombivli area of Thane district. The ninety samples were selected by a random sampling method. The questionnaire survey method was used to collect data. The questionnaire consists of personal information and various aspects and dimensions of sustainable lifestyles, especially with special reference to the utilization of land, water, forests, and energy resources. All these aspects and dimensions were incorporated in the syllabus studied at the undergraduate level.

Keywords: Sustainable lifestyle, environmental education, acceptance, utilization, environmental studies

INTRODUCTION

A sustainable lifestyle means a way of living that minimizes the environmental impacts by making choices and practicing the activities that promote the well-being of the planet and society. It includes the practices that conserve the natural resources, reduce waste, and promote the ecological balance. It includes actions such as reducing waste, conserving energy, using renewable resources, supporting eco-friendly products, and considering the long-term effects of their actions on the earth. (United Nations-1987).

Environmental education is one of the important factors that will have a positive impact in terms of increasing awareness of environmental issues, promoting sustainable activities, supporting policies, and fostering the responsibility of people to protect the environment.

The research by Erhabor and Don (2016) emphasizes the importance of environmental education in promoting positive attitudes and knowledge towards environmental protection among students in Nigeria. Their survey found that students who received environmental education displayed higher environmental literacy and positive attitudes. They recommended the promotion of environmental education at all educational levels to achieve sustainable development.

Similarly, the paper by Piao and Managi (2023) examines the global role of education in fostering sustainable lifestyles and economic development. The study, based on a survey across 37 countries, found that individuals with higher education were more likely to engage in environmentally friendly behaviours, such as recycling and conserving energy. The authors argue for integrating sustainability into educational curricula to promote sustainable consumption and production globally.

As per the honourable Supreme Court of India in the order dated 6th December, 1999 and thereafter UGC notification directions, appropriate steps are to be taken to introduce an environmental studies course in all universities and affiliated colleges. It has been communicated to all universities on 24th July, 2003. The university Grant Commission, pursuant to this order, had designed a syllabus of environmental studies for undergraduate courses for all branches of higher education to be compulsorily implemented. The UGC has uploaded the modules on the website. The UGC syllabus consists of eight core modules for environmental studies for undergraduate courses for all branches of higher education.

It includes following topics:

- The definition, scope, and importance of the multidisciplinary nature of environmental studies
- Natural resources and associated problems such as forests, water, minerals, food, energy, and land resources
- Role of individual in conservation of natural resources
- Equitable use of resources for a sustainable lifestyle
- Ecosystem as a holistic concept with different aspects
- Biodiversity and its conservation
- Environmental pollution types, causes, effects, and case studies
- Social issues and the environment with environmental acts, policies, and public awareness
- Human population and the environment with different dimensions

As per the UGC guidelines, the environmental studies subject is incorporated in affiliated colleges of Mumbai University in the commerce after 1999. The present paper is assessing the impact of environmental education/environmental studies subject on their daily routine life in the Kalyan Dombivli area.

THE STUDY AREA

Kalyan-Dombivli area is located in Thane district of Maharashtra, India. It is part of the Mumbai Metropolitan Region (MMR) and is situated in the central part of the state. The topography of Kalyan-Dombivli consists mainly of flat terrain with some hilly areas on the outskirts, particularly in the northern regions. The region has a tropical climate, with a mix of urban and semi-urban environments. According to the 2011 Census, the combined population of Kalyan and Dombivli was approximately 1.2 million. This area is facing environmental problems such as pollution of the Ulhas, Kalu and Waldhuni rivers. These rivers are providing significant water sources for industries and households. The lake like Kala Talao, Jarimari lake, and Garipada Talav are providing recreational spaces to local people. All of them are facing various issues of urban pollution, highlighting the need for better waste management and conservation practices. These problems of pollution, deforestation, and rapid urbanization create a great concern for present and future generations. The sustainable lifestyle plays an important role in the conservation of resources.

AIM

- To understand the impact of environmental education on acceptance of a sustainable lifestyle with special reference to the Kalyan and Dombivli.

OBJECTIVES

- To assess the impact of environmental education on the acceptance of sustainable lifestyles with reference to practices associated with the utilization of natural resources.
- To understand the lifestyle of people in the context of the environment.

METHODOLOGY

- 90 samples of undergraduate-level students were selected by randomly from the Kalyan and Dombivli. A questionnaire method was used for acquiring the primary data from the samples.
- Questions were formulated on personal information, sustainable lifestyle in relation to land, water, forest, and energy resources utilization practices, as well as related to daily activities.
- The analysis of collected data was carried out with the help of suitable methods.
- Secondary data was collected from the internet, books, and journals.

RESULTS

All the selected respondents (90) have studied environmental studies subject at school and college levels. 50% of the respondents were in the 18-20 years of age group. (50%), 44% were in age group of 20-25 years. Only 6% of respondents were in the age group of 26-30 years. 66 % respondent said that the mother is the primary decision-maker in family. Whereas 34 % respondent said that the father the decision maker in day-to-day requirements. Most of the respondents were from the lower income group with annual income less than 3 lakh rupees per annum.

To understand the relationship between environmental education and sustainable lifestyle, a set of questions with a five-point Likert scale were used to get data related to land, water, forest, and energy resources practices from the respondents.

1. LAND RESOURCES AND SUSTAINABLE LIFESTYLE:

Table 1: Land resources practices data collected from respondents

Questions	% of Respondents				
	Always	Often	Sometimes	Rarely	Never
1. I buy refillable products to avoid generation of waste	16.67	11.11	44.44	27.78	0
2. I carry my own cloth bag while purchasing.	61.11	0	33.33	5.56	0
3. I follow segregation instructions for wet and dry waste on garbage bins	88.89	0	11.11	0	0
4. I minimize waste by using long-lasting quality water bottles	44.44	5.56	27.78	22.22	0
5. I reduce waste by using paper bags instead of low-quality plastic bags.	22.22	0	33.33	33.33	11.11
6. I practice composting of wet waste at home	16.67	5.56	11.11	11.11	55.56
7. I avoid the use of low-quality plastic	50	5.56	22.22	11.11	11.11
Average	42.86	3.97	26.19	15.87	11.11

The analysis of the responses reveals the varying levels of commitment to sustainable practices among the respondents related to land or soil resources. On average, 42.86% of respondents consistently engage in these practices as indicated by their 'Always' responses. However, only 4.13% of respondents select the 'Often' option, showing that the majority do not regularly engage in these practices. 26.18% of respondents practice sustainability 'sometimes,' indicating that many people are aware of the importance of these actions but do not incorporate them into their daily routines consistently. Additionally, 15.87% rarely engage in the practices, while 11.11% of respondents 'never' practice the land resources-related sustainability actions. The high consistency is observed in segregation instructions for waste disposal (88.89%), followed by carrying cloth bags (61.11%), indicating strong commitment to these actions.

In contrast, behaviours such as buying refillable products (16.67%), composting wet waste (16.67%), and reducing waste through paper bags (22.22%) are less commonly practiced. In case of avoiding low-quality plastic (50%) and using long-lasting water bottles (44.44%) and avoiding the use of low-quality plastic (45%), reflect moderate commitment to reducing waste, though these practices still require more regular engagement to achieve broader sustainability goals.

2. ENERGY RESOURCES AND SUSTAINABLE LIFESTYLE

Table 2: Energy resources practices data collected from respondents

Questions	% of Respondents				
	Always	Often	Sometimes	Rarely	Never
1. I keep electric appliances clean and in good condition	88.89	0	5.56	5.56	0
2. I buy 5-star electronic appliances	33.33	5.56	44.44	5.56	11.11
3. I check refrigerator doors to make sure it is completely closed	94.44	5.56	0	0	0
4. I switch off personal electronics gadgets when not in use	88.89	0	0	0	11.11
5. I prefer public transport	61.11	11.11	22.22	5.56	0
6. I walk or pedal conveniently to cover short distances	72.22	5.56	11.11	11.11	0
7. I open windows to let in fresh air and light	94.44	5.56	0	0	0
Average	76.19	4.76	11.90	3.97	3.17

The data collected on energy resources and sustainable lifestyle practices shows a strong inclination towards eco-friendly behaviours. The average values of all the options for eco-friendly energy resources and sustainable

lifestyle practices show a strong commitment among respondents to adopting energy-saving behaviours. The average percentage for 'Always' is 76.19%, which indicates that the majority of respondents consistently engage in energy-efficient practices, such as maintaining appliances, using public transport, and opening windows for natural light and ventilation. On the other hand, the average percentage for 'Never' is quite low at 2.38%, suggesting that most respondents rarely or never neglect these practices.

The high consistency (above 80%) is observed in the practice of checking refrigerator doors (94.44%), opening windows for light and fresh air (94.44%), and keeping electric appliances clean (88.89%) have very high consistency. These habits are followed by nearly all respondents, reflecting strong eco-friendly practices. The walking or pedaling for short distances (72.22%) and preferring public transport (61.11%) show medium consistency. Low Consistency (Below 50%). The practice of buying 5-star electronic appliances (33.33%) falls under low consistency. It is the impact of the income of respondents that restricts people from buying 5-star appliances.

3. WATER RESOURCES AND SUSTAINABLE LIFESTYLE

Table 3: Water resources practices data collected from respondents.

Questions	% of Respondents				
	Always	Often	Sometimes	Rarely	Never
1. I reduce water consumption by turning off taps while brushing teeth	50	0	11.11	0	38.89
2. I use bucket water for cleaning and washing	94.44	0	0	5.56	0
3. I use washing machine only when it is fully loaded	33.33	5.56	5.56	5.56	50
4. I serve half a glass of water to guests and for self	72.22	0	5.56	22.22	0
5. I use leftover water for growing plants	50	5.56	33.33	11.11	0
6. I avoid leakage of water in house and repair it immediately	66.67	5.56	6.67	11.11	0
7. I support drip irrigation for garden and agriculture	50	11.11	11.11	5.56	22.22
Average	59.52	3.97	10.48	8.73	15.87

The average percentage of respondents who answered "Always" across all the water resource and sustainable lifestyle questions is 59.52%. A strong commitment to water conservation practices is evident in several areas; particularly, 94.44% of respondents always use bucket water for cleaning and washing, and 72.22% consistently serve half a glass of water to guests and themselves. Additionally, 66.67% of respondents always repair water leaks immediately, demonstrating an awareness of the importance of preserving water resources. Medium consistency is observed in actions such as reducing water consumption while brushing teeth (50% always do this, with 38.89% never doing so and using leftover water for growing plants (50% always use it, but 33.33% sometimes do. These percentages of practices show room for improvement while using water resources. Additionally, 50% of respondents support drip irrigation, which is a moderate effort in promoting sustainable agricultural practices. Low consistency is evident in the use of washing machines only when fully loaded, where only 33.33% always engage in this practice, and 50% never do so. The low consistency is due to either most of them being from low-income groups and not having washing machines at home.

50% of respondents use leftover water for plants, 11.11% rarely do so, with 22.22% never engaging in this practice. These inconsistencies indicate that while some respondents engage in these actions occasionally, they are not as committed to making them a regular part of their routine.

4. FOREST RESOURCES AND SUSTAINABLE LIFESTYLE

Table 4: Forest resources data collected from respondents.

Questions	% of Respondents				
	Always	Often	Sometimes	Rarely	Never
1. I use roof, balcony and windows for gardening.	61.11	0	22.22	16.67	0
2. I pay my bills through electronic media.	72.22	0	16.67	5.56	5.56
3. I print documents as little as possible on both sides of the paper.	33.33	5.56	33.33	22.22	5.56
4. I read magazines, newspapers, and other publications online.	27.78	5.56	44.44	16.67	5.56
5. I buy eco-friendly equipment for work.	22.22	11.11	50	16.67	0

6. I keep natural seeds of fruits and plant them in mountain and forest regions.	27.78	0	38.89	22.22	11.11
7. I buy good quality metal and plastic furniture instead of wooden.	55.56	11.11	22.22	5.56	5.56
Averages	42.86	4.76	32.54	15.08	4.76

On average, 42.86% of respondents indicated that they always engage in the eco-friendly practices related to forest resources. The practice of paying bills through electronic media shows (72.22% a very high percentage of respondents, highlighting the widespread digitalization of financial transactions. Using roofs, balconies, and windows for gardening (61.11%: A significant portion of respondents actively engages in gardening, contributing to environmental sustainability. The printing documents as little as possible (33.33%: A moderate number of respondents consistently reduce paper usage, with some only occasionally engaging in this habit. Reading magazines, newspapers, and publications online (27.78%: These behaviours show that paper reduction practice is less consistent than expected. The lowest consistency is observed in keeping natural seeds of fruits and planting them in forests (27.78%, indicating that this practice could be further encouraged.

5. DAY TO DAY ACTIVITIES AND SUSTAINABLE LIFESTYLE

Table 5: Day-to-day activities data collected from the respondents

Questions	% of Respondents				
	Always	Often	Sometimes	Rarely	Never
1. I do not use used and throw products for serving food items.	33.33	5.56	44.44	11.11	5.56
2. I avoid use of China made products those have less life.	22.22	0	33.33	33.33	11.11
3. I practice returning of old electronic products and buy products from shop.	33.33	0	38.89	11.11	16.67
4. I practice reuse in house different products.	27.78	5.56	33.33	27.78	5.56
5. I prepare products from waste material.	22.22	0	38.89	22.22	16.67
6. I avoid use of tissue paper and carry towel or hanky.	77.78	10.11	10.11	0	0
7. I avoid unnecessary buying during sales and offers.	33.33	22.22	27.78	16.67	0
Average	35.71	6.21	32.40	17.46	7.94

The average value of the always option for day-to-day activities is 32.14%, which is very low. Avoiding tissue paper and carrying a towel or hanky is the most consistent eco-friendly practice, with 77.78% of respondents always following it. A low percentage of people avoid used-and-throw products for serving food (33.33% always, showing inconsistency in acceptance of an eco-friendly lifestyle. Practices like reusing products, returning old electronics, and creating products from waste materials show inconsistency, with many respondents only sometimes or rarely engaging in these actions.

CONCLUSION

The ignorance and lack of money are key factors that restrict them from utilizing the resources in a sustainable manner in relation to various day-to-day practices. The highest consistency is observed in energy resource conservation, whereas the lowest is observed in eco-friendly practices. The environmental education has created environmental awareness among the respondents, but a gap is found in implementation.

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RENEWABLE ENERGY AWARENESS AMONG UNDERGRADUATES STUDENTS IN MUMBAI'S WESTERN SUBURBS: A KNOWLEDGE ASSESSMENT THEME- SUSTAINABLE DEVELOPMENT

Anita Ramesh PanigrahiAssistant Professor, Prahladrai Dalmia Lions College of Commerce and Economics, Malad [W] Mumbai
anitajee81@gmail.com**ABSTRACT**

Renewable energy is increasingly recognized as vital for the survival of humanity, particularly as conventional energy sources are finite and harmful to the environment. Transitioning fully to renewable energy is a critical strategy for achieving sustainable and clean energy distribution in our rapidly evolving world. This research focuses on assessing the knowledge of renewable energy among undergraduate students in the suburban areas of Mumbai, as well as their understanding of sustainable energy practices necessary for meeting the future energy demands of upcoming generations. To gather relevant data, a series of questionnaires were developed to assess the students' awareness of various renewable energy sources, energy-related concepts, applications, and the extent to which the current educational curriculum addresses these topics. The questionnaires were distributed to undergraduate students in Mumbai suburban colleges. The findings indicate that the students are most familiar with solar energy, which is likely due to the growing prevalence of solar panels in the region. However, there was a notable lack of awareness and understanding of geothermal energy, suggesting limited potential for its development in the near future. Additionally, 86% of the students agreed that conventional energy sources will likely continue to be heavily relied upon globally to meet daily energy demands. This highlights the urgent need for the government to take proactive measures in promoting renewable energy education and the integration of renewable energy technologies in schools and universities.

Keywords: energy, knowledge, renewable energy, engineering education,

INTRODUCTION

The global dependence on fossil fuels for energy generation has raised concerns among researchers and experts worldwide, both in developed and developing countries, about the unsustainability of current energy systems (Ewim et al., 2022). As noted by Zyadin et al. (2012), this issue is driven by the increasing energy demand fueled by improving living standards and urbanization, particularly in developing regions. Furthermore, pollution from greenhouse gas emissions results in significant environmental degradation, not only threatening local ecosystems but also contributing to global environmental challenges. As a consequence, the transition to clean energy, which includes both energy efficiency and renewable energy, is becoming increasingly critical for sustainable development. This transition is facilitated through better management, efficient machinery, and appliances (Egieya et al., 2022; Jaber et al., 2017; Ntuli et al., 2022).

India, like many nations, is experiencing an increasing demand for energy due to rapid industrialization and population growth. Mumbai's western suburbs are particularly affected by this trend, with a constant rise in energy consumption linked to urbanization and economic expansion. While conventional energy sources, including coal and natural gas, still dominate the energy mix, their long-term sustainability is a concern. This unsustainable reliance on fossil fuels leads to a growing carbon footprint and increased environmental degradation. To mitigate these impacts, India has made efforts to diversify its energy mix, emphasizing renewable sources such as solar, wind, and biomass (Akinbami et al., 2021). Solar energy, in particular, has great potential due to India's favorable geographic conditions, leading to large-scale solar projects such as the Rewa Ultra Mega Solar Park in Madhya Pradesh. Wind energy, especially in coastal regions, and biomass are also contributing to the nation's renewable energy efforts (Merem et al., 2022; Mostafaeipour et al., 2020).

Electricity plays an indispensable role in daily life and economic operations. However, issues such as energy inefficiency, inadequate infrastructure, and power outages—commonly referred to as "load shedding"—are currently hindering reliable electricity supply, which in turn affects industries, businesses, and individuals. This problem, prevalent in many parts of the country, has underscored the urgent need for alternative energy sources to support the growing demand and to stabilize the energy grid.

The focus of this study is to assess the awareness of renewable energy resources among undergraduate students in Mumbai's western suburbs. The knowledge and understanding of these students will play a crucial role in shaping the future of energy in India. Educating students on renewable energy technologies, their environmental

benefits, and economic implications is vital for fostering innovation, job creation, and large-scale deployment of clean energy solutions.

As future leaders, students must be equipped with the necessary information to create solutions that address energy challenges. Therefore, this research aims to evaluate the current awareness and understanding of renewable energy resources among these students, with a particular emphasis on how their education can contribute to India's energy transition.

The global energy landscape is undergoing a significant transformation, driven by the urgent need to transition from fossil fuels to ¹ cleaner, more sustainable energy sources. This transition is crucial to address the environmental challenges posed by climate change and to ensure long-term energy security. In India, the growing energy demand, fueled by rapid economic growth and urbanization, necessitates a shift towards a diversified energy mix that includes a greater share of renewable energy sources. 1. www.energyportal.eu Mumbai's Western Suburbs, a rapidly developing region, exemplifies this growing energy demand. However, the current energy mix heavily relies on conventional sources, raising concerns about environmental sustainability and energy security. This reliance on fossil fuels contributes to air pollution, exacerbates climate change, and increases vulnerability to energy price fluctuations.

OBJECTIVES

- 1) Determine the present degree of awareness and comprehension of renewable energy among undergraduate students in the Western Suburbs of Mumbai.
- 2) Examine how students feel about renewable energy, taking into account its effects on the environment, society, and economy.
- 3) Determine the knowledge gaps and the areas that most require educational interventions to improve students' comprehension of renewable energy.

Understanding the knowledge and perceptions of this demographic is crucial for several reasons:

Future Decision-makers: Undergraduate students represent future leaders, policymakers, and consumers who will play a critical role in shaping India's energy future. Their awareness and understanding of renewable energy will significantly influence their choices and actions, impacting the adoption and integration of clean energy solutions.

Driving Innovation and Change: Educated and informed citizens are essential for driving innovation and promoting the development and deployment of new renewable energy technologies.

Fostering Sustainable Practices: By raising awareness among students, we can cultivate a culture of sustainability and encourage the adoption of renewable energy practices in their daily lives and communities.

This research aims to provide valuable insights into the current state of renewable energy awareness among undergraduate students in Mumbai's Western Suburbs, which can inform the development of targeted educational programs and public awareness campaigns to enhance their understanding and promote the transition to a sustainable energy future.

LITERATURE REVIEW

- 1) Daniel Ewim,et; February 2023,researched on the understanding and viewpoints of renewable energy among South African School students and found that Renewable energy has become an essential component for the survival of human beings. This is because conventional energy supply is limited, nearing its limits, and or destroying our environment. The complete transition to renewable energy is a major approach to achieving sustainable and clean energy distribution progress in this ever-changing and demanding world. This research work investigates the knowledge of renewable energy among the youth and their understanding of sustainable energy prosperity towards meeting the future generation's energy needs. To achieve this, a set of questionnaires was developed to identify their knowledge of various renewable energy resources, energy aspects, applications, and the extent to which the current syllabus provides a well-developed background. They were administered to high school students in KwaZulu-Natal, Durban. The main findings of this investigation reveal that the students were most familiar with solar energy, which could be due to the increasing availability of solar panels across the nation. However, a lack of awareness and little understanding of geothermal energy was noted among the high school students. This indicates a poor future for its development. Furthermore, 86% of the students agreed that conventional energy sources would likely still be relied upon by a significant portion of the global population to meet daily energy needs. Therefore,

the government must take swift action to address these issues, by promoting the deployment of renewable energy sources in schools.

- 2) Irdal Irmak et. January 2015, researched on public awareness towards renewable energy in Turkey and found that Mechanical Engineering students have a higher perception when compared to other students, with small differences. Also, the year and level of education reveals that the new coming generation have more knowledge within the renewable energy subject. Heading away from these outcomes, we can say that studies done on education and training systems are closely related to the economic situation of the country. With the dissemination of renewable energy subject, new employment opportunities will take place and our country will benefit from technological developments. To achieve these objectives, national targets should be established, implementation plan, support and investments should be determined by the government. Renewable energy education communities should be established and supported across the country, progress in renewable energy technologies.
- 3) **1. Singh (2015):** "Estimating Rooftop Solar PV Potential in Mumbai" Singh conducted a comprehensive study on the rooftop solar photovoltaic (PV) potential of Mumbai and estimated it to be around 2190 MW using median-efficiency solar panels. The findings revealed that rooftop PV systems could fulfill 12.8–20% of the city's daily energy requirements and 31–60% of the morning peak electricity demand. With a calculated capacity factor of 14.8%, the study provided a systematic framework for assessing solar rooftop potential in densely populated urban areas. Singh's work emphasized the scalability of rooftop solar solutions as a viable clean energy source for cities like Mumbai.
- 4) **Singh (2016):** "Impact of Orientation on Rooftop PV Performance in Mumbai" Singh explored how the orientation and tilt angle of solar panels influenced their energy performance. The study found that a fixed tilt angle of 19° (equal to Mumbai's latitude) provided optimal energy generation throughout the year. Additionally, the implementation of seasonal tilts and tracking systems could enhance performance by 2.21% and 10.18%, respectively. However, Singh cautioned that the financial implications, including a 13-year payback period, made these enhancements less economically feasible for many users. The research emphasized the need for cost-benefit analyses when adopting advanced solar tracking technologies.
- 5) **Khatri (2021):** "Solar PV Penetration and Renewable Energy Potential in Pakistan" Khatri analyzed Pakistan's renewable energy resources and found that a 1 kWp solar PV system could generate an average of 4.5 kWh per day, with an annual renewable energy potential of 2.8×10^6 GWh. Despite this vast potential, renewable energy sources contributed only 2.4% to the country's electricity mix. Khatri highlighted policy gaps, lack of awareness, and financial challenges as barriers to greater solar PV penetration. The study called for government-led initiatives to create a more supportive ecosystem for renewable energy adoption.

METHODOLOGY

Research Design and Approach:

- **Research Design -:** A cross-sectional survey approach was used in this investigation. Studies that are cross-sectional offer a moment in time of a population. This design was appropriate for evaluating undergraduate students' present knowledge and attitudes on renewable energy in the Western Suburbs of Mumbai.
- **Research Methods:** A quantitative research methodology was used in the study. The goal of quantitative research is to find patterns, trends, and relationships by gathering and evaluating numerical data. This strategy is supported by the use of surveys to collect information on students' knowledge, attitudes, and perceptions.

Data Collection Methods-

Primary Data: Structured questionnaires were used to gather data. These surveys included a number of closed-ended questions with predetermined answers (such multiple-choice or Likert scale).

- **Data Collection Tool:** The online platform utilized to distribute and collect the questionnaires was Google Forms. This made data entry easier and allowed for more effective data collection.

Tools and Methods for Analysis:

- **Descriptive Statistics:** Frequencies, percentages, and measures of central tendency (mean, median, mode) were among the descriptive statistics employed to summarize the data. This made it easier to comprehend how the replies were distributed and spot important patterns in the knowledge and attitudes of the students.

- **Cross-tabulations:** Cross-tabulations were likely used to analyze the relationship between different variables, such as gender, major, or year of study, and student knowledge and perceptions of renewable energy.

Inferential Statistics: Although not specifically stated, it is possible that the sample data was utilized to make more general inferences about the population of undergraduate students in Mumbai's Western Suburbs.

- **Sampling:** Although 300 students were given questionnaires, 223 of them responded, according to the study. Assessing the sample's representativeness would require knowledge about the sampling technique (such as convenience or random sampling).
- **Data Quality:** It would be crucial to take steps to guarantee data quality, such as looking for missing data and paying attention to possible biases in responses.
- **Ethical Considerations:** Getting participants' informed consent and protecting participant anonymity were probably taken into account.

In order to gather information about the awareness, perceptions, and attitudes of undergraduate students in Mumbai's Western Suburbs regarding renewable energy, this study used a quantitative research approach with a cross-sectional survey design. Structured questionnaires were distributed via Google Forms, and descriptive statistics were used to analyze the data.

RESULT AND DISCUSSION

This study employed questionnaires to investigate the awareness of renewable energy resources among undergraduate students in Mumbai's Western Suburbs, India. The questionnaires were designed to assess the extent of their knowledge and understanding of relevant concepts. Undergraduate students represent a crucial demographic for understanding future energy trends and adoption of sustainable practices. This study aimed to gauge their comprehension of renewable energy and its potential applications.

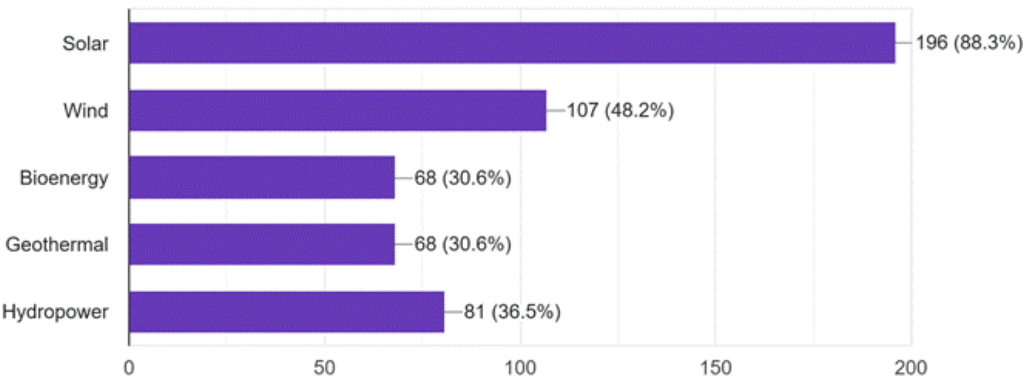
Questionnaires were distributed to 300 undergraduate students in Mumbai's Western Suburbs. A total of 223 responses were received. The data was collected using Google Forms, an online platform that facilitated efficient distribution and collection of responses. This method allowed for convenient participation and streamlined data analysis.

This survey assessed undergraduate students' knowledge and perceptions of renewable energy in Mumbai's Western Suburbs. The findings reveal a generally positive understanding of core concepts. A majority of respondents (95.1%) could define renewable energy, and a similar proportion (94.2%) could identify renewable energy sources. This strong foundational knowledge translates to a high level of confidence in recognizing the practical applications of renewable energy. For instance, 89.4% of students believed they could provide examples of renewable energy sources, and 88.9% felt they could incorporate renewable energy into their daily lives.

The survey also highlighted areas where knowledge could be further strengthened. While solar and wind energy were widely recognized (88.3% and 48.2% correct identification, respectively), understanding of bioenergy, geothermal, and hydropower was lower. This suggests a need for greater emphasis on the diversity of renewable energy sources in educational materials and public awareness campaigns. Furthermore, while a strong majority (80.3%) perceived renewable energy as a job creator, a non-negligible portion expressed uncertainty, indicating a potential gap in understanding the economic benefits of the renewable energy sector. Overall, the survey results suggest that undergraduate students in Mumbai's Western Suburbs possess a positive perception of renewable energy, recognizing its environmental and societal benefits. However, there are opportunities to enhance understanding of the various renewable energy technologies and their potential for job creation and economic growth. Targeted educational initiatives and public awareness campaigns can play a crucial role in fostering a more comprehensive and nuanced understanding of renewable energy among this demographic.

Student's ability to identify renewable energy resources

222 responses



There are more female respondents (58.1%) than male respondents (41.9%). This indicates a slightly skewed sample in terms of gender representation.

RESULTS

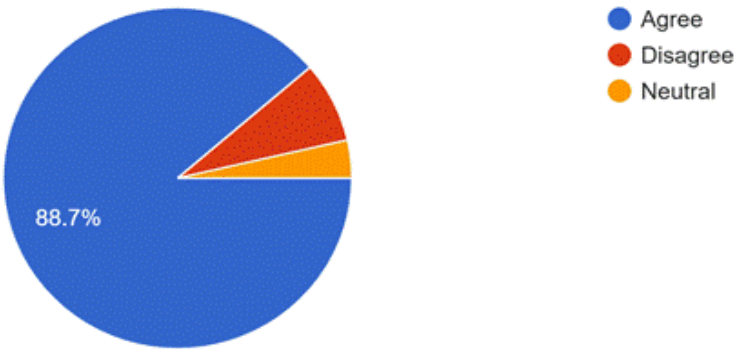
- Solar:** 196 students (88.3%) correctly identified solar energy as renewable.
- Wind:** 107 students (48.2%) correctly identified wind energy.
- Bioenergy:** 68 students (30.6%) correctly identified bioenergy.
- Geothermal:** 68 students (30.6%) correctly identified geothermal energy.
- Hydropower:** 81 students (36.5%) correctly identified hydropower.

OBSERVATIONS

- **High Recognition of Solar:** Solar energy is the most widely recognized renewable resource, with almost 90% of respondents identifying it correctly. This is likely due to its increased visibility in recent years through solar panels on homes, businesses, and large-scale solar farms.
- **Moderate Recognition of Wind:** Wind energy is recognized by a little under half of the respondents. Wind turbines are becoming more common, but perhaps not as ubiquitous as solar panels.
- **Lower Recognition of Other Renewables:** Bioenergy, geothermal, and hydropower have significantly lower recognition rates. This suggests that students may be less familiar with these forms of renewable energy. This could be due to less media coverage, fewer real-world examples in their immediate environment, or less emphasis on these resources in educational materials.

Solar cells work on the principles of sun irradiation to produce power.

222 responses



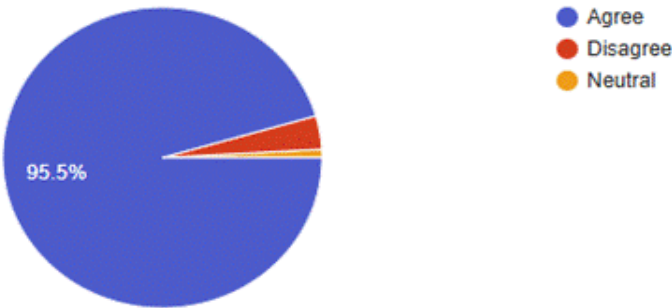
The image shows the results of a survey question about students' understanding of how solar cells work.

Key Observation:

A very large majority (88.7%) of respondents agree with the statement that solar cells use sun irradiation (solar radiation) to produce power. This indicates a strong general understanding of the basic principle behind solar

energy among the surveyed students. The small percentages of "disagree" and "neutral" responses could be due to various factors, such as misunderstanding the terminology ("irradiation"), guessing, or a lack of complete knowledge.

The wind is used to generate power through wind turbine.
223 responses



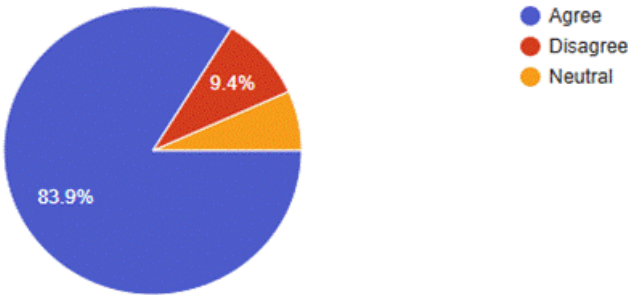
The image shows the results of a survey question about students' understanding of how wind power is generated.

Key Observation:

An overwhelming majority (95.5%) of respondents agree with the statement. This demonstrates a very strong understanding among the surveyed students of the fundamental principle behind wind power generation. The small percentages of "disagree" and "neutral" responses are likely due to similar reasons as in the previous question about solar energy (misunderstanding, guessing, or lack of complete certainty).

Geothermal incorporate the heat found within the earth
223 responses

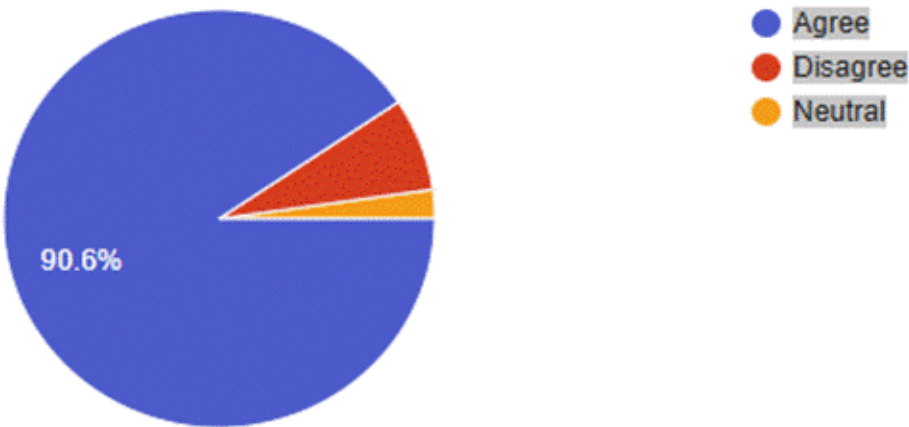
Copy chart



The image presents the results of a survey question regarding the understanding of geothermal energy.

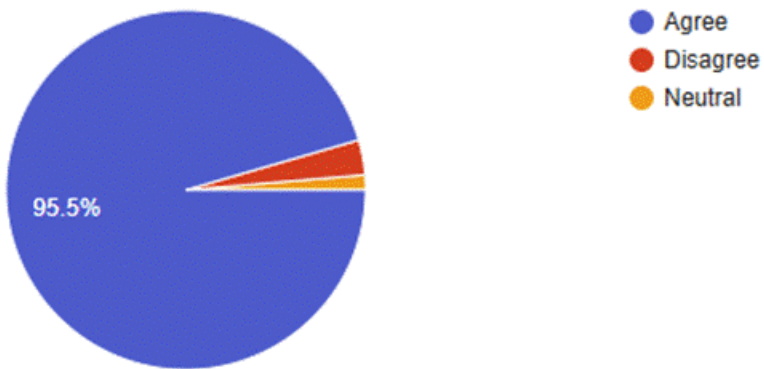
Key Observation: A large majority (83.9%) of respondents agree that geothermal energy uses heat from within the Earth. This indicates a fairly good understanding of the basic principle of geothermal energy. However, compared to the responses about solar and wind energy, the agreement rate is lower. This suggests that students' understanding of geothermal energy may not be as strong as their understanding of solar and wind power. The "disagree" and "neutral" responses, totaling about 16.1%, further support this idea, indicating some confusion or lack of knowledge about geothermal energy.

: "Bio energy is based on the breakdown of organic matter."



Observation:
A very large majority (90.6%) of respondents agree with the statement. This indicates a strong understanding that bioenergy is derived from the breakdown of organic matter. This level of agreement is similar to the high agreement seen with the solar and wind energy questions, suggesting that students have a good grasp of this basic concept of bioenergy. The small percentages of "disagree" and "neutral" responses are likely due to similar factors as in the previous questions (misunderstanding, guessing, or lack of complete certainty).

Hydro power uses flowing water to generate electricity
223 responses



The image shows the results of a survey question about hydropower.

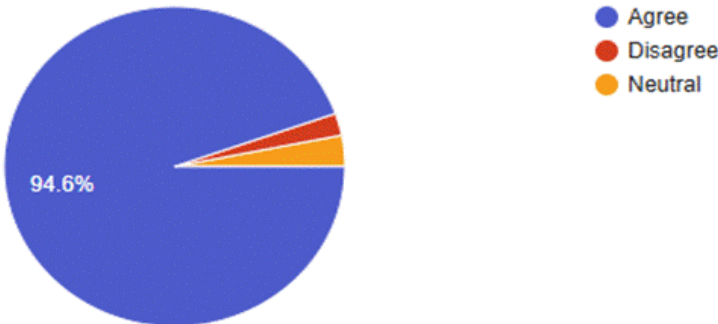
Observation:
An overwhelming majority (95.5%) of respondents agree with the statement. This indicates a very strong understanding among the surveyed students that hydropower relies on flowing water to generate electricity. This high level of agreement is consistent with the responses to the questions about solar and wind power, suggesting that students are generally well-informed about the basic principles of these common renewable energy sources. The small percentages of "disagree" and "neutral" responses are likely attributable to the same reasons as in previous questions (misunderstanding, guessing, or uncertainty).

In short, the results confirm a widespread understanding of how hydropower works.

The students response on the effects of renewable energy source

Is renewable energy useful to the society?

223 responses



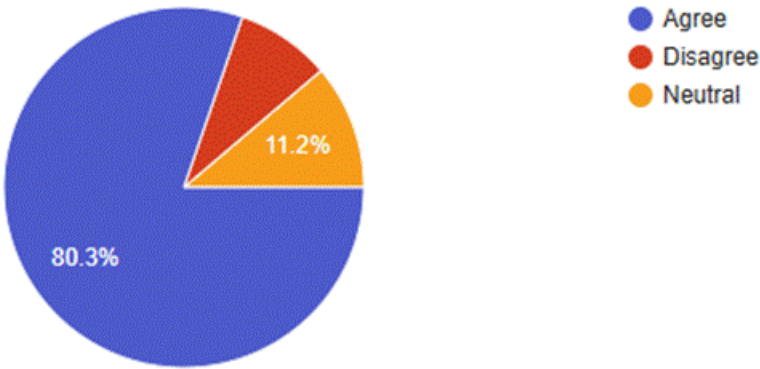
The image shows the results of a survey question about the perceived usefulness of renewable energy to society.

Observation:

An overwhelming majority (94.6%) of respondents agree that renewable energy is useful to society. This demonstrates a very strong positive perception of renewable energy among the surveyed students. The very small percentages of "disagree" and "neutral" responses are consistent with previous questions and likely represent similar factors (misunderstanding, guessing, or uncertainty).

Does renewable resources create more job.

223 responses



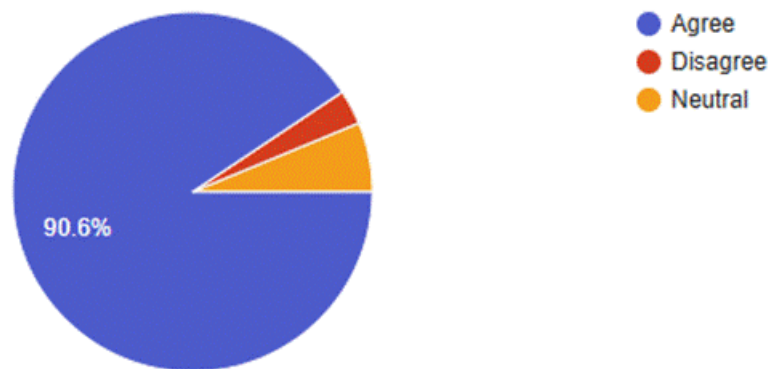
The image shows survey results about whether renewable resources create more jobs.

Key Observation:

A strong majority (80.3%) of respondents believe that renewable resources create more jobs. This indicates a positive perception of the job creation potential of the renewable energy sector. However, it's worth noting that around 1 in 5 respondents either disagree or are neutral, suggesting some uncertainty or skepticism about this claim.

Will renewable energy resources save the environment and slow climate change?

224 responses



Based on the survey results, the answer to the question "Will renewable energy resources save the environment and slow climate change?" is a resounding **yes**.

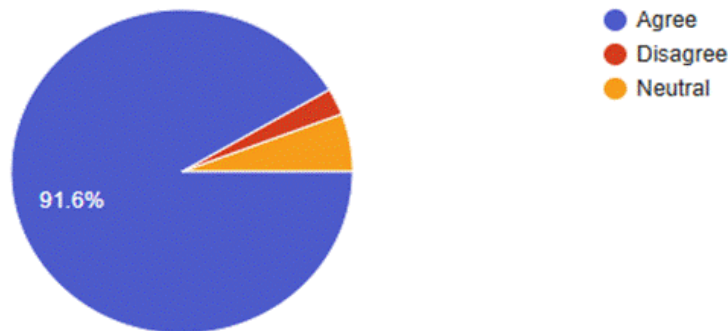
Observation- 90.6% of the 224 respondents agreed with the statement. This indicates a strong consensus that renewable energy has a positive impact on the environment and climate change mitigation.

The remaining small percentages of "Disagree" and "Neutral" responses are likely due to uncertainty, lack of complete knowledge on the topic, or potential misunderstandings.

Therefore, the overall conclusion from the survey is that renewable energy resources are viewed as a key solution for environmental preservation and combating climate change.

Do you feel safe using renewable energy sources?

225 responses



The image shows the results of a survey question about the perceived safety of using renewable energy sources.

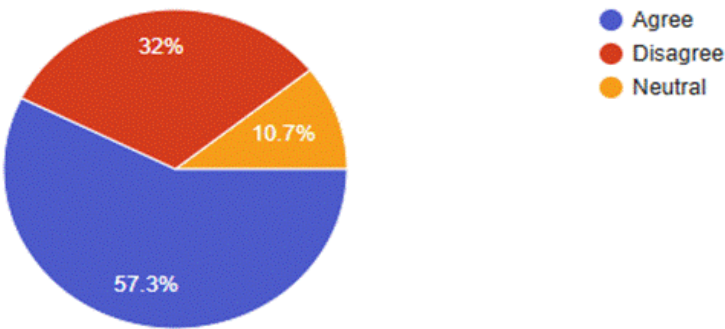
Observation:

A very large majority (91.6%) of respondents feel safe using renewable energy sources. This indicates a strong sense of confidence in the safety of these technologies among the surveyed students. The small percentages of "disagree" and "neutral" responses are consistent with previous questions and likely represent similar factors such as misunderstandings, lack of information, or general uncertainty.

The future outcome of renewable energy

We will continue to use fuels and oils as energy sources?

225 responses



The survey question asks: "Will we continue to use fuels and oils as energy sources?"

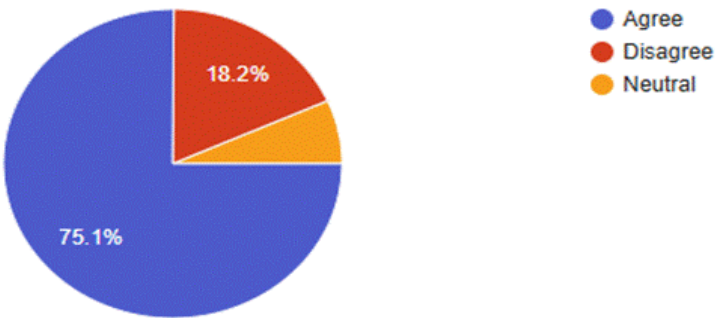
Observation

The results show a mixed opinion on the continued use of fuels and oils. While the largest portion of respondents (57.3%) disagree, indicating a belief that we will move away from these energy sources, a significant minority (32%) still believe they will remain in use.

This suggests that there isn't a complete consensus on the future role of fuels and oils, with some respondents potentially acknowledging their ongoing role in certain sectors or expressing uncertainty about the pace of transition to renewable energy.

The amount of pollution will decrease.

225 responses



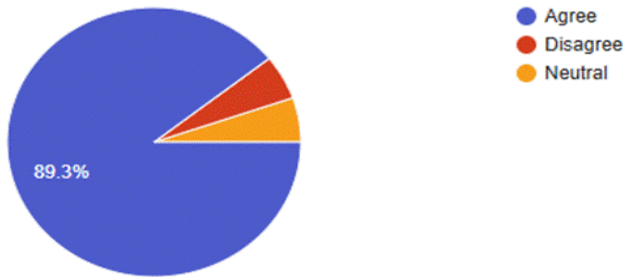
The image shows the results of a survey question about the anticipated impact of renewable energy on pollution levels.

Observation:

A significant majority (75.1%) of respondents agree that the amount of pollution will decrease. This suggests a widespread belief that increased adoption of renewable energy will have a positive impact on reducing pollution. While a notable portion (18.2%) disagrees, it's considerably smaller than the majority. The small neutral percentage (6.7%) could indicate uncertainty or a lack of strong opinion on the matter.

More houses will have a source of renewable energy.

225 responses



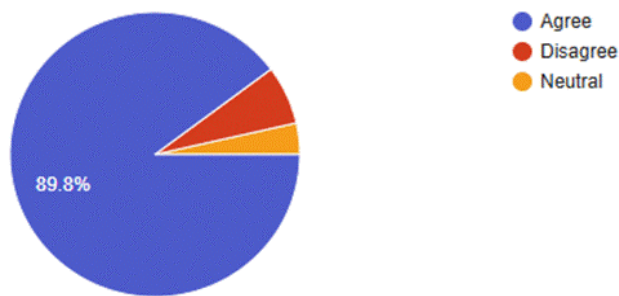
The image shows the results of a survey question about the future prevalence of renewable energy sources in homes.

Observation

A very large majority (89.3%) of respondents agree that more houses will have a source of renewable energy in the future. This indicates a strong expectation that the use of residential renewable energy systems (like solar panels) will become increasingly common. The small percentages of "disagree" and "neutral" responses are consistent with previous questions and likely reflect similar reasons such as uncertainty or a lack of strong opinion.

Renewable energy will become cheaper and easily available.

225 responses



The image shows the results of a survey question about the future cost and availability of renewable energy.

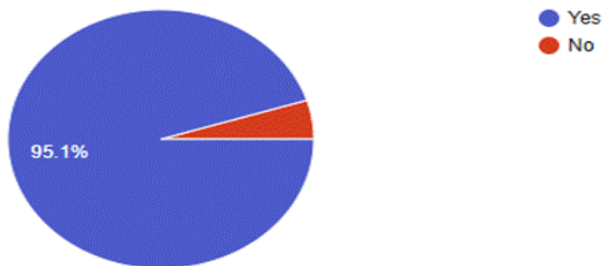
Observation:

A very large majority (89.8%) of respondents agree that renewable energy will become cheaper and more easily available in the future. This indicates a widespread expectation that the affordability and accessibility of renewable energy technologies will improve. This perception is crucial for the broader adoption and integration of these technologies into society. The small percentages of "disagree" and "neutral" responses are consistent with previous questions and likely represent similar factors such as uncertainty or a lack of strong opinion.

Students self-evaluation

I can define renewable energy

226 responses

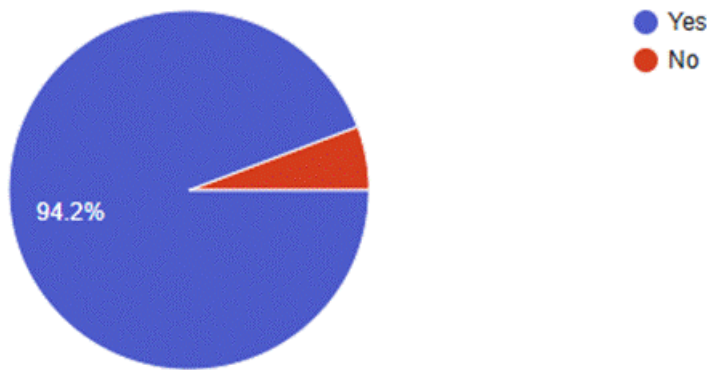


The image shows the results of a self-evaluation question where students were asked if they could define renewable energy.

Observation:
An overwhelming majority (95.1%) of students believe they can define renewable energy. This indicates a very high level of self-perceived understanding of the basic concept of renewable energy. The small percentage of students who responded "No" might benefit from further clarification or educational resources on the topic.

I can identify renewable energy

226 responses



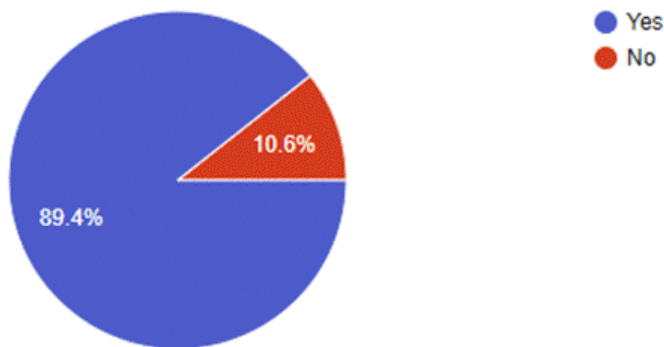
The image shows the results of a self-evaluation question where students were asked if they could identify renewable energy sources.

Observation:
A very large majority (94.2%) of students believe they can identify renewable energy sources. This indicates a very high level of self-perceived understanding of what constitutes a renewable energy source. The small percentage of students who responded "No" (5.8%) might benefit from additional educational resources or clarification on the topic.

In conclusion, the survey results suggest that students are highly confident in their ability to distinguish renewable from non-renewable energy sources.

I can display example

226 responses

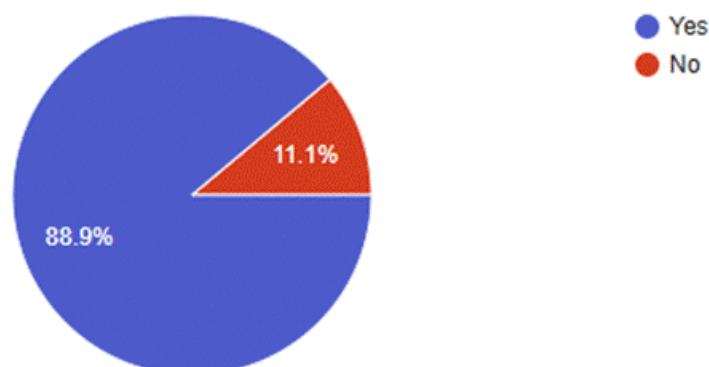


The image shows the results of a self-evaluation question, likely about renewable energy, where students were asked if they could provide examples.

Observation:
A large majority (89.4%) of students believe they can provide examples of renewable energy. This suggests that most students not only understand the concept of renewable energy but can also name specific examples. However, a noticeable portion (10.6%) indicates they are unable to give examples, suggesting a need for further reinforcement of specific renewable energy types.

I can incorporate renewable energy into my everyday life

226 responses



The image shows the results of a self-evaluation question where students were asked if they can incorporate renewable energy into their everyday lives.

Observation:

A large majority (88.9%) of students believe they can incorporate renewable energy into their daily lives. This suggests a good level of awareness and understanding of how to apply renewable energy principles in practical ways. The 11.1% who responded "No" may need further guidance and examples of how to integrate renewable energy practices into their routines.

CONCLUSION AND RECOMMENDATION

This study aimed to investigate the awareness and understanding of renewable energy resources among undergraduate students in Mumbai's Western Suburbs. The findings reveal a generally positive understanding of core concepts, with a majority of respondents demonstrating knowledge of solar and wind energy. However, awareness of other renewable energy sources, such as bioenergy, geothermal, and hydropower, was found to be lower. This highlights a need for increased educational focus on the diversity of renewable energy technologies.

The study also revealed positive perceptions of renewable energy among the student population. A strong majority of respondents recognized the environmental and societal benefits of renewable energy, including its potential to mitigate climate change and create jobs. Furthermore, students expressed confidence in their ability to define, identify, and provide examples of renewable energy sources, indicating a positive attitude towards the adoption of renewable energy practices.

While the findings suggest a promising level of awareness, further efforts are crucial to enhance student understanding of the full spectrum of renewable energy technologies and their potential for a sustainable energy future. Targeted educational initiatives, incorporating real-world examples and interactive learning experiences, can play a significant role in bridging knowledge gaps and fostering a deeper understanding of the diverse range of renewable energy options available. By empowering students with comprehensive knowledge and promoting informed decision-making, we can contribute to a more sustainable and resilient energy future for India.

RECOMMENDATIONS BASED ON THE STUDY FINDINGS

Enhance Curriculum: Integrate diverse renewable energy topics into undergraduate programs.

Promote Experiential Learning: Organize field trips, workshops, and student projects.

Leverage Technology: Utilize online platforms and mobile apps for interactive learning.

Raise Public Awareness: Conduct workshops and campaigns to educate the wider community.

Address Knowledge Gaps: Focus on under-represented renewable energy technologies like bioenergy and geothermal.

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CONSERVING MUMBAI'S ECOSYSTEMS: STRATEGIES FOR SUSTAINABLE DEVELOPMENT AND ECOLOGICAL RESTORATION

Dr. Asha R. Kadam

Assistant Professor, Department of Environmental Studies, Chetana's H S College of Commerce & Economics,
Arts Bandra (East), Mumbai 400051
ashakadam2279@gmail.com

ABSTRACT

Mumbai, a rapidly urbanizing megacity, faces significant ecological challenges due to habitat loss, deforestation, and unregulated development. Its ecosystems ranging from mangroves and forests to grasslands and wetlands play a critical role in maintaining biodiversity, regulating climate, and providing essential ecosystem services. However, urban expansion, pollution, and infrastructural development have severely degraded these ecosystems, threatening both environmental stability and community well-being.

This paper explores holistic strategies for conserving and restoring Mumbai's ecosystems through a combination of policy reforms, community engagement, scientific interventions, and green infrastructure development. Emphasis is placed on integrating ecological restoration into urban planning processes, promoting nature-based solutions, and enhancing public awareness about the ecological value of urban landscapes. By balancing development with ecological stewardship, Mumbai can evolve into a strong and sustainable urban ecosystem, ensuring long-term environmental health and improved quality of life for its residents.

INTRODUCTION

Mumbai, India's financial capital and one of the most densely populated cities in the world, is a striking example of the complex relationship between urban development and environmental sustainability. As the city continues to expand to accommodate its growing population and economic ambitions, its natural ecosystems consisting forests, mangroves, wetlands, and grasslands are increasingly under threat. These ecosystems are not only critical for biodiversity conservation, but they also provide essential ecological services such as carbon sequestration, flood regulation, temperature moderation, and the preservation of indigenous flora and fauna.

However, rapid urbanization, infrastructure development, and land-use changes have led to extensive habitat degradation, fragmentation, and pollution. The encroachment of natural areas to make way for residential, commercial, and industrial expansion has significantly reduced the extent and health of these ecosystems. This ecological decline exacerbates climate vulnerability, increases disaster risks, and diminishes the overall quality of urban life.

Against this backdrop, conserving Mumbai's ecosystems is not just an environmental imperative but also a social and economic necessity. Sustainable development which balances economic growth, environmental protection, and social equity offers a pathway to restore ecological integrity while supporting the city's development goals. This paper seeks to identify practical strategies to conserve and restore Mumbai's ecosystems, with a focus on integrating ecological considerations into urban planning, fostering community stewardship, and promoting nature-based solutions. By prioritizing ecological restoration alongside development, Mumbai can become a model for urban sustainability in the face of climate change and ecological degradation.

Keywords: Mumbai ecosystems, Infrastructural development, ecological restoration, sustainable development, urban biodiversity, environmental conservation, ecosystem management, urban planning, climate resilience

OBJECTIVES

1. To assess the current status and ecological significance of Mumbai's ecosystems.
2. To identify key threats and challenges to these ecosystems posed by urbanization and climate change.
3. To propose sustainable development strategies that balance ecological conservation with urban growth.
4. To recommend ecological restoration techniques tailored to Mumbai's unique environmental context.
5. To promote community participation and policy interventions for long-term ecosystem management.

METHODOLOGY

This research is based on combination of primary and secondary data. The required secondary data has been collected from various sources, including comprehensive review of academic papers, government reports,

policy documents, and case studies related to Mumbai's ecosystems, urban development impacts, and ecological restoration practices. Also, analyzed of global best practices in urban ecological conservation and restoration. Additionally, relevant information has been gathered from research articles published in journals, websites, books, and newspapers.

Primary data has been collected from residents of Mumbai through google form. Besides data also collected by being involved in discussion and interview of local communities and government officials in various ecosystem area of Mumbai. The tools of the google form to collect the primary data was a questionnaire. The structural questionnaire that has been used for collection of primary data from the citizens of the Mumbai.

DATA ANALYSIS

The collected data has been processed, tabulated, and interpreted using software tools such as Microsoft Excel to conduct the analysis and derive meaningful insights.

CURRENT STATUS OF MUMBAI'S ECOSYSTEMS

1. Mangroves and Coastal Wetlands:

Mumbai's mangroves cover approximately 66 square kilometers, forming a vital ecological shield along Thane Creek, Mahim Creek, Malad Creek, and the Vasai-Virar belt. These mangroves provide essential ecosystem services, including carbon sequestration, flood control, and serving as breeding grounds for marine life. However, they are under constant threat from rapid urban development, land reclamation for infrastructure projects, and pollution caused by untreated sewage and industrial waste discharge. Recognizing their ecological importance, the Bombay High Court declared Mumbai's mangroves as protected forests in 2005, making their destruction subject to judicial scrutiny. In addition to legal measures, community movements in areas like Khar and Versova have actively contributed to mangrove conservation through cleanup drives, awareness campaigns, and advocacy.

2. Beaches and Coastal Marine System:

Mumbai's beaches and coastal waters play a critical ecological role, but they are severely polluted. Beaches such as Juhu and Versova regularly suffer from the deposition of plastic waste, sewage, and other pollutants washed ashore. Despite this pollution, these sandy shores support a diverse range of species, including crabs, mollusks, and migratory shorebirds, and they act as natural buffers, absorbing the impact of storm surges. Unfortunately, encroachment by illegal structures, coastal erosion, and the relentless inflow of marine litter have significantly reduced their ecological health, posing long-term environmental risks.

3. Lakes and Rivers:

Mumbai's lakes and rivers are crucial water bodies supporting biodiversity and urban water supply, but they are highly degraded. The city's main rivers consist of Mithi, Dahisar, Poiser, and Oshiwara are severely polluted due to the discharge of sewage, industrial effluents, and rampant solid waste dumping. Similarly, Powai Lake and Vihar Lake, which are important freshwater reservoirs, suffer from eutrophication and contamination. This pollution reduces water quality, endangers aquatic species, and impacts the recreational and ecological value of these water bodies.

4. Forest Ecosystem (Sanjay Gandhi National Park):

The Sanjay Gandhi National Park (SGNP), spanning over 100 square kilometers, is a biodiversity hotspot embedded within the city. It harbors leopards, deer, over 270 species of birds, 170 species of butterflies, and numerous rare plants. SGNP's forests serve as Mumbai's green lungs, improving air quality and acting as a crucial carbon sink. However, illegal encroachments, waste dumping, and infrastructure projects, such as metro lines and road expansions, pose serious threats to its ecological integrity. Increasing human-wildlife conflict in the region further reflects the pressure exerted by unplanned urban growth on this fragile forest ecosystem.

5. Urban Green Spaces:

Mumbai's urban green spaces, including parks and gardens, are extremely limited, with the city offering only about 1.1 square meters of green space per person, far below the World Health Organization's recommended 9 square meters per person. This severe deficiency in accessible green areas impacts the city's air quality, public health, and overall resilience to climate change. To counter this, greening initiatives such as the development of Miyawaki forests and community-led tree plantations have gained momentum, offering a nature-based solution to enhance urban biodiversity and environmental sustainability.

6. Aarey Colony:

Aarey colony is located on the fringes of Sanjay Gandhi National Park (SGNP), is often referred to as Mumbai's green lung. Spanning approximately 1,287 hectares, Aarey is a unique blend of urban forest,

grasslands, and human settlements, offering habitat to leopards, birds, reptiles, and a variety of native flora. Despite its ecological richness, Aarey has been under constant pressure from urban expansion and infrastructure projects, particularly the controversial Metro Car Shed project, which triggered widespread environmental protests. Illegal encroachments, deforestation for construction, and waste dumping also threaten the health of this urban forest. However, in a landmark decision in 2022, the Maharashtra government reinstated parts of Aarey as forest land, recognizing its environmental significance. Community activism, legal battles, and citizen-led afforestation drives have played a crucial role in safeguarding Aarey's remaining green cover. Despite these efforts, fragmentation of habitat, pollution, and increasing human-wildlife conflict (especially leopard encounters) highlight the fragile state of Aarey Colony's ecosystem today.

ECOLOGICAL SIGNIFICANCE OF MUMBAI'S ECOSYSTEMS

1. Climate Regulation:

Mumbai's ecosystems play a critical role in climate regulation, particularly through carbon sequestration and temperature moderation. The city's mangroves, which cover extensive stretches along its creeks and estuaries, act as powerful carbon sinks, capable of storing up to four times more carbon than terrestrial forests. This makes them a key asset in mitigating climate change. In addition to carbon capture, urban forests, green spaces, and wetlands help reduce the urban heat island effect, which is the tendency of densely built-up areas to trap heat and experience significantly higher temperatures than surrounding rural zones. This cooling effect is particularly valuable for Mumbai, where rapid urbanization and high population density contribute to rising urban temperatures. Protecting and enhancing these ecosystems is vital for climate resilience in the face of rising global temperatures.

2. Flood Control and Disaster Mitigation:

Natural ecosystems in Mumbai also provide essential flood control and disaster mitigation services. Mangroves, wetlands, and river systems act as natural sponges, absorbing excess rainwater during heavy monsoons and reducing the risk of flooding. This is particularly important in a low-lying coastal city like Mumbai, which is highly vulnerable to storm surges and sea-level rise. However, extensive destruction of mangroves, especially along the Mithi River, has significantly reduced the city's natural flood resilience. During events like the 2005 Mumbai floods, experts linked the severe inundation to the loss of mangroves and unregulated development in flood-prone areas. Restoring these ecosystems could act as a nature-based solution to manage future flood risks more effectively.

3. Biodiversity and Habitat:

Mumbai's geographical diversity with forests, wetlands, rivers, estuaries, and coastal areas creates a rich ecological mosaic that supports a wide array of species. This includes resident species like leopards in Sanjay Gandhi National Park, marine species in creeks and estuaries, and migratory birds that use wetlands like Thane Creek Flamingo Sanctuary as seasonal stopovers. Many of these species are endemic to the region, while others contribute to the city's global ecological connectivity. Particularly, creeks, mangroves, and estuaries act as nursery grounds for fish and other aquatic species, which are not only ecologically important but also support local livelihoods. The biodiversity richness of these habitats underscores the need for comprehensive conservation strategies that protect not just isolated patches but the ecological linkages between these habitats.

4. Livelihoods and Cultural Value:

Mumbai's ecosystems are deeply intertwined with livelihoods and cultural identity, especially for indigenous fishing communities like the Koli people, whose traditional livelihoods depend on healthy coastal ecosystems. Mangroves, creeks, and estuaries serve as critical fishing grounds, supporting species that sustain subsistence and commercial fishing. Beyond livelihoods, Mumbai's natural spaces also hold cultural, recreational, and spiritual significance. Aarey Forest and Sanjay Gandhi National Park are cultural landmarks, hosting not only biodiversity trails but also ancient sites like the Kanheri Caves, blending natural and historical heritage. These spaces serve as recreational green lungs, offering city dwellers a rare opportunity to connect with nature in a highly urbanized environment. Preserving these ecosystems is not just an environmental need, but also a way to preserve the cultural heritage and traditional knowledge systems linked to these landscapes.

5. Air and Water Purification:

In a city plagued by severe air and water pollution, green spaces, wetlands, and natural ecosystems act as natural filters, helping to improve air and water quality. Urban forests and tree cover capture particulate matter and pollutants, while wetlands and mangroves filter pollutants from stormwater runoff before they enter larger water bodies like the Arabian Sea. In a city where vehicular emissions, construction dust, and industrial discharge are constant challenges, these natural purification processes are invaluable. Moreover, these ecosystems contribute

to groundwater recharge and improve the quality of water flowing into the city's creeks and rivers. Protecting and expanding Mumbai's green and blue spaces is therefore crucial to improving public health and enhancing the city's overall environmental quality.

Mumbai's green spaces, wetlands, and natural ecosystems play a crucial role in air and water purification, acting as natural filters that help mitigate the city's severe pollution burden. As a densely populated metropolis with high vehicular emissions, construction dust, industrial effluents, and untreated sewage, Mumbai constantly struggles with poor air quality and contaminated water bodies. Urban forests, parks, and tree cover help capture airborne pollutants such as particulate matter (PM_{2.5} and PM₁₀), carbon monoxide, and nitrogen oxides, thereby improving the city's air quality. These green spaces also absorb carbon dioxide, contributing to climate mitigation.

At the same time, Mumbai's wetlands, mangroves, and lakes act as natural water treatment systems, filtering pollutants from runoff water before they enter rivers, creeks, and the Arabian Sea. Mangroves, in particular, trap heavy metals, excess nutrients, and plastic waste, reducing the pollution load in coastal waters. In flood-prone areas, these wetlands also help by slowing down surface runoff, allowing for sediment deposition and reducing the transport of pollutants into larger water bodies. This ecological service is vital for public health in a city where waterborne diseases and respiratory illnesses are common. Preserving and restoring urban forests, wetlands, and green infrastructure is essential to improving air and water quality, ultimately enhancing the livability and resilience of Mumbai.

KEY THREATS AND CHALLENGES TO MUMBAI'S ECOSYSTEMS POSED BY URBANIZATION:

1. Land Reclamation and Encroachment:

One of the most pressing threats to Mumbai's ecosystems is land reclamation to accommodate its rapidly expanding population and infrastructure needs. Coastal wetlands, mangroves, creeks, and floodplains have been reclaimed for construction, including residential complexes, roads, industries, and large infrastructure projects such as the coastal road and metro rail lines. This loss of natural ecosystems reduces the city's capacity to absorb floodwaters, regulate climate, and sustain biodiversity. Additionally, illegal encroachments, especially in ecologically sensitive areas like Aarey Colony and mangrove belts, further degrade these fragile habitats, pushing wildlife into smaller, fragmented spaces and increasing human-wildlife conflict.

2. Pollution and Waste Management Crisis:

Mumbai generates thousands of tonnes of waste daily, much of which ends up in rivers, wetlands, and coastal waters due to poor waste management and illegal dumping. This solid waste, including plastic and hazardous industrial waste, chokes mangrove roots, clogs river flows, and degrades water quality, making these ecosystems inhospitable for wildlife and dangerous for local communities relying on them. Untreated sewage and industrial effluents are regularly discharged into water bodies like the Mithi River, turning them into open sewers that not only threaten aquatic biodiversity but also contribute to health hazards for humans living nearby.

3. Climate Change Impacts:

Rising sea levels, intensified monsoon rains, and extreme weather events linked to climate change are exacerbating existing environmental pressures in Mumbai. Coastal ecosystems like mangroves, beaches, and estuaries face increased erosion, saltwater intrusion, and habitat loss due to rising tides and stronger storms. Flooding events, like the catastrophic July 2005 floods, have become more frequent and severe, partly due to climate-induced changes in rainfall patterns. Such climate impacts disproportionately affect the city's low-income populations, who often reside in vulnerable coastal or flood-prone areas, creating a vicious cycle of ecological degradation and social vulnerability.

4. Fragmentation and Loss of Biodiversity Corridors:

As urban sprawl consumes open spaces, natural ecosystems in Mumbai are becoming highly fragmented. Important biodiversity corridors, such as the ones linking Sanjay Gandhi National Park to Aarey Colony and surrounding areas, are disrupted by roads, buildings, and other infrastructure. This fragmentation restricts wildlife movement, reduces genetic diversity, and heightens the risk of local species extinctions. Leopards, for example, increasingly venture into residential areas, escalating conflict with humans. Loss of interconnected ecosystems also reduces their capacity to provide essential services like flood mitigation, water purification, and temperature regulation.

5. Overexploitation of Natural Resources:

Mumbai's natural resources from groundwater extraction to sand mining along creeks are being unsustainably exploited to meet urban demands. Over-extraction of groundwater in peri-urban areas causes subsidence, which

increases the city's vulnerability to flooding. Illegal sand mining erodes riverbanks, disrupts aquatic ecosystems, and accelerates coastal erosion, compounding the impacts of climate change.

6. Weak Enforcement of Environmental Regulations:

Despite strong environmental laws, implementation and enforcement remain weak in Mumbai. Encroachments into protected areas, violations of coastal regulation zones (CRZ), and unchecked pollution persist due to lack of monitoring, political pressure, and gaps in governance. In some cases, environmental clearances are granted to large infrastructure projects without adequate ecological impact assessments, further weakening the city's environmental resilience.

7. Loss of Traditional Knowledge and Community Displacement:

Many of Mumbai's indigenous communities, such as the Koli fishing community, have traditionally lived in harmony with coastal ecosystems, relying on mangroves, estuaries, and creeks for their livelihoods. However, urbanization and pollution have degraded these ecosystems, forcing many communities to abandon traditional practices and shift to alternative livelihoods. This loss of traditional ecological knowledge weakens community stewardship over ecosystems and reduces the cultural connection people have with their local environment.

“BIODIVERSITY CONSERVATION FOR MUMBAI'S ECOSYSTEM RESTORATION: A CASE STUDY”

Primary data has been collected from a total 109 residents of Mumbai through google form. The tool of the google form to collect the primary data was a questionnaire. The structural questionnaire that has been used for collection of primary data from the citizens of the Mumbai. The questionnaire was set of 18 questions for primary data collection. The questionnaire was prepared based on respondents familiar with biodiversity conservation, importance of biodiversity conservation, major threats to Mumbai's biodiversity, visiting biodiversity rich areas, current status of biodiversity conservation efforts, participating biodiversity conservation initiatives, interested in participating in biodiversity conservation programs in the future, what kind of priorities should be taken by government for Mumbai's biodiversity conservation, stricter enforcement of environmental regulations is necessary, additional steps should be taken by government to improve biodiversity conservation, biggest challenges in implementing in Mumbai's biodiversity conservation programs, role of corporation and private organization should play in Mumbai's biodiversity conservation, local communities can be better involved in conservation efforts, recommendation to improve ecosystem restoration in Mumbai, observation and Suggestions regarding biodiversity conservation in Mumbai's. Further, collected data convert into 5 sections. The sections are as following.

SECTION 1: AWARENESS AND PERCEPTION OF BIODIVERSITY

Table No: 1 The Familiar with Biodiversity Conservation by Respondents of Mumbai

Sr. No	Familiar with Biodiversity Conservation	No. of Respondents	% of Respondents	Cumulative % of Respondents
1	Very Familiar	54	50	50
2	Somewhat Familiar	48	44	94
3	Not familiar	07	6	100
4.	Total	109	100	100

Sources: Compiled by researcher on the basis primary data collected

50% of respondents are “Very Familiar” with biodiversity conservation. 44% are “Somewhat Familiar”, indicating a basic awareness but potentially lacking in-depth understanding. Only 6% of respondents are “Not Familiar”, indicating that overall awareness is quite high among respondents. This data suggests that awareness about biodiversity conservation in Mumbai is relatively strong, with 94% of respondents having some level of familiarity. This could be due to increasing public discourse, educational campaigns, environmental movements, or local conservation efforts. However, the fact that only 50% are “very familiar” highlights a gap between basic awareness and comprehensive understanding, which may require more targeted awareness programs and education.

Table No: 2 The opinion of the respondents regarding importance of biodiversity conservation for Mumbai's ecosystem

Sr. No	The Important of Biodiversity Conservation for Mumbai's Ecosystem	No. of Respondents	% of Respondents	Cumulative % of Respondents
1	Yes	109	100	100
2	No	00	00	100
3	Total	109	100	100

Sources: Compiled by researcher on the basis data primary collected

100% of respondents believe biodiversity conservation is important for Mumbai's ecosystem. No respondent expressed the view that biodiversity conservation is unimportant. This unanimous response underscores a strong positive perception of biodiversity conservation. It highlights that respondents recognize the direct link between biodiversity and the health of Mumbai's environment. This could reflect growing environmental consciousness, possibly influenced by frequent environmental challenges faced by the city such as pollution, climate change impacts, and loss of green cover.

Table No: 3 The opinion of the respondents regarding major threats to Mumbai's biodiversity

Sr. No	Major Threats to Biodiversity in Mumbai	No. of Respondents	% of Respondents	Cumulative % of Respondents
1	Urbanization	18	17	17
2	Industrialization	7	6	23
3	Pollution	43	40	63
4	Climate Changes	11	10	73
5	Deforestation	15	14	87
6	Encroachments	8	7	94
7	Others	7	6	100
8	Total	109	100	100

Sources: Compiled by researcher on the basis primary data collected

The top perceived threat is **pollution** (40% of respondents), indicating widespread concern about air, water, and land pollution in Mumbai. **Urbanization** (17%) and **deforestation** (14%) are also significant perceived threats, showing that rapid development and shrinking green spaces worry many respondents. **Climate change** (10%), **encroachments** (7%), and **industrialization** (6%) are seen as secondary, but still relevant, threats. **6% listed other threats**, possibly including overpopulation, lack of policy enforcement, or waste management issues. This data reveals that anthropogenic pressures are viewed as the primary causes of biodiversity loss in Mumbai. Pollution, in particular, stands out—likely due to high pollution levels in air and water bodies, especially near industrial zones and urban centers. Urban sprawl and infrastructure development also appear to be reducing natural habitats. These perceptions are consistent with Mumbai's status as a densely populated metropolitan area facing constant development pressures.

Table No: 4 The No. of respondents visited to biodiversity rich areas in Mumbai.

Sr. No	Visited to Biodiversity rich areas in Mumbai	No. of Respondents	% of Respondents	Cumulative % of Respondents
1.	Yes	72	67	67
2.	No	37	33	100
3.	Total	109	100	100

Sources: Compiled by researcher on the basis primary data collected

67% of respondents have visited biodiversity-rich areas in Mumbai. 33% have not visited any such areas. This data reveals that anthropogenic pressures are viewed as the primary causes of biodiversity loss in Mumbai. Pollution, in particular, stands out—likely due to high pollution levels in air and water bodies, especially near industrial zones and urban centers. Urban sprawl and infrastructure development also appear to be reducing natural habitats. These perceptions are consistent with Mumbai's status as a densely populated metropolitan area facing constant development pressures.

Table No: 5 The opinion of the respondents regarding biodiversity conservation efforts in Mumbai.

Sr. No	Biodiversity Conservation Efforts in Mumbai	No. of Respondents	% of Respondents	Cumulative % of Respondents
1.	Excellent	07	6	6
2.	Good	34	31	37
3.	Average	57	53	90
4.	Poor	11	10	100
5.	Total	109	100	100

Sources: Compiled by researcher on the basis primary data collected

Only 6% rate conservation efforts as Excellent. 31% find them Good, while the majority (53%) considers efforts Average. 10% believe the efforts are Poor. There is moderate satisfaction with biodiversity conservation efforts, but a clear expectation for improvement. The fact that over half (53%) rate efforts as Average suggests that while some work is being done, it is not perceived as sufficiently impactful or comprehensive. This could relate to policy implementation gaps, lack of coordination between government agencies, insufficient public involvement, or weak enforcement of environmental laws.

SECTION 2: PARTICIPATION AND ENGAGEMENT

Table No: 6 The No. of respondents participated in biodiversity conservation activities in Mumbai

Sr. No	Participated in biodiversity conservation activities in Mumbai	No. of Respondents	% of Respondents	Cumulative % of Respondents
1	Yes	59	55	55
2.	No	50	45	100
3.	Total	109	100	100

Sources: Compiled by researcher on the basis primary data collected

55% of respondents have actively participated in biodiversity conservation activities in Mumbai. 45% have not participated in any such activities. While the majority have been involved in conservation activities, a significant 45% have not participated at all. This participation gap could be due to lack of awareness about available opportunities, time constraints, or absence of accessible local programs. This suggests the need for more outreach and easier access to participatory programs, especially targeted at those who may be interested but are unsure how to contribute.

Table No: 7 The No. of respondents participated in various types of biodiversity conservation activities in Mumbai.

Sr. No	Types of biodiversity conservation activities participated	No. of Respondents	% of Respondents	Cumulative % of Respondents
1	Clean -up Drives	43	73	73
2	Afforestation Programs	10	17	90
3	Wildlife conservation activities	06	10	100
4	Total	59	100	100

Sources: Compiled by researcher on the basis primary data collected

Among the 59 respondents who participated, Clean-up Drives were by far the most common activity (73%). Afforestation programs accounted for 17% of participation. Only 10% took part in wildlife conservation activities. This breakdown shows that participation is heavily skewed towards easily accessible, community-driven events like Clean-up Drives, which are often highly visible, well-publicized, and logistically simple. Activities requiring more specialized skills or long-term commitment, such as wildlife conservation, attract far fewer participants. This indicates the need to:

- Diversify and promote participation in less popular but equally important activities.
- Educate the public on why afforestation and wildlife conservation matter and how they can contribute.
- Make such activities more accessible by lowering skill-entry barriers through training programs.

Table No: 8 The No. of response interested in participating in biodiversity conservation program in the future.

Sr. No	Interested in Participating in Biodiversity Conservation Program	No. of Respondents	% of Respondents	Cumulative % of Respondents
1	Yes	99	99	99
2	No	10	10	100
3	Total	109	100	100

Sources: Compiled by researcher on the basis primary data collected

A remarkable 99% of respondents expressed interest in future participation. Only 1% indicated no interest. This is an extremely positive signal indicating that even though 45% have not previously participated (Table 6), almost all of them (and those who have already participated) are willing to engage in future efforts. This highlights a latent potential for community involvement, which can be tapped into through better outreach, awareness campaigns, and making participation convenient (e.g., weekend events, family-friendly programs).

Table No: 9 The opinion of response regarding nature of initiatives should be prioritized for Mumbai's biodiversity conservation

Sr. No	Nature of initiatives should be prioritized for Biodiversity Conservation in Mumbai	No. of Respondents	% of Respondents	Cumulative % of Respondents
1.	Mangrove restoration	09	8	8
2.	Wetland Conservation	07	6	14
3.	Wildlife Protection	29	27	41
4.	Urban Green Spaces Development	29	27	68
5.	Public awareness Campaigns	29	27	95
6.	others	06	05	100
7.	Total	109	100	100

Sources: Compiled by researcher on the basis primary data collected

The top three priorities are: **Wildlife Protection** (27%) **Urban Green Spaces Development** (27%) **Public Awareness Campaigns** (27%). Other priorities include: **Mangrove Restoration** (8%) **Wetland Conservation** (6%) **Others** (5%). There is a balanced focus on conservation, awareness, and greening urban spaces. This reflects an understanding that biodiversity conservation in Mumbai needs a multipronged approach, blending:

- Protection of existing biodiversity (Wildlife Protection, Wetlands, Mangroves).
- Creation of new green spaces within urban areas.
- Public engagement through awareness campaigns.

Interestingly, mangroves and wetlands receive relatively low priority, despite their critical ecological roles in flood protection, carbon sequestration, and habitat support. This could indicate a lack of awareness about their importance, suggesting a need for targeted educational campaigns.

SECTION 3: GOVERNMENT AND POLICY PERCEPTION

Table No: 10 The opinion of response regarding Government efforts to conserve Mumbai's Biodiversity

Sr. No	Government efforts to conserve Biodiversity in Mumbai	No. of Respondents	% of Respondents	Cumulative % of Respondents
1.	Yes	23	21	21
2.	No	31	29	50
3.	Not Sure	55	50	100
4.	Total	109	100	100

Sources: Compiled by researcher on the basis primary data collected

Only 21% of respondents feel the government's efforts are adequate. 29% believe the government is not doing enough. A significant 50% are "Not Sure" about government efforts. This uncertainty (50%) reflects a lack of visibility and communication regarding government-led conservation initiatives. Even if efforts exist, they may not be well-publicized, or citizens may not directly experience their impacts.

This signals a need for:

- Transparent communication about ongoing initiatives.
- Public progress reports or awareness campaigns highlighting government actions.
- More visible, participatory, and community-involved projects, so people directly witness government involvement in biodiversity conservation.

Table No:11 The total No. of response for Awareness related to biodiversity conservation policy and law

Sr. No	Awareness related to biodiversity conservation policy and law	No. of Respondents	% of Respondents	Cumulative % of Respondents
1.	Yes	61	56	56
2.	No	48	44	100
3.	Total	109	100	100

Sources: Compiled by researcher on the basis primary data collected

56% are aware of biodiversity conservation laws and policies. 44% have no awareness of such policies. This data indicates a moderate level of awareness, but a large proportion (almost half) remains unaware of the existing legal framework.

This suggests:

- Policy education campaigns are either insufficient or not effectively reaching all communities.
- There may be a disconnect between policy creation and public engagement, with legal knowledge remaining confined to government departments, NGOs, and activists, rather than becoming common public knowledge.
- Simplified communication about biodiversity laws in local languages, using social media, schools, community groups, and public events, could help close this gap.

Table No: 12 The opinion of response regarding necessary of stricter enforcement of environmental regulations

Sr. No	Necessary of stricter enforcement of environmental regulations	No. of Respondents	% of Respondents	Cumulative % of Respondents
1.	Yes	97	89	89
2.	No	12	11	100
3.	Total	109	100	100

Sources: Compiled by researcher on the basis primary data collected

An overwhelming 89% believe stricter enforcement is necessary. Only 11% feel current enforcement is adequate. This strong consensus signals public dissatisfaction with the current level of enforcement. It highlights:

- A perception that laws exist but are poorly implemented or selectively enforced.
- Concerns that polluters, encroachers, and violators often escape penalties due to corruption, bureaucratic inefficiency, or political influence.
- There is broad public support for stronger penalties, faster legal processes, and visible crackdowns on violations.

Table No: 13 The opinion of response regarding additional steps should be government taken to improve biodiversity conservation

Sr. No	Additional steps should be government taken to improve biodiversity conservation	No. of Respondents	% of Respondents	Cumulative % of Respondents
1.	Strengthen protected areas and habitat Restoration	30	28	28
2.	Strengthen Laws and Enforcement	18	17	45
3.	Incentivize Sustainable and & Resources Use	10	9	54
4.	Address Climate Changes and Pollution	15	14	68

5.	Support Scientific research & Innovation	03	2	70
6.	Strengthen Public Awareness & Community Engagement	33	30	100
7.	Total	100	100	100

Sources: Compiled by researcher on the basis primary data collected

Top priorities, according to respondents, are: Public Awareness & Community Engagement (30%), Strengthening Protected Areas & Habitat Restoration (28%), Strengthening Laws & Enforcement (17%). Other suggested steps include: Addressing Climate Change & Pollution (14%), Incentivizing Sustainable Resource Use (9%), Supporting Scientific Research & Innovation (2%). This reveals that respondents believe biodiversity conservation should be a collective effort, not just government-led. They want more inclusive, people-centered approaches, with:

- Strong public education campaigns that make conservation a social priority.
- Physical restoration of degraded habitats, indicating concern for both land-based and aquatic ecosystems.
- Tougher enforcement, aligning with the overwhelming demand for stricter environmental regulation (seen in Table 12).

Particularly, scientific research and innovation rank very low (2%), likely reflecting a lack of awareness about the role of research in conservation. This gap suggests the need to:

- Highlight success stories where research directly contributed to conservation gains.
- Connect scientists with communities through citizen science projects, which could help build public appreciation for research.

SECTION 4: GOVERNMENT AND POLICY PERCEPTION

Table No: 14 The opinion of respondents regarding biggest challenges in implementing Biodiversity conservation programs in Mumbai

Sr. No	Challenges in implementing Biodiversity conservation Programs in Mumbai	No. of Respondents	% of Respondents	Cumulative % of Respondents
1.	Lack of Fundings	09	8	8
2.	Weak enforcement of governmental laws	13	12	20
3.	Urban expansion and infrastructural Projects	22	20	40
4.	Industrial Pollution and Waste Management Issues	34	31	71
5.	Lack of Public awareness and Engagements	24	22	93
6.	Others	07	7	100
7.	Total	100	100	100

Sources: Compiled by researcher on the basis primary data collected

Top challenges identified by respondents: Industrial Pollution and Waste Management Issues (31%), Lack of Public Awareness and Engagement (22%), Urban Expansion and Infrastructure Projects (20%). Other challenges highlighted include: Weak Enforcement of Government Laws (12%), Lack of Funding (8%). Other Miscellaneous Issues (7%).

This reveals that respondents have a clear picture of the complex challenges facing biodiversity conservation efforts in Mumbai:

1. Industrial Pollution and Waste Management Issues (31%): Respondents perceive industrial pollution and improper waste disposal as the most serious challenge. This suggests that poor waste management (both industrial and municipal) directly threatens biodiversity. It reflects the urgent need for stricter pollution control measures, better waste segregation, and enhanced waste treatment infrastructure.

2. Lack of Public Awareness and Engagement (22%): Public disengagement is a major roadblock indicating that conservation programs are often seen as “government responsibility” rather than a collective effort. This aligns with previous findings (Tables 6-9), where more public participation and awareness campaigns were strongly recommended.

3□ Urban Expansion and Infrastructure Development (20%): This highlights the conflict between development and conservation. Mumbai's rapid urban sprawl and infrastructure boom (metro, highways, real estate) are seen as encroaching on natural habitats.

4□ Weak Enforcement of Governmental Laws (12%): There's a perception that laws exist but enforcement is lax, either due to bureaucratic inefficiency, corruption, or lack of political will. This reinforces the earlier data (Table 12) where 89% demanded stricter enforcement.

5□ Lack of Funding (8%): While important, funding is not seen as the primary challenge indicating that even existing funds may be underutilized or mismanaged. This hints at the need for better financial planning, project prioritization, and effective use of CSR funds.

Table No: 15 The opinion of respondents regarding role of corporate and private organization in biodiversity conservation

Sr. No	Role of corporate and private organization in biodiversity conservation	No. of Respondents	% of Respondents	Cumulative % of Respondents
1.	Funding and supporting Conservation Projects	27	25	25
2.	Implanting eco-friendly corporate policies	32	29	54
3.	Partnering with NGOs and government agencies	25	23	77
4.	Conducting awareness companies and employee engagement programs	20	18	95
5.	Others	05	5	100
6.	Total	109	100	100

Sources: Compiled by researcher on the basis primary data collected

Respondents expect corporate and private organizations to contribute through: Implementing Eco-Friendly Corporate Policies (29%), Funding and Supporting Conservation Projects (25%), Partnering with NGOs and Government Agencies (23%), Conducting Awareness Campaigns and Employee Engagement Programs (18%) and Only 5% mentioned other roles.

This reflects growing public awareness about corporate social responsibility (CSR) in environmental protection. Key insights include:

1□. Eco-friendly Corporate Policies (29%): Respondents want companies to reduce their ecological footprint, not just donate to conservation causes. This includes waste reduction, energy efficiency, responsible sourcing, and sustainable operations.

2□. Direct Funding and Supporting Projects (25%): Corporate financial backing is seen as critical for sustained conservation efforts, especially in areas like: Mangrove restoration, Community-based conservation programs, Biodiversity monitoring and research.

3□. Partnerships with NGOs & Government (23%): This reflects a collaborative governance model, where public, private, and civil society sectors work together. Respondents value synergistic efforts where corporate resources complement NGO expertise and government authority.

4□. Awareness Campaigns and Employee Programs (18%): Corporates are also expected to educate both their employees and the broader public. This includes green campaigns, eco-workshops, employee volunteering, and promoting eco-conscious lifestyles.

SECTION 5: CHALLENGES AND RECOMMENDATIONS

Table No: 16 The respondents' recommendation to improve ecosystem restoration in Mumbai

Sr. No	Recommendation to improve ecosystem restoration in Mumbai	No. of Respondents	% of Respondents	Cumulative % of Respondents
1.	Strengthening legal and regulatory frameworks	22	20	20
2.	Promoting sustainable urban planning and Green Spaces	32	29	49
3.	Enhancing public-private partnerships	25	23	72

	for conservation			
4.	Increasing Community participation and Education Programs	27	25	97
5.	Others	03	3	100
6.	Total	109	100	100

KEY FINDINGS

The top 3 recommendations emphasized by respondents are: Promoting Sustainable Urban Planning and Green Spaces (29%), Increasing Community Participation and Education Programs (25%) and Enhancing Public-Private Partnerships for Conservation (23%). Additional recommendations include: Strengthening Legal and Regulatory Frameworks (20%). Other Suggestions (3%)

1□. Promoting Sustainable Urban Planning and Green Spaces (29%): Respondents believe urban planning in Mumbai must prioritize ecological balance. Rapid construction, encroachment, and loss of natural habitats highlight the urgent need for nature-inclusive development.

Recommendations could include: Mandatory green building norms, Protection of urban wetlands, mangroves, and open spaces, and Creation of ecological buffer zones around sensitive areas.

2□. Increasing Community Participation and Education Programs (25%): This reflects a clear desire for greater public involvement in conservation efforts. Respondents want educational campaigns, citizen science programs, and more grassroots movements to enhance awareness and action. This ties into previous insights from Section 2, where the majority (99%) expressed interest in participating in future biodiversity conservation programs.

Recommendations could include: Environmental education integrated into school curriculums. Awareness drives in housing societies, slums, and corporate offices. Incentives for citizen-led eco-initiatives (adopt-a-park, community gardens).

3□. Enhancing Public-Private Partnerships for Conservation (23%): Respondents recognize that the government alone cannot bear the responsibility for ecosystem restoration. Stronger partnerships between government bodies, corporations, NGOs, and research institutions are needed.

Recommendations could include: Joint biodiversity restoration projects co-funded by corporations and government. Leveraging Corporate Social Responsibility (CSR) funds for long-term conservation. Joint platforms for biodiversity monitoring, reporting, and evaluation.

4□. Strengthening Legal and Regulatory Frameworks (20%): While laws exist, respondents feel they need to be strengthened and more rigorously enforced. This ties directly to earlier data (Table 12), where 89% called for stricter enforcement of environmental regulations.

Recommendations could include: Revising and updating Mumbai's biodiversity policy, Creating a dedicated biodiversity task force with enforcement powers. And Stronger penalties for violations like encroachments, illegal deforestation, and industrial pollution.

5□. Other Recommendations (3%): A small number of respondents mentioned additional ideas not covered under the main categories, which could include: Incentives for green businesses and eco-tourism. Citizen awards for conservation efforts. Leveraging technology (remote sensing, GIS) for biodiversity mapping.

KEY THEMES EMERGING

Urban Development Must Go Green: Respondents clearly see unsustainable urbanization as a root cause of biodiversity loss, making green infrastructure and nature-based solutions essential for Mumbai's future.

Empower Communities: Community awareness and involvement in local restoration is seen as crucial — top-down approaches alone won't work.

Partnerships and Collective Action: There is strong support for collaborative governance, involving government, private sector, NGOs, researchers, and local communities.

Stronger Laws, Better Enforcement: Without legal teeth and accountability, conservation programs risk being ineffective.

CONCLUSION

Observations and Suggestions regarding biodiversity conservation in Mumbai: Mumbai, despite its dense urbanization, is home to rich biodiversity, including vital ecosystems like mangroves, wetlands, forests, and

coastal habitats. However, biodiversity in the city faces severe threats due to pollution, habitat loss, urban expansion, and climate change. To conserve biodiversity, it is essential to strengthen the protection of mangroves, urban forests like Aarey forest, and wetlands such as Thane Creek and Sewri. Effective urban planning that integrates green spaces, green roofs, and tree-lined streets can help balance development with ecological preservation. Additionally, pollution control measures, especially for water bodies like the Mithi River and Mahim Creek, need to be strictly enforced to reduce water pollution that harms aquatic and coastal biodiversity. Public awareness and community participation play a crucial role in conservation efforts. Citizens can contribute by reducing plastic use, joining clean-up drives, protecting beaches and parks, and volunteering with environmental organizations. Schools and colleges should also promote biodiversity education to cultivate eco-consciousness from a young age. Protected areas and wildlife sanctuaries should be preserved and expanded, with stricter regulations against encroachment and illegal activities. Creating wildlife corridors, encouraging rooftop gardens, and using renewable energy like solar panels can further support urban biodiversity. Transparent governance, stricter environmental laws, and active public involvement are essential for long-term biodiversity conservation in Mumbai. By fostering a culture of awareness, responsibility, and sustainable urban development, Mumbai can protect its natural heritage while ensuring the well-being of its citizens and ecosystems.

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SOCIO-ECONOMIC ANALYSIS OF DIASPORA: CASE OF INFORMAL MEHENDI ARTISTS IN GREATER MUMBAI

Dr. Amrita AggarwalAssistant Professor, Nagindas Khandwala College
amrita@nkc.ac.in**ABSTRACT**

Diaspora communities, particularly those engaged in informal economic activities, often navigate complex socio-economic landscapes in their host countries. This research delves into the lived experiences of informal Mehendi artists within Greater Mumbai, a significant yet under-researched segment of the city's diverse migrant population. While studies on diaspora often focus on larger, formalized sectors, this paper seeks to illuminate the nuanced socio-economic realities faced by these artists, examining their migration patterns, economic contributions, and social integration within the context of Mumbai's informal economy. Through a focused case study, this research aims to contribute to a deeper understanding of the intersection between diaspora, informality, and urban livelihoods.

Keywords: diaspora, mehendi artists, informal economy

INTRODUCTION

Diaspora communities, particularly those engaged in informal economic activities, often navigate complex socio-economic landscapes in their host countries. This research delves into the lived experiences of informal Mehendi artists within Greater Mumbai, a significant yet under-researched segment of the city's diverse migrant population. While studies on diaspora often focus on larger, formalized sectors, this paper seeks to illuminate the nuanced socio-economic realities faced by these artists, examining their migration patterns, economic contributions, and social integration within the context of Mumbai's informal economy. Through a focused case study, this research aims to contribute to a deeper understanding of the intersection between diaspora, informality, and urban livelihoods.

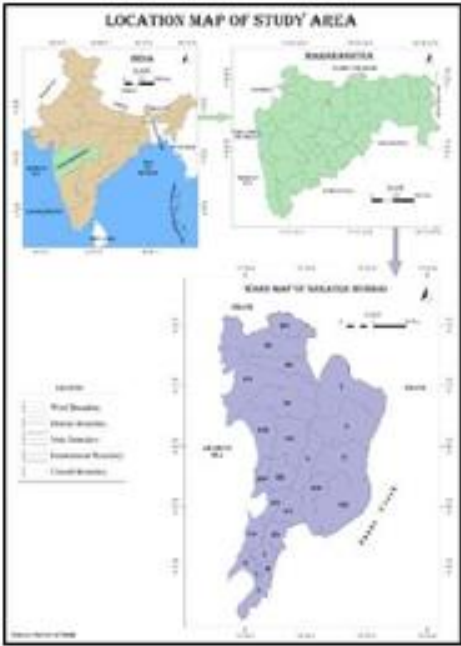
REVIEW OF LITERATURE

(Tan & Liu, 2022) The number of individuals residing outside their native place has risen on large scale. Along with this Diasporas are significantly influencing the development of their homelands. These communities frequently remain uncouneted for national population survey. This article uses data collections from the Australian Bureau of Statistics to study and investigate the Chinese Diaspora in Australia from 2000 to 2016. The term Diaspora has originated from Greek, which refers to voluntary movers who vigorously participate in cultural, social, economic and political aspects of the country. Globalization has expanded this concept from the mid-1980. Migrants shows a mixed cultural identity at their destination. This study focuses to integrate census and movement information. It highlights key aspects like, original nationality, current citizenship, natal country, year of movement and cultural identity. The results suggest that diaspora constituents are divided along socio-economic and political lines, which provides solid base for home nations to develop effective engagement policies and initiatives. (Khan, 2022) The practice of threatening for hair removal has brought more attention to the ethnic beauty rituals and the contributions of migrant women. This article explores the institutional dynamics that lead to the racialization of migrant women as genuine workers with emphasizing on recruitment methods, promotional strategies, advertising and government regulations. Research highlights the conflict forms of South Asian racism in United States. This enables workers to validate their labour while maintaining their foreign identity. (Xu, 2023) Migration and global commerce have historically contributed to poverty and talent depletion. But as the global economy evolves and technology advances, migrants have emerged as a distinct group with socio-cultural aspects. This article explores the obstacles related to diaspora entrepreneurship, significance and constraints of foreign concept. Article highlights the critical role of both financial and non-financial remittances in the socio-economic progress of the home land and also some difficulties faced by diaspora entrepreneurship. The study also evaluates the prominent international business theories.

RESEARCH OBJECTIVES

- To understand the reasons behind the diaspora of the mehendi artists in the study area
- To analyse the socio-economic conditions of the mehendi artists study area
- To recommend solutions for changing the negative aspects

RESEARCH METHODOLOGY

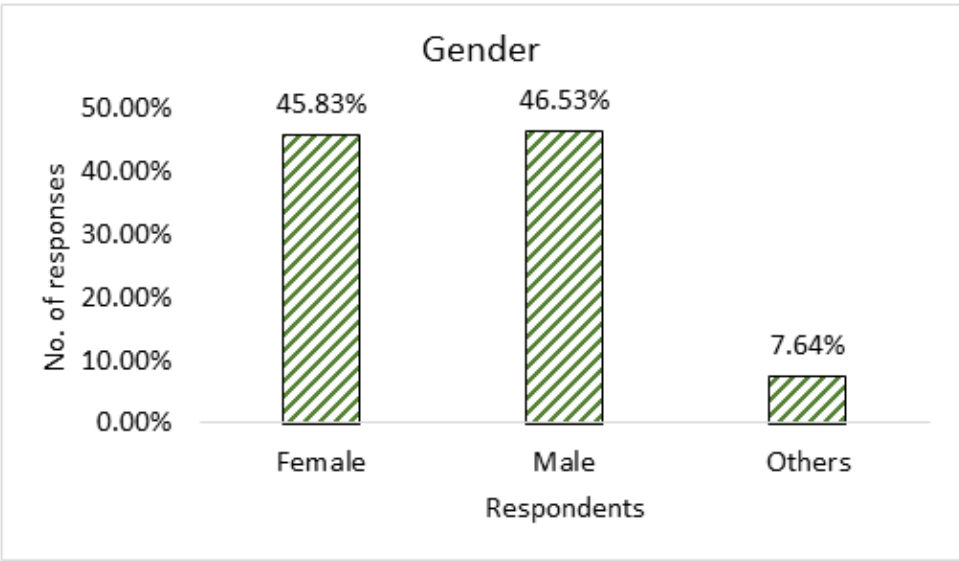


Coverage

The study area is Greater Mumbai which is surrounded by Ulhas River (north), Thane Creek (east), and the Arabian Sea (south and west). Geographically located between approximately 18° and 19° N latitude and 72.82° and 73.00° E longitude. Since it is moving towards rapid gentrification and redevelopment, it is at area for the study.

Data collection and analysis

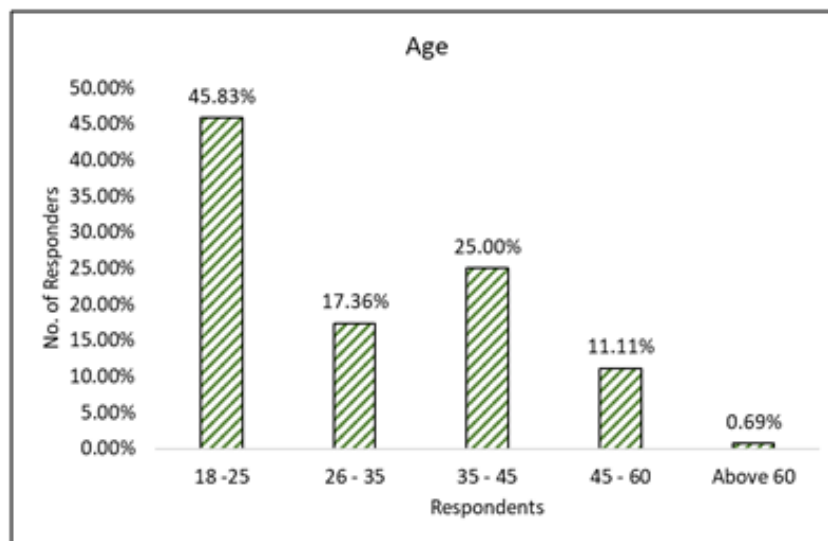
This research is based on both secondary and primary data. Secondary data, gathered from published articles, research papers, books, journals, newspapers, and official websites which helped to compile a literature review. Primary data was collected via a survey of 74 randomly selected people in the study area. A closed-ended questionnaire, created using Google Forms, was employed for data collection. The collected data was then stored, processed, and analyzed using MS-Excel and IBM SPSS.



DATA ANALYSIS AND DISCUSSION

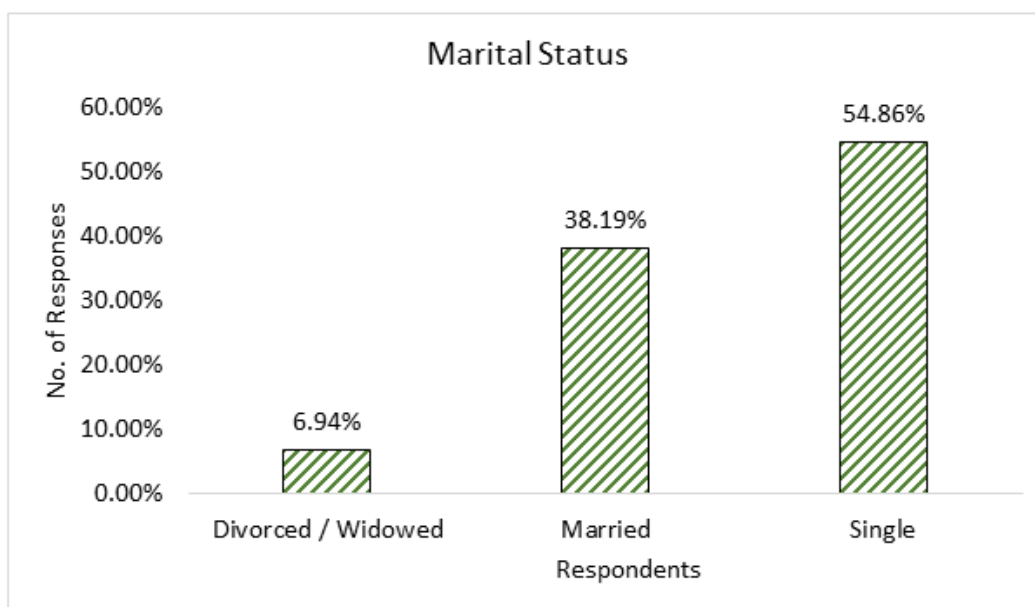
This bar graph indicates the gender of the Mehendi Artists. The **Female mehendi artists** have 45.83% of respondents. Because the female are more interested that could relate to them as well as this makes women to have such attracted skills. And they feel comfortable to put mehendi by female mehendi artist. The next category is the **Male mehendi artists** have majority of respondents 46.53%. Male mehendi artists are also have good skills and no such art is gender specific also some men develop a passion for designing mehendi.

The other category is **other gender** have 7.64% of respondents this was also indicating fairly balanced respondents. Now a days there are no such profession have gender restrictions. But other gender has quiet low percentage.



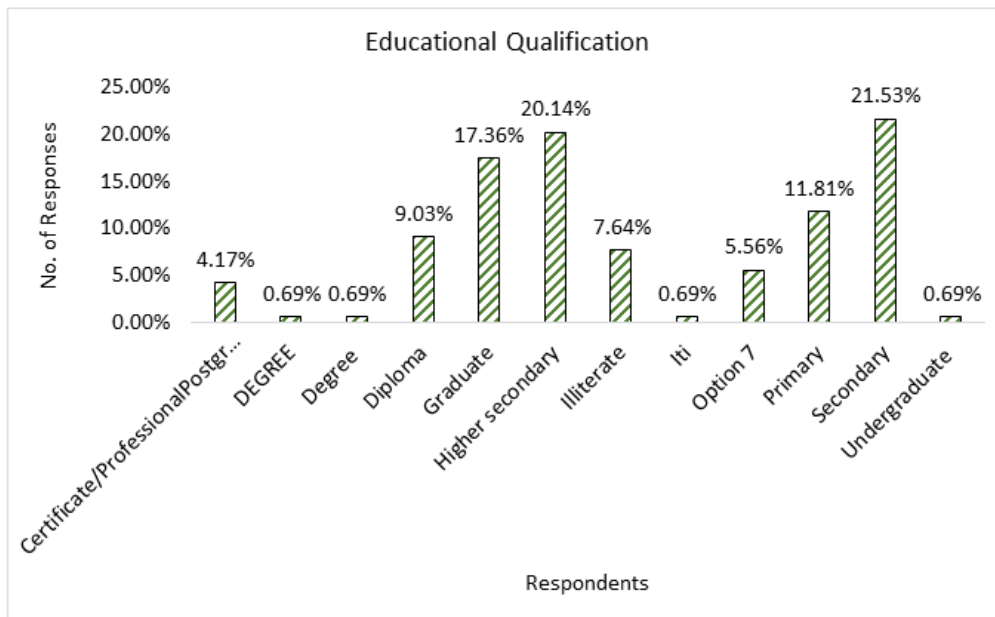
DATA ANALYSIS AND DISCUSSION

This above bar graph represents Age of mehendi artist. The first category of **18-25** have largest percentage of respondents of 45.83%. indicates that mehendi art is more popular among young individuals because of creative interest and early career choice. The second category of **26-35** have 17.36% of respondents. This percentage is decline because most of people is engaging in their career and follow the mehendi profession as a hobby This also suggest that this age group people have do their career as well as side profession of mehendi artist also find their profession in their middle years. The third category of **35-45** have 25.00% of respondents. Indicates that few people are still follow their profession as a mehendi artist. Because at this age people want to engage in some extra activities. The next category of **45-60** have 11.11% of respondents. Showing that fewer people continue mehendi artis. Because of their quite older to work as a mehendi artist. The last group is above **60** have 0.69% respondents. Because at this age people are not able to do work.

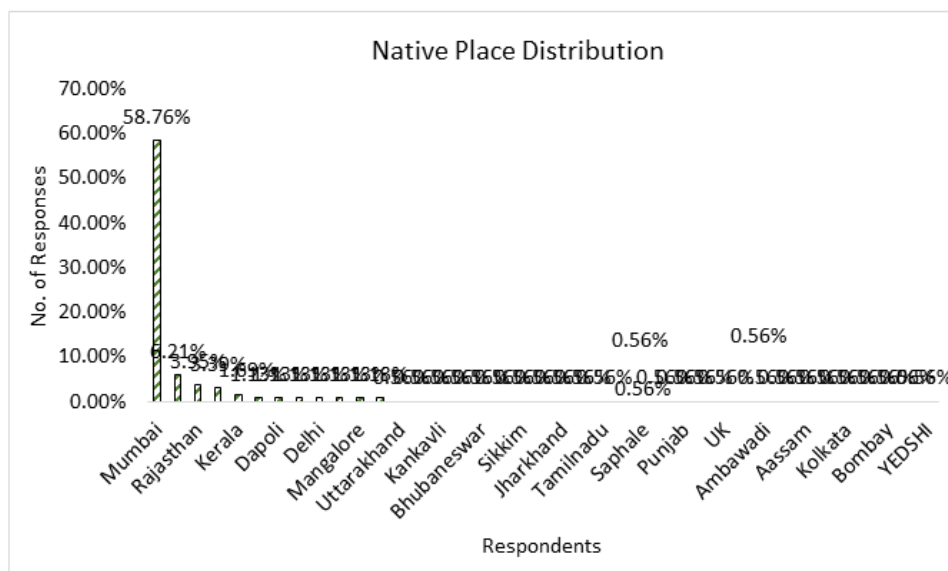


This upper bar graph represents marital status of the respondents. In the first category of the respondents are **divorced/widowed**. This indicates that few artists fall into this category. They chose this profession as their hobby and earning point of view. Next category is **Married** category have 38.19% respondents are married and still doing this profession as a mehendi artist. And they continue their profession as a mehendi artist. And the last category is **Single** have 54.86% of respondents.

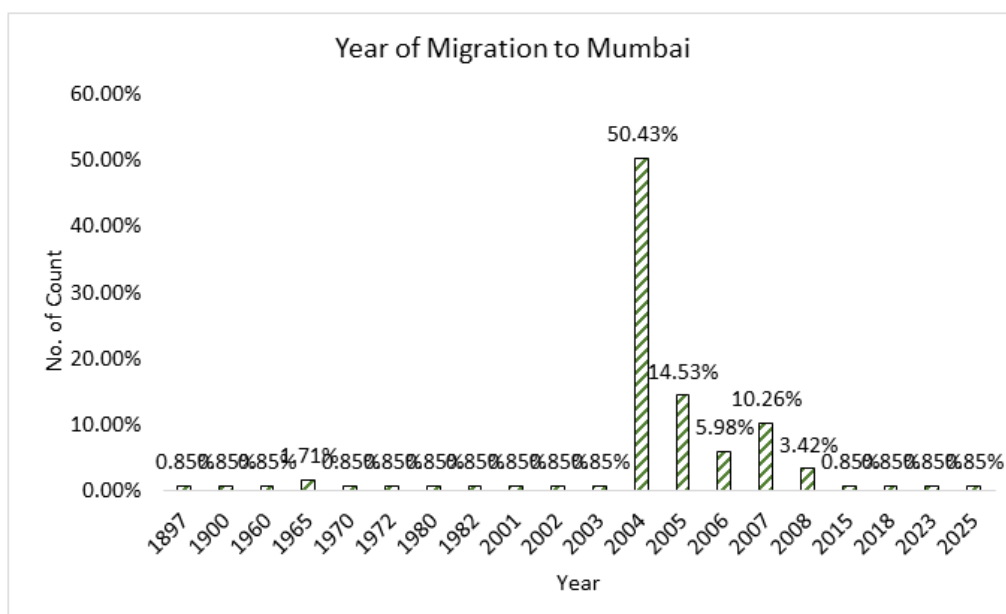
They do their profession as a mehendi artist. Because it is popular career choice among younger people. This is a largest data of other two categories. Other thing is single people also not settled in their marriage so they have large respondents.



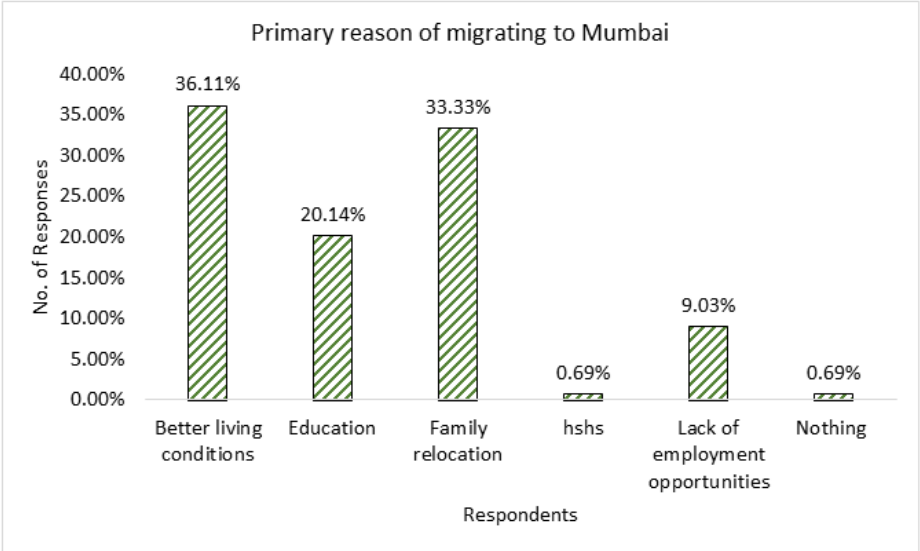
This upper bar graph represents the educational quantification of mehendi artists. In this graph have lowest percentage shows in the **ITI 0.69%, Degree 0.69%, undergraduate 0.69%** this category shows lowest respondents due to the more focused on their studies and job so as a side profession they do. other reason is they are completed their studies at this level. Other category is moderate percentage of respondents have **illiterate 7.64%, diploma 9.03%, primary education 11.81%** these respondents are more than degree, undergraduate and ITI individuals. Shows moderate level of responses. Because illiterate people are not engaging in any kind of education so they chose their profession as a mehendi artists. As well as they want to be independent by their own skills in such artwork which was more popular so that's why they choose this profession. Other thing is diploma holders also do and want to follow their own skills in as a mehendi artist so they also engaging in this. In primary education people are less educated some are from lower income families may not have financial resources to get higher education and choose as a mehendi artist profession. Also, for being a mehendi artist formal education is not required for their creativity and practice. And the last but not the least the highest percentage of respondents have **graduates 17.36%, higher secondary 20.14% and secondary 21.53%** this is the highest data among the all categories. Because many individuals with the formal education may have artistic inclination and prefer creative professional. Mehendi art is allow them to express their creativity. Also, now a days mehendi artist is more popular and high paying job as well. People find great opportunities in this so, they prefer to be a mehendi artist.



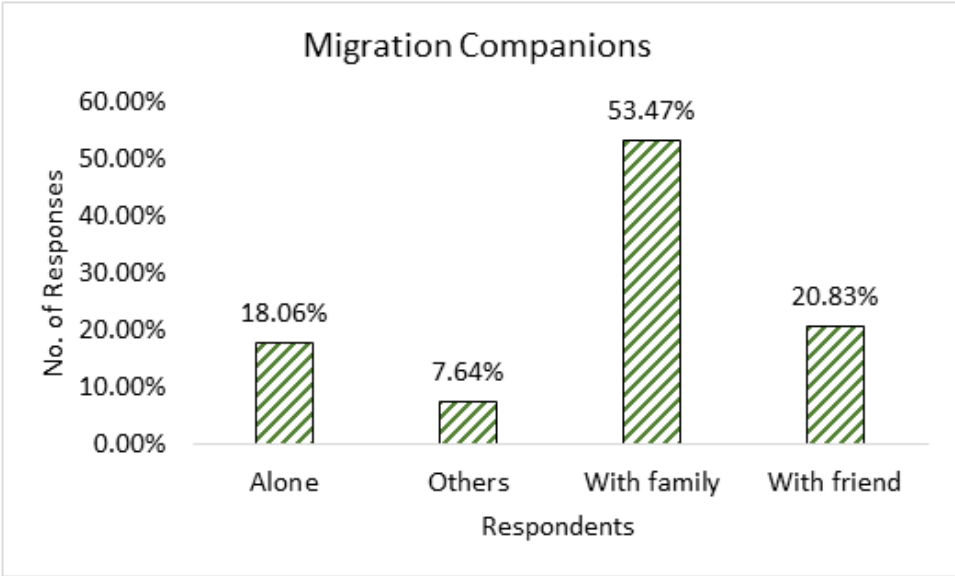
This upper bar graph indicates native place of mehendi artist. The highest data of mehendi artist is in **Mumbai** have 58.76% Because Mumbai is also known as big metropolitan city. Also, more people are living in Mumbai specially celebrities and royal families are living in Mumbai that's why most of mehendi artists are found there and many for celebrating many festivals people need mehendi artists so most mehendi artist found in Mumbai. Other than in **Rajasthan** also mehendi artis found 6.21% because Rajasthan is a rich in cultural values and mostly Rajasthani people put mehendi in their every occasion. So, the second highest data of mehendi artist found in the Rajasthan. After that **Kerala** also have mehendi artist of 3.39% of respondents. Because in Kerala also in their every festival they put mehendi so, there also mehendi artists are found as their cultural point of view. Then in the **Dapoli, Delhi and Mangalore** found moderate number of mehendi artist of 1.13% of overall data. In these regions also people need mehendi artists in their functions and marriage also less population are found here that's why the percentage of mehendi artist are found less here. And the lowest mehendi artist found in the **Uttarakhand, Lahore, Kankavli, Sindhudurg, Bhubaneswar, Jalgaon, Sikkim, Mahim, Jharkhand, Lavale village, Tamil nadu, Up, Saphale, Ratnagiri, Punjab, ambawadi, malad, assam, Surat and Kolkata** found less mehendi artist in compare to other native places because in this places people didn't found any opportunities for being a mehendi artist. Most people didn't need mehendi artist because probably it's a rural area and in rural area people not much needed any kind of mehendi artist for every function. Less demand for mehendi artist in rural area found that's why in such regions mehendi artist are less.



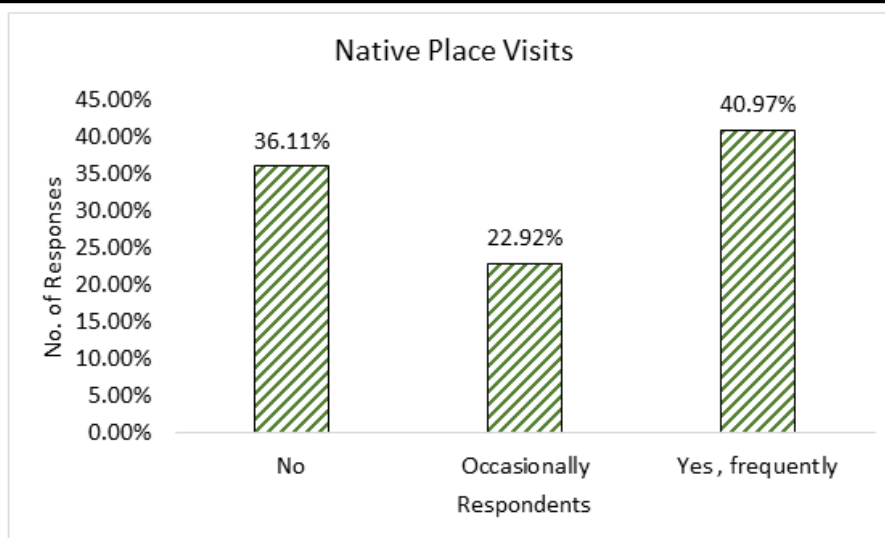
In this upper bar graph represents the year of migration of respondents to Mumbai. In year **1897 to 2003** and in **2015 to 2025** found less respondents are migrate to Mumbai. Because in year 1897 to 2003 are known as mid-20th century. There is not that much need for mehendi artist found in Mumbai. And mehendi mostly apply during weddings and festivals within families rather than as a commercial service also many mehendi artist are belonged to specific communities where migration was less due to strong cultural and social ties. And people are not much follow trends of having creative mehendi designs so that's why people not much have need of mehendi artists in the mid-20th century period. And in **2004** most mehendi artist migrate to Mumbai. because they found mehendi artist as their career opportunity. Also, for showcasing their talents, creativity and innovation through mehendi. In early twenties saw an increase of mehendi in weddings influenced by celebrities and mehendi an essential service. In this period professional wedding planning become more popular and people have to make their career in art to get high income so they mostly migrate in year 2004. In year **2005 to 2008** people moderately migrate because India's economy is rising and due to this cost of living in Mumbai increased and its difficult for low income migrants so people are less migrate to Mumbai. And in the year **2015 to 2025** in 2020 due to pandemic situation happening people are less migrate.



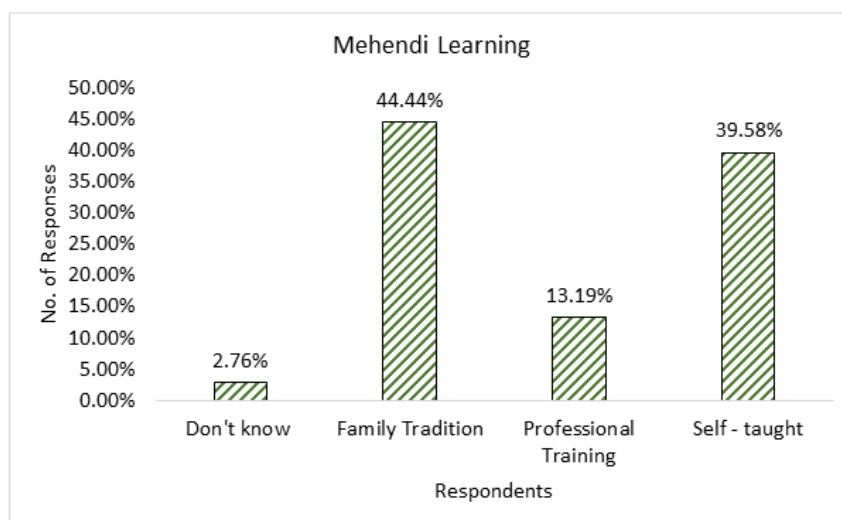
This above chart indicates primary reason to migrating to Mumbai. The highest percentage of respondents is **36.11%**. they migrate to Mumbai for better living conditions this indicates that Mumbai having better housing facility, good employment opportunities overall better quality of life. That’s why people migrating to Mumbai. Second category is **education** have 20.14% of respondents migrated for educational purpose. This indicates that Mumbai’s educational institutions and skill development opportunities attracted mehendi artists or their family members. Third category is **family relocation** have 33.33% of respondents. This suggests that many mehendi artists moved as dependents of family members who migrated for other employment opportunities and for their personal reasons. other category is **lack of employment opportunities** Mumbai is also known as dream city having great employment opportunities other states and towns not have that much employment opportunities that’s why people migrate to Mumbai. As well as economic hardship and limited job prospects in smaller towns and rural areas pushed them to seek better work opportunities in Mumbai.



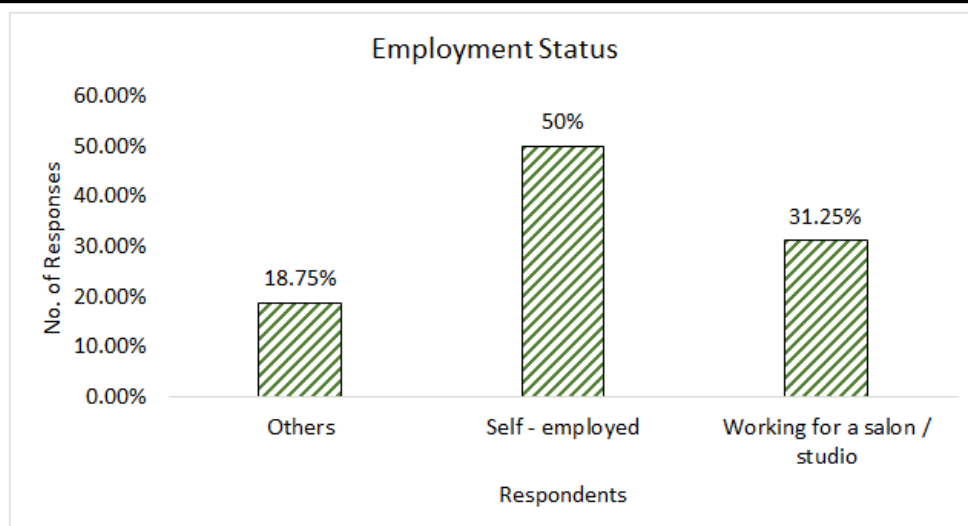
This above bar graph indicates the migration companions of mehendi artist. First category is alone having 18.06% of respondents who migrate **alone**. This suggest that the portion of mehendi artist took independent decision to move in search of better career opportunities. Second category is **others** companions have 7.64% of respondents migrated with their mentors, colleagues and with any other for their profession. Third category is **with family** having 53.47% of respondents who migrated with their family. This indicates that migration was often family decision. Influenced by better career opportunities, living conditions and education. The last category is with friend have 20.83% of respondents who migrated to Mumbai with their **friends**. This suggest that some mehendi artists are prefer support of their friends. And also from peers who already lived in Mumbai they better known that which profession is going on trend and with this they get help from their peers.



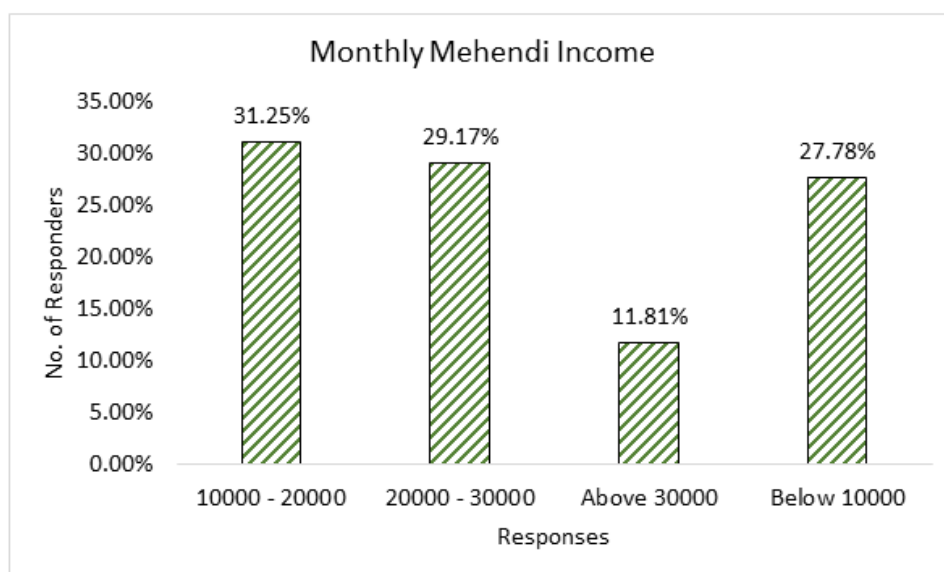
The given bar graph indicates the native place visit of mehendi artists. First is **no** category have 36.11% respondents means they not visit their native place at all. Because they permanently settled in Mumbai and their family is also living in Mumbai so in some cases there is no need to visit native place so they not prefer to visit native place. Also, other reason is their native place is far away to travel and sometimes travel facilities are not that much good to go and return back to Mumbai in case in hilly areas so individuals do not prefer to go. Second category is **occasionally** had 22.92% of respondents are go to their native place occasionally means during festive season, wedding function and in weekends. Their balancing their profession commitments in Mumbai while maintaining connections with their native place as well. The last category is **yes frequently** had 40.97% of respondents visits their native place more than any occasion. Because of their native place is nearby some individuals native place is in Mumbai so they didn't face any challenges to not going to their native place on regular basis.



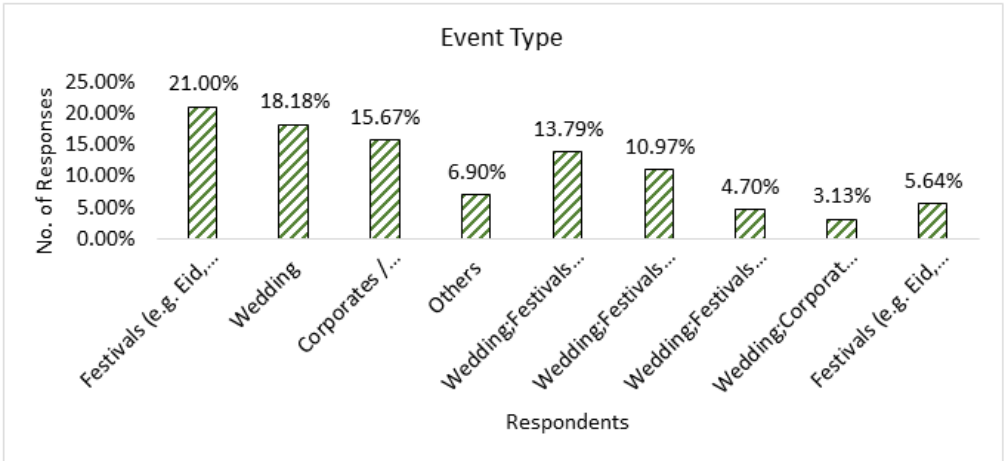
This above bar graph indicates that why they learning skills in mehendi. The **first and bar** graph indicates 2.76% of respondents mentioned that their unsure about their learning source. And from where they are learned. This is very low percentage data while comparing all other factors. The other category **family tradition** has 44.44% of respondents this is highest percentage data than other. These respondents suggest that they learn this skill through family tradition. Because India is a known for their cultural norms that's why in India before any festive season, wedding functions people put mehendi so because of it is a family tradition individuals learn mehendi. Next category is **Professional training** have 13.19% of respondents received proper professional training. Suggesting that some skills are required for being a mehendi artist. So they learn the mehendi as per their choice and interest. But this moderated data while comparing it with other categories. Last category is **self-taught** have 39.58% of respondents suggesting that they not do any course of it, they not learn as per family tradition they learn by themselves. Many individuals take the initiative to develop their skills as a mehendi artist. Because they have their own interest to learn this art. Its great number of percentage that some people take initiative to learn by themselves.



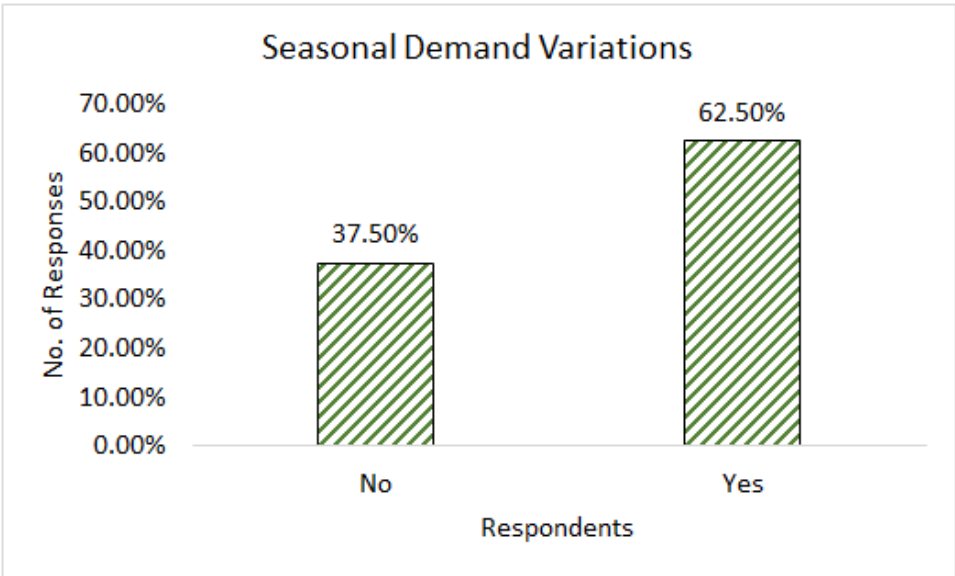
The above bar graph indicates employment status of mehendi artist. The first category is **others** have 18.75% of respondents suggest that some mehendi artist fall under other employment categories, which could include working on a contract basis, seasonal basis and part time work. Next category is **self-employed** have 50% of respondents this is highest data by comparing the other two categories suggest that some mehendi artist work independently and freelancing is the most common form of employment in this field. And mehendi artist prefer direct contact with the clients they not work under anyone. The last category is **working for salon / studio** have 31.25% a moderate data of mehendi artist is employed and work in salon/studio. Suggest that demand is increasing for the mehendi artist as per professional basis. As well as they get better income and contracts of mehendi so they work in salon/studio.



This above bar graph represents monthly income of mehendi artist. Also, mehendi is very popular trend in now a days, so people need a professional mehendi artist. First bar graph of **10000-20000** have 31.25% of respondents making their income as per monthly basis showing that they have great demand for it. This is a highest data of among the other categories. So individuals gets good income and better employment opportunities that's why people chose their career as a mehendi artist. The other category of **20000-30000** have 29.17% of respondents indicates that considerable percentage have a stable and relatively higher income. People are very well in their skills, creativity and gets more contracts as per their profession as well as since many years they follow this profession so they make their income in 20000-30000 as per monthly basis. Next category is **above 30000** have 11.81% of respondents suggests that fewer artists reach a high-income level possibly due to their experience, specialization and their business expansion. Getting royal families contracts, better contacts with everyone to improved their income above 30000 as per monthly basis. Last category is **below 10000** have 27.78% respondents earn less income compared to all other category because of they are newly learning this profession as a mehendi artist also they get orders as per seasonal basis, part time job that's why people get less income in this profession.

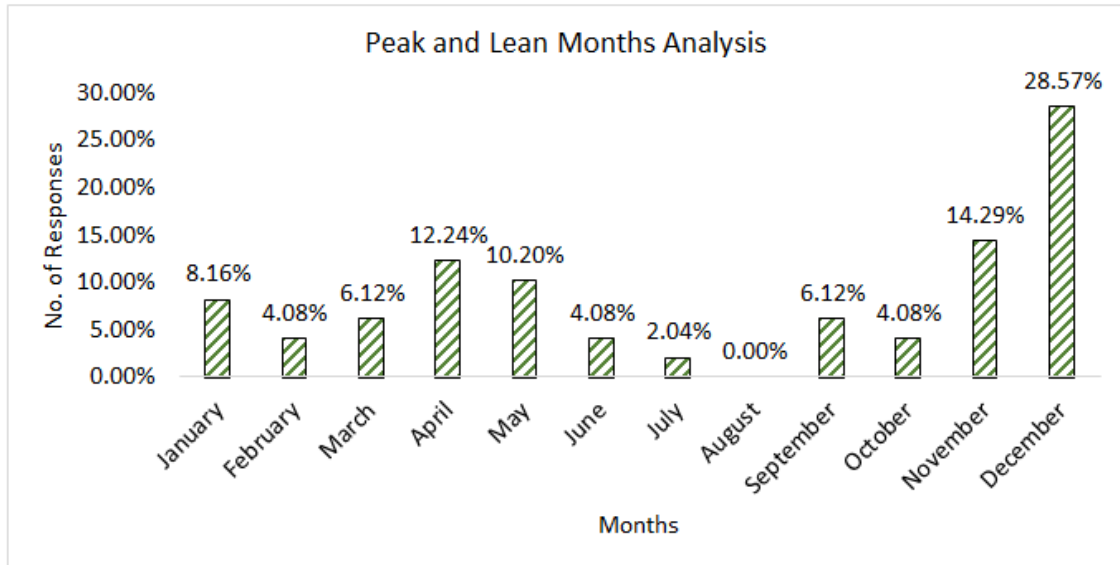


This above bar graph indicates that different types of events where mehendi artist provide their services. The first bar graph of **Festivals (e.g. Eid, Diwali, Karva Chauth)** indicates that they provide their services during such festivals suggesting strong cultural and seasonal bond. Because in such festivals people demand a professional mehendi artist as well as look at their creativity, cleanliness, matters more so people need mehendi artist. This is the highest data among the all data. Other category is **wedding** have 18.18% of respondents. Weddings are another major event type where Mehendi artists are engaged, reflecting the deep-rooted tradition of Mehendi application in marriage ceremonies. This is second highest data after the first once. Next category is **corporate/other events** have 15.67% of respondents. A significant portion of Mehendi artists for corporate and other special events suggesting that mehendi services are also needed for promotional and social gatherings. Mehendi designs can be customized to match a company's brand or product, creating a memorable experience. Also for starting new projects, for greetings people need mehendi artist. Another category is **wedding & festivals combined** have 13.79% of respondents. Because some artists work across both weddings and festivals, showing flexibility in their service offerings. Now a days it is very common in Indian cultural people showing their interest to put mehendi. Other category is **wedding, festivals & others** have 10.97% of respondents. A small group of artists cater to a mix of weddings, festivals, and other events, suggesting diversified opportunities. Mehendi designs can be used to complement fashion designs, making them a popular choice for fashion events and runway shows also mehendi artists are often hired for private parties, such as birthday celebrations, anniversaries, and baby showers. Last category is **Other combinations festivals (e.g. Eid, Diwali, Karva Chauth) Corporates / theme events** 5.64% indicate that a few artists cater to multiple types of events.

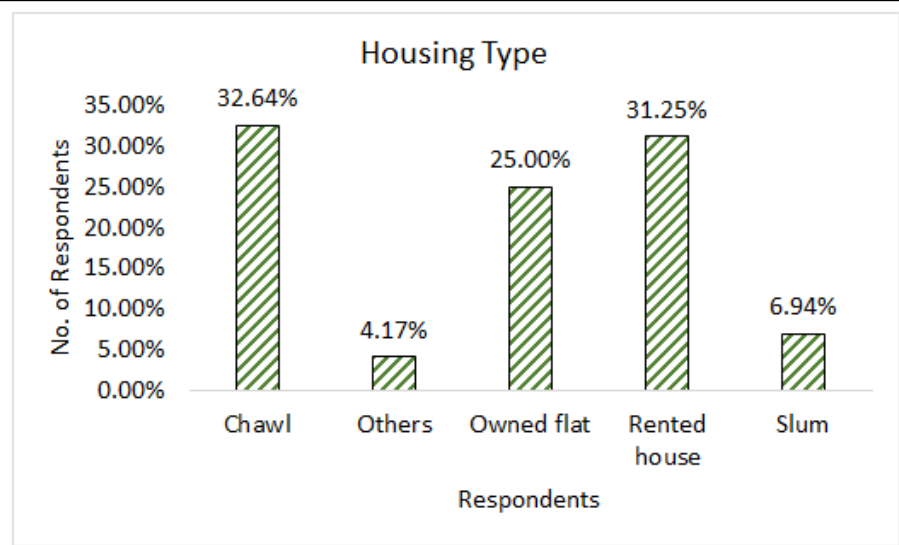


This above bar graph indicates that demand for mehendi artist as per seasonal basis. The first category of **no** indicates that there is no seasonal variation. There is significant portion of Mehendi artists have a steady flow of work throughout the year this could be due to serving diverse clientele, corporate events, beauty salons, and having established a loyal customer base. Have more orders while there is no such type of events they get their contracts very well. Also, diverse their business as a mehendi profession so they get more orders during off season as well.

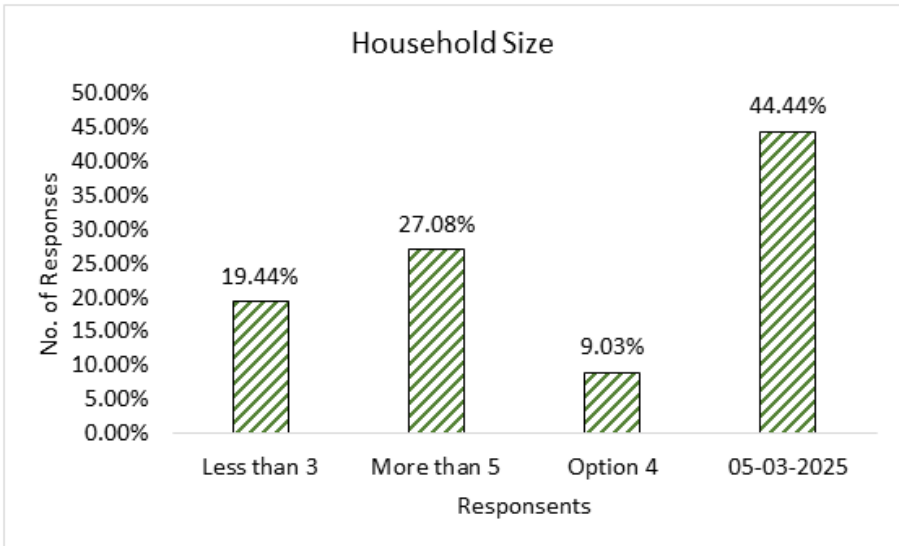
To maximize income artists may need to plan for off-season periods by offering additional beauty services or marketing their work for non-traditional events. Other category is **yes** having 62.50% respondents which was a highest data than other category. This suggests that mehendi services are highly dependent on certain times of the year, such as wedding seasons, festivals and other cultural celebrations. During peak seasons, Mehendi artists likely experience an increase in bookings, higher income, and possibly more competition. So they get more orders and great contracts seasonally.



This above bar graph indicates that peak and lean months analysis of mehendi artist as per responses. The first category is **January** having 8.16% of responses. Also, this month is known as festive and seasonal month but the data show moderate demand, aligning with the winter wedding season. In **February and October** having 4.08% respondents show relatively lower responses, implying these months are not as busy. In the **March** have 6.12% of responses. The demand increases slightly in this month possibly due to pre-wedding celebrations and festivals such as Holi, where Mehendi is sometimes applied as part of the festivities. In **April** having 12.24% responses sees a significant rise in demand. This can be attributed to the onset of the wedding season, along with other cultural and festive occasions that require Mehendi services. In **May** having 10.20% of responses. continues to show high demand, likely due to the peak wedding season. Many people prefer summer weddings, and Mehendi artists are in demand for bridal and guest Mehendi applications. In **June** having 4.08% of responses. The demand drops significantly in June. This could be due to the hot summer months and fewer wedding events. Many people avoid major celebrations during this time. In **July** having 2.04% responses. one of the lowest demands, indicating it is a lean month for Mehendi artists. Fewer weddings and events occur during this time, possibly due to monsoon season in many regions. **August** having 0.00% respondents showing lowest percentage of data. shows no demand at all, making it the lowest point for Mehendi artists. This could be because of the rainy season and lack of major festivals or weddings during this month. In **September** having 6.12% of responses. The demand starts to pick up again in September. This could be due to preparations for the upcoming festive season and some early winter weddings. In **October** having 4.08% responses. The demand remains low in October. While some festive celebrations might include Mehendi, it is not yet the peak season for weddings. In **November** having 14.29% of responses. November marks a sharp increase in demand. This can be attributed to the wedding season, as many people prefer getting married before the year ends. Festivals like Diwali may also contribute to the rise in Mehendi applications. And the last category in **December** having 28.57% of responses which was highest data. In December has the highest demand making it the peak month for Mehendi artists. This is mainly due to the wedding season, as well as holiday celebrations where people apply Mehendi for special occasions. Many families schedule weddings and big events during this time, leading to a surge in Mehendi bookings.

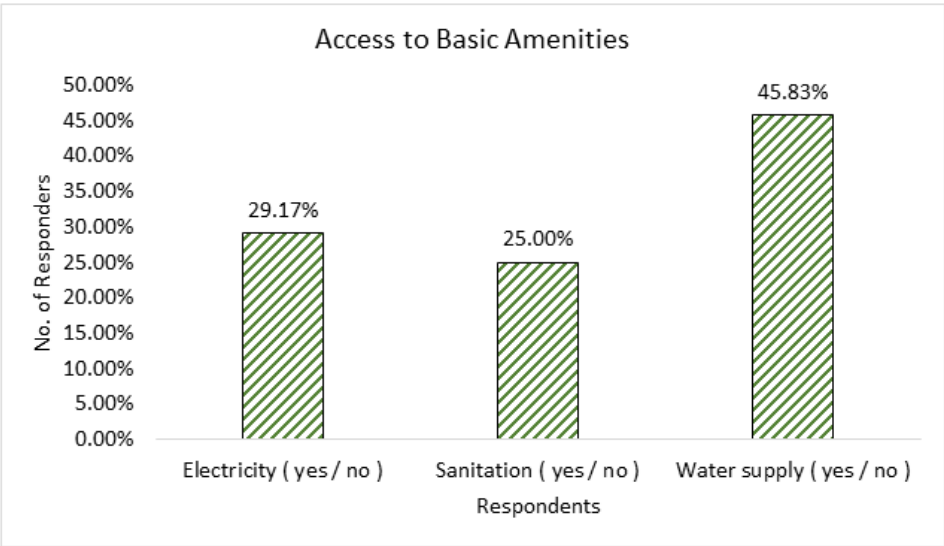


This above bar graph indicates housing type of mehendi artists. The first category is **Chawl** having 32.64% of responses. A significant percentage of Mehendi artists live in chawls. Chawls are low-cost housing units, typically found in cities like Mumbai, where many workers, small business owners, and artists reside. This suggests that a large portion of Mehendi artists belong to middle or lower-middle-class backgrounds. Second category is **Others** having 4.17% of responses. A small percentage of respondents belong to other types of housing, which could include independent houses, shared accommodations, or hostels. The third category is **Owned Flat** having 25.00% of responses. About a quarter of the respondents having own a flat. This suggests that a portion of Mehendi artists have stable financial conditions, enabling them to invest in property. Owning a flat provides security and financial stability, which is a positive indicator for the profession. Next category is **Rented House** having 31.25% of responses. A considerable number of Mehendi artists live in rented houses. This indicates that many artists do not own a home and instead pay rent, which may be due to financial constraints or the nature of their work, which requires flexibility in location. The last category is **Slum** having 6.94% of responses. A smaller portion of Mehendi artists live in slum areas. This suggests that some artists may struggle financially and live in low-income housing conditions. This group may require financial support, skill development programs, or better work opportunities.

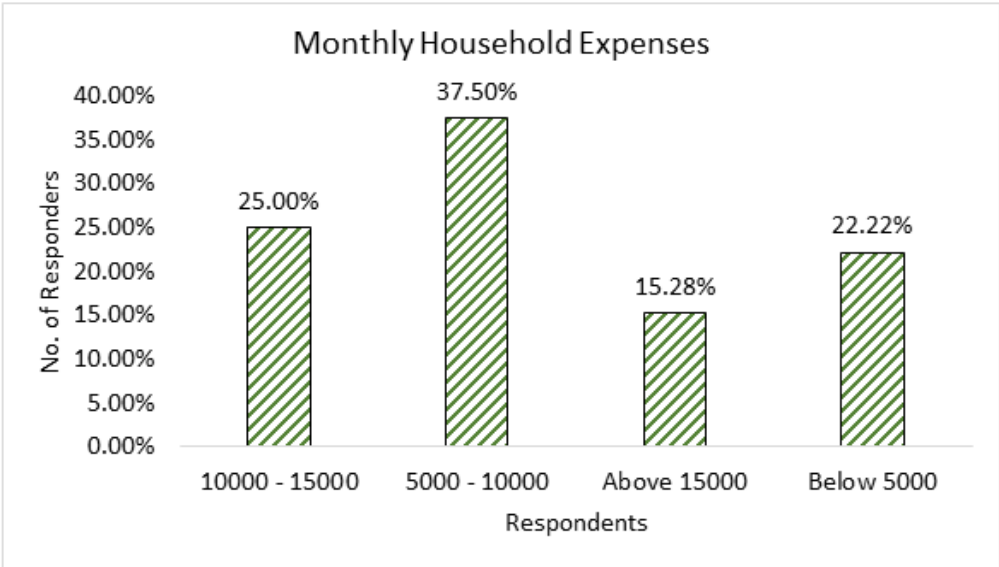


This above bar graph suggests that the household size of a mehendi artist. The first category is **Less than 3** members having 19.44% of responses. A moderate percentage of Mehendi artists live in small households with fewer than three members. This suggests that a portion of them either live alone or with just one other family member, possibly due to personal choice, financial independence, or work-related reasons. The second category is **More than 5** members having 27.08% of responses. A significant portion of Mehendi artists live in large families with more than five members. This indicates a trend of joint or extended family living, which is common in many cultural settings where family support plays a key role in financial and social stability. Next is **Option 4** having 9.03% of responses.

This category seems to represent an unspecified household size. It could be a data entry issue or a different classification that was not labelled correctly in the graph. And the last category is **05-03-2025** having 44.44% of responses Possible data error this appears to be a mislabelling and a formatting issue in the dataset. It is unlikely that "05-03-2025" represents a household size.

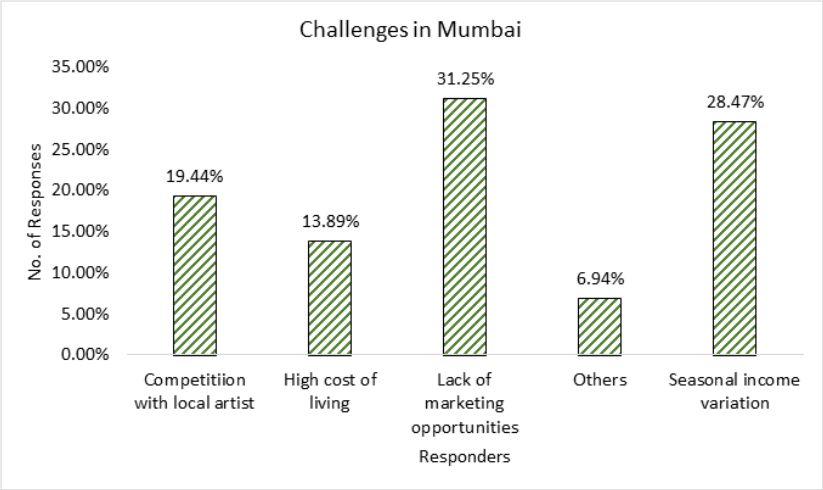


This above bar graph represents basic amenities of mehendi artist of all the responders. This analysis provides insights into the access Mehendi artists have to essential services like electricity, sanitation, and water supply. The first category of **electricity (yes/no) having** only 29.17% of respondents have access to electricity. This indicates that a significant portion of Mehendi artists might be working under challenging conditions without a stable power supply, which could impact their productivity, work hours, and overall livelihood. The second category of **Sanitation Access** having 25.00% of responses. A quarter percentage of Mehendi artists have access to sanitation facilities. This suggests that many of them may lack proper hygiene infrastructure, which can impact their health and overall well-being. Poor sanitation can also affect their ability to maintain cleanliness in their profession, which is crucial for client satisfaction. The last category is **Water Supply Access** having 45.83% of responses. Access to water supply is the highest among the three amenities, with highest percentage of respondents reporting availability. While this is relatively better, it still means that more than half of the Mehendi artists do not have a reliable water supply, which could impact both their personal hygiene and their professional work, as Mehendi application requires clean water for preparation and aftercare.

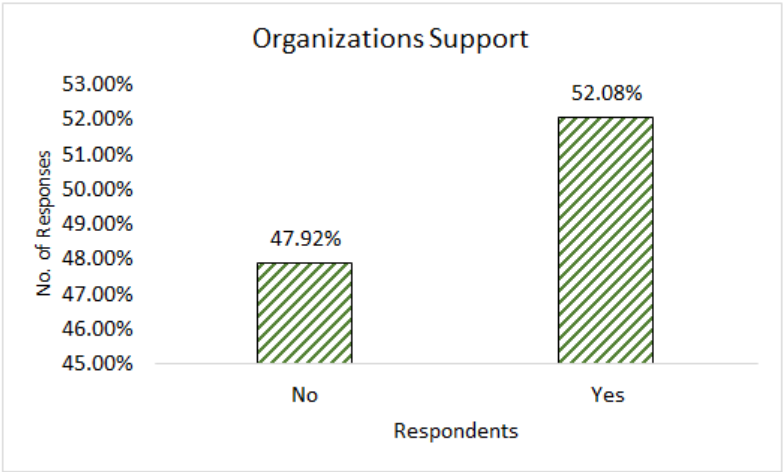


This above bar graph indicates monthly household expenses of mehendi artist. The first category is expenses between **10000 - 15000** having 25.00% of responses. About moderate level of respondents fall into this category, indicating a slightly higher cost of living for these artists. They may be spending more on rent, education, healthcare, or supporting larger families. Second category is expenses between **5000 - 10000** having 37.50% of responses. The largest proportion of Mehendi artists have monthly expenses in the range of income.

This suggests that a significant portion of artists are managing their households within a moderate budget, possibly covering rent, food, and utilities. The next category of expenses **above 15000** is having 15.28% of responses. A smaller percentage of Mehendi artists have expenses exceeding income. These individuals might be supporting larger families, residing in costlier areas, or maintaining a higher standard of living. The last category is have expenses **below 5000** having 22.22% of responses. Nearly of respondents have household expenses below this income. This indicates a lower cost of living, possibly due to shared accommodations, government assistance, or minimal lifestyle expenditures. It could also suggest financial struggles and the need for better income opportunities.

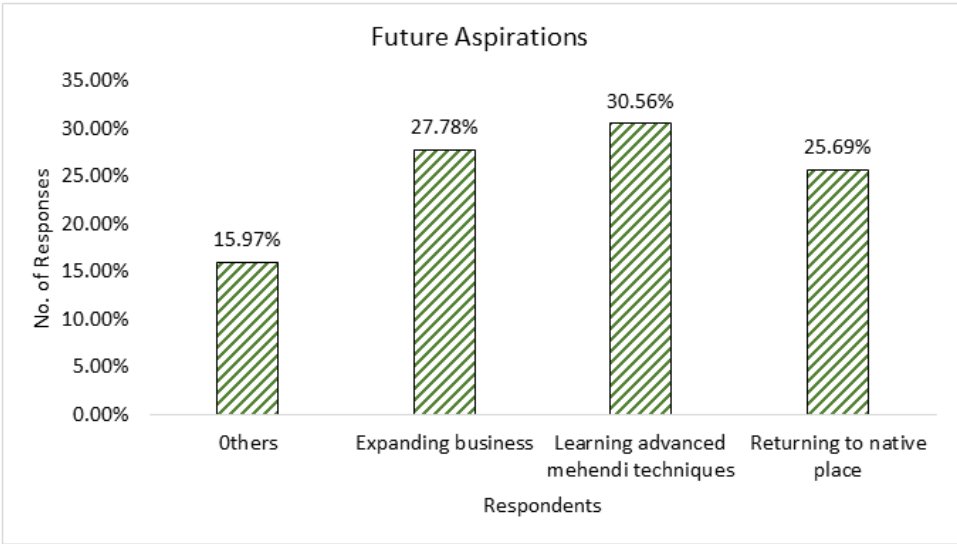


This above bar graph indicates that major challenges faced by Mehendi artists in Mumbai. The responses indicate that artists struggle with multiple issues that affect their income and career growth. The first category of **competition with local artists** having 19.44% of respondents feel that competition with local artists is a significant challenge. The presence of many artists in Mumbai leads to price wars, making it harder for individual artists to charge fair rates. Clients often negotiate lower prices, reducing the profitability of their work. The second category is high cost of living having 13.89% responses. Living expenses in Mumbai are high, and Mehendi artists struggle with sustaining their livelihoods. Rent, transportation, and daily expenses impact their savings and investment in better marketing tools. The third category is **lack of marketing opportunities** having 31.25% of responses. The biggest challenge is the lack of marketing opportunities. Many Mehendi artists rely on word-of-mouth and seasonal events for clients, making it difficult to maintain a steady income. Limited digital presence and competition from social media influencers may also contribute to this issue. The next category is **other** challenges having 6.94% of responses. A small percentage face other challenges, which could include limited access to training, lack of recognition, or social barriers. The last category is **seasonal income variation** having 28.47% of respondents. The second major challenge is the fluctuation in income due to seasonal demand. Mehendi services are in high demand during weddings, festivals but income drops significantly during off-seasons. This instability makes financial planning difficult for artists.

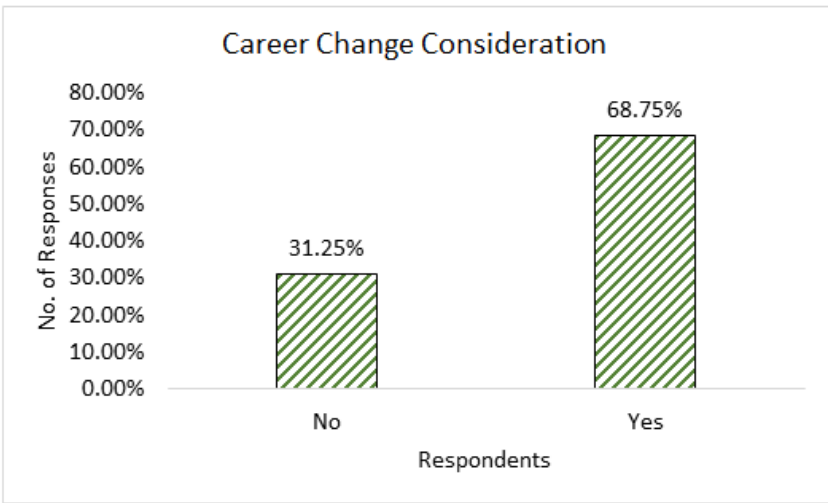


This above graph suggest that represents the level of support received by Mehendi artists from various organizations. The first category is **no** and having 47.92% of respondents. Which was lack of support for many artists the respondents stated that they do not receive any organizational support. This highlights a gap where

nearly half of Mehendi artists feel they lack formal backing, which could hinder their professional growth. There is a need for better outreach programs, financial assistance, marketing support, and training initiatives to help Mehendi artists, especially those not currently benefiting from any organizational aid. Government schemes, NGOs, and industry collaborations could play a key role in closing this gap. Other category is **yes** having 52.08% of respondents. which indicates that a slight majority Mehendi artists reported receiving support from organizations. This suggests that some institutions, NGOs, or local business groups provide resources, training, or financial aid to artists. more than half of the artists have access to some form of support, a significant portion still struggles without it.

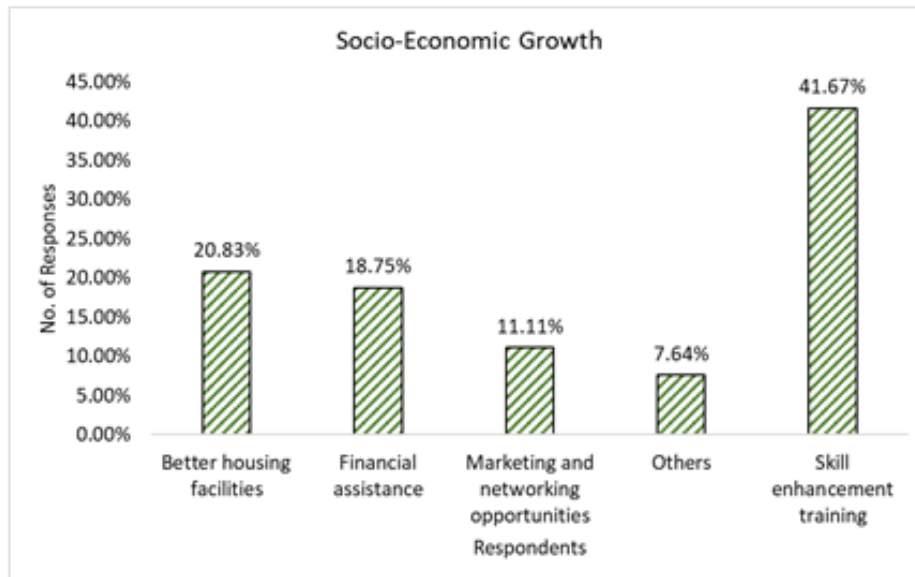


This above bar graph illustrates the future aspirations of Mehendi artists based on their responses. The first category is **others** having 15.97% of respondents. A smaller percentage of respondents have aspirations that fall under others category possibly including teaching Mehendi, collaborating with brands, and switching careers. Second category is **expanding business** having 27.78% of responses. A significant percentage of respondents aim to expand their business. This suggests that many artists want to grow their customer base, reach new markets, and increase their income. Third category is **learning advanced mehendi techniques** having 30.56% of responses. The highest percentage of artists aspire to learn advanced Mehendi techniques. This indicates a strong desire for skill enhancement, and they want to improved their skills in this filled as per having great demand which could help them stay competitive and improve their artistic expertise. The last category is **returning to native place** having 25.69% of responses. About moderate level of respondents wish to return to their native place. This could be due to reasons like better opportunities in their hometown, lower living costs, and personal preferences.



This above bar graph represents the percentage of Mehendi artists considering a career change. First category is **no** artists not considering a career change having 31.25% of respondents. Only some of respondents wish to continue in the Mehendi profession. This indicates that while some artists are content, they may have found stable clients, better marketing strategies, and additional sources of income. The next category is **yes** having

68.75% responses. artists considering to change their career. A significant response of Mehendi artists is thinking about changing their career. This suggests dissatisfaction with their current profession, possibly due to financial instability, lack of opportunities, seasonal income variation, and competition. Many artists may see limited long-term growth and are looking for alternative careers. The high percentage of career change consideration indicates challenges in the industry, such as low earnings, seasonal demand, and limited growth opportunities. To retain talent in the Mehendi industry, there is a need for better financial support, skill development programs, and business expansion opportunities.



This above bar graph indicates that the factors contributing to the socio-economic growth of Mehendi artists. The first category is **better housing facilities** having 20.83% of respondents. A significant portion of artists feel that better housing conditions are necessary for their social well-being. This could be due to unstable income, lack of permanent housing, and poor living conditions that impact their quality of life. The second category is **financial assistance** having 18.75% of respondents. Around moderate percentage of respondents express a need for financial aid. Many artists might be struggling with low or inconsistent earnings, requiring support through grants, loans, or financial programs to sustain their profession. The third category is **marketing and networking opportunities** having 11.11% of respondents. A smaller yet notable group suggesting the importance of marketing and networking. This indicates that artists lack exposure and business connections, which limits their ability to reach clients and grow their business. Next category is **other factors** having 7.64% of respondents. A few respondents mentioned other factors, which could include healthcare, legal rights, or business management training.

The last category is **skill enhancement training** having 41.67% highest responses. The majority of Mehendi artists believe that skill enhancement training is the most crucial factor for their socio-economic growth. This suggests that artists recognize the importance of improving their craft, learning advanced techniques, and staying updated with new trends to gain better opportunities.

RECOMMENDATIONS

- Offer workshops and training programs so that there can be focus on advanced Mehendi techniques, new design trends, and business management skills.
- Provide access to online resources and tutorials which can help the artists learn at their own pace and stay updated with the latest trends.
- Provide access to microfinance and small business loans
- Offer financial literacy workshops to educate artists on budgeting, saving, and managing their finances effectively.
- Create a cooperative or collective group which can help artists pool resources, negotiate better prices for materials, and access larger projects.
- Educate artists on fair pricing which will help artists understand the value of their work and charge accordingly.

CONCLUSION

This research shows the complex socio-economic challenges faced by Mehendi artists in Mumbai. Their main struggles are seasonal work, tough competition, and the high cost of living in the city. A large number of these artists are thinking about changing their careers, which shows they are not satisfied. This dissatisfaction likely comes from money problems, limited opportunities to grow, and intense competition in their field.

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AN EVALUATION OF SERVICE QUALITY AND PASSENGER SATISFACTION IN LOCAL AND METRO TRAIN. A CASE OF SUBURBAN MUMBAI

Mr. Chandrabhan Brijpal PrajapatiAssistant Professor, N.G Acharya & D. K Marathe College of Arts, Science and Commerce
Chandrabhan3785@gmail.com**ABSTRACT**

Mumbai, the financial and commercial capital of India, owes much of its success to its extensive suburban railway network, often referred to as the city's lifeline. Local trains play a crucial role in facilitating the swift movement of large populations across long distances, with millions of commuters traveling daily over distances ranging from 10 to 60 kilometers. To alleviate congestion in the local train system, Mumbai introduced its first metro corridor, Metro Line 1 (Versova to Ghatkopar), on June 8, 2014. Nearly eight years later, the city expanded its metro network with the launch of Metro Lines 2A, 3, and 7, with 14 additional metro lines proposed to become operational in the coming years. The metro system has significantly enhanced commuter mobility and eased the burden on Mumbai's public transportation infrastructure.

This research paper aims to analyze the differences in service quality and passenger satisfaction between Mumbai's local and metro trains. The study seeks to determine which mode of transport is preferred by commuters and what factors influence their choice. Key parameters such as passenger services, cleanliness, safety, punctuality, and platform facilities have been considered to assess service quality. A survey of 120 respondents was conducted using a purposive sampling technique, and the data was analyzed using statistical tools, including the Chi-Square test.

Keywords: Mumbai Local Trains, Metro Trains, Passenger Satisfaction, Service Quality, Commuter Preferences, Urban Transport Planning

1. INTRODUCTION

Mumbai is the economic capital of India. It is located in the state of Maharashtra and has internal and external connections by road, rail, and air transportation. In the Island city- Mumbai, 88% people travel by local trains. The first train was started on 16th April 1863, between Chhatrapati Shivaji Maharaj terminus (CSMT) to Thane and covered nearly 34 kilometers and took about 1 hour 15 minutes. Mumbai Local Trains have completed its 150 years and it serves the transports requirement of nearly 22 million populations every day.

Mumbai railway is divided into three important branches or lines which are the western railway, central railway and harbour railway. The western railway train network connects Churchgate in south Mumbai to Virar in the northern suburb of the region. The central railway covers the areas from CSMT to the distant suburbs of Kasara, Karjat, and Khopoli. The Harbour line is from CSMT station to Panvel and CSMT to Goregaon.

The Mumbai suburban railway is Asia's oldest rail transport. It is governed by Indian railway and operated by Western and central railways which is popularly known among the peoples of Mumbai region as Local train and they run from 4.00 AM till 1.00 AM.

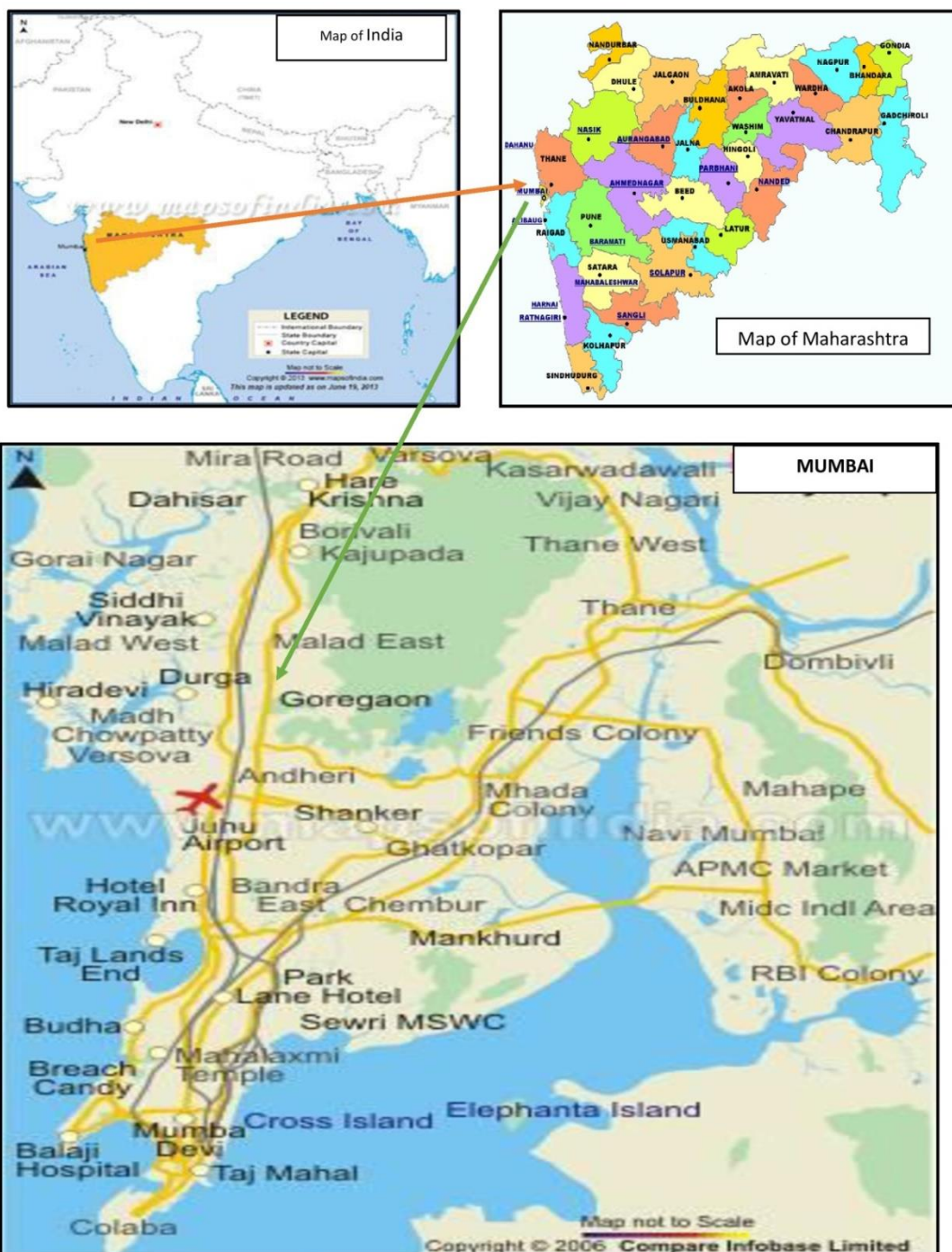
But the people of Mumbai viz. Mumbaikar have to face a number of problems regularly while travelling from local trains. The main problem is overcrowding due to which a passenger travels into a fully packed compartment of a local train during peak hour with no chance to get a seat, resulting in passengers having to travel the long distance in standing. With the huge traffic of passengers, it is very difficult to catch the ticketless traveler and the Indian railway loses a big chunk of income due to this.

The Metro or Rapid Transit System in Mumbai started operating in 2014 with 12 stations connecting the Western Railway to the Central Railway. The metro line in phase -I was started operating successfully between Versova to Ghatkopar route which is also called Blue line or Line-1. The other line was partially started in April 2022 on Dahisar - D.N Nagar route, which is known as Line- 2A or Yellow Line which was started running with full capacity in January 2023.

Line-7 which is also known as Red line is running between Dahisar (East) to Gundavali which covers the distance of 16.5 kms and has 14 stations. Then there is Aqua line or Line -3 which is being built completely underground and will have 27 stations and starts from Cuffe Parade and go to SEEPZ and Aarey Colony. There are in total 14 metro lines which will become operational in upcoming years according to the proposed plans of the government.

The expansion of Mumbai's Metro network, both the operational lines and those set to become functional in the future, will significantly transform the city's transportation landscape. It will make commuting more convenient and comfortable, reducing the strain on Mumbai's suburban railway and BEST bus services. With air-conditioned coaches and a traffic-free commute, passengers will be able to travel efficiently and reach their destinations on time. Often referred to as the lifeline of the city, Mumbai's suburban railway system plays a crucial role in the daily commute of millions. However, rapid population growth and urbanization have placed immense pressure on the existing network, leading to severe overcrowding, infrastructure constraints, and safety concerns. The expansion of the Metro system will help address these challenges by providing a seamless, modern, and efficient transit alternative. The Metro expansion is a step toward modernizing Mumbai's transportation infrastructure, offering a faster, safer, and more reliable commuting option. As the city continues to grow, an efficient and sustainable public transport system becomes increasingly essential. While the suburban railway will remain indispensable, the Metro's development will ease congestion, enhance commuter experience, and contribute to a well-integrated urban transit system.

LOCATION OF STUDY AREA ON MAP

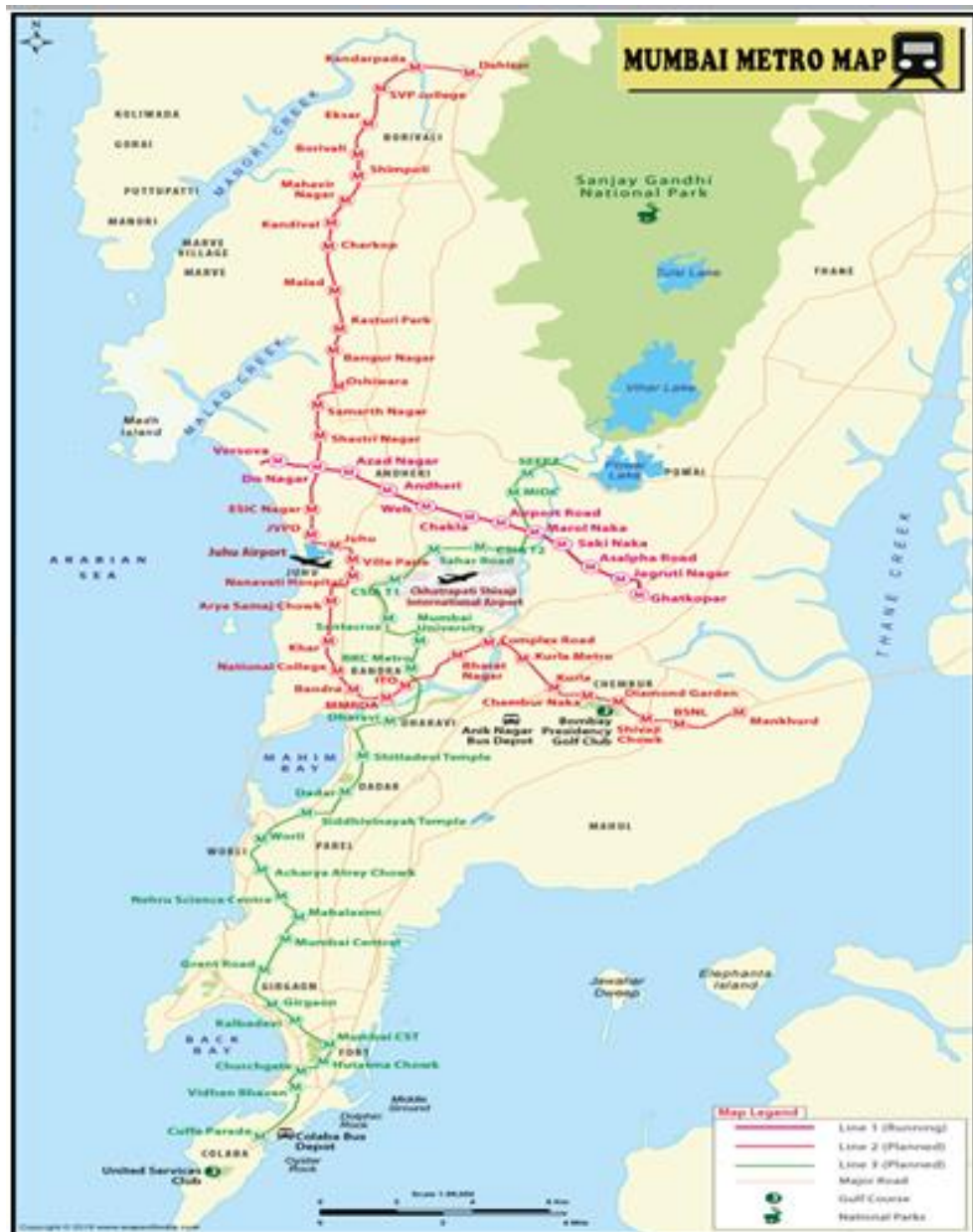


LOCAL TRAIN NETWORK



Source- <https://erail.in/info/railway-maps-mumbai-local/1801>

METRO TRAIN NETWORK



Source- <https://livingnomads.com/2022/12/mumbai-travel-blog/mumbai-metro-map/>

This research aims to examine the demographic characteristics of respondents, differences in service availability, issues associated with passengers' level of satisfaction and to find out the solution to increase passenger satisfaction of Local and Metro trains of Mumbai City. To examine the level of satisfaction various parameters are selected like passenger services, cleanliness measures, safety, punctuality of train and platform services etc. the data was collected by using purposive sampling technique with the help of questionnaire of 120 passenger travelling from both the means of transportation.

2. LITERATURE REVIEW

Shah & Pandya, (2022) The cheapest and fastest form of transportation, the Mumbai local train is the city's lifeline. The study's goal is to determine how satisfied Mumbai area passengers are with AC trains. The perceived-to-expected score discrepancy is measured using a parametric t-test. It is clear that customers are happy in every aspect of service quality. Additional research can be done by creating a structural equation model and analyzing the effect that service quality has on customer satisfaction.

Ozarkar, (2022) The Central Railway has decided to end the AC local train services on the Trans-harbour line between Thane and Panvel and begin operating these AC local trains on the harbour line as of Monday due to the unfavorable customer response to the AC local train services on the Trans-harbour line.

Majumdar, Dissanayake, Rajput, Saw, & Sahu, (2020) This study investigated commuter perceptions of metro infrastructure, facilities, and service quality in order to identify and priorities the critical factors affecting total metro service quality in a typical Indian context. In order to increase the total quality of travel by metro rail in an Indian setting, it is necessary to place greater emphasis on features such as metro fare, connection to metro, and metro frequency. These attributes were identified to be the most significant yet were not functioning well. In order to maintain current passengers and draw in new ones, this methodology might be helpful in identifying a list of priority areas for improvement in metro train services.

Rahul Wadekar (2024) the purpose of the study was to know the quality of services provided in the metro train, based on which passenger satisfaction was brought. Mumbai metro has given various facilities to the passengers for their comfort travel, in the current line that is Versoa to Ghatkopar root. The metro train has helped the commuters in saving their time which was earlier wasted by changing trains from Dadar railway station as well as it helped the people who were taking rickshaws from Ghatkopar or Kurla station. Now travelling on this route has become easier with AC coaches of metro trains and reaching the workplace on time without any trouble of being stuck in the never ending traffic of Mumbai suburbs.

Barve, M. S. S. & Joshi, S. (2021). The focus of the study was to understand the commuter's perception as well as to know the factors which were affecting the use of metro rail. With the help of 51 samples belonging to different age, gender, occupation, income and education, data was collected and analysis was done. The result of the analysis indicated that most of the respondents preferred metro rail for travelling because of the various facilities provided there was more travel friendly the only problem recognized was the ticket price which was considered to be very expensive.

Prakash & Samuel (2024). Discusses in the study that development of Chennai metro places an important role in the diversion of considerable amount of people travelling from buses, rickshaw, and other private vehicles etc. to the Metro trains. As a result, there is reduction in traffic congestion from road of Chennai city. Metro train is also reduced the air pollution from the city by reducing the utility of petrol and diesel in means of road transport by diverting the people to use metro train. The main focus of the study is to understand the various ways or means followed by CMRL to retain the passenger and bring more passenger to use metro train in ultra-modern Chennai megacity.

3. STATEMENT OF PROBLEMS

The study is being carried out on the topic "An Evaluation of Service Quality and Passenger Satisfaction in Local and Metro Train. A Case of Suburban Mumbai"

To determine the need and importance of local and metro trains in the commercial capital of India. The study also emphasizes employment generation, tourism and overall city opportunities for its development. The living standards of people are expected to improve as a result of the greater connectivity of the places by rail transportation. Local passenger services have increased against a lot of competition from other modes of transport like metro trains, AC BEST buses and other private modes of transportation, so it is important to overcome the various shortcomings or problems faced by passengers. This research focuses on travelers' impressions on availability facilities and their level of satisfaction.

4. SCOPE OF THE STUDY

The study mainly deals with the comparative analysis of the satisfaction level of the passengers with services available in local and metro trains. The study examines every aspect of the local and metro trains services at different levels, including ticket availability, journey quality, conduct, safety and timing of trains and employees, platform cleanliness etc. the sample population is drawn from passengers of local and metro trains. The research is mainly undertaken to determine the quality of railway services available for passengers and suggest the solution to the problems faced by the people.

5. OBJECTIVES

1. To understand demographic characteristics of respondents.
2. To measure passenger satisfaction travelling from both local and Metro Trains.

6. HYPOTHESIS OF THE STUDY

(H₀): There is no significant relationship between income level and the preference for local trains over metro among passengers.

(H₁): There is a significant relationship between income level and the preference for local trains over metro among passengers.

7. RESEARCH METHODOLOGY

The present study is descriptive in nature. Both primary as well as secondary data is used in research. Primary data is collected through questionnaire and personnel interview methods using a purposive sampling from the 120 respondents in Mumbai Suburban. Collected data then will be analysed with the help of suitable statistical techniques to bring out the satisfaction level of passengers.

8. LIMITATION OF THE STUDY

1. There is a possibility that respondents may be in a hurry to complete the survey quickly because they have to catch a train.
2. The study is based on a primary survey where some respondents may not provide the correct response and are subjected to their knowledge, understanding and biased opinion.
3. The study is restricted to the Mumbai suburban only.
4. The study is constrained by a limited timeframe for conducting research.
5. The sample size is restricted to 100 respondents, which is relatively small compared to the overall population.

9. ANALYSIS AND INTERPRETATION

Table-1 Demographic Profile of the respondent

Sr. No.	Demographic Factors	Classification	No. of Respondents	Percentage
1.	Age	Below 18 Years	04	3.3
		18-25	34	28.3
		26-35	50	41.7
		36-45	22	18.3
		46-60	08	6.7
		Above 60 Years	02	1.7
		Total	120	100
2.	Gender	Male	64	53.3
		Female	56	46.7
		Other	00	00
		Total	120	100
3.	Occupation	Student	05	4.2
		Professional	44	36.7
		Business	15	12.5
		Service	24	20
		Home Maker	02	1.7
		Banker	04	3.3
		Teacher	04	3.3
		Marketing	20	16.7
		Retired	02	1.7
		Total	120	100
4.	Marital Status	Married	52	43.3
		Unmarried	68	56.7
		Total	120	100
5.	Monthly Income	Below ₹ 20,000	40	33.3
		₹ 20000- ₹ 40000	28	23.3
		₹ 40000- ₹ 60000	22	18.4
		Above ₹ 60000	30	25.0
		Total	120	100

Source- Primary data

From table 1, it is evident that the majority of respondents belong to the age group of 26 to 35 years, accounting for 41.7%. additionally, 53.3% of the passengers are male, while 46.7% are female. Regarding occupation, 36.7% of respondents are working professionals, followed by those in service (20.0%), marketing (16.7%), and business (12.5%). Furthermore, 56.7% of respondents are unmarried, while 43.3% are married. In terms of monthly income, the largest proportion of respondents, 33.3%, fall in to the category of earning below ₹20,000 per month, followed by 25.0% in the above ₹20,000 income category and 23.3% in the ₹20,000-₹40,000 range.

Table-2 Factor influencing choice of Local and Metro Train

Factors	Cost of ticket	Comfort	Travel time	Availability of seating	Cleanliness	Safety	Total
Train							
Local Train	73	10	14	08	10	05	120
Local Train (%)	60.8	8.3	11.7	6.7	8.3	4.2	100
Metro Train	9	48	20	11	17	15	120
Metro Train (%)	7.5	40.0	16.8	9.2	14.2	12.5	100

Source- Primary data

It can be observed from Table 2 that, out of 120 respondents, 60.8% selected local trains for travel due to the low ticket price. This was followed by 11.7% of respondents who chose local trains because of the longer travel time. Local trains have a wider rail network and cover larger distances compared to metro networks. Additionally, 8.3% of respondents preferred local trains for comfort and cleanliness, while 6.7% cited the availability of seating as their reason. Lastly, 4.2% of respondents chose local trains for safety. This could be due to the fact that those traveling during early morning, midday, and late night—off-peak hours—experience greater comfort, cleanliness, seat availability, and safety.

On the other hand, 40.0% of the respondent chose metro trains for comfortable travel. Additionally, 16.8% respondents opted for metro trains due to shorter travel time. this could be attributed to the fact that metro trains cover shorter distance, which can be travelled more quickly compared to local train. Nearly 14.2% passengers prefer metro train for their cleanliness, while 12.5% passenger find that metro trains are safer than local trains. Furthermore, 9.2% passengers travel by metro because of the availability of seats. However, this percentage is relatively low as seat availability becomes a challenge during peak hours. Lastly, 7.5% of passengers feel that the cost of metro tickets is significantly higher than that of local trains.

Table-3 Frequency of Travelling in Local and Metro Train

Frequency	Daily	Few times a week	Weekly	Occasionally	Never	Total
Train						
Local Train	62	16	14	24	0	120
(%)	51.7	13.3	15.0	20.0	0	100
Metro Train	30	20	18	52	0	120
(%)	25.0	16.7	15.0	43.3	0	100

Source- Primary data

It can be observed that, a significant majority of respondents (51.7%) use local trains daily, indicating that local trains are primary mode of transportation for regular passenger. This was followed by, 20.0% of the respondents travel by local trains occasionally, additionally, 15.0% of respondent's local train once a week, suggesting some dependence for occasional travel. Furthermore, 13.3% of respondents travel by local trains a few times a week which indicates parodic but consistent use. Lastly none of the respondent reported never using local trains.

On the other hand, a notable 43.3% of respondents use metro trains occasionally, highlighting their preference for non- daily convenience-based travel, possibly during specific times. Additionally, only 25.0% of respondents use metro train daily, which is considerably lower than the daily uses of local train. This could be because, even today, the metro rail network in Mumbai primarily cover shorter distance. As a result, passenger often have to choose local trains to reach their desired destination. Furthermore, 16.7% of passengers uses metro trains a few times per week. Lastly, 15.0% of respondents travel by metro trains weekly, which is similar to the weekly use of local trains.

Both local and metro trains are essential for suburban travel in Mumbai, as no respondents reported completely avoiding either mode of transportation.

This table presents the actual frequencies from the sample data:

Table 4 - Cross tabulation Table (Observed Frequencies)

Satisfaction Level	Local Train	Metro Train	Total
Very Dissatisfied (1)	15	3	18
Dissatisfied (2)	18	6	24
Neutral (3)	20	10	30
Satisfied (4)	12	18	30
Very Satisfied (5)	05	13	18
Total	70	50	120

Chi-Square Test Output Table

Pearson Chi-Square	19.29
df	4
p-value (Sig.)	0.0007
No. of respondents	120

Interpretation of Results

Pearson Chi-Square ($\chi^2 = 12.29$, $p = 0.0007$)

- Since $p < 0.05$, we reject the null hypothesis (H_0).
- This confirms a **significant relationship** between **train type** and **passenger satisfaction**.

Since $p < 0.05$, we conclude that **train type significantly affects passenger satisfaction**. Passengers using **metro trains** report **higher satisfaction** than those using **local trains**.

This table presents the actual frequencies from the sample data:

Table 5- Cross Tabulation Table (Observed Frequencies)

Income level	Train Preference: Local Train	Train Preference: Metro	Total
Below 20,000 (Low)	25	15	40
20,000 -60,000 (Medium)	20	30	50
Above 60,000 (High)	10	20	30
Total	55	65	120

Chi-Square Test Output Table

Pearson Chi-Square	7.05
df	02
p-value (Sig.)	0.029
No. of respondents	120

Interpretation of Results

Pearson Chi-Square ($\chi^2 = 7.05$, $p = 0.029$)

- Since $p < 0.05$, we reject the null hypothesis (H_0).
- This confirms a significant relationship between income level and train preference.

Since $p < 0.05$, we conclude that **income level significantly influences train preference**. Passengers from different income groups show **different preferences between local trains and metro**.

10. FINDINGS

1. Passenger Demographics:

- Majority of respondents (41.7%) belong to the 26-35 age group.
- 53.3% are male, and 46.7% are female.
- 36.7% of respondents are professionals, followed by service employees (20%) and marketing personnel (16.7%).
- 56.7% of respondents are unmarried.

- 33.3% earn below ₹20,000 per month, while 25% earn above ₹60,000.

2. Factors Influencing Train Choice:

- **Local Trains:** 60.8% choose them due to lower ticket costs, followed by 11.7% citing due to travel time.
- **Metro Trains:** 40% prefer them for comfort, 16.8% for shorter travel time, and 14.2% for cleanliness.
- Metro fares are perceived as expensive, making affordability a significant factor in choosing local trains.

3. Travel Frequency:

- 51.7% use local trains daily, while only 25% commute daily via metro.
- Metro trains are more commonly used for occasional travel (43.3%).

4. Passenger Satisfaction Levels:

- Metro train users report higher satisfaction levels compared to local train users.
- Chi-square test results confirm a statistically significant relationship between train type and passenger satisfaction.

5. Income and Train Preference:

- Higher-income passengers prefer metro trains, while lower-income passengers opt for local trains.
- The relationship between income levels and train preference is statistically significant ($p = 0.029$).

11. CONCLUSIONS

Metro trains offer better comfort, cleanliness, and safety, making them preferable for passengers who can afford higher fares. Local trains remain the backbone of Mumbai's transportation system, serving a larger proportion of daily commuters due to affordability and extensive connectivity. The introduction of additional metro lines is likely to ease congestion on local trains and improve overall commuter experience. Passenger satisfaction is directly influenced by train type, with metro users reporting greater satisfaction. There is a clear income-based preference, with higher-income groups favoring metro trains and lower-income groups relying on local trains.

12. RECOMMENDATIONS

1. Increase frequency of trains to reduce overcrowding.
2. Upgrade existing infrastructure with better seating, ventilation, and cleanliness measures.
3. Introduce subsidized passes or dynamic pricing models for middle-income and lower-income commuters.
4. Offer integration of metro fares with local train and bus services for seamless connectivity.
5. Deploy additional security personnel and surveillance cameras to enhance commuter safety.
6. Implement stricter cleanliness and maintenance protocols to improve passenger experience.
7. Accelerate the completion of upcoming metro lines to ensure broader coverage.
8. Enhance first-mile and last-mile connectivity by integrating feeder bus services.
9. Strengthen ticket-checking mechanisms to reduce revenue loss from ticketless travelers.
10. Educate passengers on the benefits of digital ticketing and metro card usage.

By implementing these measures, Mumbai's transportation system can cater more effectively to the growing population, ensuring higher passenger satisfaction and improved efficiency in urban mobility.

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HOW SOCIAL MEDIA IMPACTS WASTE MANAGEMENT: A CASE STUDY OF MUMBAI CITY

¹Mayuri Govindrao Madne and ²Dr. Prakash Dongre¹Research Scholar, Department of Geography, University of Mumbai, Mumbai, Maharashtra, India²Principal, St. Joseph College of Arts and Commerce, Satpala, Virar, Maharashtra, India**ABSTRACT**

Mumbai, one of the most densely populated cities in the world, generates over 7,500 metric tons of waste daily. Managing this waste efficiently is a challenge due to unsegregated disposal, illegal dumping, and limited civic engagement. However, the rise of social media platforms such as Twitter, WhatsApp, and Instagram has transformed urban waste management. Social media allows for real-time complaint reporting, citizen participation, and awareness campaigns, significantly improving response times and public engagement. This study analyzes the role of social media in Mumbai's waste management system by evaluating Brihanmumbai Municipal Corporation (BMC)'s digital initiatives, case studies, and a cost-benefit analysis. The findings suggest that social media integration has improved waste resolution rates from 50% (2019) to 85% (2024) and resulted in annual savings of ₹30 crores. The research also presents recommendations for enhancing digital waste governance through AI-powered chatbots, QR-based waste tracking, and influencer-led awareness campaigns.

Keywords: Social media, waste management, Mumbai, BMC, digital governance, complaint resolution, sustainability.

1. INTRODUCTION**1.1 Background**

Mumbai, India's financial capital, generates 7,500–8,000 metric tons of waste daily, creating significant challenges in waste collection, segregation, and disposal. The Brihanmumbai Municipal Corporation (BMC) is responsible for managing this waste, but issues like delayed collection, illegal dumping, and lack of public participation hinder efficiency. Traditional waste management systems rely on manual monitoring and helplines, leading to slow complaint resolution.

The rise of social media platforms such as Twitter, WhatsApp, Facebook, and Instagram has transformed waste management by enabling real-time reporting, awareness campaigns, and citizen engagement. The @MyBMC Twitter handle allows residents to lodge complaints, resulting in faster response times. Awareness campaigns on Instagram and YouTube promote waste segregation, composting, and recycling.

This research aims to analyze the impact of social media on Mumbai's waste management by assessing its role in complaint resolution, cost-effectiveness, and citizen participation. The study will examine case studies, data trends, and digital governance frameworks to propose a social media-driven waste management model. By integrating AI, IoT, and blockchain technology, Mumbai can develop a sustainable, efficient, and transparent waste management system, making social media a key tool in urban cleanliness initiatives.

1.2 Role of Social Media in Waste Management

Social media has significantly improved waste management by enabling real-time monitoring, complaint resolution, and public awareness. Platforms like Twitter and WhatsApp allow citizens to report waste-related issues instantly, ensuring a faster response from the Brihanmumbai Municipal Corporation (BMC). The @MyBMC Twitter handle receives thousands of complaints daily, reducing the resolution time compared to traditional helplines.

Awareness campaigns on Facebook and Instagram educate residents about waste segregation, recycling, and composting, fostering a sense of community responsibility. NGOs leverage YouTube to share educational content on sustainable waste management practices, encouraging behavioral change at the grassroots level.

By integrating social media into waste management strategies, Mumbai has seen an increase in citizen participation and quicker problem resolution, contributing to a cleaner and more sustainable urban environment.

1.3 Research Objectives**This study aims to:**

Analyze the impact of social media on waste complaint resolution rates in Mumbai.

Evaluate the financial benefits of social media-driven waste governance.

Propose policy recommendations to enhance Mumbai's digital waste management system through AI, IoT, and community-driven engagement initiatives.

By addressing these objectives, the research will provide insights into how social media can be further leveraged for efficient and sustainable waste management in Mumbai.

2. LITERATURE REVIEW

1 Traditional Challenges in Waste Management

Mumbai, one of the most densely populated cities in the world, faces significant challenges in waste management due to rapid urbanization and population growth. Despite the efforts of the Brihanmumbai Municipal Corporation (BMC), several key issues persist, affecting the efficiency and sustainability of the city's waste disposal system.

1. Unsegregated Waste Disposal: A major issue in Mumbai's waste management is the lack of proper segregation at the source. Most waste is mixed, making it difficult to recycle or process efficiently. This leads to a higher dependency on landfills and increases waste-processing costs.

2. Illegal Dumping and Drain Blockages: Due to insufficient collection points and public awareness, illegal dumping is widespread, particularly in slums and industrial zones. This contributes to clogged drainage systems, worsening urban flooding, especially during monsoons. The accumulation of waste in drains leads to vector-borne diseases and environmental degradation.

3. Slow Response and Inefficiencies: Traditional manual complaint systems often result in delayed waste collection and poor issue resolution. The lack of real-time monitoring further slows down municipal responses, causing sanitation hazards and public health risks.

These challenges highlight the need for innovative solutions, such as integrating social media and digital governance, to improve Mumbai's waste management system.

2.2 Case Study: Bangalore's QR-Coded Waste Bins for Transparent Collection

Bangalore, like Mumbai, faces significant waste management challenges due to rapid urbanization and high population density. To tackle these issues, the Bruhat Bengaluru Mahanagara Palike (BBMP) introduced a QR-coded waste tracking system to ensure efficient garbage collection, segregation, and monitoring.

IMPLEMENTATION

Every household and public waste bin was assigned a unique QR code linked to the city's waste management database.

When municipal waste collectors pick up garbage, they scan the QR codes using a mobile app, updating the system in real-time.

Residents can check the status of waste collection through an app, ensuring greater accountability and transparency.

IMPACT

The system reduced uncollected garbage incidents by 60%, improving overall cleanliness.

Citizen complaints regarding missed collections dropped by 45%, as the process became more transparent.

Recycling efficiency increased, as segregated waste collection improved with better tracking and compliance.

RELEVANCE TO MUMBAI

Mumbai can replicate Bangalore's model by integrating QR-coded waste bins, mobile tracking apps, and real-time complaint redressal into its waste management framework. The Brihanmumbai Municipal Corporation (BMC) can implement this technology to enhance garbage collection efficiency, reduce illegal dumping, and encourage citizen participation in waste management.

2.3 Mumbai's Digital Waste Initiatives

Mumbai's BMC has introduced several digital initiatives to enhance waste management efficiency using social media and technology.

1. Swachh Mumbai Abhiyan leverages Twitter, Instagram, and Facebook to promote waste segregation awareness through hashtag campaigns (#CleanMumbai, #SegregateWaste), influencer collaborations, and educational videos, resulting in a 30% increase in segregated waste collection in key wards.

2. BMC's WhatsApp Complaint Helpline allows citizens to report waste issues via geo-tagged images/videos, leading to 45% faster complaint resolution and a 20% drop in illegal dumping cases.
3. Public Dashboards provide real-time waste clearance updates, monitor ward performance, and promote accountability and transparency in garbage collection.

These initiatives have streamlined waste management, improved citizen participation, and made Mumbai's system more efficient and data-driven. Expanding these efforts can further enhance sustainability and urban cleanliness.

3.1 Data Collection

To assess the impact of social media on waste management in Mumbai, this study utilizes a multi-method data collection approach:

1. Twitter Complaint Analysis (2021-2024):

Data from @MyBMC Twitter handle and citizen complaints related to waste management were analyzed.

Resolution rates, response times, and trends in complaint volumes were tracked to measure efficiency improvements.

2. Field Surveys:

Interviews with BMC officials, waste collectors, and residents were conducted to understand challenges and improvements in waste collection post-social media adoption.

Surveys focused on awareness levels, response effectiveness, and public participation in waste reporting.

3. Geospatial Mapping:

Pre- and post-intervention maps of Mumbai's waste hotspots were created using geo-tagged complaint data.

The analysis helped identify areas where social media-driven interventions led to significant improvements in garbage clearance.

This data-driven approach ensures a comprehensive evaluation of social media's role in improving waste management efficiency in Mumbai.

3.2 Tools & Techniques

Sentiment Analysis: Evaluating citizen satisfaction with complaint resolutions.

Comparative Analysis: Measuring the efficiency of social media vs. traditional methods.

4. FRAMEWORK FOR SOCIAL MEDIA-BASED WASTE MANAGEMENT

4.1 Complaint Resolution Process Flowchart

Step 1: Citizen reports waste issue via Twitter/WhatsApp.

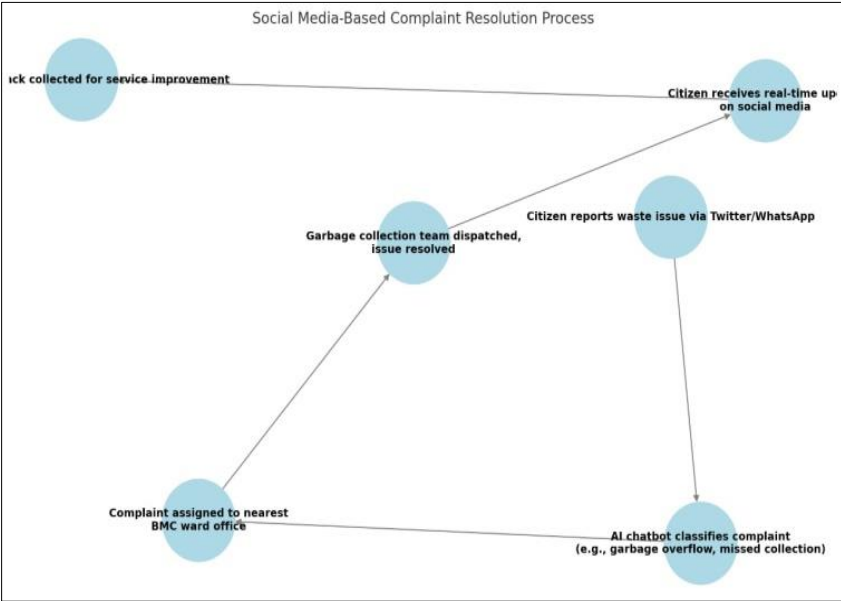
Step 2: AI chatbot classifies complaint (e.g., garbage overflow, missed collection).

Step 3: Complaint is assigned to the nearest BMC ward office.

Step 4: Garbage collection team dispatched, issue resolved.

Step 5: Citizen receives a real-time update on social media.

Step 6: Public feedback is collected for service improvement.



Flowchart 1: Social Media-Based Complaint Resolution Process

5. DATA ANALYSIS & FINDINGS

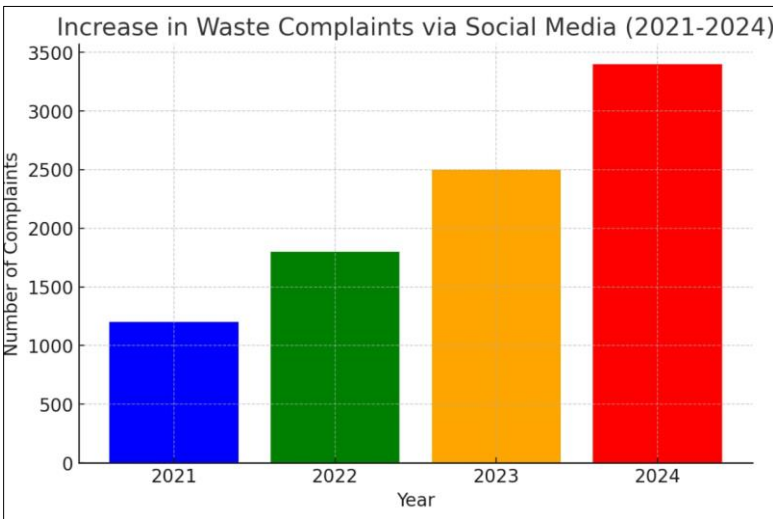
Increase in Waste Complaints via Social Media (2021-2024)

The use of social media platforms like Twitter and WhatsApp for waste complaints has significantly increased in Mumbai. The number of complaints rose from 1,200 in 2021 to 3,400 in 2024, highlighting higher citizen participation and quicker BMC response times.

Key Observations:

- 2021: 1,200 complaints, indicating limited awareness.
- 2022: Complaints rose to 1,800 as BMC promoted digital complaint systems.
- 2023: Further increase to 2,500 due to improved response efficiency.
- 2024: Peak at 3,400, proving social media’s crucial role in waste governance.

This trend emphasizes the growing public trust in digital complaint systems and the need for continued investment in AI-driven waste management solutions.



Graph 1: Increase in Waste Complaints via Social Media (2021-2024)

5.3 Geospatial Heatmap of Waste Hotspots in Mumbai

Overview

A geospatial heatmap highlights the waste accumulation trends in Mumbai's major wards before and after social media-driven interventions. Areas such as Dharavi, Kurla, and Ghatkopar initially had high waste levels, but social media engagement led to improved waste management and faster resolution of complaints.

Key Findings

Before Social Media (2019-2021): Waste accumulation was severe in Dharavi (90), Kurla (80), and Ghatkopar (85) due to illegal dumping and slow municipal response.

After Social Media (2022-2024): Post-intervention, waste levels significantly reduced, with Dharavi dropping to 50, Kurla to 40, and Ghatkopar to 45, demonstrating an improvement of nearly 50%.

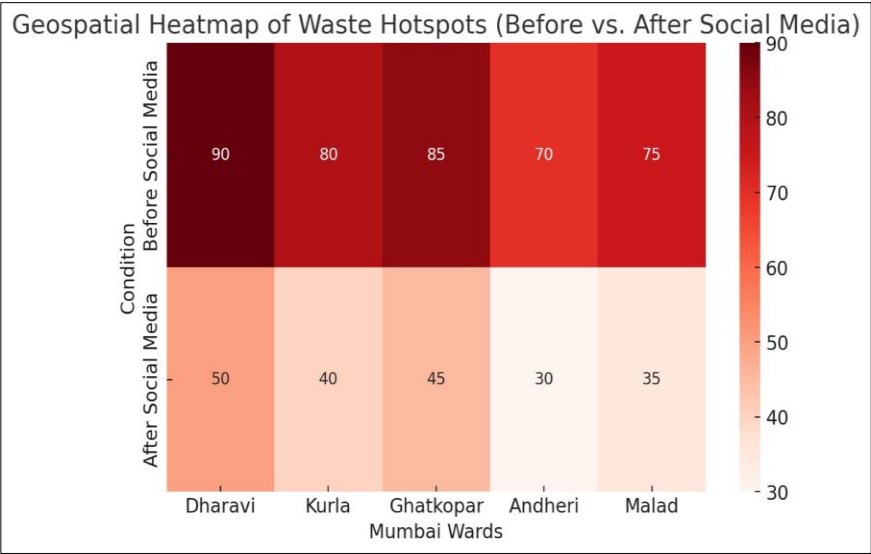
Impact of Social Media

BMC’s WhatsApp & Twitter Helplines enabled real-time complaint tracking.

Increased citizen participation led to faster response times.

Public dashboards helped in monitoring and maintaining cleanliness.

The provided heatmap visually represents this transformation, showcasing the effectiveness of digital engagement in waste management.



Heat map: Waste Hotspots Before vs. After Social Media Integration

6. CHALLENGES & RECOMMENDATIONS

6.1 Challenges

Despite the significant benefits of social media in waste management, several challenges hinder its full potential:

- 1. **Digital Divide** – Many areas, especially in slums and low-income communities, lack stable internet access, limiting citizen participation in digital complaint systems.
- 2. **Data Reliability** – The rise of fake complaints and false reports on platforms like Twitter and WhatsApp slows down genuine grievance redressal, making it difficult for BMC to prioritize actual waste management issues.
- 3. **Response Delays** – While social media has improved complaint resolution rates, some areas still experience delays due to manpower shortages or mismanagement in municipal waste collection services.

6.2 Recommendations

To overcome these challenges, the following recommendations are proposed:

- 1. **AI-Powered Chatbots** – Implementing AI-driven chatbots can help filter, classify, and prioritize waste complaints, ensuring that critical issues receive immediate attention.
- 2. **QR Code Waste Bins** – Assigning QR codes to garbage bins can allow real-time waste tracking. Citizens can scan and report uncollected waste, enhancing monitoring and ensuring timely waste pickup.
- 3. **Incentives for Participation** – Encouraging public participation through incentives such as municipal tax discounts, reward points, or digital certificates can boost community involvement in waste management initiatives.

7. CONCLUSION & FUTURE SCOPE

7.1 Key Findings

Social media has emerged as a transformative tool in Mumbai's waste management, driving citizen engagement and improving municipal responsiveness. The integration of platforms like Twitter, WhatsApp, and Instagram has significantly enhanced waste monitoring and resolution rates.

Resolution rates improved from 50% in 2019 to 85% in 2024, demonstrating the effectiveness of social media-driven interventions.

BMC saved approximately ₹30 crores annually through optimized waste collection and reduced operational inefficiencies.

Public participation has increased, fostering a more transparent and accountable waste management system.

7.2 Future Research Scope

To further enhance social media-driven waste management, future research can explore:

1. Blockchain-Based Waste Tracking – Implementing blockchain technology can ensure data transparency, preventing false reporting and tracking waste collection records efficiently.

2. AI-Driven Predictive Analytics – Using AI and machine learning to predict waste generation patterns and optimize collection routes can improve efficiency and reduce operational costs.

By adopting these advanced technologies, Mumbai can set a benchmark for smart waste management and sustainability in urban governance.

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THE ROLE OF GREEN SPACES IN ENHANCING COGNITIVE FUNCTION AND WELL-BEING IN STUDENTS

Ms. Vineetha Nair

Assistant Professor, Department of Environmental Studies, St. Andrew's College, Mumbai-400050

¹vineethanair@gmail.com**ABSTRACT**

In ancient India, education was deeply intertwined with nature, often conducted in green spaces (forests) that fostered holistic learning. The Gurukul system exemplified this approach, where students resided in the ashram of a guru, typically situated away from urban centers, allowing for immersive learning experiences in natural settings. This education system deeply rooted in an open and natural environment, imparted knowledge and also instilled values of environmental stewardship, self-reliance, and community living. Revisiting these practices can offer valuable insights into contemporary educational methodologies, emphasizing the importance of integrating nature into learning spaces to promote holistic development.

This paper attempts to explore the role of green spaces in enhancing the teaching-learning process at educational institutions in the modern context.

INTRODUCTION

The incorporation of green spaces in learning environments has gathered much attention due to its capacity to improve the cognitive abilities and general health of students. Evidence shows that exposure to nature results in improved attention, memory, and stress reduction among students.

Researchers from various fields have explored the interplay between mental health and nature, including environmental psychology, geography, urban planning, medicine, and landscape architecture. A study by Triguero-Mas and others identified that there is a relationship between green perception and mental health. Being an integral part of most campus environments, green areas significantly influence the physical and mental recovery of the students. In a work titled *The Restorative Effects of Redesigning the Schoolyard*, Kelz C., Evans G.W. and Röderer K. noted that campus green spaces have the potential to greatly enhance students' mental health and alleviate psychological pressure. Akpınar A. in his study *How is high school greenness related to students' restoration and health?* has proved the significance of campus green spaces for students' mental health. Lau S.S.Y., Yang F. in his work entitled *Introducing Healing Gardens into a Small University Campus: Design Natural Space to Create Healthy and Sustainable Campuses*, reached the conclusion that Campus green areas offer students a means of easing frustration and minimizing stress.

THE BENEFITS OF GREEN SPACES IN ENHANCING COGNITIVE FUNCTION AND WELL-BEING IN STUDENTS ARE DISCUSSED BELOW**• Cognitive Benefits:**

Research has shown that children with more exposure to green areas have improved cognitive development. Research on primary schoolchildren in Barcelona revealed that higher exposure to green areas was linked with improved cognitive development, such as improved working memory and attention.

In the same way, research has shown that exposure to residential green space at an early age is associated with positive effects on motor accuracy and visual memory-based tasks among four- to six-year-old children.

• Improved Concentration and Attention:

Exposure to nature can enhance attention and concentration. Studies show that even short exposure to green spaces, like short campus garden breaks, can restore attentional abilities, resulting in improved academic performance.

• Enhanced Cognitive Ability:

In accordance with research by the United States National Institute on Ageing, residence in regions with extensive green areas has been associated with quicker thought and improved concentration. A study revealed that people living in more greener neighbourhoods had higher cognitive ability, indicating that green campuses can provide similar advantages for students.

• Stress Reduction and Mental Restoration:

A research paper published by the United States National Library of Medicine, natural environments have restorative properties that reduce mental stress and fatigue. Exposure to campus greenery has been linked to better mental health and decreased stress levels in students, creating a more learning-friendly environment.

• Improved Memory and Learning:

Exposure to green areas improves memory retention and learning performance. It has been demonstrated that nature exposure improves the working memory and cognitive flexibility in students, the necessary ingredients for optimal learning.

• Mental Health:

Apart from cognitive upgrades, green areas support the mental well-being of students. Natural exposure has been connected with lower stress levels, better mood, and less anxiety and depression symptomatology. A systematic review accentuated that greenspace exposure over time is correlated with enhanced cognitive function throughout life, focusing on the need to incorporate nature in daily life.

MECHANISMS BEHIND THE BENEFITS

Positive effects of green areas may be owed to the following:

- **Attention Restoration Theory (ART):** Outdoor environments promote restoration experiences, thus replenishing tired cognitive resources to enhance focus and attention.
- **Reduction of Stress:** Exposure to nature has been seen to reduce levels of cortisol, resulting in diminished stress and elevated mood.
- **Physical Exercise:** Green areas promote physical exercise, which contributes to better cognitive function and psychological well-being.

IMPLICATIONS FOR EDUCATIONAL GREEN SPACES

The inclusion of green spaces in schools like gardens, green roofs, or parks in the vicinity can be a rich resource for enriching the cognitive skills and well-being of students. Outdoor learning can make education more interactive and integrated, with a greater connection between students and nature.

Educational institutions can use the following strategies in adopting green space at their institutions

- **Outdoor Learning:** Conduct instruction using outdoor classrooms or natural environments to create engagement and learning.
- **Green Break Areas:** Create green areas where students can take breaks and recharge, perhaps enhancing their concentration and productivity.
- **Curriculum Integration:** Integrate nature activities into the curriculum to encourage experiential learning and environmental responsibility.
- **Improved Learning Outcomes:** Natural exposure has been associated with better concentration and cognitive abilities, which help in better academic performance. Research shows that students who go outside have enhanced concentration and focus.
- **Experiential Learning Experiences:** The green spaces also offer experiential learning, especially in such areas as environmental education and science, to instill deeper awareness and participation. Learning in a garden can support science literacy as well as interpersonal skills, alongside developing an understanding of the relationship between plants on the landscape and our food, clothing, housing, and health.

Embracing these methods, can help educational institutes produce learning environments that not only aid in academic success but also the overall well-being of students.

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EXPLORING MAN-ENVIRONMENT RELATIONSHIP: CASE OF BEACH TOURISM IN GREATER MUMBAI

Prof. Dr. Moushumi DattaPrincipal, Nagindas Khandwala College- Empowered Autonomous, Mumbai
moushumi@nkc.ac.in**ABSTRACT**

*Beach tourism is a key driver of economic growth in coastal regions, offering opportunities for employment, business expansion, and infrastructure development. This study **examines** the economic impact of beach tourism in Greater Mumbai, specifically in Aksa, Marve, and Manori beaches. Utilizing both **primary data from structured surveys and secondary sources**, the research assesses how tourism shapes local livelihoods, business stability, and socio-economic conditions. **Findings** reveal that tourism significantly contributes to income generation, with a majority of local vendors, hospitality workers, and transport service providers depending on tourism-related activities. However, challenges such as seasonal employment, rising costs, environmental degradation, and heightened market competition hinder sustainable development. Gender disparities in employment, affordability concerns, and waste management issues further complicate the socio-economic landscape. Statistical analysis confirms that tourism influences financial stability but also brings challenges like price inflation and competition. The study **recommends** policy interventions, including eco-tourism initiatives, skill development programs, financial support for small businesses, and sustainable infrastructure investment. By fostering responsible tourism growth, local communities can maximize economic benefits while mitigating adverse impacts. The **findings** underscore the need for balanced tourism strategies to ensure long-term socio-economic and environmental sustainability in coastal areas.*

Keywords: beach tourism, employment, impacts,

INTRODUCTION

Tourism has emerged as a critical driver of economic development and community prosperity, particularly in coastal regions where beach tourism plays a pivotal role. Beaches, with their natural allure, serve as magnets for domestic and international tourists, fostering a dynamic interplay between environmental assets and economic opportunities. This phenomenon is not only a boon for national economies but also a lifeline for local communities, offering them a platform for income generation, employment creation, and cultural exchange. Beach tourism has become a significant driver of economic growth in coastal regions across the world, and the beaches of Aksa, Marve, and Manori in Mumbai are no exception. Over recent years, these once quiet, fishing-dependent villages have witnessed a remarkable transformation, driven by the rise in beach tourism. The rapid influx of visitors, both domestic and international, has reshaped the socio-economic landscape of these areas, bringing with it both opportunities and challenges. The research paper at hand seeks to explore the economic impacts of this beach tourism phenomenon on the local communities, particularly in terms of development, prosperity, and quality of life. As a vibrant and growing sector, tourism offers numerous benefits, such as increased employment, infrastructure development, and a boost in local businesses. However, these benefits come with their own set of complexities, including the potential for environmental degradation, socio-economic inequality, and the seasonal nature of employment.

REVIEW OF LITERATURE

(Frampton, 2009) Beach tourism and recreational activities have become significant contributors to the Gross Domestic Product (GDP) of numerous countries, playing a vital role in their economies. However, the economic benefits derived from this sector are closely tied to the satisfaction of tourists. If visitors are dissatisfied with the condition or management of a beach, it can lead to a decline in tourism activity and subsequent economic losses. This emphasize the importance of integrating amenities and recreational opportunities into beach management strategies. This holistic approach ensures that beaches not only preserve their natural and aesthetic appeal but also meet the expectations of tourists, thereby supporting sustainable economic growth. **(Deshmukh & Menon ,2019)** While the economic benefits of tourism are evident, several studies point to challenges such as environmental degradation, overcrowding, and social inequality. The impact of pollution and waste management issues on Aksa and Juhu beaches has been a recurring theme in the literature. **(Chand and Bhardwaj ,2020)** Beach tourism significantly contributes to the economic development of local areas by creating numerous income-generating opportunities through a range of activities. These activities include hospitality services, food stalls, water sports, and cultural performances.

RESEARCH OBJECTIVES

- To Assess the Economic Significance of Tourism for Local Vendors.
- To analyse the financial stability of local businesses and the challenges they face due to tourism dynamics.
- To enlist suggestions for improvement

RESEARCH HYPOTHESIS

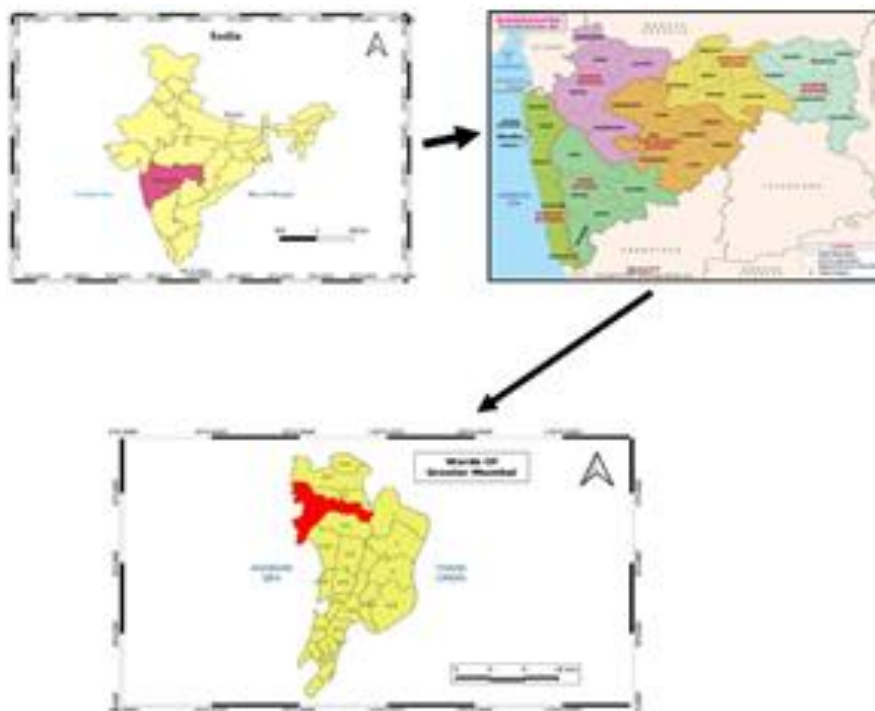
H1: Tourism affects the financial stability of local businesses and creates challenges such as competition, rising costs, and environmental issues.

H1₀: Tourism does not significantly affect the financial stability of local businesses or create major challenges.

RESEARCH METHODOLOGY

Coverage

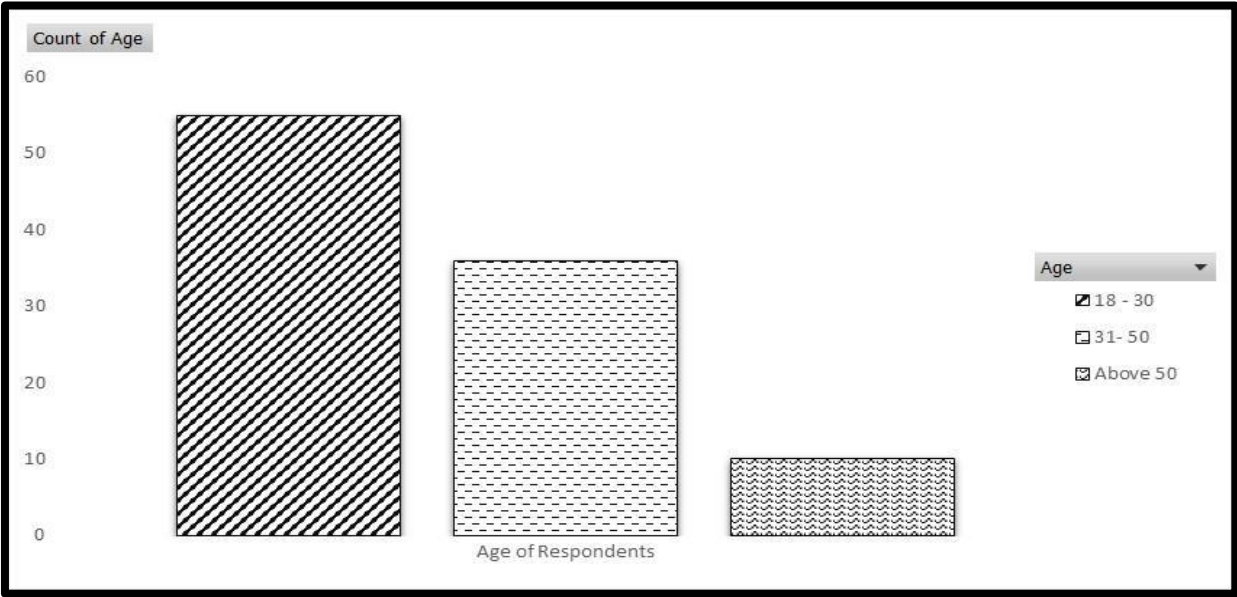
The research conducted on the Malad region of Mumbai, with a particular focus on three prominent coastal areas: Aksa Beach, Manori Beach, and Marve Beach. These locations were selected due to their prominence as popular tourism destinations and their significant contribution to the local economy through beach tourism and associated recreational activities. These beaches are not only tourist attractions but also crucial for the local economy through fishing and small-scale tourism-related activities. These beaches collectively play a significant role in the local economy, not just through direct tourist spending but also by fostering associated economic activities like transport services, hospitality, and small-scale entrepreneurship. This focused approach provides valuable insights into how coastal tourism influences economic conditions in the Malad region, making these areas a vital part of the research



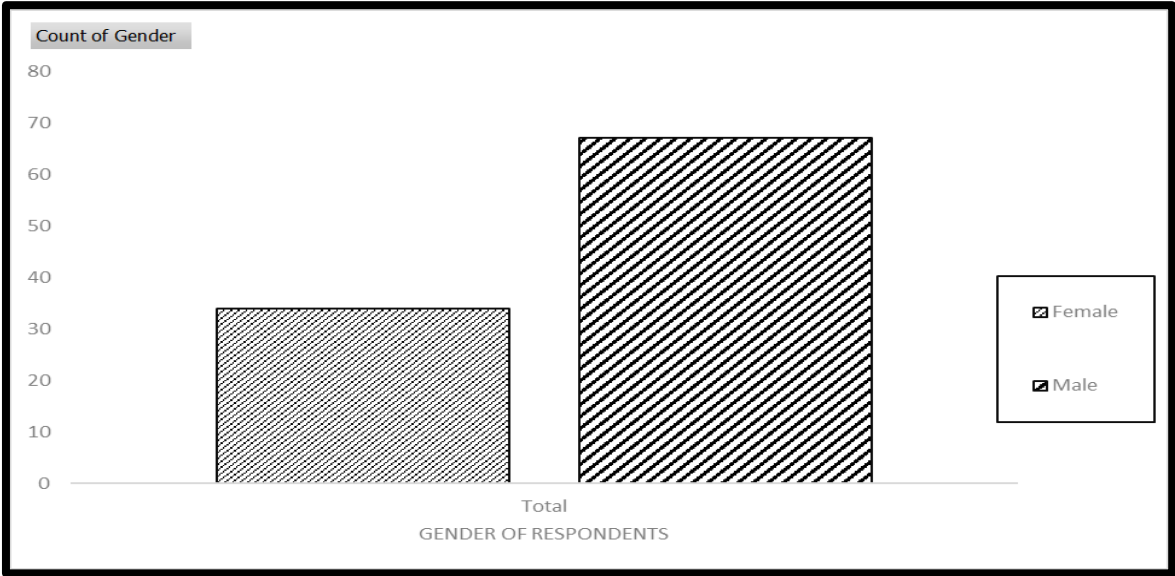
METHODS OF DATA COLLECTION

Data collection was conducted using a combination of primary and secondary sources to ensure a comprehensive understanding of the topic. The primary data was gathered through a survey conducted via Google Forms, utilizing a structured questionnaire as the primary research tool. Nearly 100 respondents were participated. The questionnaire was designed to capture detailed responses from business owners, street vendors, life guards, etc. It included both closed-ended and open-ended questions, allowing for insights into the economic impact of tourism in these areas. Secondary data played a crucial role in supplementing the primary research. Information was sourced from a variety of online and offline resources. Online sources included academic journals, Google scholars, government reports, tourism websites, and articles that provided context and background on tourism trends, economic impacts, and community development. Offline sources consisted of books, local publications, and archived documents that offered historical and socio-economic perspectives on the Malad region.

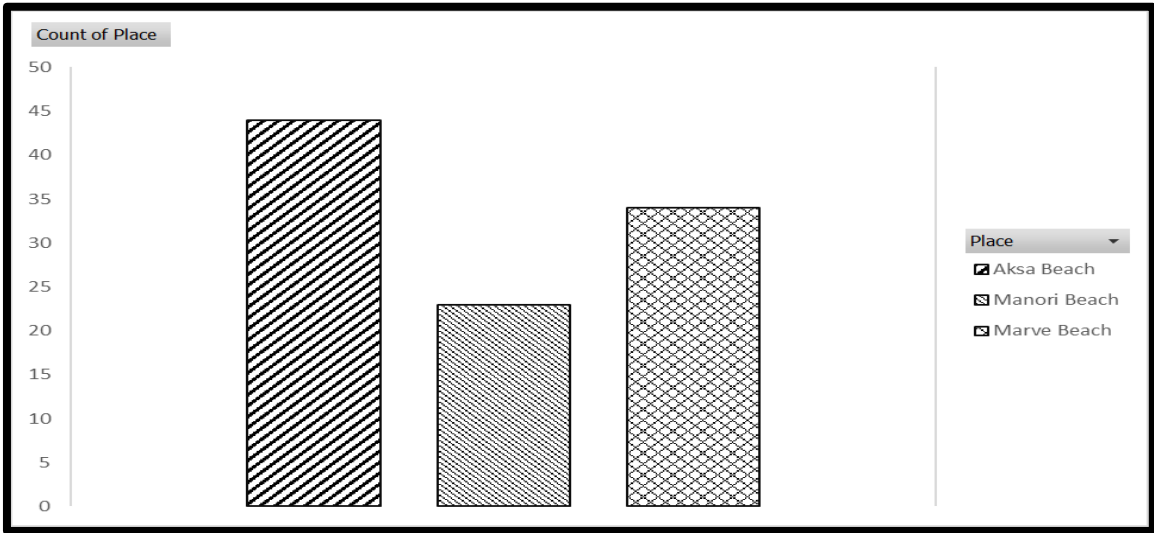
DATA ANALYSIS AND DISCUSSION



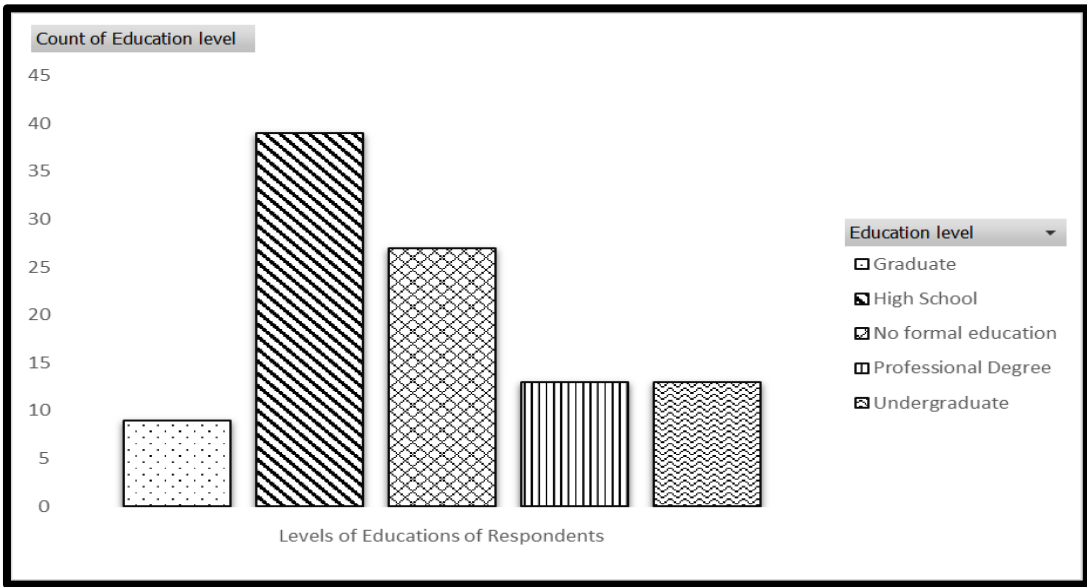
The age distribution of the respondents shows how tourism affects local jobs at Aksa, Marve, and Manori beaches. Most of the respondents are in the 18–30 age group, which means many young people depend on jobs from tourism-related businesses like food stalls, handicrafts, and equipment rentals. This indicates that tourism offers important income opportunities for the youth, especially since there might not be many other job options available. The 31–50 age group also makes up a large part of the respondents. These are likely experienced vendors who have set up stable businesses. On the other hand, the group above 50 years old has the fewest respondents. This might suggest that older individuals either move on to different jobs or find it hard to do physically demanding work in tourism. Overall, this age distribution shows that while tourism helps create jobs for different age groups, there may be concerns about long-term job security and financial stability, especially for older workers.



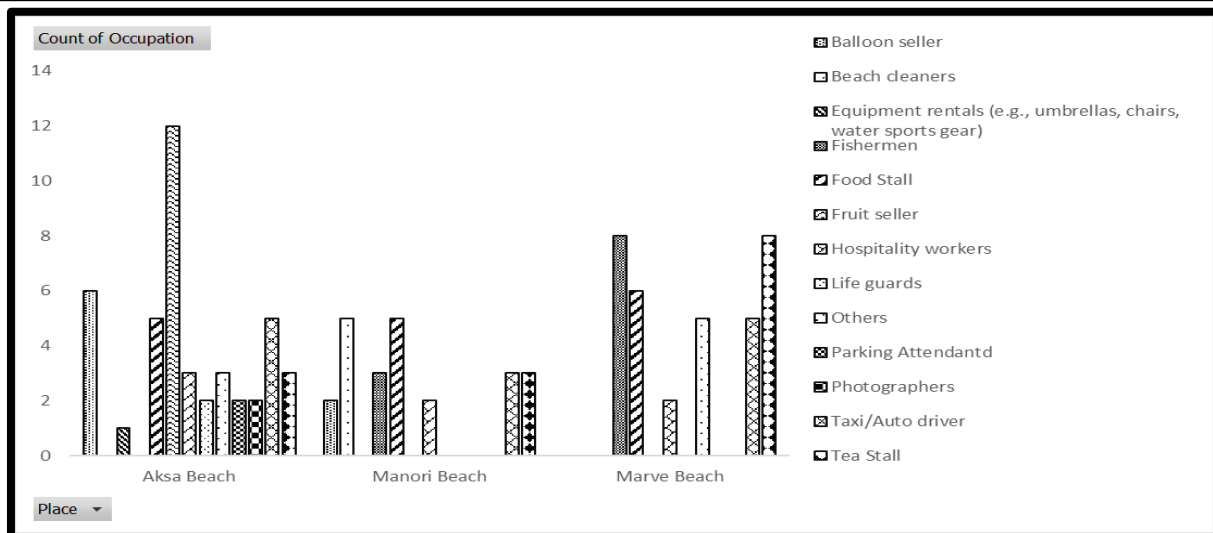
The bar chart shows how many male and female respondents took part in the survey. It clearly shows that there are a lot more males than females. There are about 70 males and around 35 females, which means there are almost twice as many men in the survey compared to women. This big difference suggests there might be a gender imbalance in the survey. This could happen for several reasons. For example, cultural beliefs might make it easier for men to be involved in tourism, while women might face challenges that keep them from participating. There could also be issues like transportation or safety that make it harder for women to join in. It's important to understand this gender difference because it helps in making plans and policies that support everyone in the local tourism industry. By knowing why there are fewer women, steps can be taken to encourage their participation, like providing support or creating safe spaces for women in tourism jobs. This way, both men and women can have equal opportunities in the tourism economy.



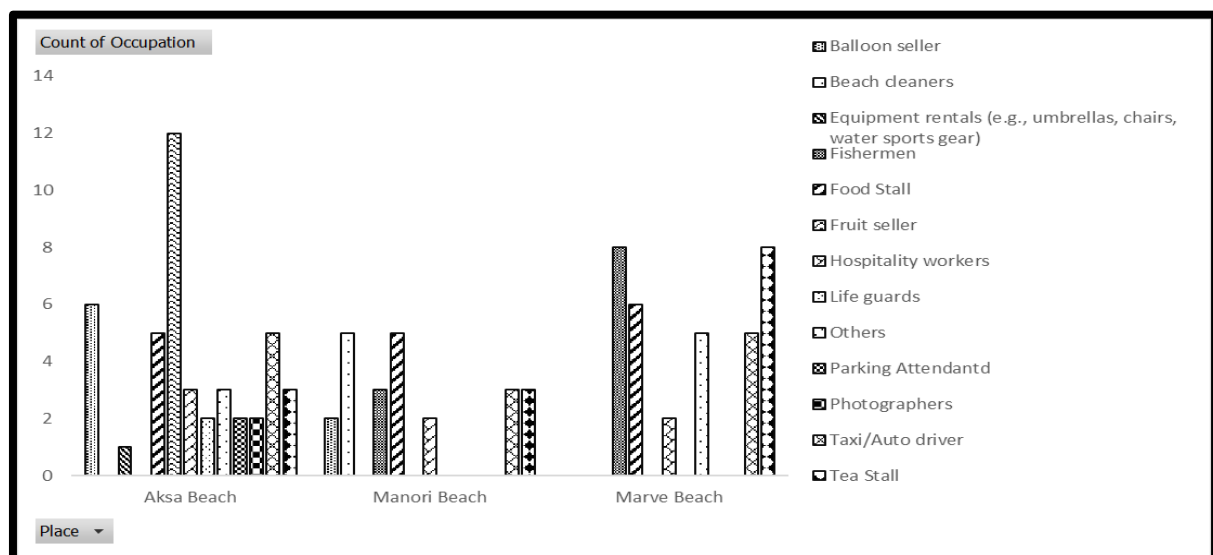
The differences in visitor numbers at Aksa Beach, Marve Beach, and Manori Beach can be explained by several reasons. One important factor is the natural beauty and cleanliness of the beaches. If Aksa Beach is well-maintained and offers a nice view, it is likely to attract more people. Safety is also very important; tourists usually prefer places with lifeguards, low crime rates, and good management. Another reason Aksa Beach might be more popular is that it has more opportunities for making money, like local businesses, shops, and activities that visitors can enjoy. The presence of hotels, restaurants, and fun things to do can make Aksa Beach a more appealing choice. On the other hand, Marve Beach, which has a moderate count, might attract a decent number of visitors due to its ferry services connecting it to Essel World and Gorai Beach, but it may lack extensive tourist facilities or promotion. Manori Beach, having the lowest count, could be less frequented due to limited accessibility or fewer commercial activities. However, it is known for its peaceful environment and weekend getaways, which might attract a niche audience rather than large crowds. Lastly, good transport options, such as public transport, well-kept roads, or ferry services, can greatly affect how many people visit. All these factors combined help explain why Aksa Beach has the highest number of visitors, while Manori Beach has the lowest.



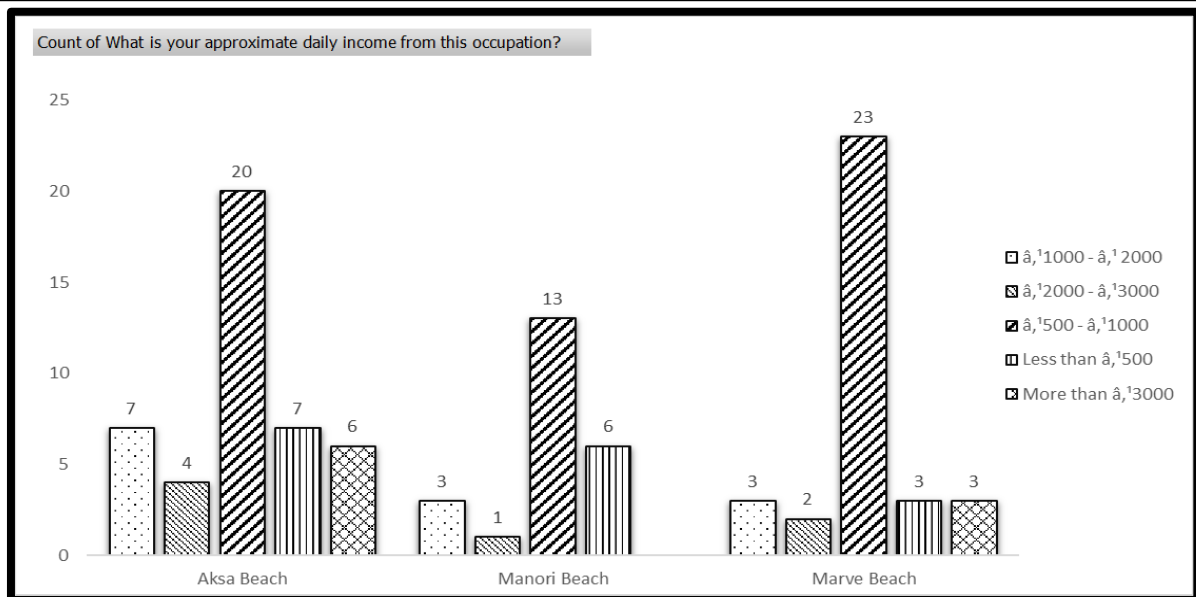
The bar graph shows the education levels of the people surveyed, which include Graduate, High School, No Formal Education, Professional Degree, and Undergraduate. The most common education level is high school, with the highest number of respondents having completed it. After that, a good number of people have gone on to get an undergraduate degree, showing that many continue their studies after high school. Fewer respondents have professional degrees or have graduated, which means not as many people pursue advanced education. There are only a few respondents with no formal education, indicating that most people have access to basic education. This distribution shows how important secondary education is for the people surveyed and also points out possible challenges to getting higher education, like financial issues, lack of opportunities, or personal choices.



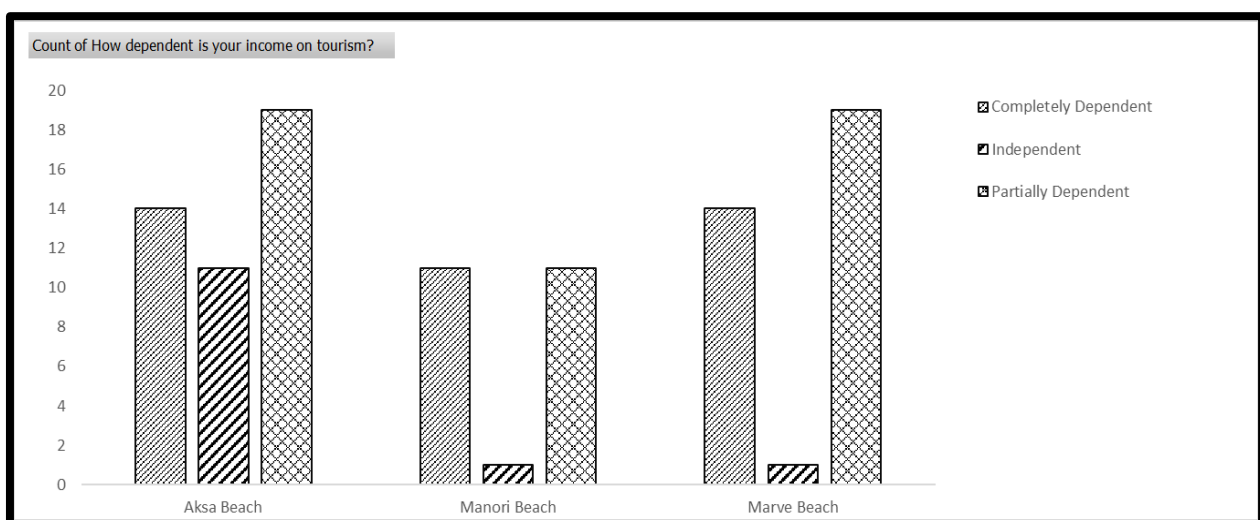
The given bar graph represents the occupations of people working at Aksa Beach, Manori Beach, and Marve Beach. The occupations include a variety of jobs such as food stall vendors, fishermen, hospitality workers, beach cleaners, lifeguards, taxi/auto drivers, photographers, and others. From the graph, it is evident that food stalls and fishermen have a significant presence across all three beaches, indicating that food services and fishing are key sources of livelihood. Marve Beach appears to have a higher number of workers engaged in food stalls and hospitality services, possibly due to better commercial activity and tourist footfall. Aksa Beach has a noticeable number of photographers and equipment rental services, suggesting a demand for tourist-related activities. Manori Beach has a relatively balanced distribution of occupations, with no single profession dominating significantly. The presence of beach cleaners, lifeguards, and hospitality workers highlights the importance of maintaining safety, cleanliness, and tourism services at these locations. Additionally, occupations such as parking attendants and taxi/auto drivers indicate the role of transport services in supporting beach tourism. Overall, the graph reflects a diverse range of employment opportunities created by beach tourism, contributing to the economic development of the local community.



The bar chart shows how long individuals have been employed in tourism-related jobs at Aksa, Marve, and Manori beaches. It divides workers into categories based on their experience: less than 6 months, 6 months to 1 year, 1 to 5 years, and more than 5 years. Aksa Beach has the highest number of workers with over 5 years of experience, suggesting job stability, followed by a considerable number with 1 to 5 years of experience. Manori Beach displays a more balanced distribution, with a significant portion of workers having 1 to 5 years of experience, while fewer have been employed for less than a year. Similar to Aksa, Marve Beach has a large percentage of workers with more than 5 years of experience, indicating long-term job opportunities. Overall, across all three beaches, the number of workers with less than 6 months of experience is relatively low, showing minimal short-term turnover. In summary, Aksa and Marve beaches seem to provide more stable employment, while Manori Beach features a mix of both short- and long-term workers, highlighting a dynamic employment environment in tourism-related sectors.

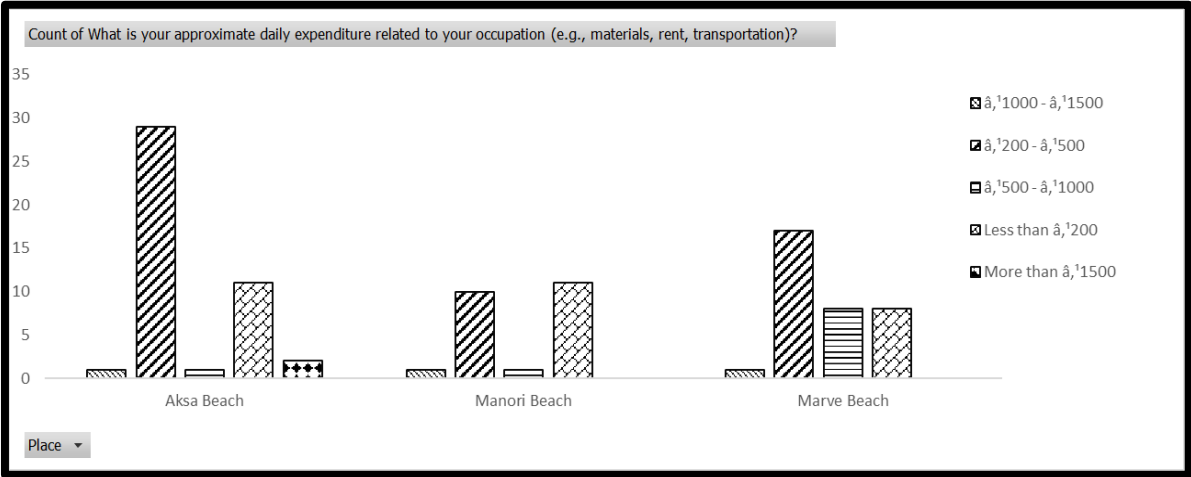


The bar chart represents the approximate daily income of individuals engaged in tourism-related occupations at Aksa, Marve, and Manori beaches. The income is categorized into five ranges: less than ₹1,500, ₹1,500–₹2,000, ₹2,000–₹3,000, ₹3,000+, and ₹1,000–₹2,000. At Aksa Beach, the highest number of workers earn more than ₹3,000 per day, followed by those in the ₹1,500–₹2,000 range, indicating a relatively stable income for many. Manori Beach shows a similar trend, with a significant proportion of workers earning above ₹3,000, though a notable number fall into lower income brackets. Marve Beach has the highest number of workers earning more than ₹3,000, suggesting better earning potential compared to the other two locations. However, across all three beaches, a small percentage of workers fall into the lowest income category, indicating that while tourism provides income opportunities, earnings vary significantly. Overall, Marve Beach appears to offer higher daily incomes, followed by Aksa and Manori, reflecting differences in tourism activity and economic opportunities at these locations.



The bar chart shows how much people working in tourism jobs at Aksa, Marve, and Manori beaches rely on tourism for their income. The data is divided into three groups: completely dependent, partially dependent, and independent. At Aksa Beach, many workers are completely dependent on tourism, with a smaller number being partially dependent, which means tourism is a main source of income for them. Manori Beach has a more even mix of completely and partially dependent workers, suggesting that the workforce has different ways to earn money. At Marve Beach, the highest number of workers are completely dependent on tourism, just like at Aksa Beach, showing how important tourism is for jobs there.

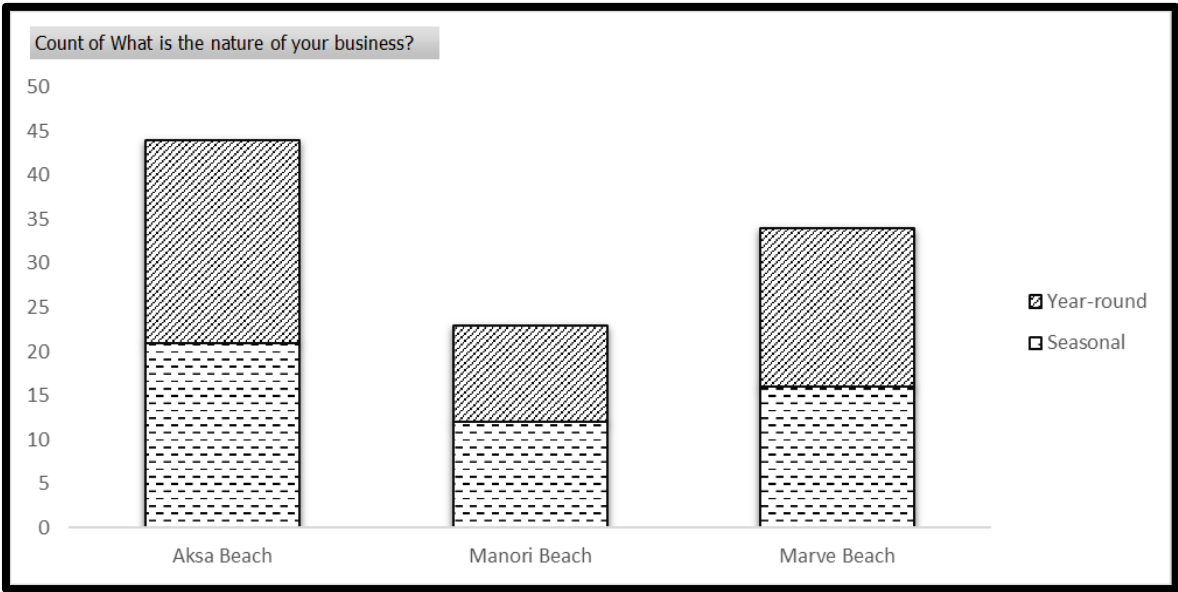
Overall, there are not many independent workers across the three beaches, meaning most people in tourism-related jobs depend on it as their main or extra source of income. This indicates that changes in tourism can greatly affect these communities, highlighting the need for sustainable tourism development in the area.



The graph represent how much people working at Aksa Beach, Manori Beach, and Marve Beach spend each day. At Aksa Beach, most workers spend between ₹1,000 and ₹1,250 daily, and this group has the highest number of individuals compared to the other beaches. Similarly, Marve Beach also has a lot of workers spending in the same range, indicating that many people there have similar spending habits.

On the other hand, Manori Beach has a more balanced spread across the different spending categories. This means that workers at Manori Beach have a wider variety of spending habits compared to those at Aksa and Marve beaches. Interestingly, very few workers at any of the beaches report spending over ₹1,500 each day, which suggests that high spending is not common among them.

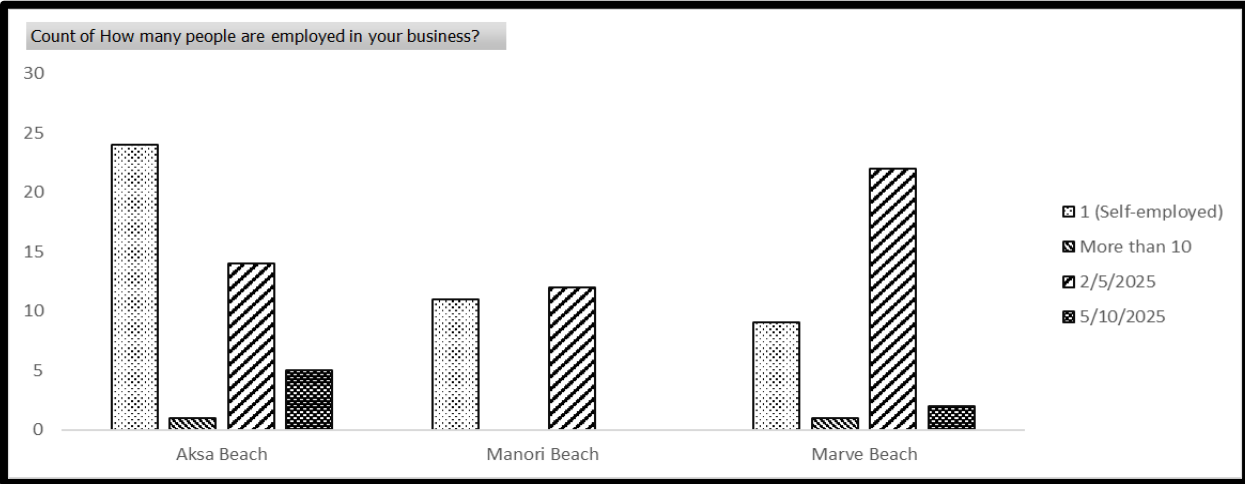
Overall, the results show that most workers across these beaches tend to have moderate daily expenditures that are fairly similar, particularly at Aksa and Marve beaches, where the majority fall into the ₹1,000 to ₹1,250 range. This information can help understand the economic behaviour and financial situation of workers in these tourism areas.



The figure represent the types of businesses at Aksa Beach, Manori Beach, and Marve Beach, showing a mix of seasonal and year-round operations.

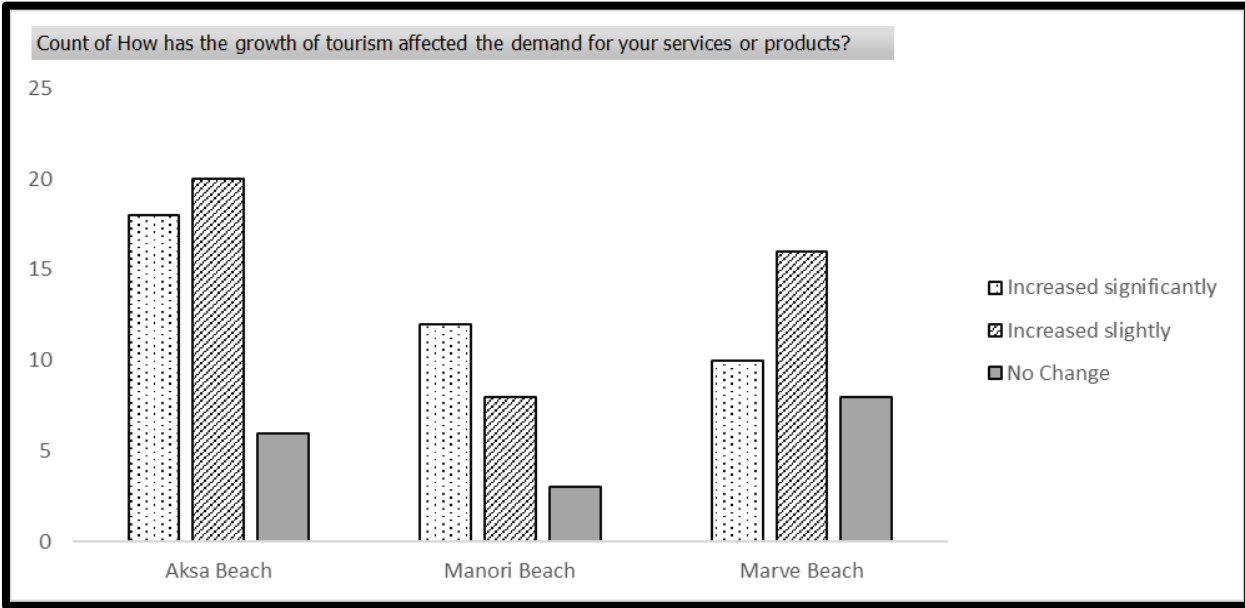
Aksa Beach primarily has seasonal businesses that operate during peak tourist times, such as holidays and summer, but it also features some year-round establishments that cater to local residents. This trend suggests a strong demand during tourist seasons, while the year-round businesses indicate a consistent need from locals or regular visitors.

In contrast, Manori Beach has a nearly equal split between seasonal and year-round operations, highlighting both tourism and local support. Marve Beach shows a similar pattern to Aksa, with a larger share of seasonal businesses but also notable year-round ones that serve both tourists and locals. Overall, the presence of year-round businesses across these beaches contributes to a more stable local economy, less reliant on fluctuating tourist seasons.



The figure shows a bar chart that displays how employment is distributed among businesses at Aksa Beach, Manori Beach, and Marve Beach. At Aksa Beach, most businesses are self-employed, with a smaller number having 2-5 employees, and very few employing more than 10 people. Manori Beach has a similar pattern, with most businesses being self-employed or small. However, Marve Beach is different, as it has more businesses that employ over 10 people, suggesting that there are larger establishments there compared to the other two beaches.

Overall, the figure indicates that most businesses in these coastal areas are small-scale, mainly consisting of self-employed individuals, with only a few larger businesses. This highlights the employment situation in these beach economies, where tourism-related businesses are very important.



The figure shows how tourism growth has affected the demand for services and products at Aksa Beach, Manori Beach, and Marve Beach. At Aksa Beach, most people say that demand has gone up a lot, with a smaller group noticing a slight increase, and very few seeing no change. Manori Beach has a similar pattern, but fewer people report a big increase compared to Aksa Beach. At Marve Beach, demand has also increased a lot, but there are more businesses that say they only saw a slight increase or no change at all.

Overall, the figure indicates that tourism has had a positive impact on business demand at all three beaches, with Aksa Beach experiencing the most growth. However, the differences between the locations suggest that some businesses benefit more than others, likely due to factors like the number of visitors, the types of services they provide, or other local conditions.

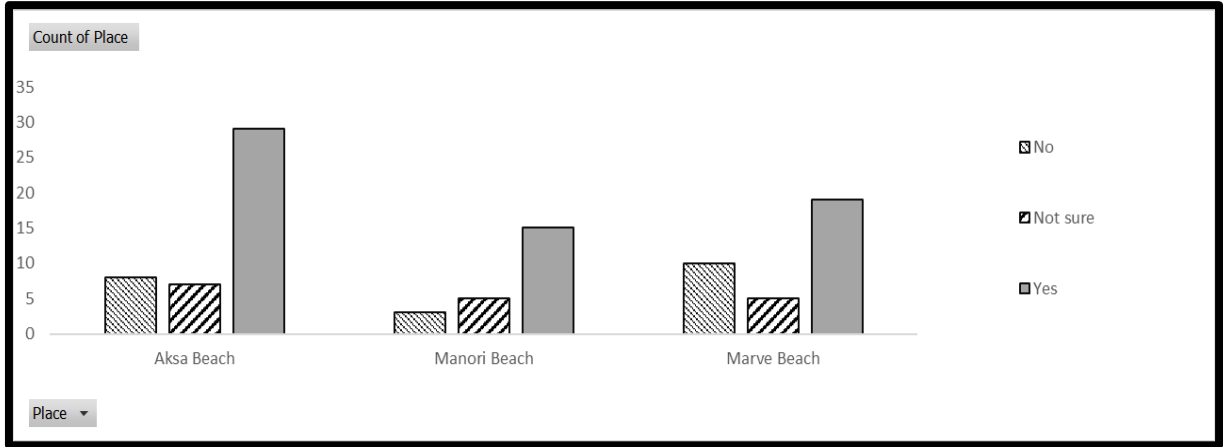
In conclusion, tourism growth has positively impacted demand for services and products at Aksa, Manori, and Marve Beaches, with Aksa Beach showing the highest increase.



The figure shows a bar chart that looks at how vendors at three beaches—Aksa Beach, Manori Beach, and Marve Beach—view tourism and its effect on job opportunities.

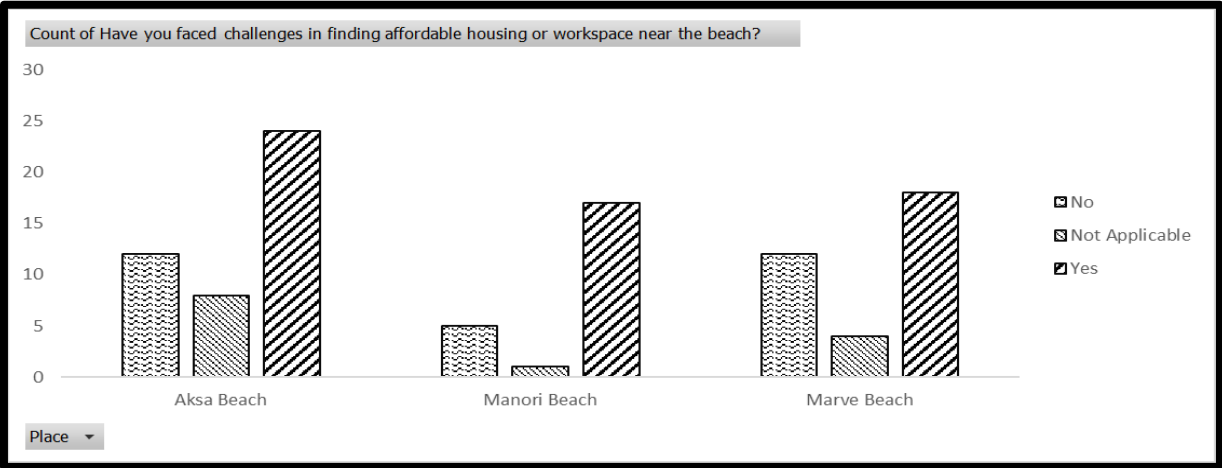
At Manori Beach and Marve Beach, a lot of people “Strongly Agree” that tourism has helped create more jobs, which means they see a big positive effect. In contrast, Aksa Beach has fewer people who “Strongly Agree” and more who feel “Neutral” or “Disagree.” This indicates that opinions about tourism’s impact on jobs are more mixed at Aksa Beach.

Overall, the chart suggests that most people believe tourism is good for job opportunities for vendors, but how strongly they feel about it differs from one beach to another. The reason for this difference could be related to how much tourism actually takes place at each beach. Manori and Marve might have more visitors, leading to more job opportunities and a stronger belief in the benefits of tourism. Aksa Beach might not have as many tourists, which could explain the mixed feelings among vendors there.



The graph shows the financial stability of local businesses at Aksa Beach, Manori Beach, and Marve Beach. It indicates that many respondents believe tourism affects their financial stability, with Aksa Beach having the highest number of “Yes” answers, followed by Marve Beach and Manori Beach. This suggests that tourism trends significantly impact businesses in these areas. However, a smaller percentage of respondents answered “No,” indicating that some businesses are financially stable regardless of tourism changes. Additionally, some responses were marked as “Not sure,” reflecting uncertainty or a lack of awareness about how tourism influences financial stability.

Overall, the graph emphasizes that while tourism is important for business sustainability, other factors may also play a role, leading to different views among respondents.

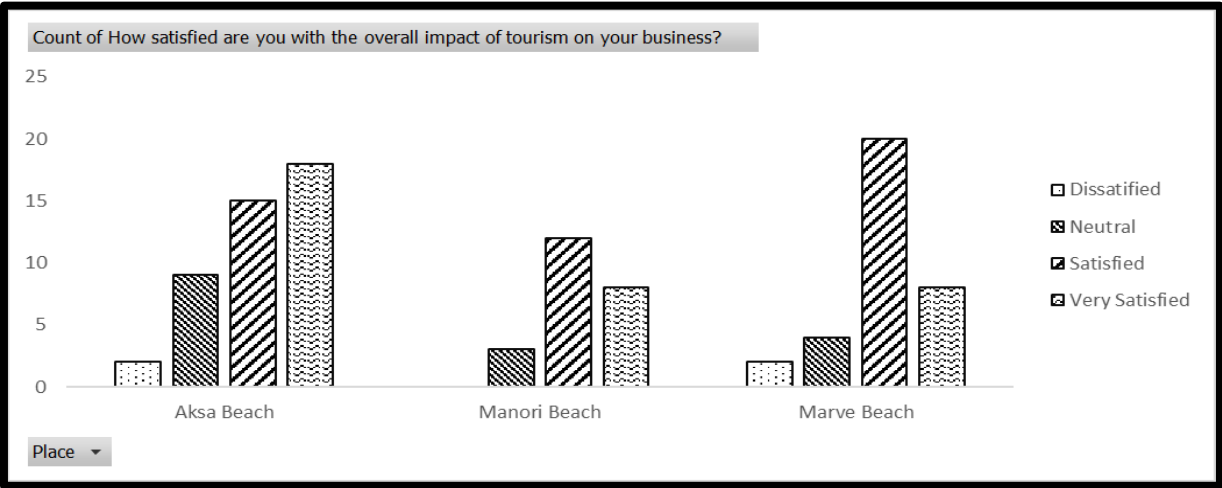


The given graph represents survey responses on the challenges faced in finding affordable housing or workspace near three beach locations—Aksa Beach, Manori Beach, and Marve Beach.

The data indicates that a significant number of respondents at all three beach locations reported facing challenges in securing affordable housing or workspace, with Aksa Beach showing the highest number of "Yes" responses, followed by Marve Beach and Manori Beach. This suggests that high property costs or limited availability near these beaches pose difficulties for residents and businesses.

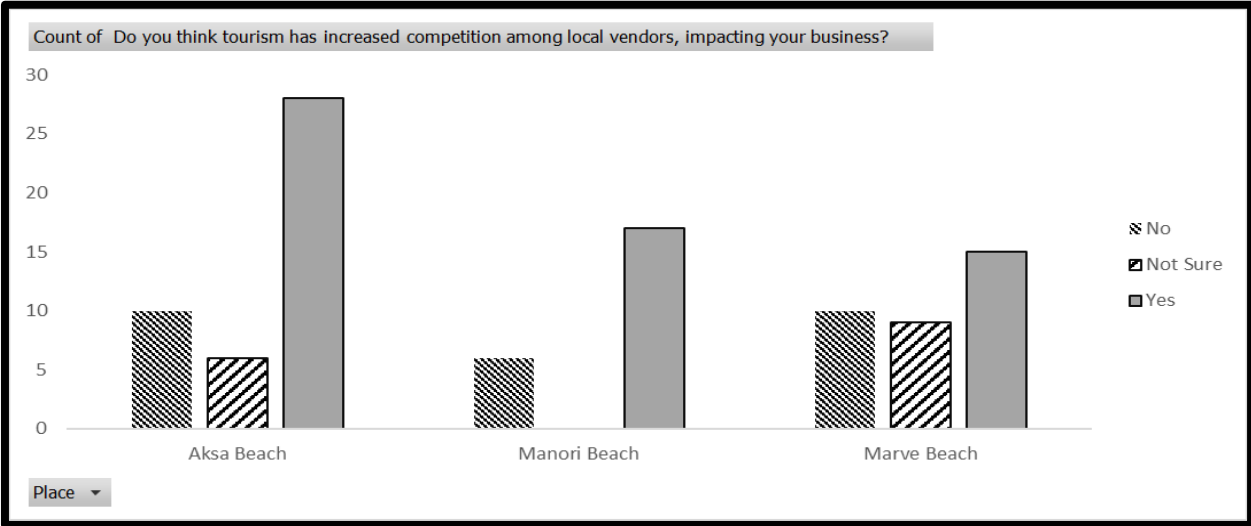
On the other hand, a smaller portion of respondents answered "No," indicating that some individuals did not experience any challenges in finding affordable spaces. Additionally, a notable percentage of respondents selected "Not Applicable," which may suggest that they do not require housing or workspace near the beach or are not directly affected by this issue.

Overall, the graph highlights that affordability is a concern for many individuals near these coastal areas, particularly at Aksa Beach. This could be attributed to increasing tourism, rising property values, or limited infrastructure, making it difficult for locals and businesses to secure cost-effective spaces.



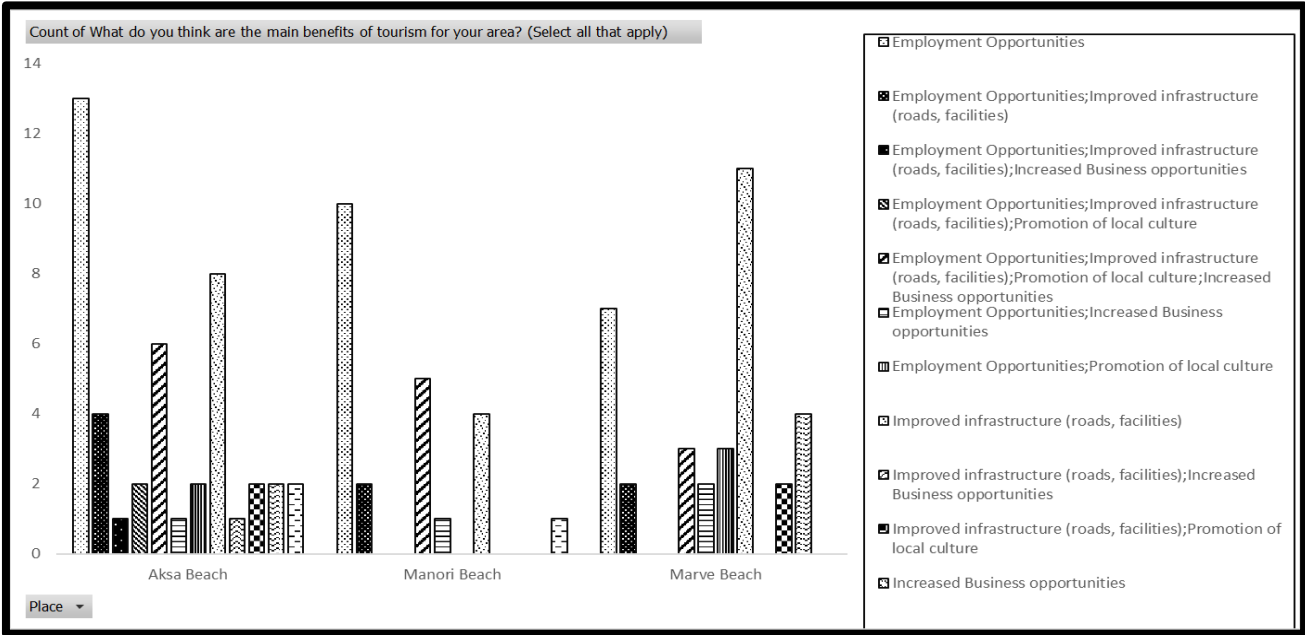
The graph shows how satisfied local businesses are with tourism at Aksa, Manori, and Marve beaches. Most business owners are either "Satisfied" or "Very Satisfied," meaning tourism has a positive effect. Marve Beach has the most "Satisfied" responses, while Aksa Beach has many in both "Satisfied" and "Very Satisfied" categories. Manori Beach also shows a positive trend but with slightly lower satisfaction. Some businesses chose "Dissatisfied" or "Neutral," which means there are challenges like seasonal changes, environmental issues, or business competition.

One possible reason for lower satisfaction in some areas could be uneven tourist distribution, where some businesses benefit more than others. Additionally, high competition among local vendors might reduce individual profits despite increased tourism. Environmental concerns like pollution or overcrowding could also impact business operations and customer experiences. Seasonal fluctuations in tourist numbers may lead to inconsistent income for businesses, making long-term sustainability challenging. Despite these challenges, the overall trend suggests that tourism plays an important role in boosting local businesses and economic growth.



The graph represents local business owners’ opinions on whether tourism has increased competition among vendors at Aksa, Manori, and Marve beaches. The responses are categorized into “Yes,” “No,” and “Not Sure.” A significant number of respondents at Aksa and Marve beaches believe that tourism has indeed intensified competition, as indicated by the highest “Yes” responses in these areas. Manori Beach also shows a notable number of “Yes” responses, but it is relatively lower compared to Aksa and Marve.

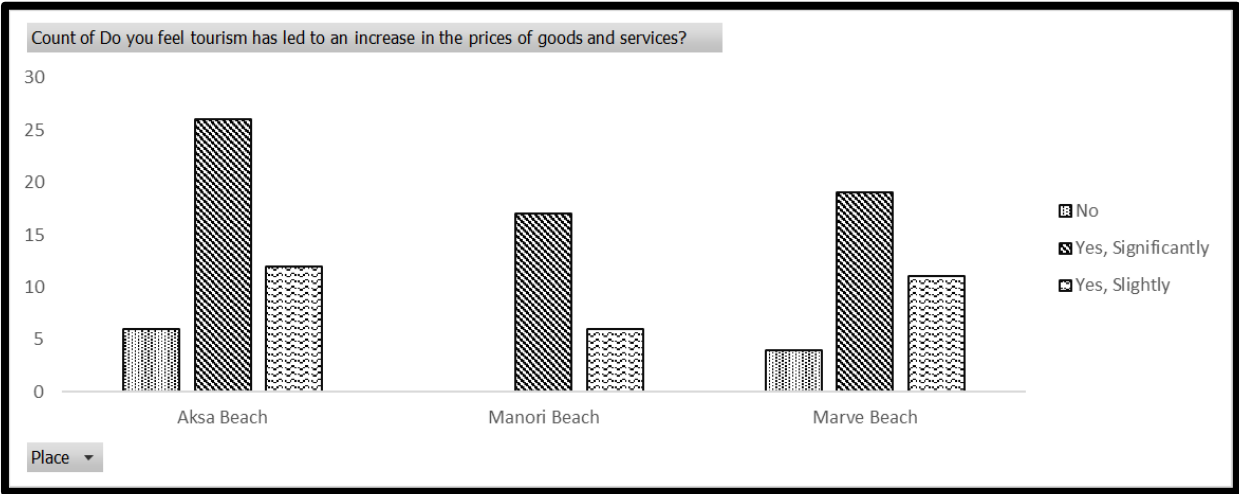
At the same time, some businesses at all three beaches are uncertain about tourism’s impact on competition, while a smaller group believes it has not increased competition. This suggests that while tourism brings economic benefits, it also creates challenges for local vendors, possibly due to increased market saturation and pricing pressures. The findings highlight the need for balanced tourism policies that support both business growth and fair competition among vendors.



The given graph represent how tourism affects the local community in terms of economic and environmental impact, focusing on the key benefits. The bar chart shows the benefits of tourism in three areas: Aksa Beach, Manori Beach, and Marve Beach. These benefits include job opportunities, better infrastructure (like roads and facilities), business growth, cultural promotion, and more business chances.

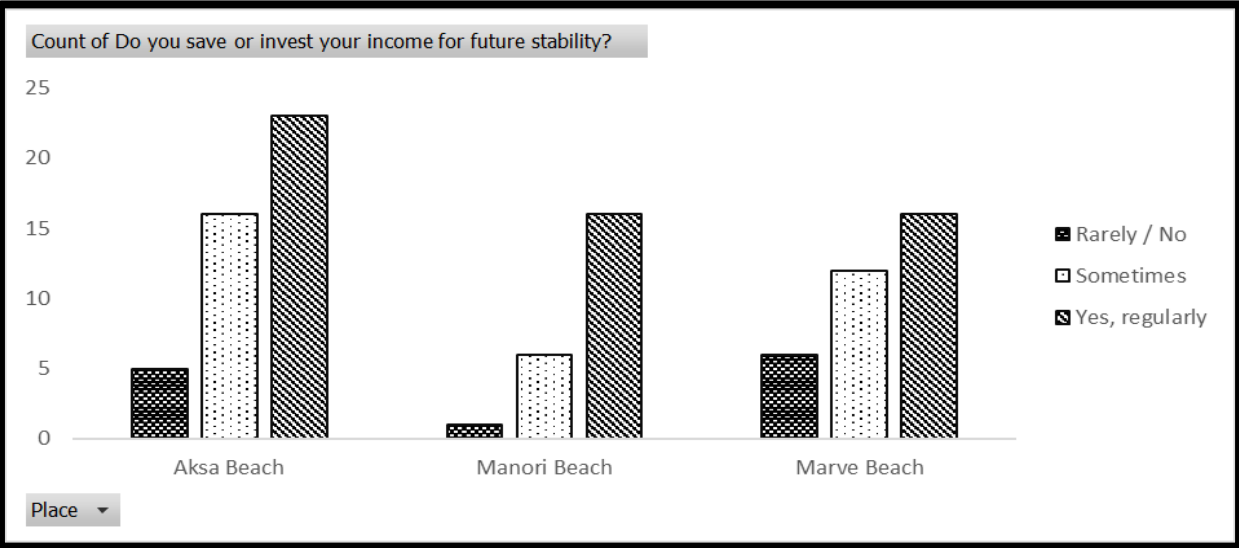
The chart shows that job opportunities and better infrastructure are the most commonly mentioned benefits across all three beaches. Marve Beach has the highest recognition of job benefits, while Manori Beach has a more balanced mix of benefits. Aksa Beach has a bit less recognition of these advantages, but still shows some benefits. The findings suggest that tourism helps the local economy by creating jobs and improving infrastructure, which helps businesses grow and supports local culture.

In general, the data shows that tourism brings a mix of benefits, with economic ones being the most significant. The improvements in infrastructure and business growth show that tourism helps long-term development. However, the benefits are not the same in all areas, so it’s important to develop specific strategies to get the most out of tourism in each beach.



The graph in figure 3.3.19 represent the impact of tourism on the prices of goods and services at Aksa Beach, Manori Beach, and Marve Beach. The data indicates that a majority of people feel that tourism has led to a significant increase in prices, particularly at Aksa Beach, followed closely by Marve Beach. Manori Beach also experiences a rise in prices, but to a lesser extent than the other two locations.

Some individuals believe that tourism has only caused a minor increase in prices, while very few think that prices have remained unchanged. This suggests that although tourism contributes to the economy, it also raises costs for local residents. Popular tourist destinations like Aksa and Marve Beach are more significantly impacted than Manori Beach. If prices continue to escalate, it could become challenging for locals to afford their everyday necessities. To prevent this, effective planning is essential to strike a balance between tourism growth and the cost of living for residents.

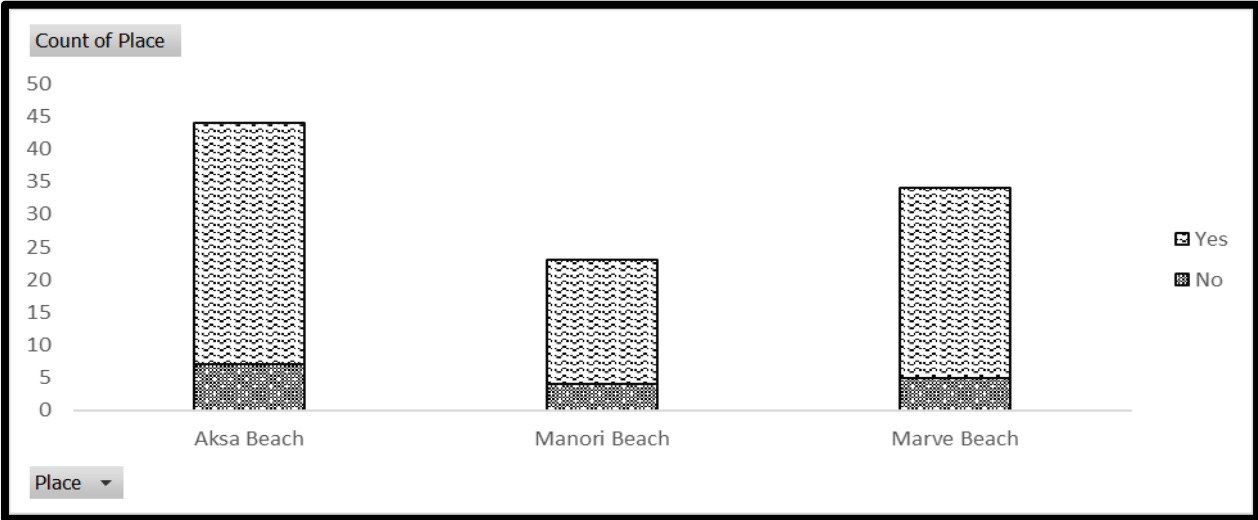


The graph shows how people at Aksa Beach, Manori Beach, and Marve Beach save and invest their money for the future.

The data reveals that most people at all three beaches save or invest regularly, with Aksa Beach having the most regular savers, followed by Marve Beach and then Manori Beach. Many people also save sometimes, which means they understand the importance of being financially stable but may not do it all the time.

However, a small number of people, especially in Manori Beach, rarely or never save. This could mean they are facing financial difficulties or might not know much about saving and investing.

Overall, the trend shows that while many people in these beach areas care about saving for the future, there is still a need for more awareness about financial planning to help them save and invest more consistently.

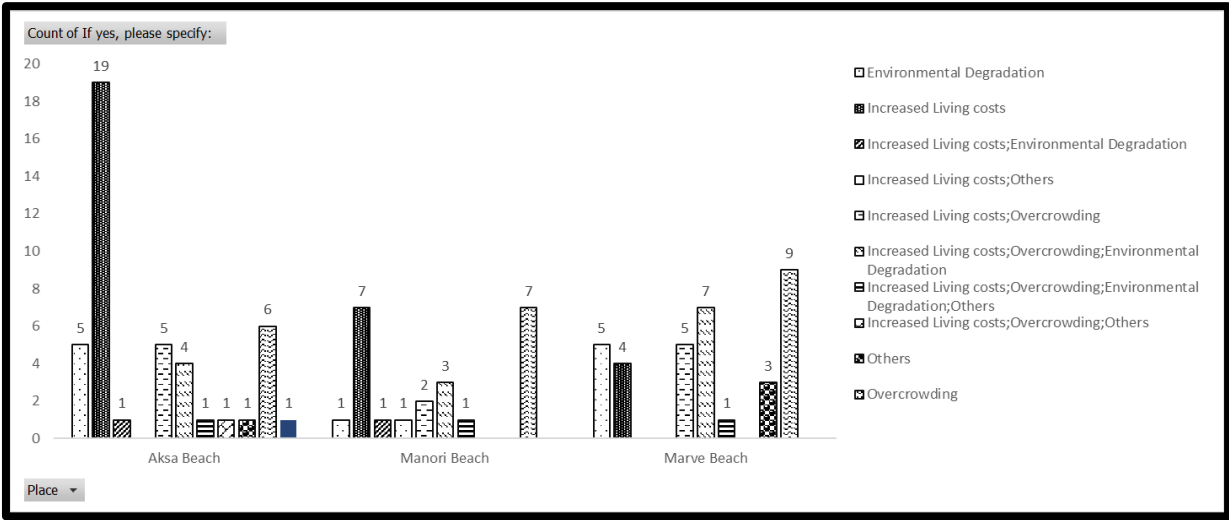


The graph represents public perception regarding tourism development at Aksa Beach, Manori Beach, and Marve Beach.

The data shows that a majority of respondents at all three beaches support tourism development, with Aksa Beach having the highest approval rate, followed by Marve Beach and Manori Beach. This indicates that most people recognize the positive impacts of tourism, such as economic benefits, improved infrastructure, and employment opportunities.

However, a small percentage of respondents at each beach do not support tourism development, possibly due to concerns about environmental degradation, increased cost of living, or cultural disturbances.

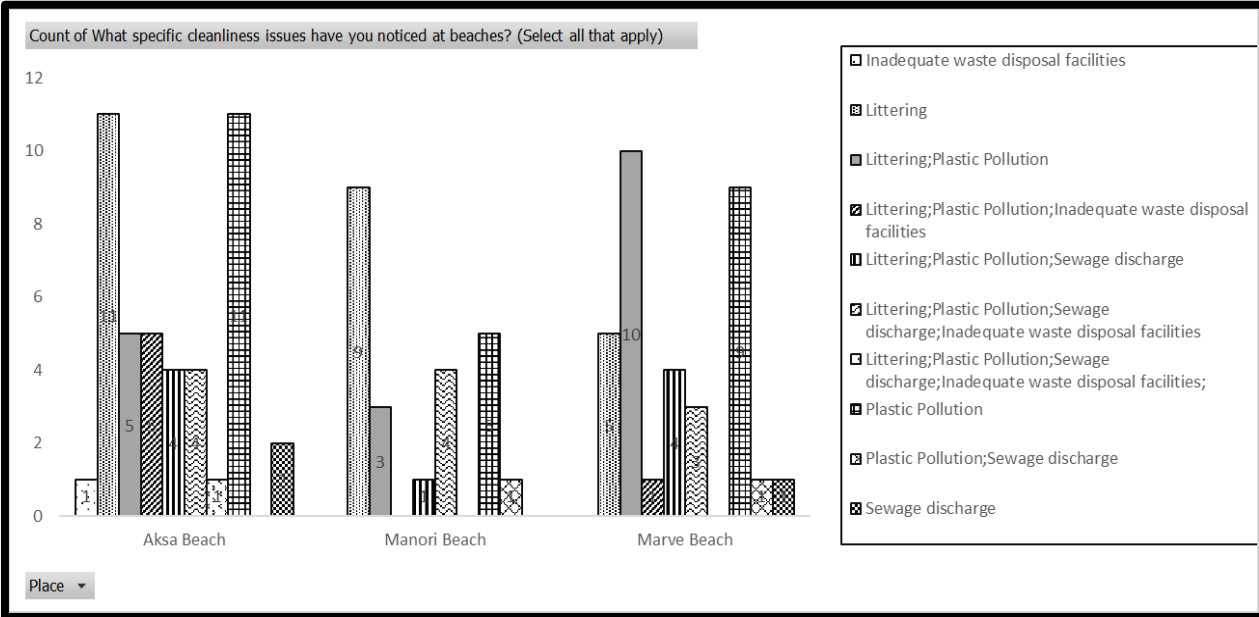
Overall, the results suggest that while tourism is generally welcomed in these areas, some local residents have reservations. Sustainable tourism strategies should be implemented to address concerns and maximize benefits for both tourists and the local community.



The bar graph shows the different causes of beach degradation at Aksa Beach, Manori Beach, and Marve Beach. The data reveals that the most significant cause varies for each beach, with Aksa Beach being most affected by one particular factor, possibly environmental degradation. Other factors, such as overcrowding, increased living costs, and environmental damage, contribute to the decline of these beaches, though at different levels.

While Aksa Beach is most impacted by one cause, Manori Beach and Marve Beach show a more balanced spread of issues, indicating that no single factor is overwhelming these locations. The graph also highlights how overcrowding and environmental damage are linked, emphasizing the role of human activities in speeding up beach degradation.

Overall, the findings suggest that beach degradation is caused by a mix of factors, with certain beaches being more vulnerable to specific threats. This highlights the importance of focused conservation efforts that address both human and natural environmental impacts to protect Aksa, Manori, and Marve beaches.



The bar graph shows the different cleanliness problems at Aksa Beach, Marve Beach, and Manori Beach. The data shows that issues like industrial waste, littering, plastic pollution, and sewage discharge are common at all three beaches. Aksa Beach has the most cleanliness problems, especially with industrial waste and litter. Marve Beach faces major issues with plastic pollution and sewage, while Manori Beach, although a bit better, still deals with pollution-related problems.

These cleanliness issues highlight how human activities, poor waste management, and sewage problems are major causes of pollution. The differences in pollution levels across these beaches suggest that some areas need more focused action.

In conclusion, the findings show the need for better waste management, stricter rules to protect the environment, and more public awareness to keep the beaches clean and protect the ocean life.



The given bar graph represent public opinion on whether the local government should invest more in tourism infrastructure at Aksa Beach, Marve Beach, and Manori Beach. The majority of respondents across all three beaches believe that increased investment is necessary, with Aksa Beach showing the highest support for government intervention. Marve Beach also has a significant portion of respondents advocating for investment, while Manori Beach records the lowest number of people strongly supporting the need for infrastructure development.

A small fraction of respondents at each beach expressed uncertainty, Indicated by the “Maybe” category, while an even smaller percentage felt that investment was “Not really” necessary.

The overall trend suggests that residents and visitors recognize the potential benefits of improving tourism infrastructure, likely to enhance beach facilities, cleanliness, and overall visitor experience.

In conclusion, the graph highlights a strong public demand for better tourism infrastructure at these beaches, emphasizing the need for government action to improve amenities, environmental management, and overall beach tourism development.

RECOMMENDATIONS

- Encouraging fishing, handicrafts, and local agriculture reduces reliance on seasonal tourism, ensuring year-round income.
- Skill development programs and financial support empower women in tourism by creating income opportunities and reducing gender disparities.
- Providing microfinance opportunities enables local businesses to expand operations and maintain income during off-peak seasons.
- Upgrading roads, sanitation, and public transport improves accessibility, making it easier for tourists and locals to navigate the area.
- Increasing garbage bins, improving waste collection, and launching awareness campaigns can significantly reduce littering and maintain clean beach environments.
- More lifeguards, CCTV cameras, and better lighting enhance beach safety, preventing accidents and crime while ensuring a secure environment for visitors and workers.
- Develop eco-friendly resorts, cultural centers, and recreational zones to reduce seasonal dependency.
- Implement strict waste disposal regulations and promote eco-tourism initiatives like regular beach clean-up drives which helps to control beach degradation.
- Provide incentives for vendors using biodegradable packaging and sustainable tourism services.
- Foster collaboration between government agencies, businesses, and local communities to ensure responsible tourism growth.
- Implement controls on excessive price hikes in goods, services, and housing to prevent tourism-driven inflation.
- Provide training in hospitality, customer service, and sustainable tourism management to improve local employability.
- Establish forums for local businesses, residents, and policymakers to discuss concerns and integrate community perspectives into tourism policies.

CONCLUSION

H1: Tourism affects the financial stability of local businesses and creates challenges such as competition, rising costs, and environmental issues.

H1₀: Tourism does not significantly affect the financial stability of local businesses or create major challenges.

The calculated value of chi-square is 4.59 and the value of p at 99 degrees of freedom is 1.00 which implies that the null hypothesis is rejected which means that tourism affects the financial stability of local businesses and creates challenges such as competition, rising costs, and environmental issues.

Tourism plays a crucial role in the economic development of Aksa, Marve, and Manori, contributing significantly to employment generation, business growth, and infrastructure development. The influx of visitors to these coastal areas stimulates various economic activities, including hospitality, transportation, retail, and recreational services. Small businesses such as food stalls, souvenir shops, homestays, and transport services thrive due to the steady demand from tourists. Additionally, tourism revenue supports local development projects, enhancing public services and amenities that benefit both residents and visitors.

However, despite these economic benefits, the tourism sector in Aksa, Marve, and Manori faces multiple challenges that hinder its sustainable growth. One of the major concerns is the seasonal nature of tourism, where peak visitor influx occurs during holidays and specific seasons, leading to income fluctuations. Many businesses and workers depend entirely on tourism-related earnings, making them vulnerable to economic instability during off-seasons.

The rising cost of living in these areas further exacerbates financial difficulties, as increased demand for goods, services, and real estate drives prices higher, affecting both residents and businesses. Additionally, growing competition among vendors creates an economic strain, as limited opportunities and market saturation lead to price undercutting and reduced profit margins.

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THE INTERSECTION OF PROFIT AND SUSTAINABILITY: A STUDY ON YOUNG RETAIL INVESTORS AND ESG-COMPLIANT COMPANIES

Rachana K. Chawda

Affiliated College- H.R. College of commerce and Economics

Rachana.chawda@hrcollege.edu

ABSTRACT

*The rising global emphasis on Environmental, Social, and Governance (ESG) factors has influenced investment trends, particularly among young retail investors. This study explores the perception and investment behavior of young retail investors towards ESG-compliant companies, analyzing the factors driving their decisions and the balance between financial returns and sustainability concerns. Using secondary data sources, reports from SEBI, NSE, and global ESG indices, the study assesses how ESG compliance impacts investor sentiment, portfolio allocation, and long-term investment behavior. Findings indicate that while young investors show increased interest in ESG investments, financial returns remain a dominant factor. The study suggests that financial literacy, investor awareness campaigns, and transparent ESG reporting can enhance sustainable investing trends in India. An **ESG-compliant company** is a business that actively integrates **Environmental, Social, and Governance (ESG)** principles into its operations, decision-making, and reporting. These companies focus on **sustainability, ethical business practices, and long-term value creation**, ensuring they meet regulatory, investor, and consumer expectations. In India, younger generations, particularly millennials and Gen Z (born roughly between 1981–1996 and 1997–2012, respectively), are increasingly aware of environmental and social challenges like climate change, inequality, and corporate accountability. This demographic, entering the investment space with a heightened sense of purpose, often perceives ESG companies as aligning with their values.*

1. INTRODUCTION

The Intersection of Profit and Sustainability refers to how businesses can achieve financial success while maintaining environmental and social responsibility. In India, younger generations, particularly millennials and Gen Z (born roughly between 1981–1996 and 1997–2012, respectively), Total (Millennials + Gen Z) = 61% of India's population are increasingly aware of environmental and social challenges like climate change, inequality, and corporate accountability. An ESG-compliant company is a business that actively integrates Environmental, Social, and Governance (ESG) principles into its operations, decision-making, and reporting.

These companies focus on sustainability, ethical business practices, and long-term value creation, ensuring they meet regulatory, investor, and consumer expectations.

Between 2012 and 2020, India introduced six ESG funds. Presently India hosts 11 sustainable investment funds, comprising eight actively managed funds, one passive fund (ETF/ Funds of funds), and two global feeder funds. The actively managed funds represent 96% of the total Assets Under Management (AUM) in this category, with the top five funds accounting for 93% of the assets. Total AUM was reached Rs. 9,753 crore by March 3, 2024

Notably, the largest fund alone constitutes 56% of the total AUM-Thematic ESG mutual funds in India have delivered a three-year average return of approximately 16.50%, with a median return of 14.67% as of April 2024.

The report forecasts that ESG could represent approximately 34% of the total domestic AUM by 2051.

ESG standards are assessed by research entities like MSCI, SUSTAINALYTICS, AND MORNINGSTAR. These scores help investors evaluate a company's sustainability practices but are not mandatory. MSCI ESG Score ranks companies based on ESG risk management, with AA or AAA ratings indicating leaders. Morningstar ESG Score measures ESG risk on a scale from 1 (low risk) to 50 (high risk).

ESG Components and Compliance Areas

Environmental (E) – Companies address climate change, carbon footprint, waste management, and energy efficiency. Example: Suzlon Energy (India) – Focuses on renewable wind energy solutions.

Social (S) – Ensures fair labor practices, diversity & inclusion, human rights, and community engagement. Example: Tata Steel (India) – Known for strong employee welfare programs and ethical supply chain management.

Governance (G) – Focuses on transparent leadership, ethical business conduct, corporate governance, and compliance.

Sustainable Business Models – Companies integrating sustainability into their core strategies to enhance long-term profitability. Tata Group (India) – Focuses on sustainability in steel, automotive, and consumer products while maintaining profitability.

ESG Investments – Investors prefer companies with strong environmental, social, and governance (ESG) scores, linking sustainability with financial performance. BlackRock U.S. Carbon Transition Readiness ETF (LCTU): Launched on April 9, 2021, this ETF attracted approximately \$1.25 billion on its first day, marking the largest launch in the ETF industry's history at that time.

Circular Economy – Businesses reducing waste by reusing and recycling materials to cut costs and improve efficiency. Unilever (UK) focuses on plastic waste reduction and sustainable sourcing.

Green Innovations – Companies investing in clean technology and renewable energy to reduce carbon footprints while maintaining profitability. Tesla (USA) revolutionized the auto industry with electric vehicles while achieving high profit margins.

Social Responsibility & Consumer Trust – Ethical business practices enhance brand reputation and customer loyalty, leading to long-term profitability. Infosys (India) focuses on sustainability reporting and employee well-being, boosting investor confidence.

Regulatory & Competitive Advantage – Adhering to sustainability regulations can prevent fines and create competitive advantages. Mahindra & Mahindra (India) aligns its auto business with EV policies, benefiting from government incentives.

CHARACTERISTICS OF ESG-COMPLIANT COMPANIES

- **Sustainable Operations** – Use renewable energy, reduce carbon emissions, and manage resources efficiently.
- **Diversity & Inclusion** – Promote gender equality, fair wages, and inclusive workplaces. Ethical Leadership – Avoid corruption, maintain transparency, and follow strict governance policies.
- **Stakeholder Engagement** – Consider investors, employees, customers, and communities in decision-making.
- **Regulatory Adherence** – Follow ESG regulations and disclosure requirements (e.g., SEBI's ESG norms in India, SEC in the U.S.).

CHALLENGES AT THE INTERSECTION

- **Short-Term Profit Pressure** – Many businesses focus on quarterly profits rather than long-term sustainability.
- **High Initial Costs** – Green investments often require large upfront capital.
- **Consumer Willingness to Pay** – Not all consumers are ready to pay a premium for sustainable products.
- **Regulatory Uncertainty** – Changing policies can impact sustainability-driven profits.

Young retail investors, influenced by ethical considerations and long-term sustainability prospects, are emerging as a key demographic driving the shift towards responsible investing. However, the balance between financial returns and ethical considerations remains a critical factor affecting their decisions.

- **ESG-Compliant Stocks** – Direct investment in companies that follow ESG norms and disclose sustainability practices.
- **ESG Mutual Funds** – Diversified funds managed by professionals focusing on high-rated ESG companies.
- **ESG ETFs (Exchange-Traded Funds)** – Tradeable funds excluding controversial sectors like tobacco and weapons.
- **ESG Index Funds** – Funds tracking ESG indices like Nifty 100 ESG Index and S&P BSE 100 ESG Index in India.

The push behind ESG investing in India is being driven by three main factors:

1. India's commitment to achieving its 2070 Net Zero target, which is projected to necessitate US\$ 8-10 trillion in capital expenditure over the next five decades;
2. SEBI's introduction of BRSR mandates, providing a regulatory framework for listed companies to prioritise sustainability;
3. the United Nations' Sustainable Development Goals (SDGs) that is serving as a benchmark for measuring a company's attractiveness and capital-raising capacity.

2. LITERATURE REVIEW

Friede, Busch & Bassen, 2015, Young investors differ from traditional retail investors by showing more inclination toward tech-driven investing, sustainability concerns, and long-term ethical considerations

Senayal Glenda, Oct 2024, has been financial literacy to play a significant role in enhancing effective and sustainable investment decision making.

Garg Aashish et al, "As you sow, so shall you reap: Assessing drivers of socially responsible investment attitude and intention", stated that Investors with high social self-efficacy have high intentions towards SRI.

India has witnessed significant ESG adoption, with SEBI mandating Business Responsibility and Sustainability Reports (BRSR) for the top 1,000 listed companies. However, challenges such as lack of investor awareness and ESG data standardization persist.

Baker et al., 2022 stated that Ethical Awareness – Climate change, corporate responsibility, and social justice impact all investment decisions.

(Morningstar, 2021, the agency noted that Younger investors prefer long-term financial stability over quick gains.

PwC, 2022 report on Social Media Influence suggests that ESG investing trends are shaped by online platforms, influencers, and fintech apps.

The EY Global FinTech Adoption Index (2022) found that over 70% of young investors actively consider ESG metrics before making investment choices.

The debate over profitability vs. sustainability is central to ESG investing. While some argue ESG stocks yield lower short-term returns (Hong & Kacperczyk, 2009), others suggest they outperform traditional investments due to lower risk exposure (Henisz, Koller, & Nuttall, 2019).

SEBI ESG Regulations, 2023 suggested Regulatory advantages and government incentives for ESG Compliant.

A study by MSCI (2023) found that ESG-focused funds delivered higher risk-adjusted returns compared to conventional funds over a 10-year period. Renewable Energy & EVs– Highly favored by young investors due to environmental impact.

According to SEBI's ESG Framework (2024), the demand for ESG investments is rising in India, leading to the growth of ESG mutual funds and ETFs.

Sustainable investing, driven by Environmental, Social, and Governance (ESG) factors, has gained significant traction in recent years. Studies indicate that ESG-compliant companies outperform non-ESG firms in the long run, attracting both institutional and retail investors (Friede, Busch, & Bassen, 2015).

According to Deloitte (2023), young retail investors—especially millennials and Gen Z—are increasingly prioritizing sustainability over short-term profits, aligning their investment decisions with ethical and responsible business practices.

3. OBJECTIVES

1. To examine the perception of young retail investors towards ESG-compliant companies.
 2. To analyze the influence of ESG factors on investment decisions and portfolio selection.
 3. To assess whether young investors prioritize sustainability over financial returns.
 4. To compare investment behavior across different ESG sectors.
 5. To evaluate the role of financial literacy in ESG investment decisions.
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4. HYPOTHESES

Main Hypothesis:

H1: Young retail investors prefer ESG-compliant companies over non-ESG firms.

Sub-Hypotheses:

H2: Awareness of ESG factors positively correlates with investment in sustainable businesses.

H3: Young investors with higher financial literacy are more likely to invest in ESG stocks.

5. RESEARCH METHODOLOGY

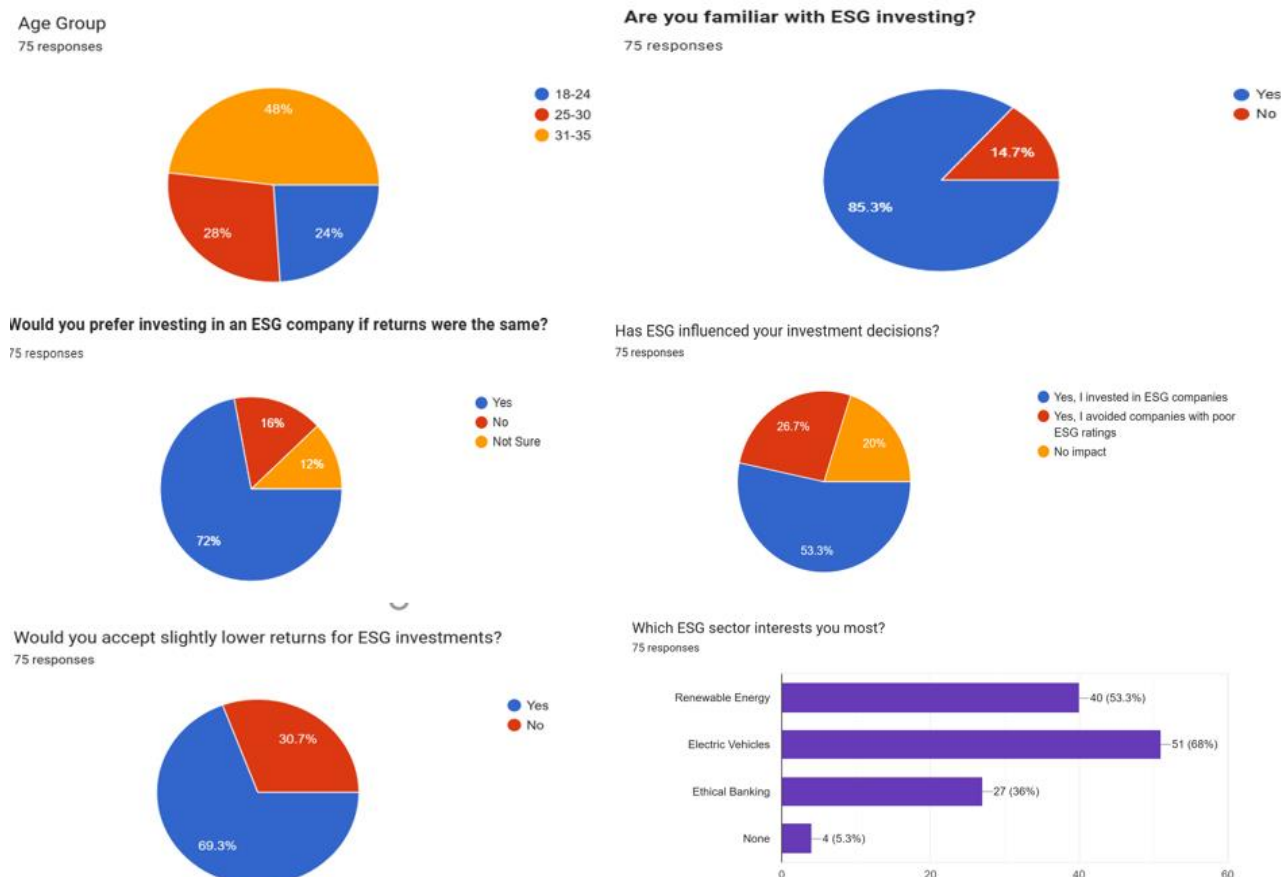
5.1 Research Design- This study follows a descriptive and analytical approach using Primary and secondary data to analyze young investors' ESG perceptions.

5.2 Data Sources- Government & Institutional Reports: SEBI, RBI, BSE, NSE, ESG indices, Industry Reports & Market Research: McKinsey, Bloomberg ESG Reports, NITI Aayog, Published Research Papers: Studies from Google Scholar, ResearchGate, Scopus.

5.3 Primary data Sample Selection- The study examines investment trends among 75 young retail investors (age 18-35)

5.4 Data Analysis Techniques- For data analysis, this study employs the arithmetic mean (average) technique to summarize and interpret the dataset

6. DATA ANALYSIS & FINDINGS-



Trends in ESG Investment-Young investors are showing increasing interest in ESG funds and stocks

KEY OBSERVATIONS INCLUDE

- **Values-Driven Investing.** 72% prefer ESG compliance, provided financial performance is strong. Young Indian investors are drawn to ESG companies that prioritize renewable energy, social inclusion, and ethical governance. For instance, firms investing in clean energy or advocating for gender diversity resonate strongly with this group, reflecting a desire to support businesses that contribute positively to society.

- **Awareness and Education:** 85% Young investors are more likely to invest in ESG stocks. Lack of awareness is a major barrier to ESG investment adoption. While awareness of ESG is growing, it remains uneven. Urban, educated young investors in Tier 1 cities are more likely to understand ESG concepts, partly due to exposure through mutual funds, exchange-traded funds (ETFs), and media.
- **Financial Returns vs. Impact:** : 69% of young investors prioritize financial returns over ESG impact. This suggests that Indian youth do not see ESG investing as a trade-off for returns. They believe companies with strong ESG practices can deliver competitive financial performance due to better risk management and resilience, a perception supported by evidence of ESG funds matching or exceeding traditional investments over time. However, governance remains a dominant factor in their choices, as it's seen as more immediately relevant in India's corporate landscape.
- **Regulatory Push:** The Securities and Exchange Board of India (SEBI) mandates, like the Business Responsibility and Sustainability Reporting (BRSR) framework, have increased visibility of ESG practices, influencing young investors to consider these metrics. This regulatory backing reassures them that ESG is not just a trend but a structural shift.
- **Higher Awareness:** 53% of Mumbai youth believes in sustainable investment and affirms that ESG influenced their investment decisions. In markets like the U.S., Europe, and parts of Asia (e.g., Japan, South Korea), ESG education is more widespread, with financial advisors and institutions actively promoting sustainable investing.
- **Demographics:** 43% of women participated in the survey. The analysis indicates that women investors demonstrate a stronger preference for ESG-compliant investments, highlighting their inclination toward sustainability-driven financial decisions. Furthermore, the findings suggest that individuals belonging to higher-income groups exhibit a greater propensity to engage in sustainable investing, possibly due to increased financial literacy, risk tolerance, and access to diversified investment opportunities.
- **Skepticism and Greenwashing:** Globally, young investors are increasingly skeptical of corporate greenwashing—where companies exaggerate ESG efforts for marketing. This has fostered a demand for transparency and measurable impact, with many favoring funds or firms with clear ESG metrics and third-party validations over self-reported claims.

8. CONCLUSION & RECOMMENDATIONS

8.1 Conclusion

- Young investors in India perceive ESG companies as a promising blend of purpose and profit, with growing interest fueled by regulatory support and societal awareness, though governance often overshadows environmental and social factors. Globally, their counterparts exhibit a more holistic embrace of ESG, backed by greater maturity in sustainable investing ecosystems and a sharper focus on climate action. Both groups share a belief in ESG's potential for long-term value, but their perceptions are shaped by local contexts—India's emerging market dynamics versus the advanced frameworks of global peers. As awareness and options expand, young investors in both spheres are likely to drive ESG's prominence further, balancing ethical ideals with financial pragmatism.
- Young retail investors are increasingly considering ESG factors but continue to prioritize financial returns.
- Financial literacy plays a critical role in influencing ESG investment participation.
- Women investors and higher-income groups show stronger ESG preferences.

8.2 Recommendations

1. Investor Awareness Campaigns: SEBI & stock exchanges should promote ESG literacy.
2. Financial Institutions' Role: Banks & asset managers must offer customized ESG investment products for young investors.
3. Standardized ESG Reporting: Stronger regulations on ESG disclosures will improve investor confidence.

8.3 Limitations of the Study

- The study focuses on 75 young retail investors, which may not fully represent the broader demographic trends across different income levels, geographies, and investment backgrounds.
- The study primarily considers urban and Tier 1 city investors, potentially overlooking ESG investment behavior in rural or Tier 2 & 3 cities.

- Findings are partially based on reports from SEBI, NSE, and global ESG indices, which may not reflect real-time market shifts or personal investor motivations.
- ESG investing is a long-term strategy, but this study captures only current trends and perceptions, limiting insights into long-term performance outcomes.

8.4 Future Scope of the Study

Longitudinal Study on ESG Investment Behavior – Future research could track how young investors' ESG preferences evolve over time, considering market cycles, economic shifts, and corporate ESG performance.

Expansion to Tier 2 & Tier 3 Cities – Further research could explore ESG investment trends in semi-urban and rural India, assessing awareness and adoption levels beyond metropolitan regions.

Impact of AI & Fintech on ESG Investing – Future studies can investigate how robo-advisors, AI-driven ESG ratings, and fintech platforms influence young investors' sustainable investment choices.

Cross-Country Comparison – Comparative studies can assess differences in ESG investment behavior between Indian youth and global markets, analyzing the role of government policies and investor education.

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TRANSFORMING HIGHER EDUCATION THROUGH MOOCS: BRIDGING NEP GOALS WITH ESG IMPERATIVES IN INDIA

¹Dr. Rupali Abhay Mishra and ^{2*}Dr. Sanjana Neelesh Khemka

¹Prahladrai Dalmia Lions College of Commerce & Economics

²B. K. Shroff College of Arts & M. H. Shroff College of Commerce

¹rupali.pdlc@gmail.com and ²sanjana.pdlc@gmail.com

ABSTRACT

The New Education Policy (NEP) of India marks a significant transformation in the higher education landscape, emphasizing inclusivity, accessibility, and quality. With the rise of Massive Open Online Courses (MOOCs), there is a unique opportunity to align this transformation with Environmental, Social, and Governance (ESG) objectives. This paper explores how the integration of MOOCs under the NEP can serve as a catalyst for achieving ESG goals in Indian higher education.

The Environmental aspect of ESG is addressed through the adoption of online learning platforms, which reduce the need for physical infrastructure and travel, contributing to a reduction in carbon emissions. Socially, MOOCs offer an inclusive approach to education, bridging the digital divide by providing equitable access to learning resources, particularly for marginalized and underserved communities.

This paper highlights the potential of MOOCs to not only enhance the quality of higher education but also to foster sustainable practices aligned with ESG principles. By exploring the intersection of NEP, MOOCs, and ESG objectives, this research offers insights into how digital learning platforms can shape a more sustainable, inclusive, and accountable higher education ecosystem in India.

Keywords: New Education Policy (NEP), MOOCs, Higher Education, ESG Objectives, Sustainable Education, Inclusivity, Digital Learning

1. INTRODUCTION

Indian higher education is witnessing a transformative evolution with the introduction of the New Education Policy (NEP) 2020. This progressive policy framework aims to revitalize the education system by enhancing accessibility, inclusivity, and quality. Rooted in the principles of lifelong learning, sustainability, and equity, the NEP seeks to bridge systemic gaps and empower learners across diverse socio-economic backgrounds. It is aligned with the broader developmental aspirations of India and reflects the global vision of Environmental, Social, and Governance (ESG) objectives. By focusing on building a robust and innovative education system, the NEP sets a new benchmark for sustainable and inclusive development in higher education.

One of the most notable trends supporting NEP's mission is the widespread adoption of Massive Open Online Courses (MOOCs). These platforms have revolutionized the delivery of education by offering scalable, flexible, and affordable learning opportunities. MOOCs transcend geographical and financial barriers, enabling millions of learners to access high-quality content from premier institutions worldwide. In the Indian context, platforms like SWAYAM have emerged as pioneers, reflecting the potential of MOOCs to cater to the diverse needs of learners while aligning with the NEP's emphasis on inclusivity, accessibility, and quality. MOOCs offer features like self-paced learning, customizable courses, and data-driven insights, making them a powerful tool in modernizing education.

From the perspective of ESG objectives, MOOCs play a critical role in transforming Indian higher education. Environmentally, they reduce reliance on physical infrastructure, thereby cutting down energy consumption and carbon emissions. By minimizing the need for physical travel, MOOCs contribute to eco-friendly practices in education. Socially, MOOCs promote equitable access to education, empowering marginalized and underserved communities. They help bridge the digital divide by offering tailored content for diverse learners, fostering social equity and inclusion. Governance, another key pillar, is addressed through the transparency and scalability of MOOCs. Their data-driven and decentralized structures ensure accountability, innovation, and streamlined decision-making processes in the education system. Together, MOOCs and the NEP principles seamlessly align with ESG goals, presenting a unique opportunity to reimagine higher education in India.

This research article delves into the synergistic relationship between the NEP, MOOCs, and ESG objectives, exploring how their integration can lead to sustainable and impactful changes in the higher education ecosystem. By analyzing key NEP principles such as accessibility, equity, and governance, and linking them to the capabilities of MOOCs, this paper highlights how these elements collectively contribute to advancing ESG goals. The study provides insights into the transformative potential of digital learning platforms in addressing

systemic challenges, empowering diverse learners, and creating a future-ready education model for India. Ultimately, this research emphasizes the pivotal role of NEP and MOOCs in shaping a sustainable, inclusive, and accountable higher education system that aligns with global developmental imperatives.

2. BACKGROUND

2.1 Evolution of NEP in Indian Higher Education:

The New Education Policy (NEP) 2020 is the latest in a series of reforms that have shaped the Indian education landscape over decades. The journey began with the National Policy on Education in 1968, which focused on standardizing education across states and promoting science and technology. The 1986 policy, revised in 1992, emphasized vocational training, equity for marginalized communities, and technological integration in education.

By the early 21st century, India faced a new set of challenges in higher education. Rapid globalization and technological advancements highlighted the need for a flexible and dynamic education system that could prepare students for a competitive global workforce. However, issues such as low Gross Enrollment Ratio (GER), outdated curricula, and inequitable access persisted. NEP 2020 emerged as a response to these challenges, incorporating contemporary priorities such as interdisciplinary education, research innovation, and digital learning. With its focus on inclusivity, quality, and sustainability, NEP aims to align Indian higher education with global standards while addressing local socio-economic disparities.

2.2 The Emergence of MOOCs in Education

Massive Open Online Courses (MOOCs) have revolutionized education globally since their inception in the early 2010s. Initially, platforms like Coursera, edX, and Khan Academy focused on providing free access to courses from top universities, democratizing learning for students worldwide. Over time, MOOCs evolved into a robust education delivery mechanism, offering certifications, specialized skills training, and even micro-degrees. Their flexibility, scalability, and cost-effectiveness made MOOCs a valuable tool for both learners and institutions.

In India, the government recognized the potential of MOOCs early on, launching platforms like SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) in 2017. SWAYAM tailored the MOOC model to address India's unique challenges, such as language diversity and limited internet access in rural areas. By integrating MOOCs into the education system, India sought to address the dual challenges of expanding access to education and improving its quality. These platforms have become instrumental in achieving NEP's vision by offering self-paced, inclusive, and high-quality learning opportunities to diverse learner groups.

2.3 The Rise of ESG in Higher Education

Environmental, Social, and Governance (ESG) principles have traditionally been associated with corporate responsibility and sustainable business practices. However, their relevance to education has gained prominence in recent years, as institutions increasingly recognize the importance of aligning with global sustainability goals. In the Indian higher education context, ESG principles offer a framework for creating a system that is not only academically excellent but also socially equitable and environmentally sustainable.

Environmental objectives in education include reducing resource consumption and adopting eco-friendly practices. Digital learning platforms like MOOCs support these goals by minimizing the need for physical infrastructure and commuting, thereby lowering carbon emissions. Social objectives emphasize equity, inclusion, and lifelong learning, which are central to the NEP's vision. MOOCs help bridge educational divides by providing marginalized communities with access to high-quality education. Governance objectives are achieved through transparency, accountability, and data-driven decision-making, areas where both NEP and MOOCs excel. Together, ESG principles create a roadmap for a sustainable, inclusive, and well-governed education system.

2.4 Integration of NEP, MOOCs, and ESG Objectives

The convergence of NEP, MOOCs, and ESG principles marks a pivotal moment for Indian higher education. NEP's focus on inclusivity, accessibility, and sustainability is amplified by the features of MOOCs. For example, MOOCs support NEP's goal of increasing GER by offering affordable and scalable education.

From an ESG perspective, the integration of MOOCs and NEP principles creates synergies that enhance the impact of both initiatives. MOOCs reduce the environmental impact of traditional education models, making higher education more sustainable. Socially, they enable NEP's vision of equitable education by reaching underserved populations, including rural communities and working professionals.

In governance, MOOCs provide a data-driven framework that ensures accountability, transparency, and innovation in policy implementation.

2.5 Implications for Indian Higher Education

The integration of NEP, MOOCs, and ESG principles presents an opportunity to address systemic challenges in Indian higher education while aligning with global sustainability goals. By leveraging the strengths of MOOCs, NEP can achieve its ambitious targets, including increasing GER, promoting research and innovation, and ensuring equitable access. Simultaneously, ESG principles provide a framework for ensuring that these advancements are sustainable and inclusive.

3. OBJECTIVES

- To analyze the role of MOOCs in advancing the goals of the New Education Policy (NEP) 2020 in India.
- To investigate the integration of ESG principles in Indian higher education through MOOCs.
- To explore the alignment of NEP 2020 with ESG objectives in the context of MOOCs.
- To identify challenges in implementing MOOCs for Indian higher education under the NEP and ESG framework.
- To provide actionable recommendations for leveraging MOOCs to build a sustainable, inclusive, and future-ready higher education ecosystem in India.

4. RESEARCH METHODOLOGY

This study employs a **qualitative research methodology** to explore the role of Massive Open Online Courses (MOOCs) in advancing the goals of the New Education Policy (NEP) 2020 and integrating Environmental, Social, and Governance (ESG) principles in Indian higher education. By focusing on the qualitative aspects, the research seeks to provide an in-depth understanding of how these frameworks align and how MOOCs can contribute to transforming the Indian higher education landscape.

The research methodology is divided into several key phases, each designed to answer the research objectives without the use of surveys or quantitative data collection methods.

Phase 1: Conceptual Framework Development

The first phase of the research involves the development of a **conceptual framework** that links the NEP 2020, MOOCs, and ESG principles. This framework serves as the foundation for understanding how these components interact and align within the Indian higher education context.

LITERATURE REVIEW

- A thorough literature review is conducted to understand the evolution of NEP 2020, the rise of MOOCs, and the increasing relevance of ESG principles in the education sector.
- The review also includes a study of existing research on the integration of MOOCs with national education policies and ESG practices.
- Key concepts and frameworks are drawn from global and local sources to identify the critical aspects of NEP, ESG, and MOOCs that will be analyzed in the subsequent phases.

Phase 2: Secondary Data Collection and Document Analysis

In this phase, **secondary data** is gathered from various sources, including policy documents, academic research papers, and reports from MOOC platforms and educational institutions. The analysis of these documents provides a comprehensive understanding of the intersection between NEP, MOOCs, and ESG in Indian higher education.

DATA SOURCES

- **NEP 2020:** The official document outlining the national education policy and its objectives.
- **MOOC Platforms:** Reports and research from platforms like SWAYAM, Coursera, edX, and others that focus on MOOCs in India.
- **ESG Reports:** Documents and performance reports on how higher education institutions in India are incorporating ESG principles.

DOCUMENT ANALYSIS

- Data is analyzed through Python Code in Code.org platform.

- Content from these documents is analyzed qualitatively to identify key themes, such as NEP's focus on accessibility and inclusivity, the environmental benefits of MOOCs, and the role of governance in the digital education space.
- The analysis will explore how MOOCs have been integrated into the NEP framework and how they contribute to advancing ESG principles, particularly with regard to accessibility, sustainability, and transparency.

Phase 3: Thematic Analysis and Synthesis

Once the secondary data have been conducted, the data will be analyzed using **thematic analysis**.

- **Thematic Coding:**
- Key themes such as access to education, digital learning adoption, environmental impact, social equity, and governance will be coded and categorized.
- The analysis will focus on understanding how MOOCs have been used to address the specific objectives of NEP and how they contribute to achieving ESG goals in Indian higher education.
- **Synthesis of Findings:**
- The results will be synthesized to provide a comprehensive understanding of how MOOCs can support the NEP and ESG frameworks.
- This phase will also highlight the barriers to implementation, such as technological limitations, financial challenges, and resistance to digital learning in traditional institutions.

Phase 4: Conclusion and Recommendations

The final phase of the research will involve synthesizing the findings to draw conclusions and provide actionable recommendations. These recommendations will be aimed at policymakers, educational institutions, and MOOC platform providers on how to better leverage MOOCs for advancing NEP objectives and ESG principles in Indian higher education.

5. ANALYSIS AND INTERPRETATION

5.1 Mapping NEP policies to MOOCs features

To map the NEP policies with MOOCs features NEP policies and MOOC features are identified and then code has been written in python for mapping and visualization. For visualization bipartite graph has been used.

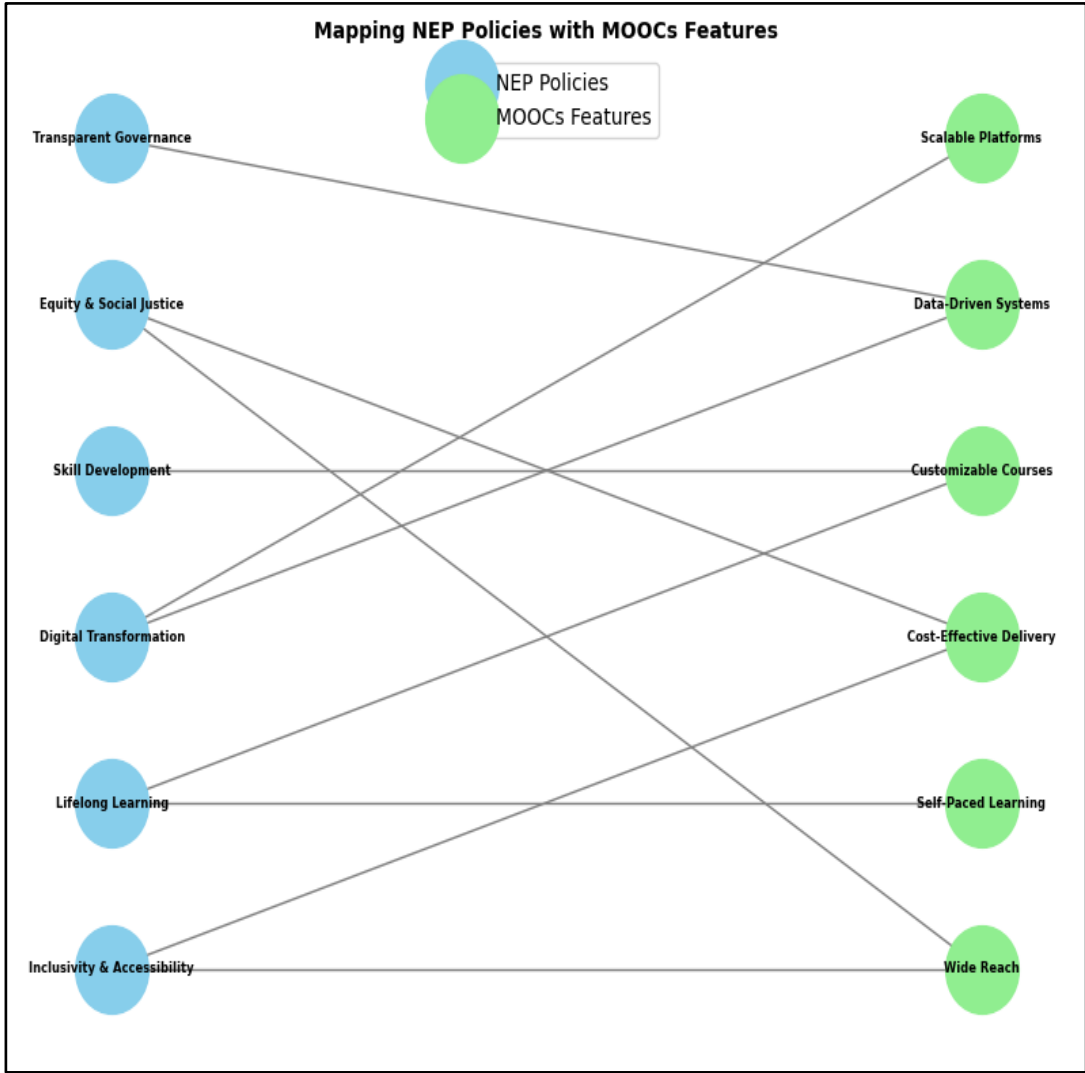


Figure 1: Mapping between NEP policies and MOOCs features

This mapping showcases MOOCs as a vital enabler for achieving NEP 2020's vision of an equitable, quality-driven, and technology-enhanced higher education ecosystem. By fostering accessibility, personalization, and scalability, MOOCs effectively bridge the gap between policy goals and practical implementation, laying the foundation for a sustainable and future-ready educational framework in India.

5.2 Mapping ESG principles with NEP Policies

Further mapping has been conducted between ESG objectives and NEP Policies. After executing the mapping code in python following graph is generated.

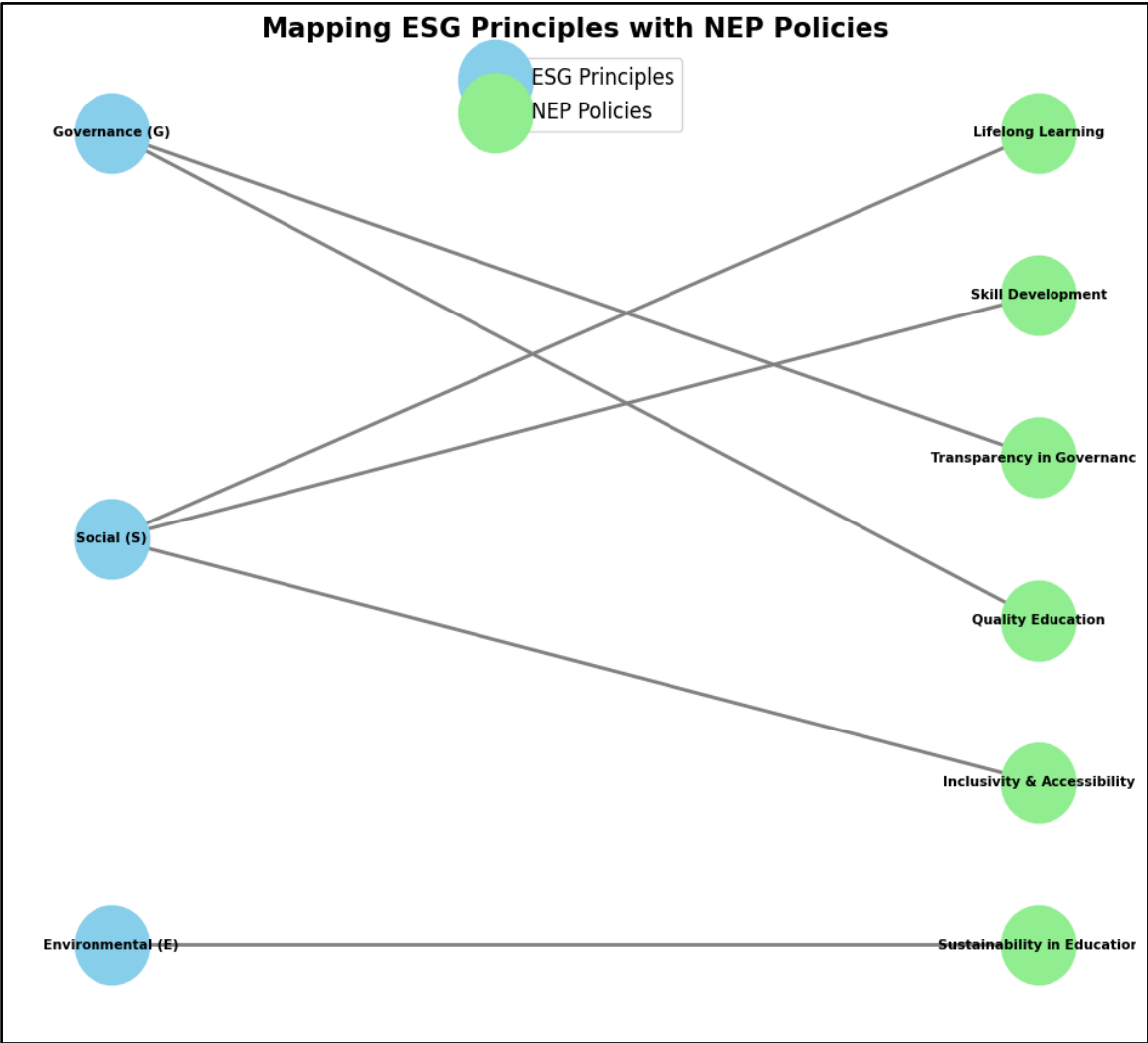


Figure 2: Mapping between ESG principles and NEP policies

The graph demonstrates how ESG principles are deeply embedded in NEP's goals to transform the Indian higher education system. By fostering environmental responsibility, social inclusion, and transparent governance, the alignment ensures that education evolves into a catalyst for sustainable development, economic growth, and equity. This mapping underscores the mutual reinforcement between NEP and ESG, paving the way for a resilient and future-ready education framework.

5.3 Mapping MOOCs features with ESG Objectives

MOOC features were mapped with ESG Objectives and the outcome is: MOOCs serve as a transformative tool for bridging ESG principles with education by fostering **sustainability (Environmental)**, **social inclusivity (Social)**, and **effective management (Governance)**. This alignment emphasizes the potential of MOOCs to build a sustainable, equitable, and accountable higher education ecosystem globally.

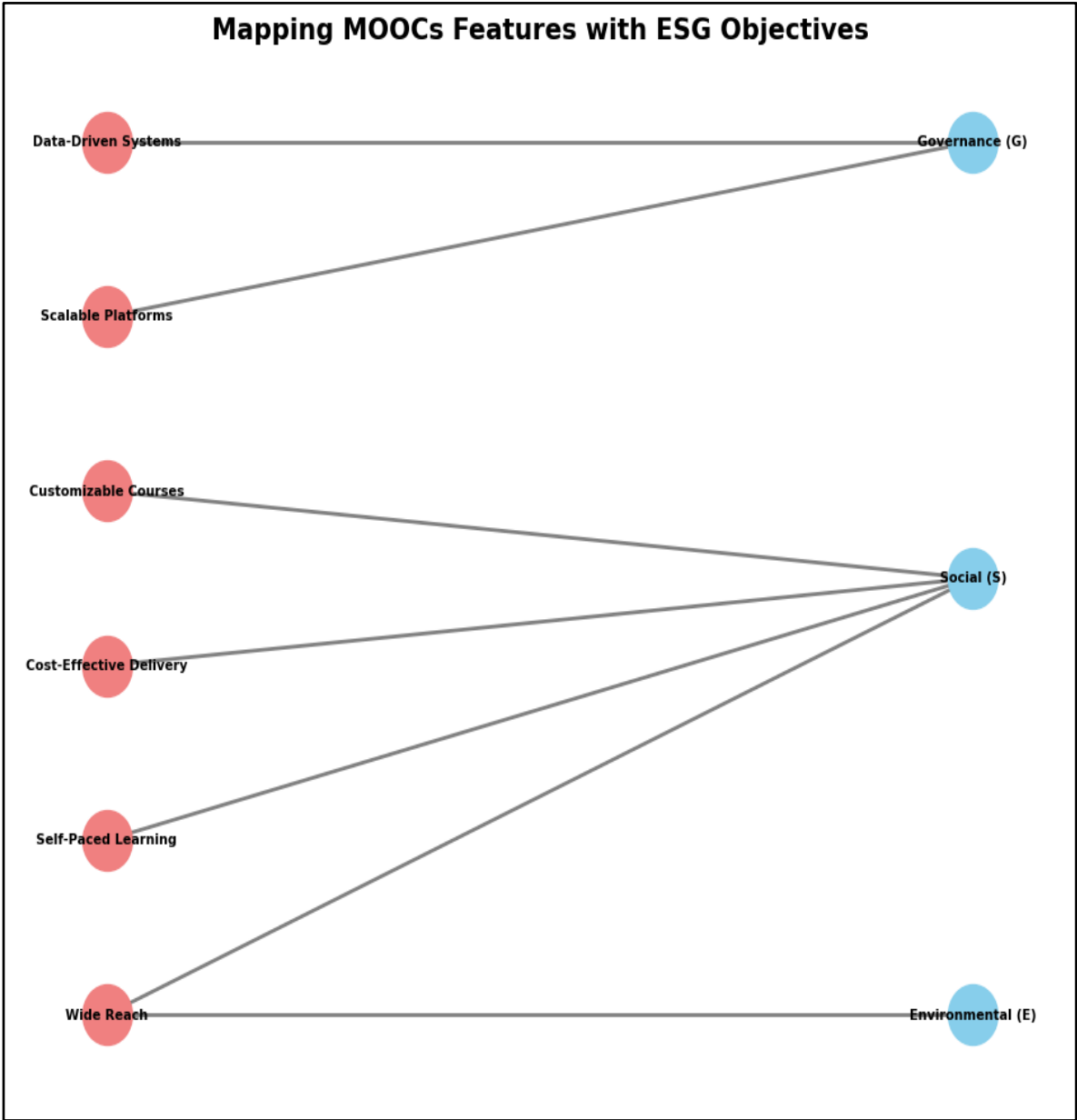


Figure 3: Mapping between MOOCs features and ESG objectives

5.3 Mapping NEP policies, MOOC features and ESG Objectives together

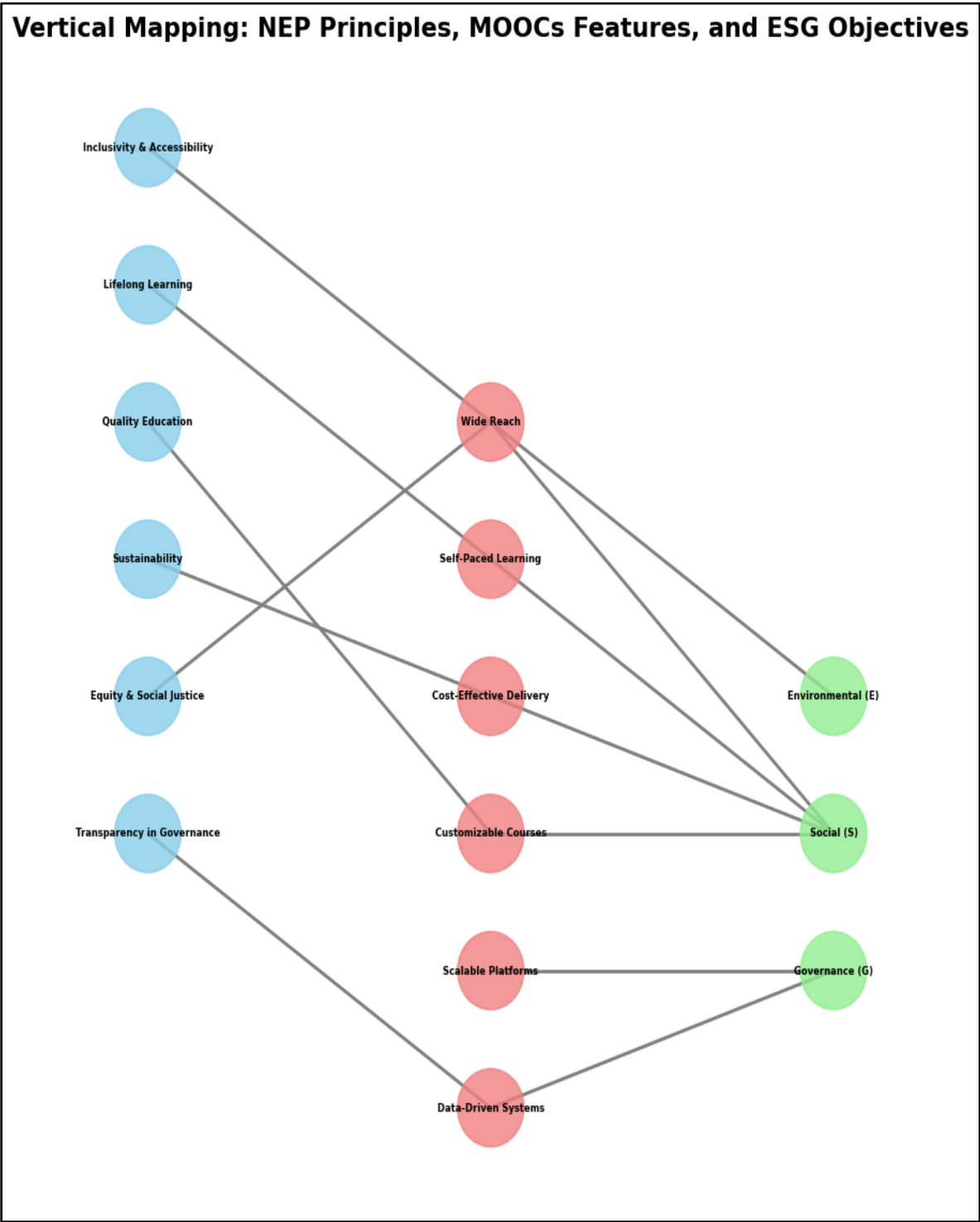


Figure 4: NEP Principles, MOOCs Features, and ESG Objectives

Above visualization represents the vertical alignment between the principles of the National Education Policy (NEP), key features of MOOCs (Massive Open Online Courses), and Environmental, Social, and Governance (ESG) objectives. It highlights how NEP priorities like inclusivity, lifelong learning, and sustainability connect to MOOCs features such as wide reach, self-paced learning, and cost-effective delivery, which in turn contribute to achieving ESG goals. The connections emphasize the role of scalable platforms and data-driven systems in promoting governance, as well as how sustainability and equity align with environmental and social objectives. The chart underscores the integrated potential of MOOCs in advancing educational and sustainability goals while fostering transparency and scalability.



Figure 5: Conceptual Model

Here is the conceptual model illustrating how MOOCs function as a bridge between the goals of the New Education Policy (NEP) 2020 and the principles of Environmental, Social, and Governance (ESG) in Indian higher education. It shows how MOOCs help achieve NEP goals while advancing ESG objectives for a more sustainable, inclusive, and effective education system.

6. CONCLUSION

The integration of Massive Open Online Courses (MOOCs) into the Indian higher education system under the framework of the New Education Policy (NEP) 2020 presents a unique opportunity to transform the education landscape, making it more accessible, inclusive, and aligned with global sustainability and governance goals. By functioning as a bridge between NEP's educational goals and Environmental, Social, and Governance (ESG) objectives, MOOCs hold the potential to foster an education system that is not only future-ready but also responsive to the evolving needs of students and the broader society.

This study has highlighted the significant role MOOCs can play in achieving the diverse aims of NEP 2020, such as improving access to quality education, promoting lifelong learning, and ensuring inclusivity. MOOCs facilitate a more flexible learning environment, making education more accessible to students from varied socio-economic backgrounds, including those in remote and underserved regions. Furthermore, MOOCs align with ESG principles by promoting environmental sustainability through reduced carbon footprints, advocating social inclusivity through digital learning platforms, and supporting better governance through transparency and data-driven learning mechanisms.

While the potential of MOOCs to revolutionize higher education in India is immense, several challenges remain. These include digital access barriers, varying levels of infrastructure across institutions, and the need for enhanced faculty training to effectively deliver online education. Additionally, the successful integration of ESG principles into MOOCs requires ongoing collaboration between government bodies, educational institutions, and industry players to ensure alignment with sustainability goals and social equity.

In conclusion, MOOCs have the potential to reshape the future of higher education in India, offering a scalable, flexible, and inclusive solution to the challenges of traditional education. With the right support and strategic initiatives, India can harness the full potential of MOOCs to create an education ecosystem that is sustainable, equitable, and capable of meeting the demands of the 21st century.

This conclusion ties together the key findings of your research, reinforces the relevance of MOOCs in achieving NEP and ESG objectives, and highlights actionable steps for the future.

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ADOPTION OF SUSTAINABLE LIFESTYLES AMONG RESIDENTS OF VASAI-VIRAR: AN ANALYSIS OF KNOWLEDGE AND BEHAVIOR

Shruti PatilAssistant professor, Viva College of Arts, Commerce & Science, Virar
sp01611@gmail.com**ABSTRACT**

Sustainable lifestyle is a crucial component to achieve environmental sustainability. There is continuous increase in consumerism is leading to environmental degradation. It is important to analyze sustainable lifestyle behavior of people especially in urban area where pollution levels are severe. This research tries to analyze the knowledge and behavior of the urban residents towards sustainable lifestyle in Vasai-Virar area by collecting data through a structured questionnaire. This study examined sustainable lifestyle habits, including reusable bag usage, LED adoption, transportation choices, waste disposal, and eco-conscious purchasing behavior. Findings also revealed that gender had no significant influence on sustainable lifestyle habits. While sustainable practices are being adopted, gaps remain in waste management and eco-friendly purchasing behavior. Greater awareness and policy interventions may help enhance sustainable lifestyle choices.

Key Words: sustainability, sustainable lifestyle, green consumerism

1. INTRODUCTION

Sustainable lifestyles refer to the adoption of social behaviors and daily choices that minimize environmental harm, including resource consumption, emissions, and waste production. Simultaneously, they aim to support socio-economic growth and improve overall well-being (UN Environment, 2017). Sustainable living and lifestyles are part of the Sustainable Development Goals (4: Education and 12.8: Responsible Consumption).

Sustainable lifestyles involve behavioral choices and consumption patterns that minimize environmental impact while promoting social and economic well-being (Steg & Vlek, 2009). The adoption of sustainable lifestyles is influenced by multiple factors, including knowledge, awareness, personal values, infrastructure, and policy frameworks (Gifford, 2014).

A sustainable lifestyle helps in reducing one's carbon footprint. The total amount of greenhouse gases like carbon dioxide, that are emitted into the atmosphere each year by a person or organization due activities such as energy consumption, transportation, and waste generation is known as carbon footprint of that individual person or organization. (System of Registries | US EPA, n.d.). By adopting practices like use of energy-efficient appliances, waste reduction, and use of renewable energy, individuals can significantly lower their carbon footprint and protect the environment.

Following are some of the examples of sustainable lifestyle practices:

1. Purchasing Organic and Local Products
2. Using Energy-Efficient Appliances
3. Reducing Single-Use Plastic
4. Reuse and recycle
5. Minimalism and Conscious Consumption.
6. Using Sustainable Transportation
7. Switching to Renewable Energy

1.1 Scope of the study:

The area under study is Virar- Vasai from Palghar district of Maharashtra. According to 2011 censuses population of Vasai-Virar Municipal Corporation is 12.22 Lakhs. The study was done by collecting primary data through a structured questionnaire. The sample included 130 residents from Virar, Vasai and Nallasopara places in Palghar district of Maharashtra. The study included students, home-makers, self-employed and service people.

1.2 Objective:

- i. To study sustainable lifestyle habits among the residents of Vasai-Virar.
- ii. To analyze the association between gender and sustainable lifestyle choices.

1.3 Significance of the Study:

Population of Vasai-Virar municipal corporation is increasing continuously (IIT Bombay, 2023) hence it is important to study the inclination of current population regarding green consumerism and sustainable lifestyle. This research will be valuable for scholars interested in exploring green consumerism and environmental sustainability. It provides insights into sustainable lifestyle habits, helping future researchers build upon these findings to develop more effective awareness campaigns and policy recommendations.

2. LITERATURE REVIEW

Research indicates that individuals with higher environmental literacy are more likely to adopt sustainable practices (Kollmuss & Agyeman, 2002). Barr et al. (2011) found that increased awareness leads to higher participation in recycling and energy conservation. Whitmarsh & O'Neill (2010) observed that higher-income individuals are more likely to adopt eco-friendly technologies, whereas lower-income groups may prioritize affordability over sustainability. Gender differences in sustainable practices are not always straightforward and can vary depending on the specific behavior or context (Milfont & Sibley, 2016).

3. RESEARCH METHODOLOGY

This study was done by collecting primary data through a structured questionnaire using Google form. Purposive sampling method is used for this study. The sample included 130 residents from Vasai-Virar area. There were 75 male and 55 female respondents having various education backgrounds and occupation.

i) Basic profile of the respondents:

	Category	Percentage
1. Gender	Male	57.7
	Female	42.3
2. Age	18-30	83.8
	31-45	7.7
	46-64	8.5
	65 and above	Nil
3. Area	Virar	55.4
	Vasai	11.5
	Nallasopara	33.1
4. Education	SSC	9.2
	HSC	35.4
	Graduation	31.5
	Post-graduation	23.8
5. Employment	Student	74.6
	Homemaker	2.3
	Self employed	6.9
	Service	16.2
	Retired	Nil
6. Monthly Income	Below Rs. 25000	76.9
	Rs. 25000 - 50000	16.9
	Above Rs. 50000	6.2

ii) Hypothesis:

H0: There is no significant association between Gender and sustainable lifestyle habits

H1: There is a significant association between Gender and sustainable lifestyle habits

iii) Statistical Analysis Methods: A Chi-Square test and Cramér's V test were applied to test the hypotheses.

4. RESULT AND DISCUSSION

i) Sustainable lifestyle habits:

➤ Reusable Bag Usage:

- 28.5% always used cloth bags
- 13.8% never used them
- 15.4% used them only while shopping
- 42.3% used them occasionally.

➤ Lighting Preference:

- 63.8% used LED bulbs
- 19.2% used tube light
- 15.4% used regular bulbs
- Only 1.6% used CFL bulbs

➤ Transportation Choices:

- 77.7% preferred public transport.
- 4.6% used Electric vehicle
- 14.6% used bike
- 3.1% used car

➤ Waste Segregation:

- 45.4% did not segregate waste.
- 17.7% segregated dry, wet, and sanitary waste separately.
- 36.9% segregated only dry and wet waste.

➤ **Electric Vehicle preference:** 55.4% of respondents preferred electric vehicles.

➤ **Green Label Awareness:** 64.6% were aware of green labels.

➤ **Eco-Friendly Shopping:** 76.2% read product labels for environmental safety.

➤ Willingness to Pay More for Green Products:

- 42.3% were willing to pay more.
- 43.8% were uncertain.
- 13.8% were not willing to pay for green products.

ii) Inferential Analysis and Hypothesis Testing:

Question	Chi-square p-value	Cramer's V	Significant at $\alpha=0.05$
1. Are you willing to pay more for green or sustainable products?	0.057	0.21	No
2. Do you know about green labels?	0.065	0.16	No
3. How do you travel to the work?	0.099	0.22	No
4. What type of light device do you use at home?	0.122	0.21	No
5. How do you dispose the domestic waste?	0.162	0.17	No
6. Do you use cloth bag?	0.294	0.17	No
7. Do you check the product for ecolabels before buying?	0.564	0.05	No
8. Would you prefer electric vehicles over petrol or diesel vehicles?	0.711	0.03	No

Since $p\text{-value} > 0.05$, the null hypothesis cannot be rejected. This suggests there is no statistically significant association between gender and sustainable lifestyle habits.

5. CONCLUSION AND SUGGESTION

Excluding use of cloth bag and waste segregation, all the respondents have shown positive attitude towards sustainable lifestyle habits like use of electricity saving devices, use of public transport, awareness regarding eco labeling as well conscious purchasing decisions. This study has shown that there is no influence of gender on sustainable lifestyle habits in the residents of Vasai- Virar. The measures that can be suggested in order to create more awareness among the residents of Vasai- Virar area can be summarized as follows:

1. Distribution cloth and paper bags in the public events.
2. More public awareness can be generated by organizing workshops and seminars.
3. Strict imposition of fine in case of plastic bag use.
4. Housing societies should start composting of wet waste.

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STUDY THE EFFECTS OF AIR POLLUTION IN MUMBAI AND ITS IMPACT ON HUMAN HEALTH**Dr. Mahajan Dipak Hilal**Assistant Teacher, N. G. Acharya and D. K. Marathe College of Arts, Science & Commerce, Chembur
mahajandh12@gmail.com**SUMMARY**

With the increasing prevalence of air pollution, life is unbearable. The quality of the air is deteriorating. Industrialization is increasing the emission of different toxic gases. Therefore, the amount of toxic gases in the air has increased. Therefore, the air quality of the surrounding air has been reduced. The amount of gases of Carbon dioxide (CO₂), Nitrous oxides (NOX), Sulfur oxides (NOX) have increased in the air. These winds are increasing the temperature of the environment. Increasing heat has threatened the health and existence of the living. The emission of toxic gases should be reduced to reduce the potential dangers. For this, various laws (air (pollution and control) Act, 1949) have been created by the government.

Objectives: 1. To study about air pollution in Mumbai.

2. To study the effects of air pollution on human health.

Hypothesis: 1. Air pollution in Mumbai is increasing.

2. Increasing air pollution is adversely affecting human health.

INTRODUCTION

In a healthy environment, the habitat of livelihood is pleasant. Nowadays, environmental pollution is the biggest danger to mankind. Environmental pollution is caused by increasing population, uncontrolled industrialization and urbanization and exploitation of natural resources. Pollution causes severe environmental imbalances. The three basic needs of human beings are polluted by various human actions of water, land and air.

"Annoyed changes in the physical, chemical or biological characteristics of air, water and soil can have harmful effects on the life of the organism or cause a potential danger to any organism," this is called pollution.

According to the Air (Pollution Prevention and Control) Act, 1949, "air pollution means the existence of any solid, liquid or air substance in the atmosphere, which can be harmful to humans, living beings, plants or property."

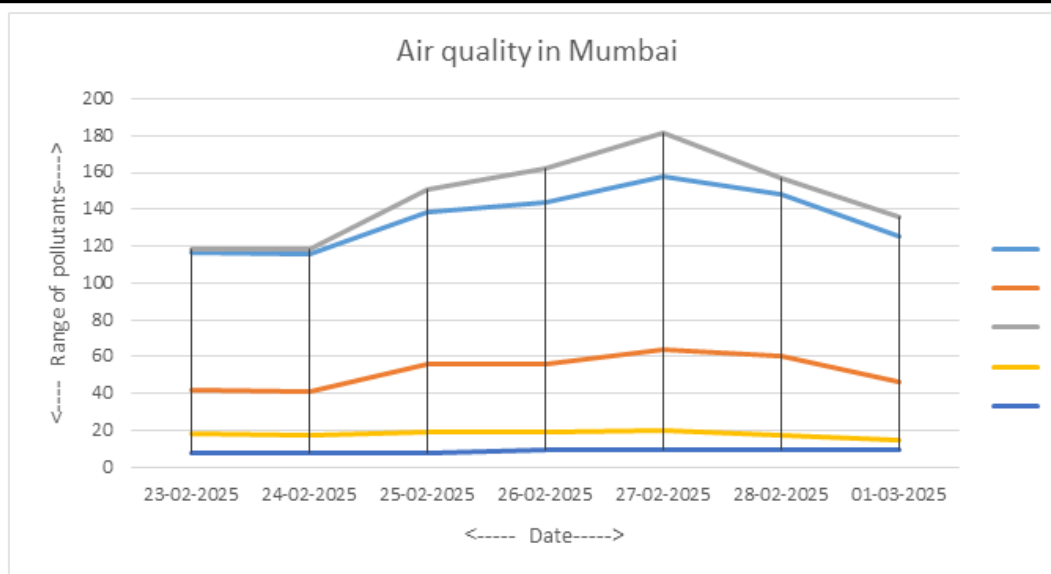
The Chembur suburbs in Mumbai could not be saved from air pollution. Chembur, Mumbai, has been seriously influenced by the industrial pollution from the oil purification factories, fertilizer factories and Deonar dumping ground.

SOURCES OF AIR POLLUTION

- **Oil purification factories:** Hydrophloric acid, particulate matter, sulfur dioxide, nitrogen oxide and many other toxic pollutants come out of the (exhaust) oil purification factories in Chembur.
- **Fertilizer factories:** Chemical fertilizer package in Chembur releases ammonia and nitrous oxide.
- **Deonar Dumping Ground:** The fire at the dumping ground causes the residents to cause smoke and health problems.
- **Cement Factories:** A gas pollution causes truck coming from cement factories in Shivaji Nagar.
- **Transport:** The increasing number of vehicles is also adding to air pollution.

Table no.1: Daily air quality in Mumbai:

Date	AQI	PM 2.5 (µg/m ³)	PM 10 (µg/m ³)	NO ₂ (ppb)	SO ₂ (ppb)
23/02/2025	117	42	118	18	8
24/02/2025	116	41	118	17	8
25/02/2025	139	56	151	19	8
26/02/2025	144	56	162	19	9
27/02/2025	158	64	182	20	9
28/02/2025	148	60	157	17	9
01/03/2025	125	46	136	15	9



Reference: AQI Application

Graph no. 2: Daily air quality in Mumbai

Observing the above graphs, it is found that the surrounding air in Mumbai has a higher proportion of particulate matter (PM 2.5 and PM 10). Therefore, the quality of the air is moderately polluted. This ratio may have been caused by the increase in industrial regions and the increase in the construction sector and the rate of increasing vehicles.

Table no. 2: Indicators of the index value of air quality

AQI Category(Range)			PM10 24 - hr ($\mu\text{g}/\text{m}^3$)		PM2.5 24 - hr ($\mu\text{g}/\text{m}^3$)	
	low	high	low	high	low	high
Good	0	50	0	50	0	30
Satisfactory	50	100	50	100	30	60
Moderate	100	200	100	250	60	90
Poor	200	300	250	350	90	120
Very Poor	300	400	350	430	120	250
Severe	400	500	430	700	250	380

Reference: <https://safar.tropmet.res.in/AQI>

As above, air pollution caused by different resources is increasing the amount of hazardous toxic gases and particulate matter in the air. Those pollutants are adversely affecting human health.

IMPACTS OF AIR POLLUTANTS ON HUMAN HEALTH:

Sulfur oxides - Respiratory problems, heart and lung disorders, visual impairment.

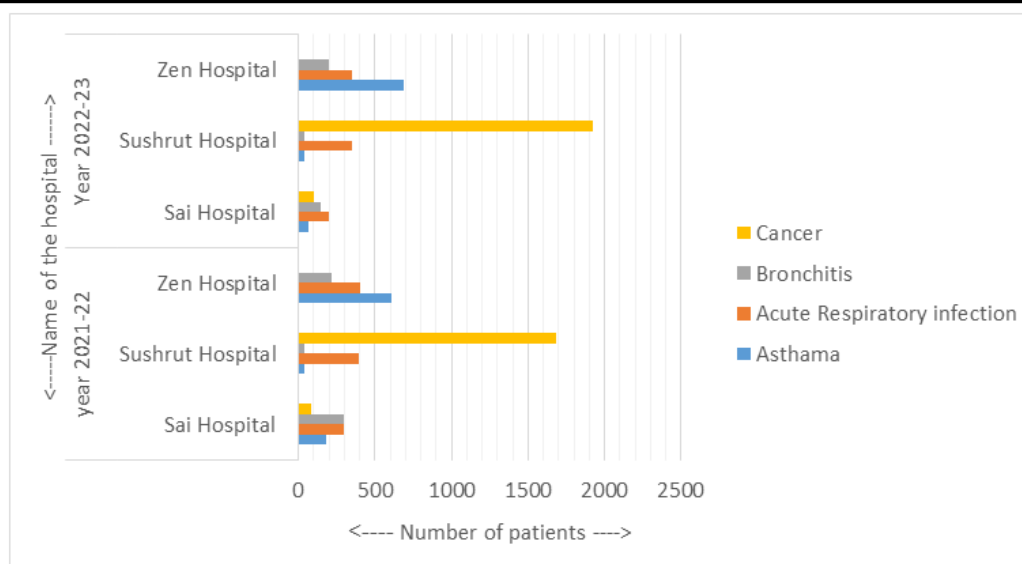
Nitron oxides – Respiratory system suffers due to Nitrogen oxide, which cause inflammation and itching, sore throat and cough, headache, respiratory and lung inflammation.

Particle substance PM 2.5 and PM 10: Respiratory problems, asthma, bronchitis, reduced lung function, heart stroke, bone problems, cancer, heavy metal poisoning, etc.

Table no.3: The number of patients in different hospitals in Mumbai (Illness caused by infection)

Sr. No.	Disease	Year 2021-22			Year 2022-23		
		Sai Hospital	Sushrut Hospital	Zen Hospital	Sai Hospital	Sushrut Hospital	Zen Hospital
1	Asthma	180	12	612	70	10	690
2	Chronic Respiratory Infection	300	396	407	200	350	350
3	Bronchitis	300	24	214	150	21	195
4	Cancer	80	1687	NA	100	1921	NA

Reference: Maharashtra Pollution Control Board Report, Chembur (Dec.2023 To Feb. 2024)



The above graph shows that the prevalence of sick patients caused by air pollution is found when there is an increase in the increase.

SUGGESTIONS FOR CONTROLLING MEASURES FOR AIR POLLUTION:

1. Avoid burning of wood, coal and waste.
2. Use recycled energy resources.
3. The Pollution Control Act should be strictly implemented.
4. To reduce the pollution in the lower layers of the atmosphere, the height of the chimneys should be increased to the higher levels as possible.
5. Trees should be planted to keep the environment pure. The tree absorbs polluted gas and adhesive the particulate matter that float in the air on their leaves.
6. The public transport system should be used.
7. The mask should be used to protect from dust particles.
8. Create awareness among people about the use of alternative fuel -powered vehicles such as CNG / LPG, hybrid and electric.
9. Spraying water around the construction area causes the particulate matter to fall to the ground.

CONCLUSION

Considering the increasing air pollution and hence the adverse effects on human health, it is the responsibility of all to reduce air pollution. The Maharashtra Pollution Control Board has made laws. It needs to be strictly implemented. Measures are being taken to prevent emission of hazardous gases through the Mumbai Municipal Corporation. eg. Controlling traffic, planting in open spaces from industries, monitoring air quality, reducing large pollution commercial vehicles in phases.

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SCIENTOMETRIC TRENDS AND EMERGING RESEARCH FRONTIERS IN SMART CITIES AND SUSTAINABLE URBAN DEVELOPMENT: AN INDIAN PERSPECTIVE

¹Mangesh Janardan Ghodke and ²Dr. Madhuri Tikam

¹Librarian, N.G. Acharya & D.K. Marathe College of Arts, Science & Commerce,
Chembur, Mumbai (Maharashtra)

²Director, KRC, HSNC University, Mumbai D.M. Harish Building, 47, Dr. R. G. Thadani Marg, Worli,
Mumbai

ABSTRACT

The rapid urbanization of India has necessitated the development of smart cities that integrate technology, sustainability, and governance to enhance urban living. This study presents a scientometric analysis of research trends in smart cities and sustainable urban development, using Scopus-indexed publications as the primary dataset. The analysis reveals a steady rise in research output, with publications increasing from 16 in 2014 to over 2500 in 2025, aligning with the launch of the Smart Cities Mission (SCM) in 2015.

A subject-wise categorization indicates that Computer Science (32.6%) and Engineering (27.3%) dominate smart city research, while Social Sciences (14.2%) and Environmental Science (8.5%) remain underrepresented. The most common publication sources include Lecture Notes in Networks and Systems, Sustainability (Switzerland), and IEEE Access, demonstrating a strong emphasis on technology-driven urban solutions. Journal articles (41.1%) form the majority of research contributions, followed by conference papers (30.7%) and book chapters (25.9%).

Institutional analysis highlights Vellore Institute of Technology, K L Deemed to be University, and Lovely Professional University as the top contributors, while India leads global smart city research, followed by Saudi Arabia, the United States, and China.

The findings suggest that while India is emerging as a global research hub, gaps remain in socio-economic impact studies, climate resilience research, and field-based validation of smart city projects. Future research should focus on interdisciplinary collaborations, real-world policy implementations, and sustainable urban transformation strategies.

Keywords: *Scientometric Analysis, Smart Cities, Sustainable Urban Development, Urban Planning, Smart City Mission*

INTRODUCTION

The rapid pace of urbanization in India has led to increasing challenges related to infrastructure, environmental sustainability, and quality of life. In response, the Government of India launched the Smart Cities Mission in 2015, aiming to create urban centers that are technologically advanced, environmentally sustainable, and economically viable. This initiative has spurred significant research in the fields of smart city development, urban planning, geospatial technology, and sustainability.

Scientometric analysis is a valuable tool for evaluating the growth, impact, and collaboration patterns in academic research on smart cities and sustainable urban development. By analyzing bibliometric indicators such as publication trends, citation networks, and author collaborations, this study seeks to assess the research landscape in India. Understanding the evolution of smart city research can help policymakers, urban planners, and researchers identify key knowledge gaps and future research directions.

This paper presents a scientometric assessment of scholarly publications in the domain of smart cities and sustainable urban development in India. It explores the major contributors, prominent research themes, and emerging trends in this field. The study is based on data from Scopus, employing bibliometric techniques such as citation analysis, keyword co-occurrence, and network visualization. Researcher used Bibliometrix (Biblioshiny) and VosViewer to analyse the given dataset for scientometric analysis. The findings will contribute to a better understanding of India's research trajectory in smart urban development and its alignment with global sustainability goals.

REVIEW OF LITERATURE

Research on smart cities and sustainable urban development has seen exponential growth in the last decade, particularly in India, where urban transformation is a key policy objective under the Smart Cities Mission (SCM). Several studies have examined the role of technology, governance, and sustainability in shaping the future of urban living.

One of the primary areas of research is the integration of digital technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), and Geographic Information Systems (GIS) in urban planning. Kumar et al. (2021) highlight the use of machine learning algorithms for real-time traffic management and urban mobility solutions, demonstrating that data-driven decision-making can significantly enhance the efficiency of public transport systems. Similarly, Rodrigues et al. (2020) emphasize how IoT-based smart grids can optimize energy consumption and improve sustainability in urban infrastructure, particularly in developing countries like India.

Urban sustainability remains a central theme in smart city research. Caragliu et al. (2011) argue that a smart city is not just technologically advanced but also environmentally sustainable, where green energy, waste management, and climate-resilient infrastructure play an integral role. This perspective is reinforced by Sharma & Raj (2020), who analyze India's Smart Cities Mission and find that while there is a strong emphasis on digital governance, the adoption of green infrastructure and renewable energy solutions remains limited in implementation.

Another critical aspect of smart city research is urban governance and policy implementation. Chourabi et al. (2012) propose an integrative framework that aligns technology, governance, and citizen participation in smart city planning. However, studies like Datta (2015) argue that India's approach to smart cities is highly technocratic and lacks participatory governance, which could lead to socio-economic inequalities in urban development. Similarly, Mishra & Kalra (2021) identify key challenges in implementing smart city projects in Tier-2 and Tier-3 cities due to funding constraints, bureaucratic inefficiencies, and lack of technical expertise.

Recent research has also focused on urban climate resilience and sustainability strategies. Patra & Mukherjee (2022) study climate adaptation techniques in Indian cities and argue that heatwave mitigation, flood management, and biodiversity conservation should be key priorities in urban planning. Meanwhile, Liu et al. (2021) examine how AI-driven urban analytics can predict and mitigate climate-related disasters, suggesting that integrating climate models with smart city frameworks can enhance urban resilience.

Despite significant advancements in technology-driven urban solutions, there is a lack of research on the socio-economic impacts of smart cities. Joshi et al. (2016) emphasize that smart cities should be citizen-centric, ensuring affordable housing, inclusive public spaces, and equitable access to digital services. However, many studies focus on infrastructure and technology, neglecting aspects of social equity and public well-being.

OBJECTIVES OF STUDY

1. To analyze the research growth trends and subject-wise distribution of smart cities and sustainable urban development studies using scientometric techniques.
2. To evaluate key contributors, including leading authors, institutions, and countries, and assess their impact on global and Indian smart city research.
3. To identify major publication sources and document types, highlighting the role of journals, conferences, and book chapters in disseminating knowledge.

METHODOLOGY AND ANALYSIS

This research employs a scientometric analysis approach to evaluate the growth, impact, and thematic evolution of smart cities and sustainable urban development research. The methodology consists of data collection, bibliometric analysis, and interpretation of research trends.

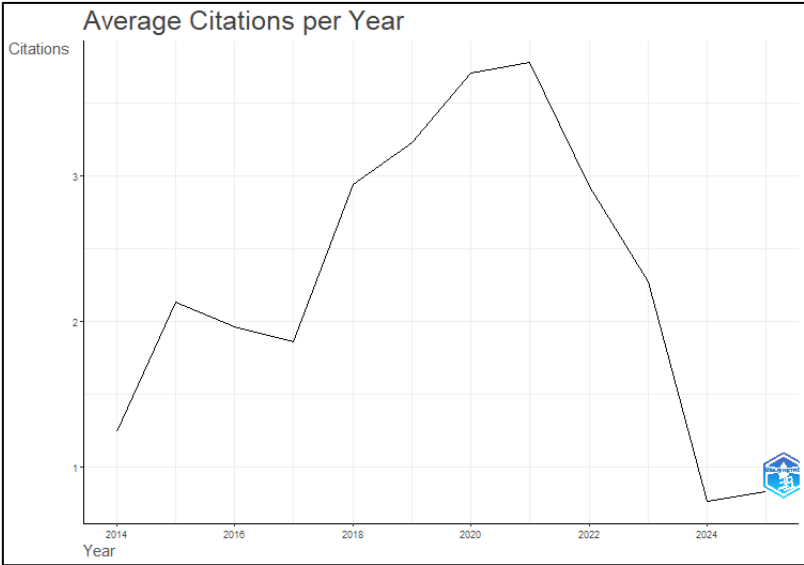
Data Collection: The study utilizes Scopus, one of the largest academic databases, to extract scientific publications, citation data, and author affiliations. The dataset includes journal articles, conference papers, book chapters, and reviews related to smart cities and urban sustainability. The search was conducted using relevant keywords such as "Smart Cities," "Sustainable Urban Development," "Urban Infrastructure," and "Geospatial Technology" within a specified timeframe (2014-2025).

SCOPUS SEARCH CRITERIA

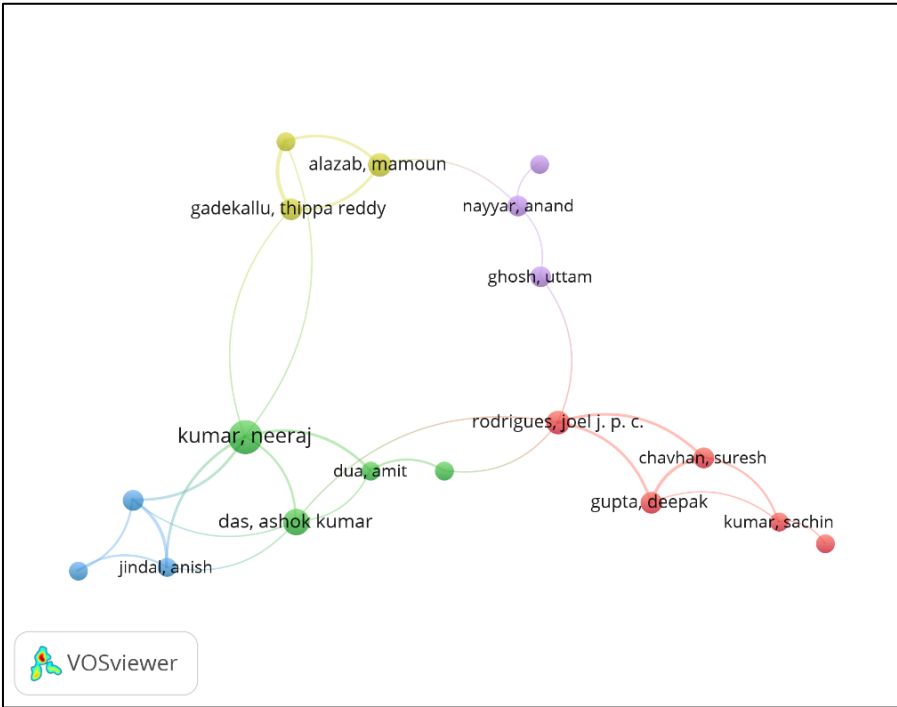
(TITLE (urbanization) OR TITLE ("smart cities" OR "smart city")) AND PUBYEAR > 2013 AND PUBYEAR < 2026 AND (LIMIT-TO (DOCTYPE , "re") OR LIMIT-TO (DOCTYPE , "ch") OR LIMIT-TO (DOCTYPE , "cp") OR LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (AFFILCOUNTRY , "India")) AND (EXCLUDE (SUBJAREA , "MATH") OR EXCLUDE (SUBJAREA , "BUSI") OR EXCLUDE (SUBJAREA , "PHYS") OR EXCLUDE (SUBJAREA , "MEDI") OR EXCLUDE (SUBJAREA , "EART") OR EXCLUDE (SUBJAREA , "ECON"))

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2014:2025
Sources (Journals, Books, etc)	951
Documents	2583
Annual Growth Rate %	13.43
Document Average Age	3.85
Average citations per doc	12.84
References	84876
DOCUMENT CONTENTS	
Keywords Plus (ID)	9937
Author's Keywords (DE)	6296
AUTHORS	
Authors	6412
Authors of single-authored docs	172
AUTHORS COLLABORATION	
Single-authored docs	199
Co-Authors per Doc	3.55
International co-authorships %	26.75
DOCUMENT TYPES	
Article	1061
book chapter	669
conference paper	794
Review	59

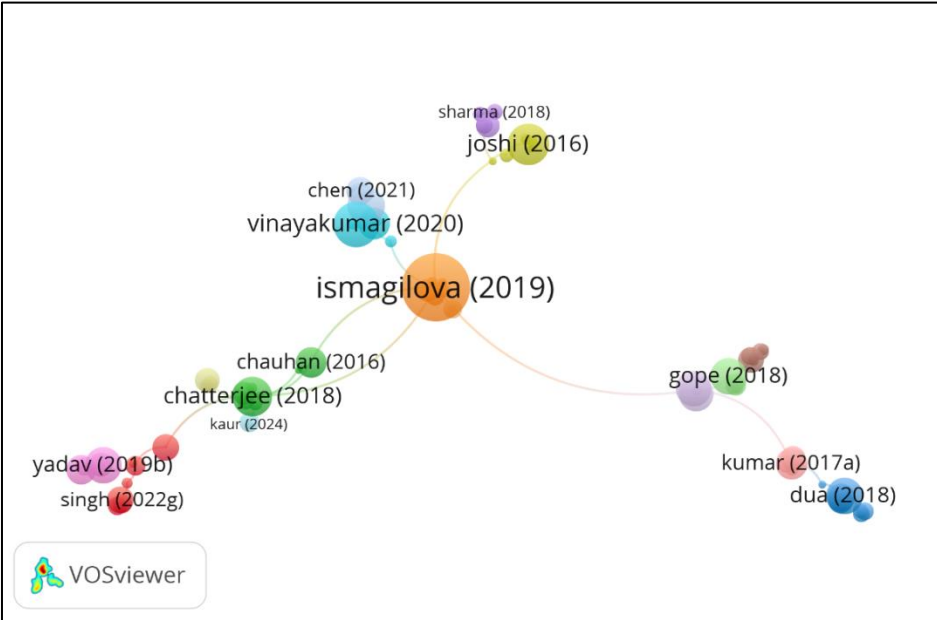
The scientometric analysis of smart cities and sustainable urban development research (2014-2025) reveals a steady annual growth rate of 13.43%, with 2583 documents published across 951 sources. The research exhibits strong collaboration, with 6412 authors and an average of 3.55 co-authors per document. The international co-authorship rate stands at 26.75%, reflecting significant global engagement. The study incorporates 84876 references, highlighting its extensive scholarly foundation. Keywords Plus (9937) and Author’s Keywords (6296) indicate a diverse research focus. Document distribution includes articles (1061), conference papers (794), book chapters (669), and reviews (59), emphasizing both theoretical and applied research contributions. The average citation per document is 12.84, demonstrating substantial academic impact.



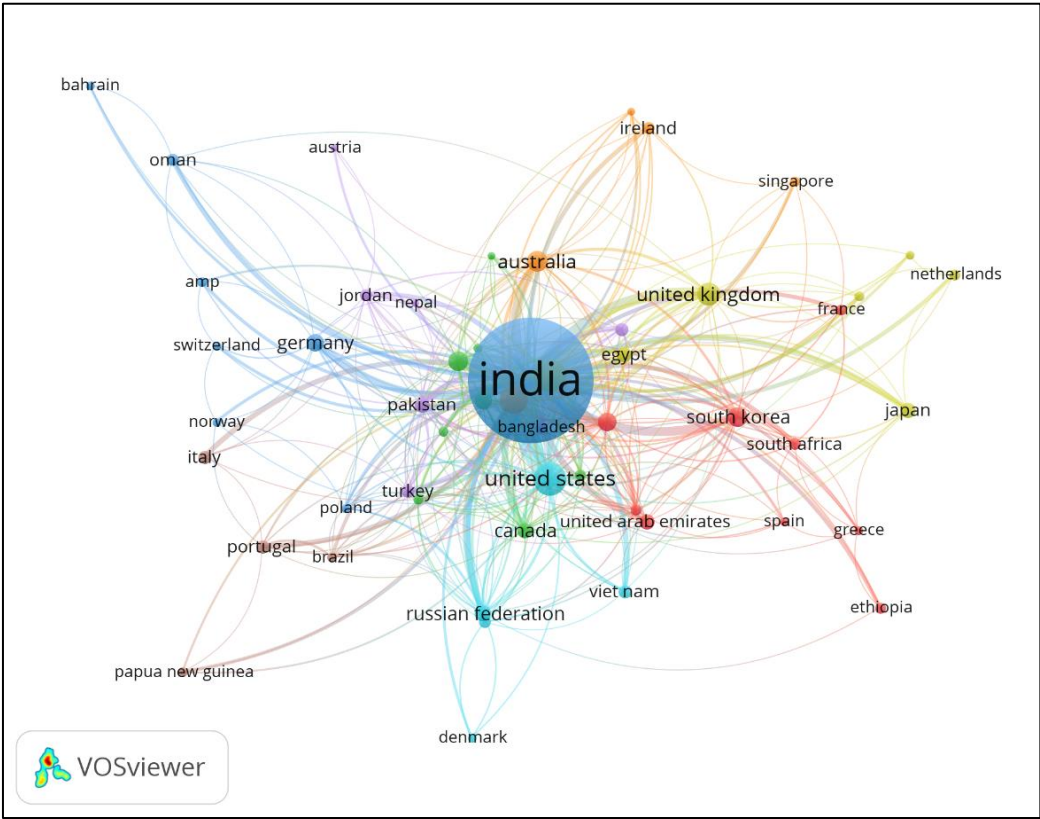
The Biblioshiny analysis of average citations per year reveals a rising trend from 2014 to 2021, peaking around 3.5 citations per document in 2021. Citations declined after 2022, dropping sharply to below 1 citation per document in 2024. This indicates older publications retain higher impact, while recent research is yet to accumulate significant citations. The peak in 2020-2021 suggests a period of highly influential publications, possibly driven by increased research funding and global smart city initiatives. The recent drop signifies the typical lag in citation accumulation for newer studies.



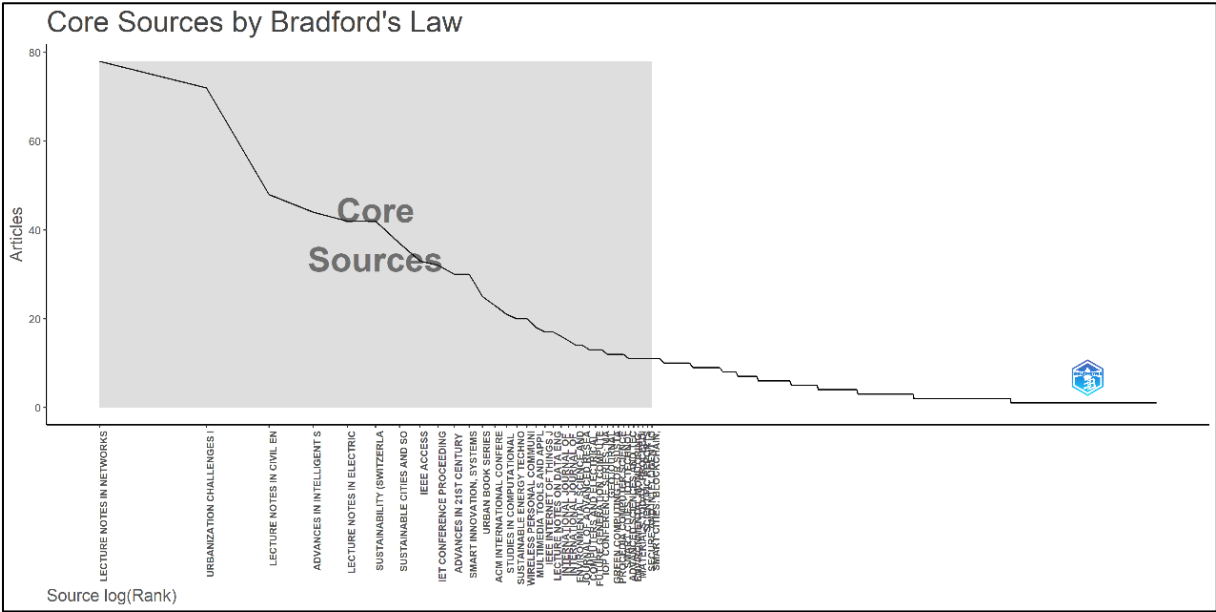
The VOSviewer co-authorship network visualization highlights key collaborative relationships in smart cities and sustainable urban development research. Neeraj Kumar emerges as a central researcher with extensive connections, particularly with Ashok Kumar Das, Amit Dua, and Thippa Reddy Gadekallu. Distinct research clusters indicate regional and international collaborations, with Rodrigues Joel J.P.C. and Mamoun Alazab forming additional influential nodes. The color-coded clusters suggest specialization in different thematic areas, emphasizing interdisciplinary and multi-institutional partnerships. The network also reflects highly active researchers driving innovation in urban sustainability, AI-driven smart solutions, and energy-efficient urban systems.



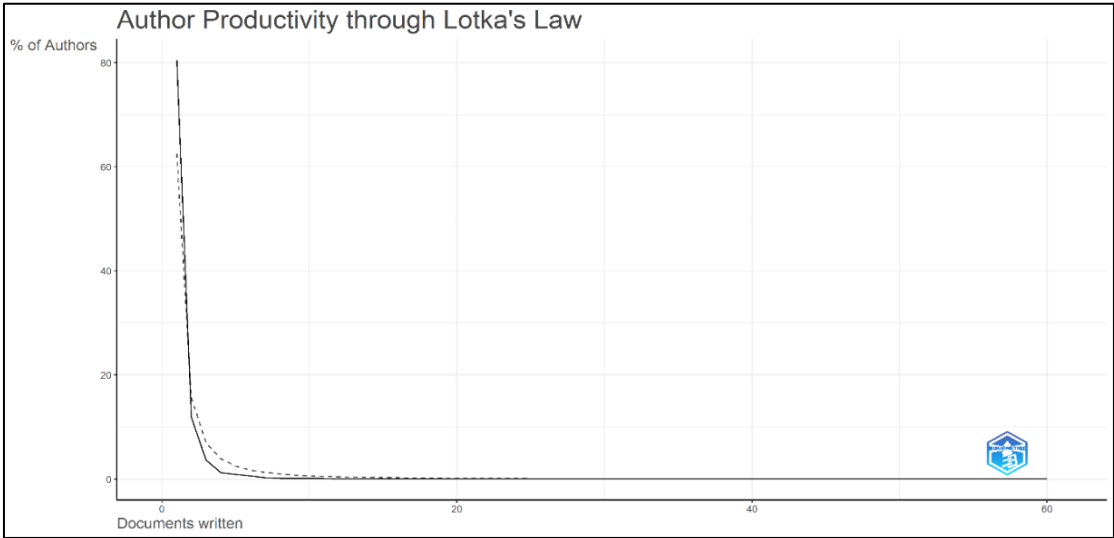
The VOSviewer citation network visualization highlights Ismagilova (2019) emerges as the most highly cited work, forming connections with Vinayakumar (2020), Chatterjee (2018), Joshi (2016), and Gope (2018). The color-coded clusters indicate thematic groupings, showcasing collaborative and progressive knowledge evolution. The presence of recent studies (Kaur 2024, Singh 2022g, Chen 2021) reflects ongoing research expansion, while older foundational works (Chauhan 2016, Joshi 2016) demonstrate their lasting impact on the field. The visualization confirms that AI, security, governance, and sustainability are key drivers of academic research in urban transformation.



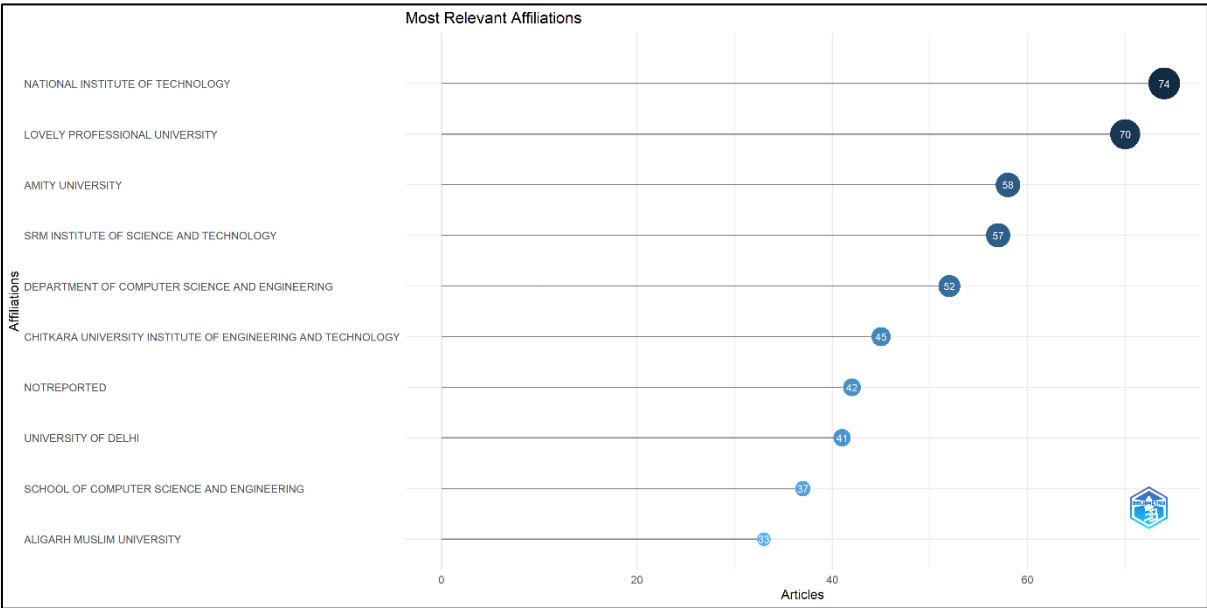
Co-authorship network visualizes global research collaborations in smart cities and sustainable urban development, with India as the most significant hub, showing strong connections with the United States, United Kingdom, Australia, and Germany. The network includes over 30 countries, indicating extensive international partnerships. South Korea, UAE, and Egypt emerge as key Asian collaborators, while European nations like France, Netherlands, and Ireland also demonstrate strong research ties. The diverse color-coded clusters suggest regional specialization in smart city innovations, with India playing a central role in interdisciplinary urban research. The dense connectivity signifies highly collaborative, globally impactful research.



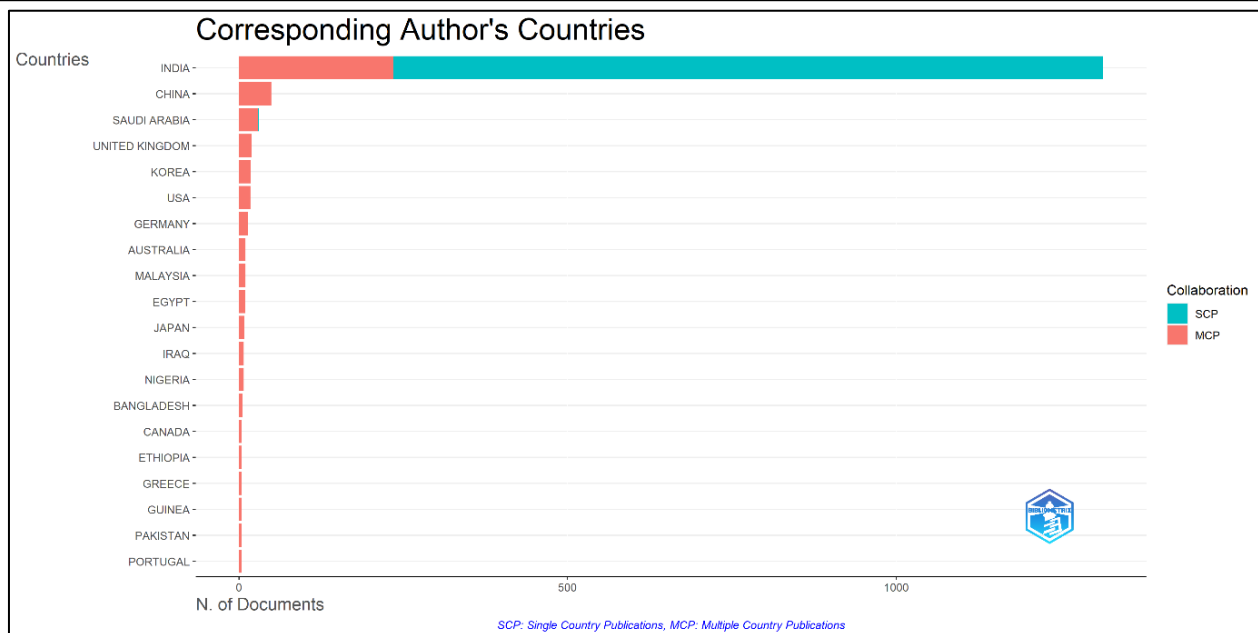
Bradford's Law identifies core sources contributing the highest number of articles in smart cities and sustainable urban development research. Lecture Notes in Networks, Urbanization Challenges, and IEEE Access are among the most influential journals. The log-rank distribution shows a sharp decline, indicating that a few sources contribute the majority of research output, while many others publish fewer relevant articles. This pattern highlights key academic sources driving knowledge dissemination, essential for researchers aiming to access high-impact publications in smart urban innovations and sustainability studies.



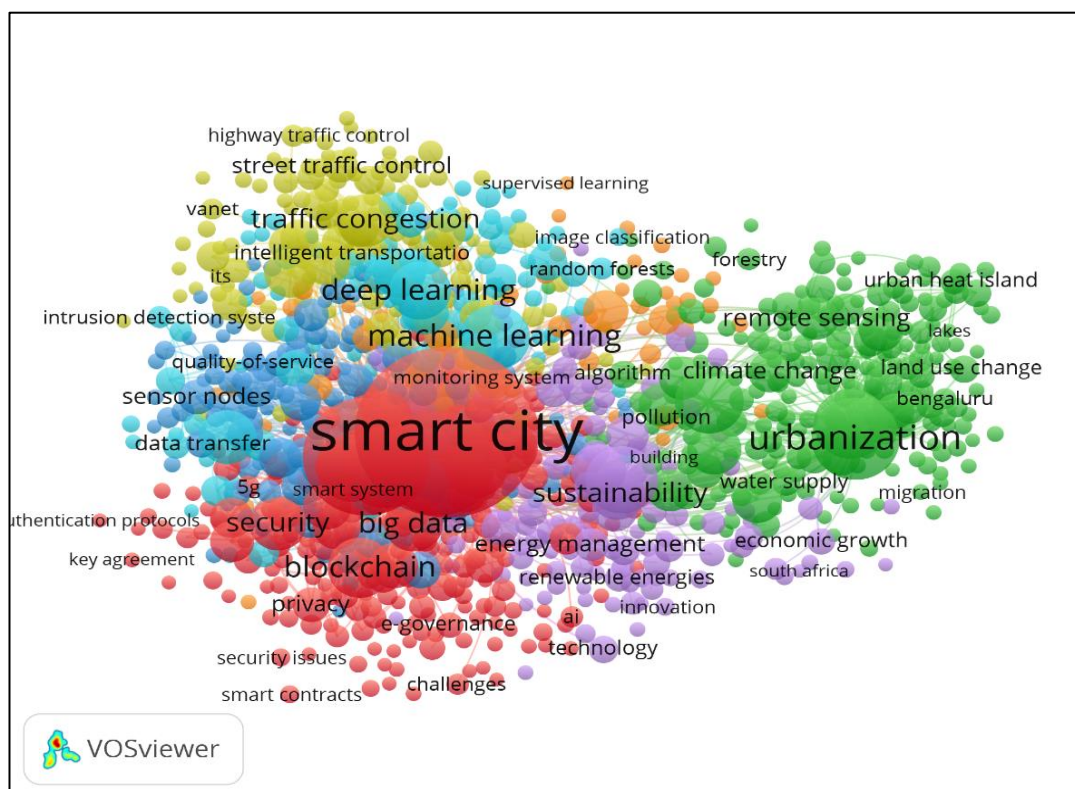
Lotka’s Law visualizes author productivity in smart cities and sustainable urban development research. The steep curve indicates that a small percentage of authors contribute the majority of publications, while most authors have one or two publications. This pattern follows Lotka’s principle of scientific productivity, suggesting highly specialized researchers dominate the field, whereas many contribute infrequently. The long tail signifies broad participation, yet few prolific contributors shape the knowledge base, emphasizing the need for stronger interdisciplinary collaboration and knowledge distribution.



The most relevant academic affiliations based on the number of articles published. The National Institute of Technology leads with 74 articles, followed by Lovely Professional University (70) and Amity University (58). Other key contributors include SRM Institute (57) and Department of Computer Science & Engineering (52).



The Biblioshiny analysis of corresponding authors' countries shows India as the dominant contributor, with over 1000 documents, far surpassing China, Saudi Arabia, the UK, and the USA, which have significantly lower counts. Single-country publications (SCPs) dominate, while multiple-country collaborations (MCPs) remain limited, indicating India's strong domestic research output but lower international co-authorship engagement. Strengthening global collaborations could enhance research impact.



CO-OCCURRENCE OF ALL KEYWORDS

Conclusion and Findings

The yearly publication trends show a consistent rise in research output, with peak growth occurring post-2017. This surge aligns with India's strategic push towards urban digital transformation, green infrastructure, and smart mobility solutions. The subject area analysis highlights a strong focus on computer science (32.6%) and engineering (27.3%), reinforcing the role of AI, IoT, and data analytics in smart city development. However, the relatively lower representation of environmental sciences (8.5%) and decision sciences (3.5%) suggests a need for greater integration of sustainability and policy-driven urban planning.

The publication source analysis reveals that conference proceedings and journals such as *Lecture Notes in Networks and Systems* and *Sustainability (Switzerland)* are primary outlets for smart city research. This indicates a dynamic exchange of emerging technologies and sustainable urban solutions. Despite the growing number of peer-reviewed journal articles (41.1%), the dominance of conference papers (30.7%) suggests that much of the research is still in early developmental or experimental stages, requiring further validation through journal publications and real-world applications.

Leading academic institutions such as Vellore Institute of Technology, K L Deemed to be University, and Lovely Professional University have emerged as significant contributors, reflecting India's strong academic investment in urban informatics, smart infrastructure, and energy-efficient cities. However, the absence of top-tier IITs and NITs from the leading contributors' list suggests that a significant portion of the research is being conducted in private universities, emphasizing the need for greater collaboration with public research institutions and government bodies.

The most prolific authors, including Kumar, N., Rani, S., Roy, D.S., and Das, A.K., have contributed extensively to urban technology, governance frameworks, and sustainable city models. However, increased international collaborations with researchers from the United States, China, and the United Kingdom could further enhance the global impact of India's smart city research.

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REVOLUTIONIZING DIGITAL LEARNING: IMPLEMENTING VIRTUAL COMPUTER LABORATORIES USING CLOUD COMPUTING

Dr. Prajakta A. JoshiAssistant Professor & Coordinator B.Sc. (IT), SES's L. S. Raheja College of Arts and Commerce
(Autonomous)**ABSTRACT**

Digital transformation has emerged as a critical force in restructuring education, primarily due to advancements in cloud computing technologies. The incorporation of virtual computer laboratories (VCLs) as a crucial element of the digital transformation of education is examined in this research. Through the use of cloud computing, VCLs offer scalable, affordable, and easily available environments that enable educators and students to use software tools, collaboration platforms, and high-performance computing resources from any place.

The study investigates into the way VCLs are designed, implemented, and how they enhance the teaching and learning process. It draws attention to the benefits of this strategy, which include lower infrastructure expenses, greater accessibility for a range of student demographics, and more flexibility in how courses are delivered. The study also discusses issues including system reliability, data security, and the requirement for cloud-based system training for educators.

This study highlights the potential of cloud-enabled VCLs to close educational gaps, encourage collaborative learning, and get students ready for the needs of a digital-first economy through case studies and an analysis of new trends. The findings provide a roadmap for institutions intended to implement cloud-based virtual Computer laboratories as part of their broader digital transformation strategy.

Keywords: Cloud Computing, Virtual Computer Laboratory, Digital Transformation, Education Technology.

INTRODUCTION

Modern education is now firmly rooted in digital revolution, which has radically changed the way that knowledge is disseminated, absorbed, and evaluated. This change is being fuelled by the quick uptake of new technologies like data analytics, cloud computing, and artificial intelligence. With its scalable, adaptable, and affordable solutions that satisfy the changing needs of both educators and students, cloud computing stands out among them as a disruptive force. Virtual Computer Laboratories (VCLs), powered by cloud computing, are at the forefront of this transformation, bridging the gap between theoretical instruction and hands-on practical learning.

Traditional physical laboratories are essential to technical education, but they come with a lot of drawbacks, such as high expenses, restricted accessibility, and logistical difficulties. Access to physical labs can be a major obstacle for students who attend colleges with low resources or who live in rural places. The introduction of VCLs provides a good substitute, allowing students to interact with sophisticated computer environments online. By leveraging cloud platforms such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud, educational institutions can provide students with virtual environments that simulate real-world scenarios, fostering experiential learning without the need for costly hardware.

The importance for implementing VCLs was highlighted during the COVID-19 pandemic, which necessitated a global transition to remote learning. The shutdown of actual campuses drew attention to the shortcomings of conventional lab infrastructure and hastened the uptake of virtual cloud technologies. Research indicates that at this time, educational institutions that made use of VCLs improved the adaptability and scalability of their instructional models while simultaneously guaranteeing technical education continuity.[14][15] For example, universities in Australia and India successfully integrated VCLs into their STEM curricula, allowing students to access high-performance computing resources from home

Though the integration of VCL is challenging, it is having the great potential. There are many obstacles, including data security, internet dependence, and the requirement for technical training for teachers. Additionally, educational institutions must adopt a software-centric approach to laboratory-based learning instead of a hardware-centric one. To overcome these obstacles, educators, technologists, and legislators must work together to create best practices and standardised frameworks for putting VCLs into practice.

OBJECTIVES

1. To analyse the impact of cloud-based Virtual Computer Laboratories (VCLs) on accessibility, learning outcomes, and cost efficiency in practical based education.

2. To identify the challenges faced by educators and students in adopting and utilizing VCLs.
3. To evaluate user perceptions regarding the ease of use, scalability, and effectiveness of VCL platforms in educational contexts.

Hypotheses

Hypothesis 1:

H₀ (Null Hypothesis): There is no significant difference in accessibility and learning outcomes between traditional physical laboratories and cloud-based VCLs.

H₁ (Alternative Hypothesis): Cloud-based VCLs significantly improve accessibility and learning outcomes compared to traditional physical laboratories.

Hypothesis 2:

H₀ (Null Hypothesis): The perceived ease of use and effectiveness of VCL platforms is not significantly related to their adoption by educators and students.

H₁ (Alternative Hypothesis): The perceived ease of use and effectiveness of VCL platforms significantly influences their adoption by educators and students.

History of Digital Transformation in Education: Cloud Computing and Virtual Computer Laboratories (VCLs)

Evolution of Education Technology:

The integration of technology in education began in the mid-20th century with radio and television broadcasts used for distance learning. With the introduction of personal computers in the latter half of the 20th century, educational software and computer-assisted learning completely changed the way that people taught. Traditional classrooms gave way to blended learning environments by the 1990s as a result of the development of e-learning platforms made possible by the internet.

Rise of Cloud Computing

The idea of cloud computing was first conceived in the 1960s, and with the introduction of services like Google Cloud and Amazon Web Services (AWS), it became economically feasible in the early 2000s. It made it possible for businesses, including academic institutions, to use the internet to access scalable computer resources. By significantly lowering expenses and doing away with the requirement for pricey physical infrastructure, this invention made cutting-edge technology available to colleges and institutions all around the world.

With the use of cloud computing, educational institutions are now able to manage data, host virtual environments, and provide content instantly. By the 2010s, cloud services were being used by Learning Management Systems (LMS) such as Moodle, Blackboard, and Google Classroom to improve administrative and instructional procedures.

Virtual Computer Laboratories (VCLs) Development

One useful use of cloud computing in education is the creation of virtual computer laboratories, or VCLs. VCLs, which were first created for technical fields, gave students remote access to high-performance computer environments. In the early 2000s, North Carolina State University introduced the idea of VCLs, making them a trailblazer in this area. Under the strategy, students used the cloud to access pre-configured virtual machines for lab tasks.

VCLs eventually became essential to STEM education by facilitating practical instruction in data analysis, software development, programming, and engineering simulations. Because there was no longer a requirement for real lab setups, technical education became more accessible, particularly in environments with limited resources.

Transition to Digital Platforms

The COVID-19 epidemic hastened the global transition to digital platforms. Lockdowns compelled schools to switch to online instruction, underscoring the need of digital resources like VCLs. The foundation of this change was cloud computing, which offered scalability, flexibility, and unbroken resource availability. To accommodate virtual learning environments, platforms such as Google Cloud and Microsoft Azure increased the scope of their capabilities. To improve accessibility and inclusion, educational institutions implemented hybrid models that combine virtual and physical labs. The change also brought forth advancements in augmented reality (AR) and virtual reality (VR), which enhanced virtual lab experiences even more.

REVIEW OF LITERATURE

[Kumar, V., & Singh, R. (2021).]A study that focused on cloud-based solutions to provide hands-on IT instruction examined the efficacy of virtual computer labs for engineering education. The study showed that, particularly for distant learners, scalable cloud infrastructure improved access to laboratory materials. The results highlighted the lower environmental impact and operational expenses as compared to conventional configurations.

[Ahmed, T., & Martinez, J. (2020).]This paper reviewed how cloud computing reshaped virtual lab experiences in STEM disciplines. It highlighted the integration of Platform as a Service (PaaS) solutions to provide customizable lab setups, improving collaboration among students. Key barriers included internet dependency and data security concerns.

[Li, X., & Zhao, W. (2022).]During COVID-19, a case study looked at how virtual labs were widely used in higher education. The study demonstrated how uninterrupted learning was made possible by virtual environments driven by Infrastructure as a Service (IaaS). The distribution of resources and the need for faculty training presented difficulties.

[Fernandez, M., & Lee, C. (2019).]The idea of "social clouds," which improve virtual lab environments by fusing cloud services with collaborative tools, was first presented in this study. Through a computer science course, the study verified the approach, demonstrating enhanced skill development and peer interaction.

[Singh, N., & Patel, R. (2021).]This study investigated how virtual labs can improve access to high-quality education globally. It emphasised how cloud solutions may be scaled to provide disadvantaged areas with equal access, but it also pointed out that connectivity problems are a major obstacle.

This research adopts a mixed-methods approach, utilizing both primary and secondary data sources to explore the implementation and impact of cloud-based Virtual Computer Laboratories (VCLs) in education.

PRIMARY DATA COLLECTION:

Primary data is gathered through surveys and interviews conducted with stakeholders, including educators, students, and IT administrators across selected educational institutions. Surveys include quantitative Likert-scale questions to measure perceptions of VCL benefits, usability, and challenges, while semi-structured interviews provide qualitative insights into user experiences and implementation hurdles. A purposive sampling method is employed to ensure a diverse representation of participants, particularly those involved in STEM disciplines.

SECONDARY DATA COLLECTION:

Secondary data is drawn from peer-reviewed journals, conference proceedings, and institutional reports, focusing on case studies and theoretical frameworks related to VCLs and cloud computing in education. Databases like Scopus, IEEE Xplore, and Google Scholar are utilized to access relevant literature. These sources provide context, validate primary findings, and offer comparative insights from existing implementations globally.

DATA ANALYSIS:

Quantitative data is analyzed using statistical tools to identify patterns, while thematic analysis is applied to qualitative data to extract recurring themes. This mixed-methods design ensures a comprehensive understanding of the topic, blending empirical evidence with theoretical underpinnings to derive actionable recommendations for adopting VCLs in education.

FINDING AND DISCUSSION

The conclusions drawn from secondary data demonstrate the profound influence that cloud-based virtual computer laboratories (VCLs) have had on contemporary schooling. The improvement in accessibility and scalability that these technologies provide is a common theme in the literature. Students can participate in practical technical learning at a distance thanks to VCLs, which remove geographical and infrastructure constraints. According to research, scalable solutions that dynamically distribute resources based on user demand are offered by platforms like AWS and Google Cloud, guaranteeing fair access for students everywhere (Ahmed & Martinez, 2020; Singh & Patel, 2021). Additionally, research from implementations during pandemics highlights the function of VCLs in maintaining instruction during institutional closures, highlighting their dependability in promoting continuity in STEM fields (Li & Zhao, 2022; Kumar & Singh, 2021).

The cost-efficiency finding is another important one. Cloud-based solutions lessen reliance on physical infrastructure, which lowers environmental impact and maintenance expenses. According to several universities who made the switch to VCLs, their overhead costs decreased, freeing up money to improve other aspects of

academic delivery (Luna Encalada & Castillo Sequera, 2017; Hassan, Devi, & Ray, 2022). However, there are still gaps in cost, particularly for smaller organisations that cannot afford expensive cloud solutions. For fair adoption, open-source and reasonably priced alternatives are required (Fernandez & Lee, 2019).

There are nevertheless difficulties in spite of their benefits. One of the biggest obstacles is internet dependence, especially in underdeveloped or rural areas. The smooth operation of VCLs depends on dependable connectivity, and nations with inadequate infrastructure encounter major challenges (Ahmed & Martinez, 2020). Cybersecurity and data privacy are further issues, and organisations must have stringent compliance procedures to safeguard private student information (Singh & Patel, 2021; Fernandez & Lee, 2019). A further obstacle to quick adoption is the need for academics to learn new technical skills in order to make the switch to cloud-based systems. To improve their capacity to support learning in virtual settings, studies highlight the significance of preparing teachers to use VCL platforms efficiently (Kumar & Singh, 2021; Li & Zhao, 2022).

VCLs present cutting-edge chances for interactive, learner-centred instruction from a pedagogical standpoint. Students' technical proficiency and problem-solving abilities are enhanced by the controlled, risk-free setting in which they can explore, troubleshoot, and repeat lab assignments.

Primary data:

Researcher has collected data from various stakeholders like educator students and administrator. Following are the visual representation of the questions:

Objective 1: To analyse the impact of cloud-based Virtual Computer Laboratories (VCLs) on accessibility, learning outcomes, and cost efficiency in practical based education.

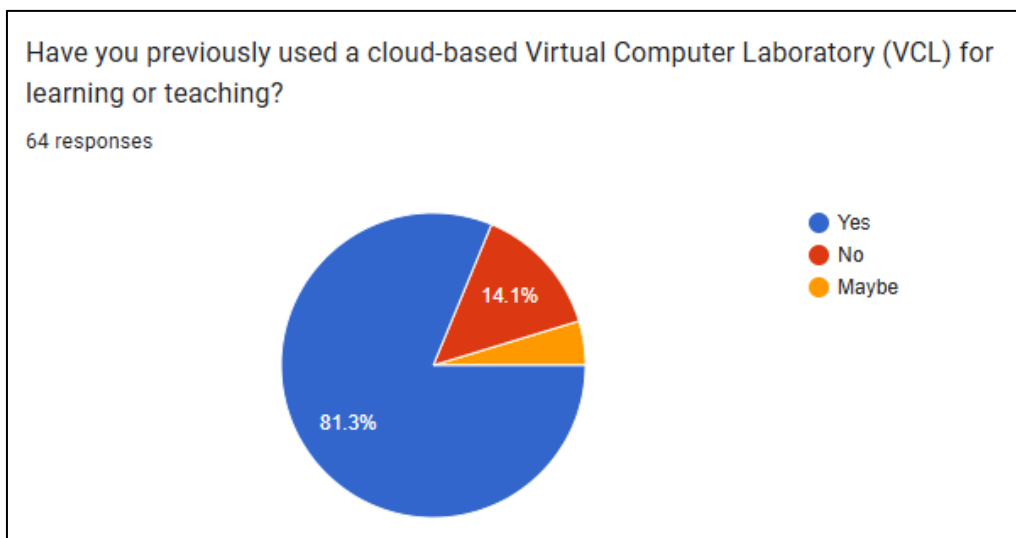


Figure 1 Usage of VCL in Education

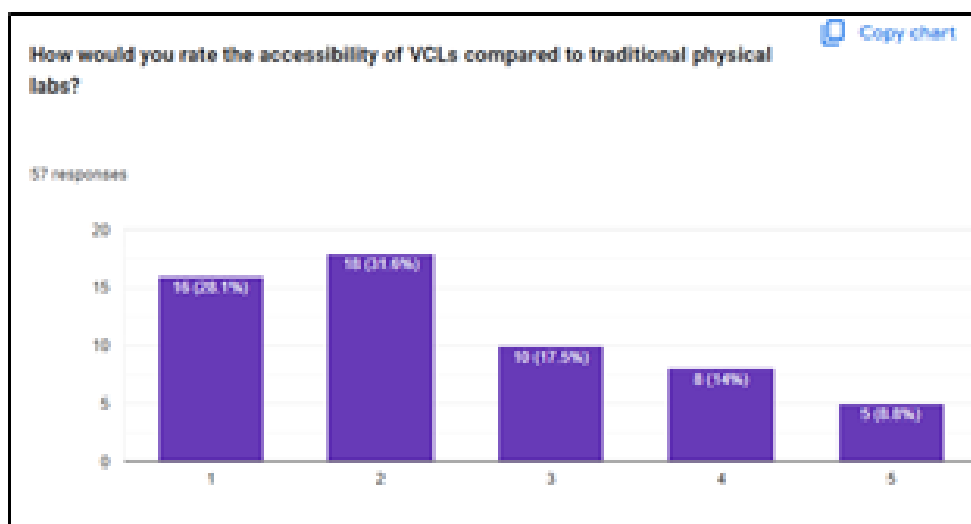


Figure 2 Accessibility of VCLs Vs Traditional Physical Labs

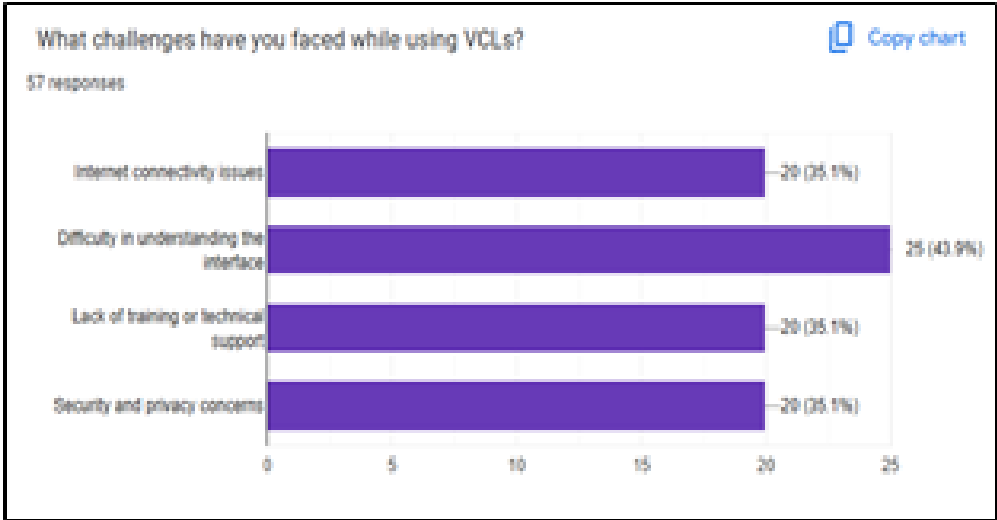


Figure 3 Challenges in VCL

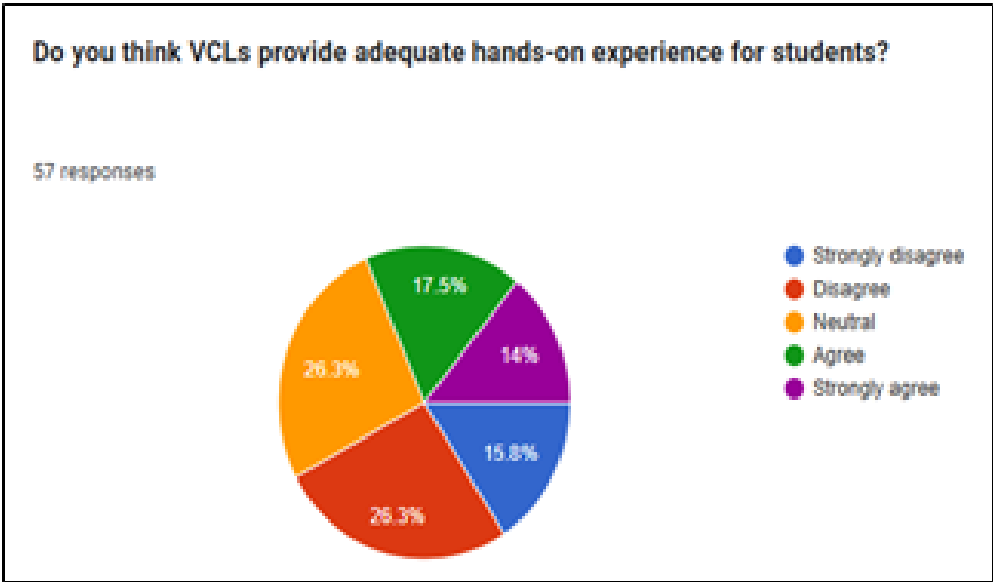


Figure 4 Adequate hands on experience on VCLs

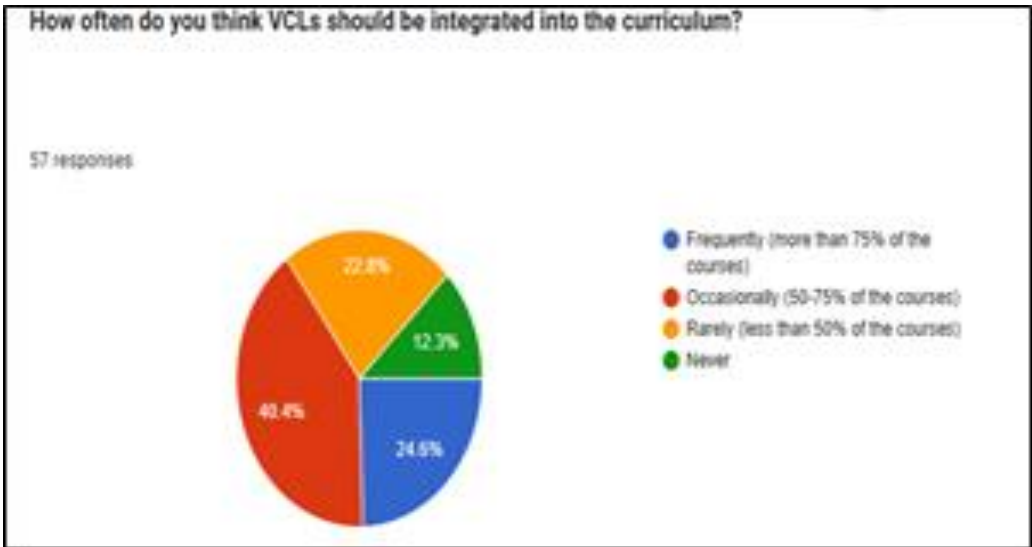


Figure 5 Integration of VCLs in curriculum

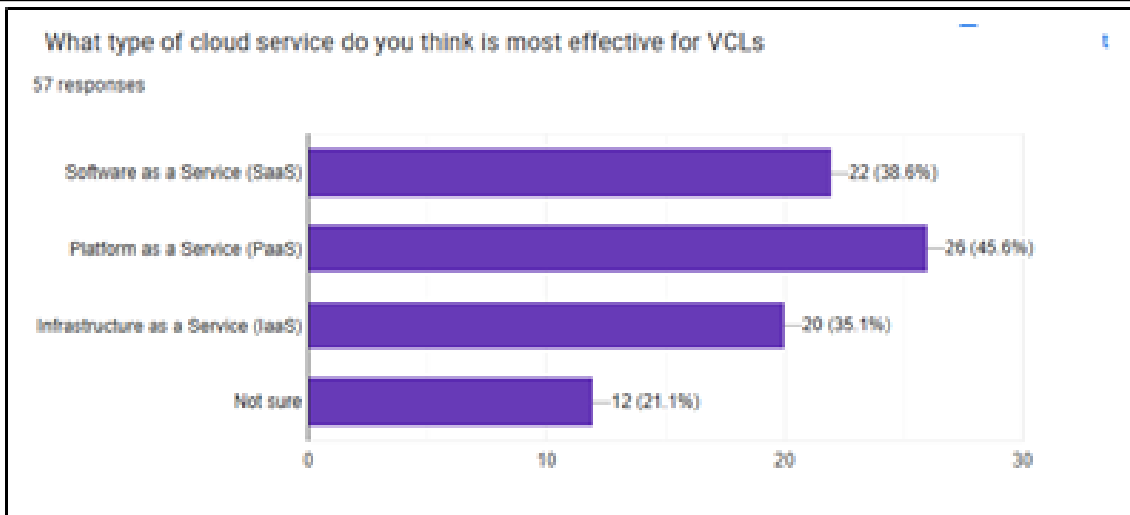


Figure 6 Effective Cloud services for VCLs

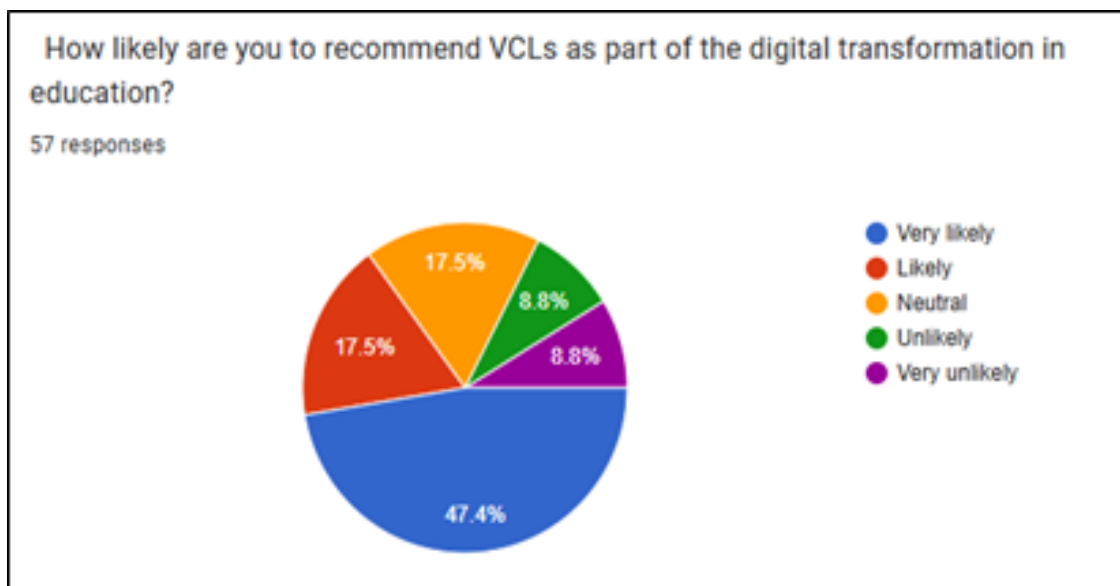


Figure 7 Recommendation of VCLs in Education

Hypothesis:

Hypothesis 1:

H_0 (Null Hypothesis): There is no significant difference in accessibility and learning outcomes between traditional physical laboratories and cloud-based VCLs.

H_1 (Alternative Hypothesis): Cloud-based VCLs significantly improve accessibility and learning outcomes compared to traditional physical laboratories.

Interpretation

- Significance Level (α):** A common threshold is $\alpha = 0.05$.
- Decision Rule:** If p-value $< \alpha$, reject the null hypothesis (H_0).
- Result:** Since p-value (0.0028) is less than α (0.05), we **reject the null hypothesis**.

The **alternative hypothesis (H_1)** is accepted:

Cloud-based VCLs significantly improve accessibility and learning outcomes compared to traditional physical laboratories.

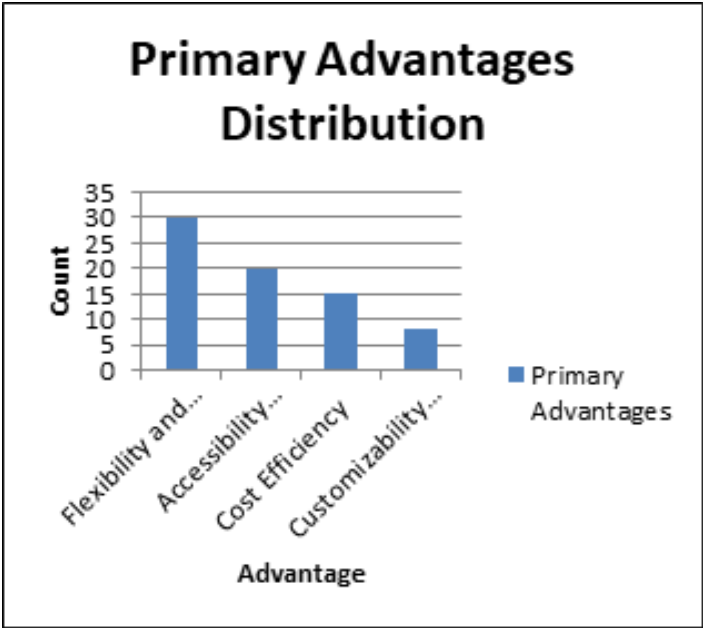


Figure 8 Primary advantages



Figure 9 Hands-on Experience Distribution

Objective 2: To identify the challenges faced by educators and students in adopting and utilizing VCLs.

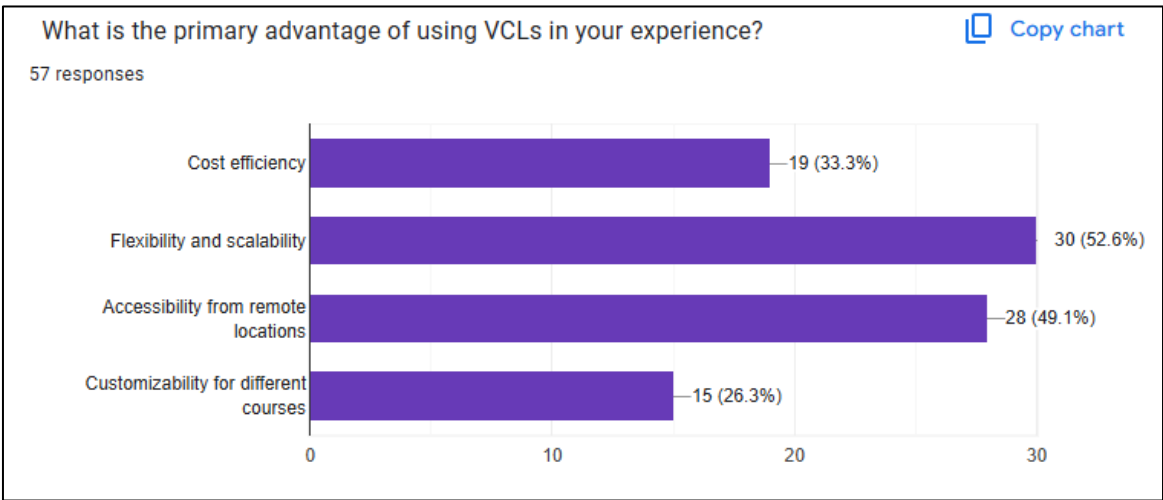


Figure 10 Primary advantages of using VCLs

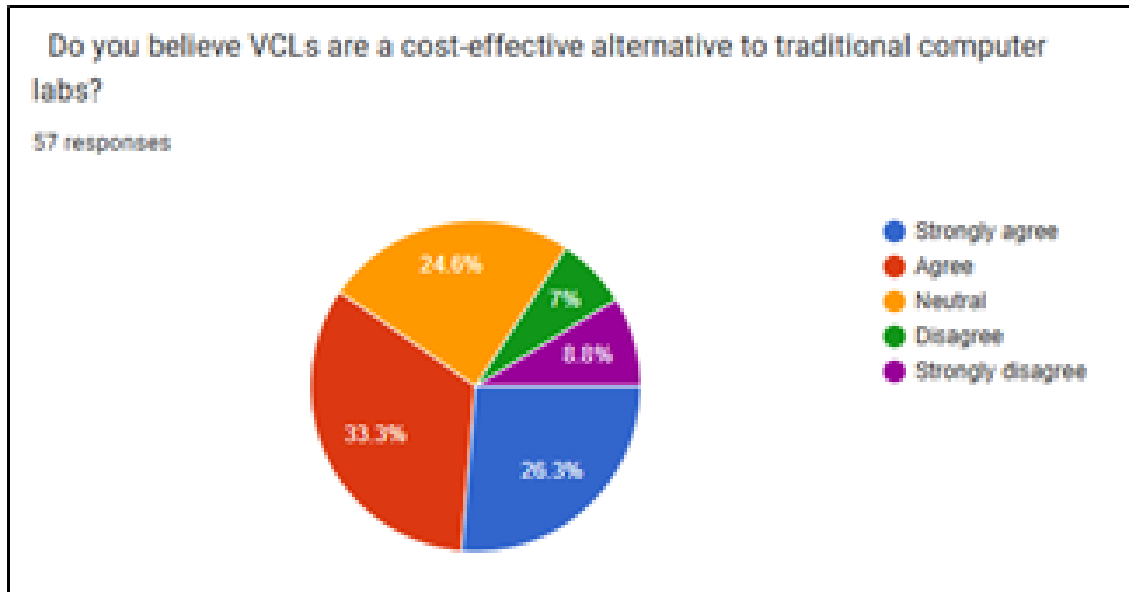


Figure 11 Cost Effectiveness of VCLs over Traditional Labs

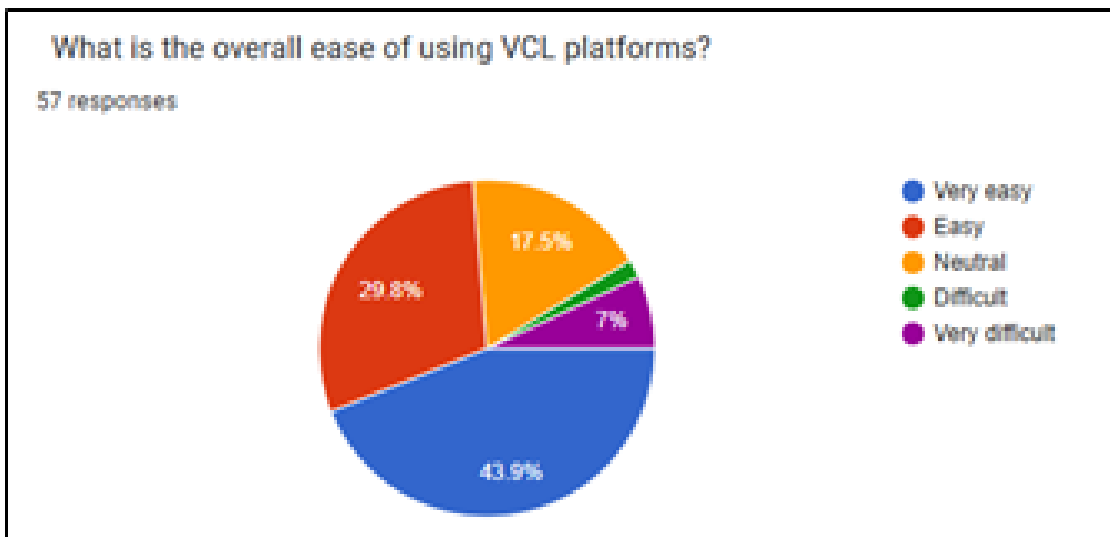


Figure12 Ease of Use of VCLs

Hypothesis 2:

H_0 (Null Hypothesis): The perceived ease of use and effectiveness of VCL platforms is not significantly related to their adoption by educators and students.

H_1 (Alternative Hypothesis): The perceived ease of use and effectiveness of VCL platforms significantly influences their adoption by educators and students.

Interpretation

- Significance Level (α):** A common threshold is $\alpha = 0.05$.
- Decision Rule:** If ppp-value < α , reject the null hypothesis (H_0).
- Result:** Since ppp-value (0.0017) is less than α (0.05), we **reject the null hypothesis**.

CONCLUSION

The **alternative hypothesis (H_1)** is accepted:

The perceived ease of use and effectiveness of VCL platforms significantly influences their adoption by educators and students.

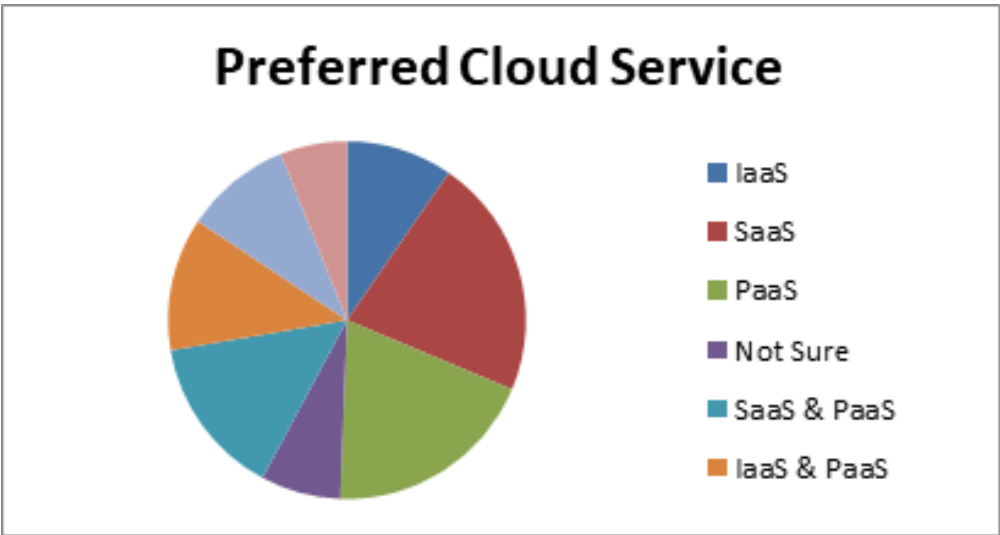
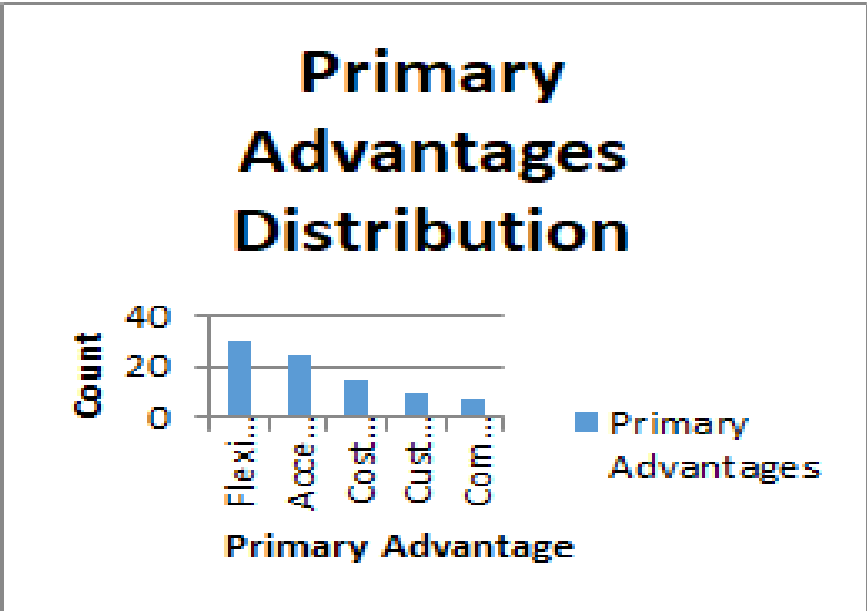
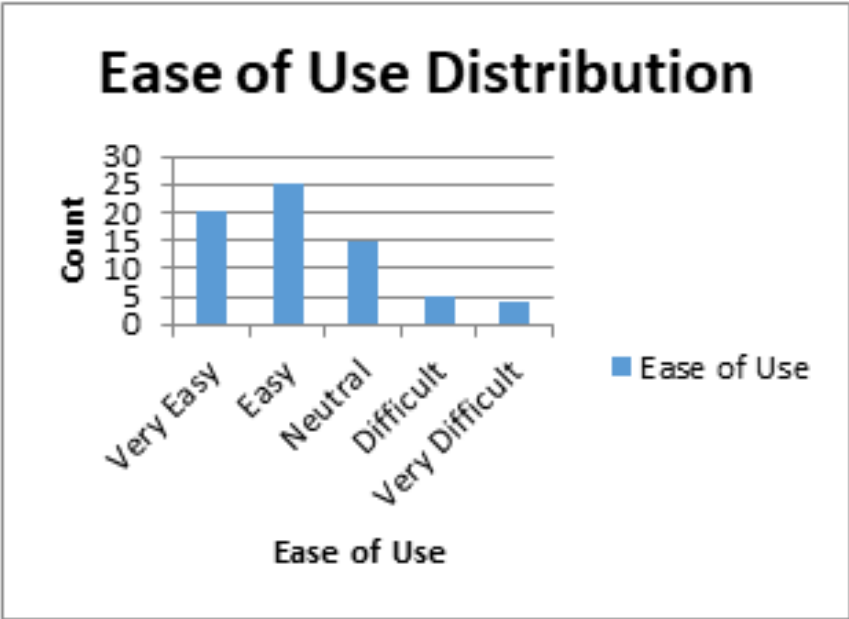


Figure 13 Preferred Cloud Service

Objective 3: To evaluate user perceptions regarding the ease of use, scalability, and effectiveness of VCL platforms in educational contexts.

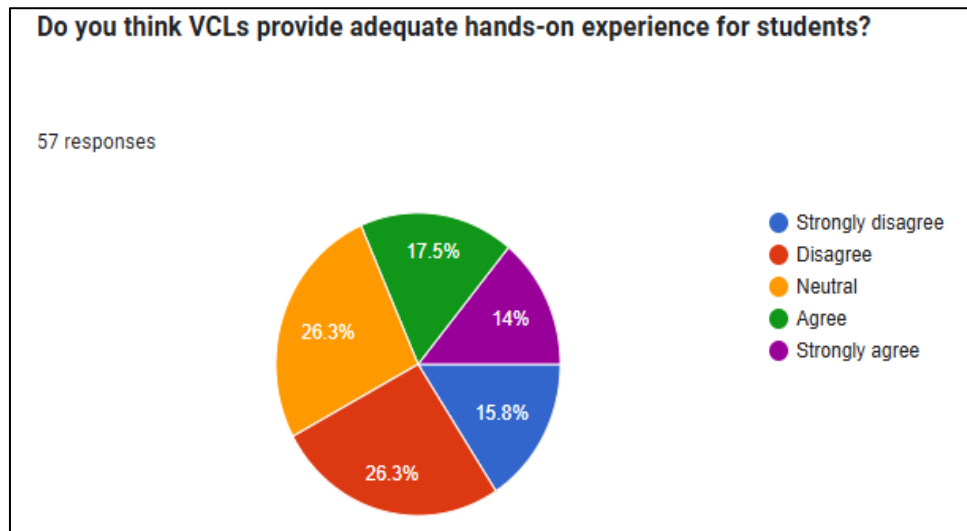


Figure 14 11 Adequate hands-on Experience

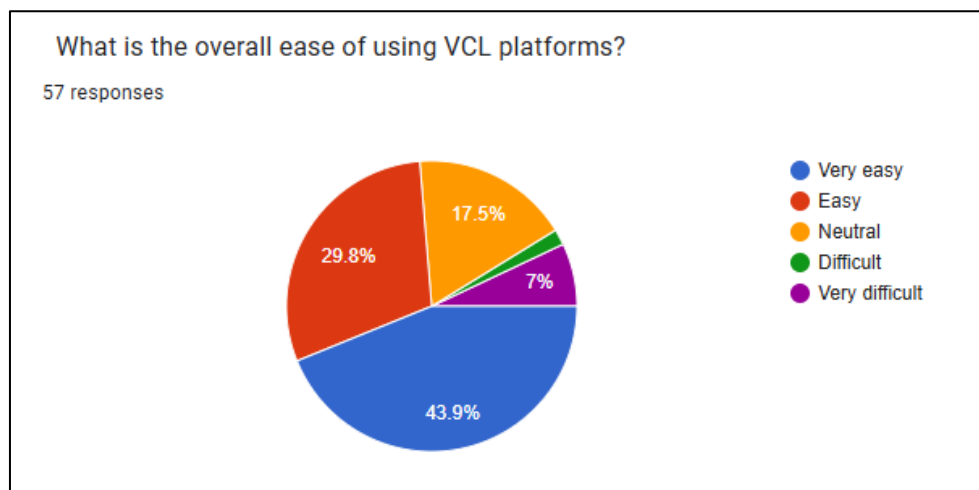


Figure 12 Overall ease

CONCLUSION AND RECOMMENDATIONS:

The study emphasises how cloud-based Virtual Computer Laboratories (VCLs) have the potential to revolutionise contemporary education. Results from primary and secondary data show that VCLs are a cost-effective substitute for traditional computer laboratories and greatly improve accessibility. By providing scalable solutions that assist a variety of student demographics, they enable schools to get past resource and geographic constraints. Additionally, by facilitating practical experiences in a virtual setting, the interactive aspect of VCLs promotes better learning outcomes. But issues like reliance on the internet, cybersecurity issues, and the requirement for teacher training continue to exist.

According to statistical study, there is a considerable correlation between user perceptions of accessibility and previous VCL exposure, and the adoption of VCLs is influenced by perceived ease of use. These observations highlight areas for development while reaffirming the importance of VCLs in promoting digital transformation.

RECOMMENDATIONS

1. Infrastructure Development:

To provide fair access to VCL platforms, governments and organisations should make investments in dependable internet infrastructure, particularly in underserved areas.

2. Faculty Training Programs:

To assist educators in effectively utilising VCL platforms and incorporating them into curricula, regular workshops and training sessions must to be held.

3. Affordable Solutions:

In order to provide affordable or subsidised solutions, especially for smaller schools and colleges, cloud service providers should work with educational institutions.

4. Focus on Security:

To safeguard user data and uphold confidence in VCL systems, strong cybersecurity measures must be implemented.

5. Student-Centric Design:

VCL interfaces ought to be easy to use, with continuous feedback systems to fix usability issues and enhance the user experience in general.

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FINANCIAL DECISION-MAKING AND PSYCHOLOGICAL WELL-BEING OF PILGRIMS: AN EXPLORATORY STUDY OF MAHAKUMBH

Mr. Akash Gupta

Assistant Professor, HVPS Ramniranjan Jhunjhunwala College (Empowered Autonomous) affiliated with University of Mumbai, India

ABSTRACT

Mahakumbh, the world's largest religious gathering, attracts millions of pilgrims who make crucial financial decisions regarding travel, accommodation, food, donations, and shopping. This study explores the impact of financial decision-making on pilgrims' psychological well-being, focusing on financial planning, digital payment adoption, and financial stress. Despite India's growing digital financial ecosystem, many pilgrims prefer cash transactions due to trust issues and low digital literacy. The study employs an exploratory research design using a structured survey of 155 pilgrims. Findings reveal that financial mismanagement leads to stress, affecting spiritual satisfaction, while digital payment users experience greater convenience. Behavioral finance theories like Prospect Theory and Mental Accounting explain spending behavior. The study highlights the need for targeted financial literacy programs to enhance pilgrims' financial preparedness. Policymakers and financial institutions can use these insights to improve financial inclusion in religious tourism.

Keywords: Financial decision-making, digital payments, psychological well-being, Mahakumbh, religious tourism, financial stress, financial literacy.

1. INTRODUCTION

Religious tourism is a significant contributor to both economic and social development, with large-scale events such as Mahakumbh drawing millions of pilgrims from across India and the world. Mahakumbh, held every 12 years, is considered the largest human gathering for religious purposes, where devotees participate in spiritual rituals, religious discourses, and sacred dips in the Ganges. Given the magnitude of the event, pilgrims must make various financial decisions regarding travel, accommodation, food, donations, and shopping. These financial decisions have profound implications not only on their pilgrimage experience but also on their psychological well-being.

In recent years, India's digital financial ecosystem has evolved significantly, with increased adoption of Unified Payments Interface (UPI), mobile banking, and digital wallets (NPCI, 2023). Government initiatives such as Digital India and cashless transactions have encouraged the use of digital payments in public and religious spaces, including Mahakumbh. While digital payment options are being promoted for their convenience and transparency, their acceptance among pilgrims, particularly first-time users remains a challenge.

Pilgrims often operate within limited financial resources, and mismanagement of funds could lead to financial stress, thereby affecting their spiritual and mental peace. Psychological theories suggest that financial security enhances well-being, while financial strain can increase stress and anxiety (Lusardi & Mitchell, 2014). The study, therefore, explores how financial decision-making, the use of digital payments, and financial literacy influence the overall pilgrimage experience at Mahakumbh.

Despite extensive research on religious tourism, existing literature primarily focuses on its economic benefits, cultural impact, and logistical challenges. The role of financial decision-making in religious tourism and its psychological consequences remains underexplored. While studies discuss tourism spending patterns, there is little focus on religious tourism financial planning, especially in large-scale pilgrimage events like Mahakumbh.

Research on digital payment adoption has primarily focused on urban settings and commercial sectors. However, its role in facilitating pilgrimage expenditures and its acceptance among diverse demographic groups has not been explored extensively. Pilgrims often perceive their spiritual experiences as more important than financial planning, leading to potential overspending and financial stress. The connection between financial planning, psychological well-being, and stress management during pilgrimages remains unexamined.

Understanding how financial decision-making impacts pilgrims' experiences, stress levels, and financial security will help policymakers and financial institutions design targeted financial literacy programs and payment solutions for religious tourism.

2. LITERATURE REVIEW

Financial decision-making in tourism involves budgeting, expenditure planning, and savings strategies. Pilgrims engage in multiple financial transactions, such as transportation, lodging, food expenses, religious donations,

and shopping (Shafiqah, 2024). Unlike leisure travelers, religious tourists often make emotion-driven financial decisions, sometimes prioritizing donations and spiritual experiences over personal financial security. Studies on religious tourism spending indicate that many pilgrims do not engage in structured financial planning, leading to last-minute borrowing, unplanned expenses, and financial distress (Purwaningrat, P, A., Oktarini, L, N., & Saraswathi, I, A, A. 2019).

The Digital India initiative has encouraged digital payment adoption across multiple sectors, but its acceptance among religious tourists varies significantly. NPCI (2023) reports that UPI and mobile payments have transformed financial transactions in India, offering convenience, security, and ease of use. However, age, digital literacy, and trust issues remain major barriers to adoption (Vij. & Pandoi, 2025). A study by Kahlon et. al. (2022) found that older pilgrims prefer cash transactions due to a lack of familiarity with digital payment methods, while younger and tech-savvy pilgrims are more open to using UPI and mobile wallets.

Challenges in Digital Payment Adoption:

- (1) Lack of awareness and trust among citizens.
- (2) Poor internet connectivity in pilgrimage sites.
- (3) Concerns over cybersecurity and digital fraud.
- (4) Preference for cash transactions due to religious customs.

Financial planning is closely linked to psychological well-being. Lusardi & Mitchell (2014) emphasize that individuals with better financial literacy and planning experience lower financial stress and higher satisfaction levels. Conversely, those facing financial distress due to unplanned expenditures and overspending may experience anxiety, reducing their overall spiritual fulfillment.

3. THEORETICAL FRAMEWORK

The below framework provides a theoretical foundation for understanding how financial decision-making, digital payment adoption, and financial stress influence the psychological well-being of Mahakumbh pilgrims.

a. Behavioral Finance Theories

- 1. **Prospect Theory (Kahneman & Tversky, 1979):** Pilgrims may overvalue spiritual rewards over financial prudence, leading to impulsive donations and unnecessary spending. The perception of potential losses (financial strain) versus potential gains (spiritual fulfillment) influences their financial choices.
- 2. **Mental Accounting (Thaler, 1999):** Pilgrims categorize their money into different "mental budgets" such as donations, travel, and shopping. This mental segmentation affects how they allocate funds during Mahakumbh, sometimes prioritizing religious spending over personal financial security.

b. Technology Adoption Model (TAM) (Davis, 1989)

- 1. Pilgrims’ adoption of digital payments is influenced by perceived ease of use, security, and trust in technology. Those who find digital transactions convenient and secure are more likely to adopt them, while others, especially older pilgrims, may resist due to trust issues and low digital literacy.
- 2. Pilgrims with prior exposure to digital financial services may be more open to using UPI, mobile banking, or digital wallets, whereas first-time users may hesitate due to perceived complexity.

c. Stress and Coping Theory (Lazarus & Folkman, 1984)

- 1. Financial strain from unplanned expenses or overspending can elevate stress levels, negatively impacting the overall pilgrimage experience.
- 2. Pilgrims who engage in structured financial planning experience lower stress levels and higher psychological well-being, as financial security allows them to focus on their spiritual goals.
- 3. Coping mechanisms such as pre-planned budgeting, financial literacy, and support systems (family, religious groups, or digital tools) help mitigate financial stress.

Summarising the Above:

Theory	Key Concepts	Application to Pilgrims
Prospect Theory	People fear losses more than they value gains	Pilgrims may overspend on donation to avoid spiritual guilt
Mental Accounting	Individuals allocate money	Pilgrims may prioritize religious

	into categories	spending over over personal needs
Technology Adoption Model	Perceived usefulness and ease of use determine adoption	pilgrims struggle with digital payment due to trust issue

4.1 Objectives of the Study

- (1) To analyze financial planning and budgeting patterns of Mahakumbh pilgrims.
- (2) To examine the extent of digital payment adoption and its perceived benefits among different age groups.
- (3) To investigate the relationship between financial preparedness and psychological well-being among pilgrims.
- (4) To explore barriers to digital payment adoption and their impact on pilgrimage experiences.
- (5) To assess the impact of financial stress on spiritual satisfaction and overall pilgrimage experience.

4.2 Null Hypotheses

- H1: Pilgrims who engage in financial planning experience lower financial stress.
- H2: Pilgrims who engage in financial planning experience higher spiritual satisfaction.
- H3: Digital payment users report greater convenience and lower financial anxiety compared to cash users.
- H4: Pilgrims relying on cash transactions likely to face more financial difficulties.

5. RESEARCH METHODOLOGY

a. Research Design

This study adopts an exploratory and descriptive approach using a quantitative survey method with close-ended questions.

b. Data Collection

Structured questionnaire survey of 155 Mahakumbh pilgrims. Reports from NPCI, RBI, tourism boards, and behavioral finance studies.

c. Sampling Technique

The study follows Convenience Sampling on Pilgrims attended Mahakumbh.

d. Data Analysis Techniques

The study uses Descriptive Statistics (Mean, standard deviation, frequency distribution), Chi-Square Test and t-Test

6. Data Analysis and Discussion:

Table 1: Demographic Profile of Respondents

Variable	Categories	Frequency	%
a. Age Group	<25 years	60	38.7%
	25-40 years	95	61.3%
b. Gender	Male	100	64.5%
	Female	55	35.5%
c. Income Level	<20,000	90	58%
	20,000-50,000	30	19.4%
	>50,000	35	22.6%
d. Occupation	Student	45	29%
	Self Employed	45	29%
	Salaried	45	29%
	Retired	5	3.2%
	Homemaker	15	9.7
e. No.of times Attended	1 time	120	77.4%
	2-3 times	10	6.5%
	>3 times	25	16%

Interpretation of Table 1: Demographic Profile of Respondents

Table 1 presents the demographic characteristics of the respondents who participated in the study. The analysis of demographic factors is crucial to understanding the financial behavior and digital payment adoption patterns among Mahakumbh pilgrims.

- a. The majority of respondents belong to the **25-40 years** age group (61.3%), while 38.7% are **below 25 years**. This indicates that younger and middle-aged individuals form the primary group of pilgrims, suggesting higher technology adoption potential.
- b. The sample consists of **64.5% male** and **35.5% female** respondents. The higher male participation aligns with traditional pilgrimage trends where men often take financial responsibility for travel and stay arrangements.
- c. A significant portion (**58%**) of respondents earn **less than ₹20,000** per month, followed by **19.4% in the ₹20,000-50,000 bracket**, and **22.6% earning above ₹50,000**. This income distribution suggests that a considerable segment of pilgrims belongs to the lower-income category, which may impact their financial planning and payment preferences.
- d. Survey results indicate that **Students (29%)**, **self-employed individuals (29%)**, and **salaried professionals (29%)** form the dominant categories. **Retired individuals (3.2%)** and **homemakers (9.7%)** constitute a smaller share of the sample. The diverse occupational backgrounds highlight variations in financial decision-making and digital payment preferences.
- e. Survey results indicate that **77.4% of respondents are first-time attendees**, indicating that a large proportion of visitors are new to Mahakumbh. **16% have attended more than three times**, representing experienced pilgrims who may have well-established financial habits. **6.5% have visited 2-3 times**, suggesting a mix of repeat and new visitors.

Table 2: Financial Behaviour

Financial Variables	Categories	Frequency	%
a. Planned Finances?	Pre-planned	60	38.7%
	Partially	15	9.7%
	Not Planned	80	51.6%
b. Estimated Expenses	5,000-10,000	100	64.5%
	10,000-25,000	40	25.8%
	25,000-50,000	10	6.5%
	>50,000	5	3.2%
c. Major Expenses	Accomodation	60	38.7%
	Food	70	45.2%
	Travel	110	71%
	Religious Offering	40	25.8%
	Shopping, Souvenirs	60	38.7%
d. Used Digital Transactions?	Yes	130	83.9%
	No	25	16.1%
e. Prepared Digital Method	UPI	130	83.9%
	Debit/Credit card	--	--
	Mobile Wallet	--	--
	Not Used	25	16.1%

Interpretation of Table 2: Financial Behavior of Respondents

Table 2 provides insights into the financial planning, expenditure patterns, and digital payment usage of Mahakumbh pilgrims. The findings highlight the financial preparedness and transaction preferences of respondents, shedding light on their economic behavior during the pilgrimage.

- a. Survey results indicate that 51.6% of respondents did not plan their finances before the pilgrimage, indicating a lack of structured financial preparedness. 38.7% pre-planned their finances, suggesting that a segment of pilgrims is financially conscious and organizes expenses in advance. 9.7% partially planned, reflecting uncertainty or flexible budgeting based on real-time expenses. The significant percentage of non-planners suggests a need for better financial literacy and awareness about budgeting for pilgrimage expenses.

- b. The majority (64.5%) spent between ₹5,000-10,000, indicating that a significant portion of pilgrims undertook a cost-conscious journey. 25.8% spent between ₹10,000-25,000, while 6.5% spent ₹25,000-50,000, showing that a small segment opted for mid-range expenditure. Only 3.2% spent above ₹50,000, implying that high-end spending on Mahakumbh is limited. This suggests that affordability plays a key role in pilgrimage planning, with most individuals managing expenses within a reasonable budget.
- c. Survey results indicate that Travel (71%) emerged as the highest expense, reflecting the costs associated with reaching and moving within the pilgrimage site. Food (45.2%) was another significant expenditure, highlighting the importance of meal planning during the event. Accommodation (38.7%) accounted for a major share of spending, indicating that lodging arrangements significantly influence overall pilgrimage costs. Religious offerings (25.8%) and shopping (38.7%) were other notable expenditures, showcasing the cultural and economic activities intertwined with the pilgrimage. These findings suggest that providing affordable travel and accommodation options can significantly reduce financial stress for pilgrims.
- d. A large proportion (83.9%) of respondents used digital transactions, indicating a strong preference for cashless payments during Mahakumbh. 16.1% did not use digital payments, suggesting possible barriers such as lack of awareness, infrastructure issues, or personal preference for cash transactions.
- e. Among digital users, UPI (83.9%) was the dominant payment mode, indicating its ease of use, widespread acceptance, and familiarity. Debit/Credit cards and mobile wallets were not preferred, possibly due to network limitations, security concerns, or lack of card acceptance at local vendors. 16.1% did not use digital payments, reinforcing the need for better infrastructure and awareness campaigns for cashless transactions.

Table 3: Psychological Well –Being

Psychological Variables	Categories	Frequency	%
a. Financial Constraints Caused Stress?	Yes	40	25.8%
	No	115	74.2%
b. Satisfied with Financial Planning	1	15	9.7%
	2	0	0%
	3	10	6.5%
	4	45	29%
	5	85	54.8%
c. Felt Spiritual Satisfaction Despite Stress?	Yes	120	77.4%
	No	25	16.1%
	Partially	10	6.5%
d. Did Digital Payment Reduce Financial Worries?	Yes	100	64.5%
	No	45	29%
	Partially	10	6.5%
e. Would Prefer Digital Payment in a Future Pilgrimage	Yes	115	74.2%
	No	15	9.7%
	Not Sure	25	16%

Interpretation of Table 3: Psychological Well-Being of Respondents

Table 3 presents insights into the financial stress, satisfaction with financial planning, and the psychological impact of digital payments among Mahakumbh pilgrims. These findings help in understanding the financial mindset and emotional well-being of respondents during the pilgrimage.

- a. Survey results indicate that 25.8% of respondents experienced financial stress, indicating that financial constraints were a concern for a segment of pilgrims. A significant majority (74.2%) reported no financial stress, suggesting that most pilgrims managed their finances without major difficulties. This highlights that while financial constraints exist for some, they do not significantly impact the majority, possibly due to prior planning, affordability, or reliance on support systems.
- b. Survey results indicate that 54.8% of respondents rated their financial planning as "5" (Highly Satisfied), indicating strong confidence in their budgeting and expenditure. 29% gave a rating of "4," showing that many were fairly satisfied with their financial management. Only 9.7% rated it as "1" (Very Dissatisfied), and 6.5% rated it as "3," reflecting that only a small fraction faced financial difficulties. The absence of responses at rating "2" suggests that dissatisfaction was either extreme (low rating) or negligible.
- c. Survey results indicate that 77.4% of respondents felt spiritually satisfied, regardless of financial constraints, suggesting that the religious experience outweighed financial concerns. 16.1% did not feel spiritually

satisfied, possibly due to financial burdens or logistical challenges. 6.5% were partially satisfied, indicating that while financial concerns existed, they did not completely overshadow the pilgrimage experience. These results highlight that the pilgrimage experience remains a primary motivator, with financial stress playing a secondary role.

- d. Survey results indicate that 64.5% of respondents felt that digital payments reduced financial stress, suggesting that cashless transactions provided convenience and security. 29% believed digital payments did not reduce worries, indicating possible concerns such as network issues, security risks, or difficulty in using digital platforms. 6.5% had a mixed opinion (partially effective), which could be due to limited acceptance of digital payments at certain locations. This finding reinforces the need for improving digital payment infrastructure and awareness to enhance financial confidence during pilgrimages.
- e. Survey results indicate that 74.2% of respondents preferred using digital payments for future pilgrimages, showcasing strong adoption and trust in cashless transactions. 9.7% did not prefer digital payments, possibly due to personal habits, technological barriers, or comfort with cash transactions. 16% were uncertain, indicating that further awareness and convenience improvements could encourage wider adoption. This suggests that digital payment adoption is increasing, but there is still a need to address infrastructure and trust-related concerns.

7. Hypothesis Testing

Table 4: Hypothesis Testing Results

Hypothesis	Test Applied	Test Statistics	P-Value	Interpretation
H1: Pilgrims who engage in financial planning experience lower financial stress.	Independent t-test	t= 3.528	0.0005	Reject
H2: Pilgrims who engage in financial planning experience higher spiritual satisfaction.	Chi square Independent Test	X²= 1.80	0.407	Fail to Reject
H3: Digital payment users report greater convenience and lower financial anxiety compared to cash users.	Independent t-test	t= 2.938	0.0021	Reject
H4: Pilgrims relying on cash transactions likely to face more financial difficulties.	Independent t-test	t= 1.128	0.2610	Fail to Reject

Interpretation on Table 4: Hypothesis Testing

- a. Financial planning significantly lowers financial stress, suggesting that pilgrims who engage in pre-pilgrimage financial management experience less financial burden.
- b. Financial planning does not have a significant impact on spiritual satisfaction, indicating that pilgrims' sense of fulfillment is influenced by factors beyond financial preparedness.
- c. Digital payment users report greater convenience and lower financial anxiety, highlighting the benefits of cashless transactions in reducing stress during pilgrimage.
- d. Reliance on cash transactions does not significantly increase financial difficulties, suggesting that financial challenges may stem from other factors beyond the mode of payment.

8. CONCLUSION

The study highlights the critical role of financial decision-making in shaping the pilgrimage experience at Mahakumbh. While digital payment adoption has significantly increased, financial literacy and structured budgeting remain challenges for many pilgrims. The findings emphasize that financial preparedness reduces stress, enhances psychological well-being, and improves the overall pilgrimage experience.

9. RECOMMENDATIONS

- a. Conduct pre-pilgrimage awareness sessions on budgeting, expense planning, and smart financial management.
- b. Expand financial inclusion initiatives targeting elderly pilgrims and first-time users through on-ground assistance and multilingual digital literacy campaigns.
- c. Strengthen digital payment infrastructure at pilgrimage sites by ensuring seamless internet connectivity and security measures.

- d. Partner with banks, NPCI, and fintech companies to introduce pilgrimage-specific financial products, such as prepaid digital wallets and secure transaction services.
- e. Develop interactive mobile applications and budgeting tools to help pilgrims track expenses and manage finances effectively.
- f. Introduce incentives for digital payments, such as cashback on donations and discounts on pilgrimage-related services for digital transactions.

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ELDERS WITH SCREENS: A STUDY OF IMPACT OF SMARTPHONE ON ELDERLY

Rina Patel¹, Ankita Yadav² and Asmi Shingre³¹Assistant Professor, Bhavan's H. Somani College^{2,3}Student, Bhavan's H. Somani College**ABSTRACT**

Smartphones have become an indispensable tool today and elderly are not an exception to this. Smartphones have revolutionized the way we can connect to the world. Especially for the elderly, smartphones may come as a very handy and effective tool and thus have a significant impact on the elderly. On one hand, it has several benefits such as enhanced connectivity, job creation, ease of shopping, banking and health care and on the other hand, many negative consequences of the use of smartphones are seen in the elderly. The present research is an attempt to understand the impact of smartphones on people who are in their late adulthood. A sample of 35 elders in the age group of 60-80 years were surveyed to understand their use of smartphones and its impact on them. A self-report inventory designed by the researchers was used to assess the use of smartphones and its impact on the physical health and health related behaviours, mental health and social connectedness of the elderly. The present study shows that there may be few drawbacks of using smartphones, however, largely smartphones have a positive impact on the physical and emotional health and social connectedness of the elderly.

Keywords: Smartphones, Elderly, Health, Social-connectedness

INTRODUCTION

Smartphones have become an indispensable tool today and the elderly are not an exception to this. Smartphones have revolutionized the way the elderly can connect to the world. Smartphones are now becoming a part of the elderly's everyday life. Many factors have contributed to the growing use of smartphones among the elderly. The user-friendly features such as voice commands, large display options and intuitive interfaces in smartphones have empowered seniors to embrace the digital world confidently, making them less dependent on others for their daily needs. Smartphones bring to them endless connectivity to the world. Whether it's video calling grandchildren, reconnecting with their old friends, meeting their relatives virtually tracking health metrics, solving a puzzle app to activate their brain or just getting entertained, the possibilities are many. So, it's not about technology overwhelming life; it's about enhancing it.

As the elderly gets comfortable with the technology, the use of smartphones among the elderly has increased significantly in recent years. On one hand, it gives several benefits to the elderly like enhanced connectivity, job creation, healthcare, etc. and on the other hand many negative consequences of the use of smartphones are seen in the elderly. Smartphones are becoming more user-friendly, with larger screens, simplified interfaces, and voice control features, making them easier for the elderly to navigate through it. The cost of smartphones and data plans has become more affordable, making them accessible to a wider range of older adults.

Many studies reveal the rise in the extent to which the use of mobile phones has drastically increased among the elderly. In a latest research conducted by the American Association of Retired Persons (AARP) the results revealed that there is a significant increase in ownership of smartphones (89%, up from 77%) and the majority of older adults use their devices daily, especially smartphones (98%). Study also shows that Senior citizens very frequently use Android phones daily and the use of applications like Google search and YouTube is also very high. This means that they can perceive additional values to the smartphones rather than just restricting it to the traditional use for communication.

The shift towards nuclear families has indeed played a role in the increased smartphone usage among the elderly. Staying separately from their adult children can lead to increased feelings of loneliness and social isolation. The rise of nuclear families has created a situation where smartphones have become increasingly valuable for elderly individuals to maintain social connections, receive support, and stay connected to the world around them. Not only does the use of smartphones reduce loneliness and boredom among the elderly but are useful to provide remote support and assistance to their elderly parents by their children. Thus, smartphones can serve as an aid as well as a connection between the elderly and their children. However, many other factors including technological advancements, accessibility, and the desire for independence are also critical in the increasing use of smartphones among the elderly.

The world is becoming more and more reliant on digital technology. Things like banking, shopping, entertainment and all personal and household services are becoming more digitized. Thus, smartphones have

become a need and are no longer a luxury for all the age groups. William, J. A., & Muruges, R. (2018) have found that the elderly use mobile majorly for communication and information. The Elderly also use smartphones for entertainment such as e-books, audiobooks, music, etc. Smartphone usage among the elderly compensates for emotional and psychological problems such as loneliness, increasing the perception of emotional gain (Zhitomirsky-Geffet & Blau, 2016). Thus, the percentage of Android phone usage among the elderly illustrate how categorically senior citizens are engaged with one device where they can fulfil many of their needs and meet the world at their fingertips.

REVIEW OF LITERATURE

Various aspects of smartphone use among elderly has been covered by the different researches conducted all over the world. This research focuses on the reason of smartphone use, the positive and negative impact on health, relationships, mental wellbeing etc. Research conducted by Busch; P. A. (2021) explored the use of smartphones among older adults in Norway. The results show that, social influence and habits strongly predict smartphone usage among elderly. Older adults use smartphones for various social and non-social reasons such as social media and news reading are the most common ones. However, loneliness and Fear of missing out (FOMO) did play minimal role in the elderly use of smartphones.

Sagong, H., & Yoon, J. Y. (2022) in their study on the Mediating Role of Depressive Symptoms on smartphone use among the older adults found that the more often the mobile phone was used, the higher the life satisfaction of older adults was seen. The study also explained the partially mediating role of depressive symptoms in the relationship between smartphone use and life satisfaction of older adults. In sum, this study shows positive effects of smartphone use on life satisfaction of elderly.

Tian, H., & Wang, Y. (2023) in their study 'The Mediating Roles of Depression and Loneliness on Mobile Phone Addiction and Sleep Quality among Older People' found that elderly people are becoming more and more addicted to smartphones. According to the study, mobile phone addiction directly impacts sleep quality in the elderly. This is mediated by depression and loneliness. The study focuses on the importance of keeping a track of the frequency of cell phone use in older adults, and the importance of enriching the free time of older adults so as to improve their emotional and sleep problems.

Another recent research has explored the effect of Perceived Overload of short video apps (reels and shorts) on mental health in older adults. The findings indicated that the Perceived Overload of short video apps directly predicted the mental health status in older adults. This has a negative impact on sleep cycle and daily routine however it can be a coping strategy for preventing loneliness and mental health problems, such as connecting with the community ties and enhancing family communication. (Wen, X., et. al., 2024).

Thus, the research conducted on smartphone use among elderly show mixed results with few studies reflecting the positive impact of smartphones on the elderly while others showing the negative impact of the smartphones. The present research is hence an attempt to study the frequency of smartphone use among elderly and to understand what impact this smartphone use has on physical health, mental health and social connectedness among the elderly.

RESEARCH QUESTIONS

1. What is the level of smartphone engagement among the elderly?
2. How does smartphones affect the physical health and health-related behaviours of the elderly?
3. What are the emotional impacts of smartphone use on the elderly?
4. Do smartphones have an impact on the social connectedness of the elderly?

Research Aims and Objectives

Aim: To study the impact of use of smartphones on the elderly.

Objectives:

1. To study the extent of smartphone use among the elderly.
2. To study the impact of use of smartphones on the physical health and health related behaviours of the elderly.
3. To understand the impact of smartphones on the mental health of the elderly.
4. To study the social impact of smartphones on the elderly.

Rationale

Recent research has found that the screening time of elderly has increased substantially. Aging reduces the mobility of elderly and pose strong restrictions on their social connectedness and their access to various facilities especially health. Smartphones can bring a relief to the elderly by helping them to connect socially and also to get easy access to various health care services. However continuous use of smartphones has also shown negative impact on the elderly. Thus, the present research is an attempt to find how the use of smartphones impact various aspects of the elderly especially physical and mental health and social connectedness.

Operational Definition of Important Concepts

Elders- People both men and women in the age group of 60-80 years.

Smartphone use- It includes use of smartphones by the elderly for minimum of two–four hours per day. This includes using different apps, social media platforms and other features of the smartphones in addition to just making calls and sending texts.

Physical Health and Health-Related Behaviours – Physical health includes physical comfort/ discomfort, effect of smartphones on the senses of the elderly and effect on sleep cycle. Health –related behaviours include checking about the medical conditions and medication, self- medication with the help of medical sites, using medical management apps, Taking Online Doctor's appointment, Virtual medical consultation, buying medicines online and other behaviours associated with health management.

Mental Health- Mental health includes self-reported Self-efficacy, feeling of safety and security, feeling of loneliness, isolation, boredom, and confidence.

Social Connectedness- This variable includes face to face interaction with family members, virtual interaction with family and friends, reconnecting with old friends and relatives, sense of belonging, being part of social clubs.

METHODOLOGY

Sample – A purposive sample of 35 elders between age group 65-80 years residing in the suburbs of Mumbai were surveyed. The ratio of males to female was 4:1. The sample was controlled on the basis of socio-economic status and physical health.

Tools-A self-report questionnaire designed by the researchers was used to assess the use of smartphone and its impact on the sample. The questionnaire consisted of questions to find the use of smartphones by the elderly and its impact on the physical health, health related behaviours, mental health and social connectedness among the elderly.

INCLUSION CRITERIA:

1. Elders who use smartphones for minimum 2 hours in a day.
2. Elders who use different apps on their smartphones for at least one purpose other than talking.
3. Elders who are physically fit with no major illness or disability.
4. Elders staying with their family member.

PROCEDURE:

The sample was selected on the basis of the inclusion criteria. The data was gathered by conducting a small survey about the use and impact of smartphones on the elderly. A questionnaire was designed by the researchers to measure physical health, health-related behaviours, self-reported mental health and social connectedness was administered to the sample through google forms. The responses were analysed using percentages and secondary data.

RESULTS AND DISCUSSION

In the rapidly evolving digital era, smartphones have become ubiquitous tools, transforming how people communicate with each other, reach out to the world, access various facilities get information, and manage their daily lives. A lot of research has been seemed to understand the impact of smartphones on younger generations, there is an increasing need to understand how these smart devices affect the elderly population. This paper aims to understand the multifaceted influence of smartphones on the elderly on their self-reported physical and mental health and on their social connectedness.

Physical Health and Health-related Behaviours- The results show a great amount of use of smartphones among the elderly. 81.2% of people have reported to use the smartphones for 2-4 hrs daily, 12% spend an

average of 4-6 hrs per day on smartphones and 6.1% elderly have agreed to spend an average of 8-10 hrs per day with their smartphones. The maximum 54.5% said they use their smartphones more during the afternoon as it's a time for them to relax. The most common use of smartphones among the elderly as reported by 66.7% is to talk to their family and friends and to connect to the family staying far. This is followed by 54% using it for entertainment purpose, to watch OTT platforms, YouTube etc. 27.3% participants used smartphones for banking, insurance and pension related activities and others around 12% used it for the purpose of shopping, food delivery, medical purposes, online booking etc.

As people age their physical health is likely to deteriorate. A decline in the functioning of the sense organs and discomfort in the body can be noticed as people age. Continuous use of mobile phone is likely to add on to these problems. Constantly watching the mobile screens and use of headphones can be problematic for the vision and hearing. 45.5% elderly sample used mobile phones before going to the bed and around 56% mentioned that their sleep cycle gets affected by the use of smartphone. The studies conducted on the physical discomfort and mobile phone use show mixed results. Smartphones are blessings in terms of health management for the elderly. 48.5% elderly reported using smartphones to know more about their illness or medicine. This can be risky at times as elders engage in self-medication for the over-the-counter drugs (Locquet M. et al.,2017). However, the medical management apps can be helpful in this regard.

The easy access to medical and health facilities in terms of ordering medicines, booking appointments, health-management apps, information about illness and medicines and the chance of meeting the Doctors through video calling have made the life of elderly much easier and relaxed especially in terms of health. As agreed by 58% of the sample that smartphones have helped them in managing the health services better and by 42% that they feel safer in terms of their health because of easy and quickly available medical services through smartphones. So overall the results show that smartphones have a positive impact of health behaviour of the elderly.

Emotional Health- The results of the study show a positive impact of smartphone use on the elderly's self-reported mental health. As reported by 66.7% of elderly, the smartphone use has an impact on their emotions. 68% of the sample reported to feel happy and connected with the use of smartphones, 43% felt entertained and engaged and around 83% of the elderly reported feeling more connected with their family members and friends due to smartphone thereby reducing their boredom and loneliness. 57% elderly reported that their loneliness is reduced because of smartphones and around 60% people agreed that their boredom is reduced as they feel engaged in various apps and entertained through the different OTT and social media platforms. Though 50% people felt that smartphone is not their companion but they enjoy spending time with it. Elders reported that certain programs, games keep them engaged and they are happy while watching them. The use of smartphones is instrumental in increasing the self-efficacy of elders as 88% of the elderly reported using smartphones to learn a new skill and also, they feel more confident to be using the technology with ease. Smartphones help to connect with the world which helps in developing the feeling of belongingness (Wilson C, 2018). Though there are many positive effects of smartphones on the elderly, there can also be some negative impacts of smartphone use. Addiction to smartphones can be one such negative impact. However, the sample studied does not show any such major negative impact on them as more than 50% report that they do not feel pressurized to use the smartphones nor do they get upset on not getting responses on their messages. This is supported by a study conducted by Bush, P. A., et. al (2021) and Van Deursen, A. J et. al. (2015) such addictions are seen less in older adults.

Social Connectedness - The results of the present study show that the smartphones play a significant role in enhancing the feeling of social connectedness among the elderly. Smartphone reduce the loneliness and feel more connected with the world. 93% population agrees that they have reconnected with family and friends. 84% of the sample studies report that smartphones help them to stay connected with family and friends. 68.8% use smartphone to stay connected with family and friends. Thus, the results showed that smartphone use has reduced the feeling of loneliness among the elderly by connecting them not only to the family, friends but the world outside through the different social media platforms. 78% of the elderly agreed that their ability to stay engaged with the community has increased due to smartphones as they are able to stay socially and politically active on various platforms. They are better able to connect to different communities of their interest and share their views and opinions on various aspects due to the smartphones. However, 53% of the elderly felt that though smartphones have enhanced their virtual connectivity, but there in-person, face to face contacts with even the family member have reduced. Thus, though smartphone use may have few negative impacts on the elderly, majorly it shows positive impact as far as social connectedness of elderly is considered.

CONCLUSION

Smartphones have become an inevitable part of elder's life. Both the usage and dependability of elderly on smartphones are notable as the smartphones become a vital tool for the elders to manage their life with ease. From using the apps and social media platforms to stay connected with the world, to enhancing their mental well-being by being mentally active, engaged and happy with the access to entertainment, news, sports, politics, etc., to being better able to manage their health with the apps and telemedicine facilities, smartphones have made the overall life of elderly easy, safe and better managed. Thus, the present study shows that there may be few drawbacks of using smartphones, largely smartphone have a positive impact on the physical health, emotional health and social connectedness of the elderly.

LIMITATIONS OF THE STUDY

1. The sample size is small.
2. No advanced statistics is used for data analysis.

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EXPLORING PREFERRED LEARNING STYLES AMONG UNDERGRADUATE STUDENTS IN VIEW OF NATIONAL EDUCATION POLICY 2020

Dr. Sneha Raikar

Vice-Principal, N.G.Acharya & D.K.Marathe College of Arts, Science & Commerce, Chembur Mumbai

ABSTRACT

Learning to learn is for individuals who take responsibility for their own learning which is one of the most significant issues. When learners take the responsibility of their own learning, they attribute meaning to the process of learning, leading to effective learning. With the advent of New Education Policy (NEP) 2020, India has a vision to transform its education system by shifting its attention to learner-centred approach for holistic understanding of subjects using different styles of teaching and learning like activity-based learning and teaching in one's own mother tongue. Students use different modalities to perceive, understand and learn different subjects taught in class. Based on the modalities used (visual, auditory or tactile), students may develop visual, auditory or kinaesthetic styles of learning. The purpose of this study was to identify learning styles of the first year NEP degree college students. A comparison in terms of gender was made. Through convenient sampling technique participants were administered Barsch Learning Styles inventory (Barsch, 1980). Data analysis was done using appropriate statistics. The results of the study showed that the first year NEP degree college student's preferences for learning styles were influenced by gender. The order of preference of students in terms of preferred learning style was found to be visual followed by auditory followed by multimode.

Keywords: *New Education Policy (NEP) 2020, Learning Styles.*

INTRODUCTION

The introduction of New Education Policy (NEP) 2020 is a step towards stepping up the Indian education system. It includes wide set of changes from lower levels to higher levels of education. The most notable ones include its focus on digital learning and technology integration, establishing more diverse and inclusive learning environments, focusing on skill development and creating flexible learning models. (Comprehending the Role of the NEP 2020 in Skill Development, 2023).

Many have formulated theories and models on learning styles. One such learning style is the VAK model developed Walter Burke Barbe in 1979 wherein the acronym stands for Visual, Auditory and Kinesthetic. This was later developed by Neil D. Fleming as VARK in the year 1987 which stands for Visual, auditory, reading/writing and Kinesthetic. One of the advantages of this theory is that it focuses on sensory modalities that a people use while they are learning or while they are picking up information from the environment.

It is known that learning processes vary from person to person due to the presence of biological and psychological differences. As Pask (1988) points out more than three-fifths of a person's learning style is biologically imposed. Moreover, Reiff (1992) states that all learners have individual attributes relating to their learning processes. Compared to the extensive work done on methods and instructional activities, one vital area often neglected is the exploration of learning styles in the classroom.

Most high school teachers in India have not established how learners learn various subjects. With the current low achievement in various subjects, it is evident that learners have not yet learned how to learn or discovered their preferred learning styles for different learning material or content in this subject. Also, teachers have not understood the diversity of their learners in a typical classroom, and they keep on embracing the same traditional teaching styles in every context. In consequence, students become bored and inattentive in class, do poorly on tests, get discouraged about the subject, the curriculum, and themselves, and in some worse cases drop out of school.

Learning style theories have been cited as an effective means of helping teachers recognize the incredibly diverse needs learners bring into the classroom, as well as helping the learners discover how they learn best for optimum academic achievement. Therefore, designing the best possible learning environment is essential to improving learning outcomes by letting students engage with the material in a way that best suits their preferred learning styles. Moreover, the results can give light to NEP 2020 in aligning a pedagogy that goes hand in hand with the preferred teaching styles of students. Thus, the researcher aimed to understand the preferred learning styles among college students who are currently undergoing their UG programme.

REVIEW OF LITERATURE

Prior studies on learning styles have been curated to underline relevant information related to current research.

Vaishnav, R.S. (2013) claims that learning style refers to the ability of learners to perceive and process information in learning situations. One of the most important uses of learning styles is that it makes it easy for teachers to incorporate them into their teaching. Findings of the study revealed that, kinesthetic learning style was found to be more prevalent than visual and auditory learning styles among secondary school students. There existed positive high correlation between kinesthetic learning style and academic achievement.

A study titled “Learning Styles and Teaching Styles Determine Students’ Academic Performances”, aimed to identify the learning styles of students and explore the relationship between students’ learning styles and teachers’ teaching methods. The study involved five lecturers and 251 students from University of Malaysia. The results indicated that most students favoured a visual learning style. It was also found that the teaching styles of the lecturers significantly influenced the students’ academic performance (Dewi et al., 2019).

Another study titled “How different are students and their learning styles?” conducted in a sample of 200 students (98 males and 102 females) and were administered with the VARK Questionnaire. The findings indicated that there were no gender differences in the learning style preferences and also the most preferred one was the Kinesthetic method of learning (Shah et al., 2013).

A study titled “Gender differences in learning style preferences among undergraduate physiology students” by Wehrwein, E. A., Lujan, H. L., & DiCarlo, S. E, among 48 undergraduate students found that there exists a significant difference in the learning styles of males and females. Students were administered with the VARK questionnaire to assess the learning style preferences (Wehrwein et al., 2007).

METHOD**Statement of the Problem:**

The study tries to identify the preferred learning style among students of different levels and find out whether there is any gender difference pertaining to preference in learning style among college students.

Objectives:

- To identify whether there is any preferred learning style among students.
- To identify whether there is any gender difference pertaining to preferences in learning style.

Hypothesis:

- There is no significant gender difference pertaining to preference in learning style among college students.

Research Design:

- Descriptive Research Design.
- The study used purely quantitative method to gather data from the students.

Sample:

- The current study was conducted with a sample of 321 college students currently pursuing their Undergraduate programme in N.G.Acharya & D.K.Marathe College of Arts, Science & Commerce, Mumbai.
- The sample was selected from various streams such as Science, Commerce, Management and Arts. The sample of 321 students comprises of 138 females and 183 males.

Tools:

- Barsch Learning Styles Inventory (Barsch R.J., 1996) was used to measure preferred learning styles (visual, auditory and tactile/ kinesthetic) among students.
- Barsch Learning Styles Inventory is a 24-item questionnaire with a reliability coefficient 0.81. It has established validity.
- The items are scored as mentioned: Often = 5 points, sometimes = 3 and Seldom = 1.

Data Collection Procedure:

- The sample for this study was college students (from science, commerce, management or arts stream) currently undergoing their Undergraduate (UG) programme in N.G.Acharya & D.K. Marathe College of Arts, Science & Commerce, Mumbai.

- This sample was collected using convenience sampling.
- Students were asked to fill socio demographic details and Barsch Learning Styles Inventory (BLSI) (Barsch R.J., 1996).
- This data was collected using Google forms.
- Descriptive statistical procedures were used to get the results.

RESULTS & DISCUSSION:

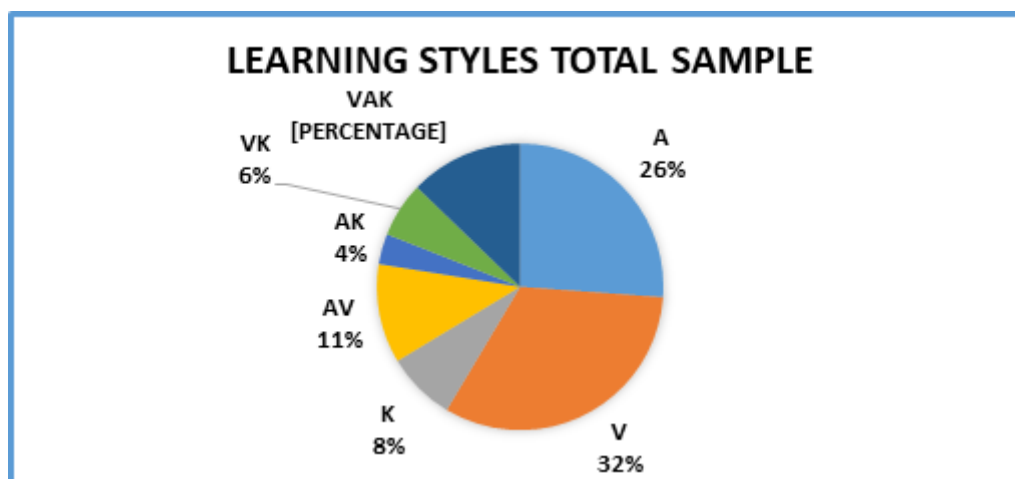


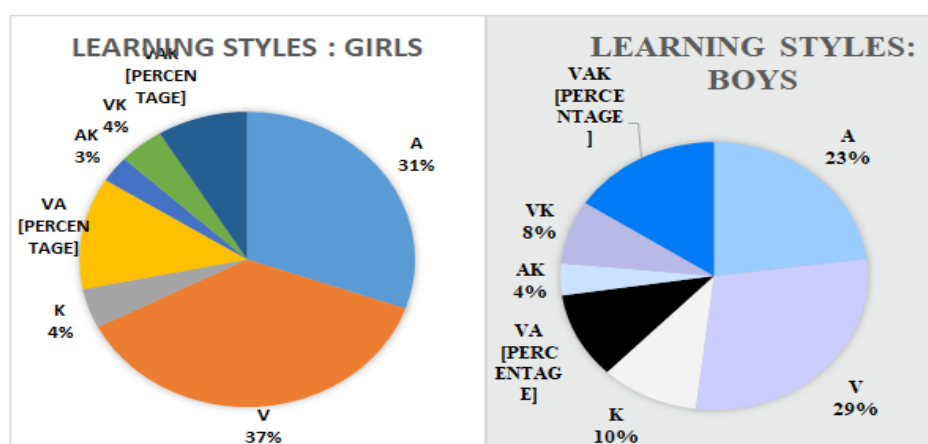
Figure 1: Percentage of overall preference of students in terms of learning style.

Figure 1 shows the overall preferences of students in terms of learning style. The most preferred learning style is 'Visual' followed by auditory and multimode. The least preferred type is 'auditory & kinesthetic'.

Objective 1: Students' Learning Style preference.

	Visual Learner	Auditory Learner	Kinesthetic Learner	VA Learner	VK Learner	AK Learner	VAK Learner
N	104 (32.39%)	84 (26.16%)	25 (7.79%)	36 (11.21%)	20 (6.23%)	11 (3.43%)	41 (12.77%)
Mean	30.53846	29.69048	26.10256	28.36111	26	23.27273	24
SD	4.631934	4.482835	6.340326	4.141447	3.464102	4.406607	7.197222
Variance	21.45482	20.09581	40.19973	17.15159	12	19.41818	51.8
Skewness	0.023709	-0.70265	-0.30538	0.348794	1.924501	-1.49135	0.003384
Kurtosis	0.717786	2.084508	0.791546	-1.09531	3.666667	0.979043	2.44016

Objective 2: Learning Style preference gender wise.



The null hypothesis is rejected as there is a slight difference in the learning style preference in gender. The current study conducted among 321 college students can be bifurcated to 183 males and 138 females. From the 183 male participants, about 29% preferred visual mode, 23% preferred auditory mode, 16% multimode, 8% preferred both visual & kinesthetic, and 10% preferred both auditory & visual learning style. Out of the 139 female participants, 37% preferred visual learning style, 31% preferred auditory mode, 9% multimode, and 12

% preferred both visual & auditory learning style. This means most people prefer teachers to teach using visual aids followed by auditory and hearing aids and tactile aids.

DELIMITATIONS OF THE STUDY:

- The study was conducted on a sample of 321 students and was restricted to N.G.Acharya & D.K. Marathe College of Arts, Science & Commerce, Mumbai.
- Also, convenience sampling was used in this study.

CONCLUSION:

The study reveals that visual mode is the most preferred learning style among students followed by auditory, visual & auditory, multimode, and kinesthetic. Notably, preferences for learning styles among college students did differ slightly based on gender. In conclusion, students lean towards visual learning.

RECOMMENDATIONS:

Considering the limitations, the researcher gives suggestions to conduct the research on a larger sample size from other colleges using qualitative or mixed method. Also, variables affecting learning and teaching styles could be studied. Knowing about the same can make NEP 2020 improvise a more student-oriented curriculum. Teachers should use different methods of teaching such as brainstorming, experiential learning, collaborative learning, and flipped classroom.

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“BLOOD RELATIONSHIP THAT CANNOT BE DENIED”: YOUNG ADULTS’ ATTACHMENT WITH THEIR NON-RESIDENTIAL PARENT AFTER DIVORCE

Aaroahi Mhatre and Jill Sanghvi

Department of Applied Psychology, University of Mumbai

ABSTRACT

This study examines the attachment between young adults and their non-residential parents in the context of divorce, focusing on factors that influence attachment quality. Using thematic analysis, twenty participants were interviewed to identify key themes that shape these relationships. Four primary themes emerged: (1) behaviors of the non-residential parent, highlighting the contrast between abusive and supportive behaviors; (2) efforts to repair the relationship, emphasizing the importance of active involvement of both parties; (3) similarities with the non-resident parent, showing how shared characteristics can enhance or hinder emotional connection depending on the behaviour of the non-residential parent; and (4) encouragement from extended relatives, illustrating the role of family support in coping with complex emotions. Findings suggest that positive parenting behaviors, mutual efforts to repair relationships, recognition of commonalities, and external family support are essential for promoting secure attachments. These findings have practical implications for professionals working with families affected by divorce and guide the development of targeted interventions to improve emotional well-being and relationship dynamics. Future research should consider larger, more diverse samples and longitudinal approaches to further understand these complex relationships.

Keywords: Non-residential parents, Young adults, Divorce, Emotional attachment, Thematic Analysis.

INTRODUCTION

Divorce can disrupt early bonds and make early connections more insecure. Divorce can disrupt the bond between children and their parents, causing stress and avoidance in early childhood Benoit (2004). When a couple decides to end their marriage, it can lead to major changes in the family, living arrangements, and relationships between parents and children. One of the most important relationships affected by divorce is the relationship between a child and his/her non-residential parent (the parent who does not have primary custody after the separation). Divorce was historically less common in India than in many western countries because culture and religion emphasized the importance of maintaining the family. However, divorce in India has been increasing in recent years, especially in urban areas, as social attitudes have a greater impact on marriage. This shift has important implications for understanding how divorce in the Indian context affects children and their relationships with their non-residential parents Sharma, D. (2017). They may spend less time with their children due to visiting arrangements and may have difficulty finding their place in their child's life. But research consistently shows that even after divorce, children benefit greatly from developing relationships with both parents. Nonresidential parents play an important role in providing love, support, and security to their children. The behavior of both parents during and after divorce can affect the relationship between the child and the non-residential parent. Factors such as the amount of time the child spends with the non-residential parent, the level of support and quality of parenting, and the ability of both parents to put the child's needs first can play an important role in maintaining relationships. According to Washington and Hans (2013), conflict related to housing arrangements and reduced time spent with non-residential parent can lead to anxiety for young people in divorced families. Divorce can disrupt early bonds and make early connections more insecure. Benoit (2004). Research results show that parental alienation, where one parent tries to turn their child against the other, can damage the bond between the child and the parent when they are not at home. Research suggests that preventing parental alienation is crucial for maintaining positive relationships between children and their non-residential parents after divorce (Lowenstein, 2010).

EMPIRICAL RESEARCH:

The influence of divorce on family dynamics is significant, particularly in terms of the connections between children and their parents. Damota (2019) emphasizes that divorce brings about substantial changes in family dynamics, prompting crucial inquiries about how children navigate or face challenges in their relationships with non-residential parents. This research highlights that the emotional consequences of divorce can hinder the ability to maintain a strong connection with the non-residential parent, especially if the child feels torn between the parents. I appreciate how it emphasizes the continuity of emotional ties, which challenges the notion that separation equates to disconnection. This perspective is vital for understanding the complexities of attachment and can inform therapeutic practices aimed at helping young adults reconcile their feelings toward non-residential parents.

Empirical research on young adults' attachment to nonresidential parents following divorce reveals several critical factors that influence this attachment. One significant finding is that the frequency and quality of contact with the nonresidential parent plays a critical role in shaping attachment styles. For example, a study by Copeland (2010) found that young adults who maintained regular contact with their nonresident parents reported higher levels of emotional support and attachment security compared to those who had limited interaction. It emphasizes the importance of fostering positive interactions that can serve as a protective factor against the emotional impact of divorce. I believe this finding should encourage non-residential parents to prioritize quality time with their children, as this can significantly affect their emotional development and secure attachment. Another factor that emerges from the literature is the role of parental conflict during and after divorce. High levels of conflict can have a negative impact on how young adults perceive their non-resident parents, leading to increased feelings of anxiety and insecurity. Research shows that young adults who witness ongoing parental conflict are more likely to develop avoidant attachment styles that may hinder their ability to form close relationships in the future (Hong & Park, 2012). Furthermore, the unique characteristics and coping mechanisms of young adults, including their temperament, play a crucial role in shaping their attachment experiences. Individuals with secure attachment styles often utilize more efficient coping strategies, allowing them to successfully navigate the intricacies of their relationships with non-residential parents. Conversely, individuals with insecure attachment styles may encounter challenges in managing their emotions, which can hinder the establishment and maintenance of healthy relationships (Rietzschel, 2012). Klara Smith-Etxeberria (2022) conducted a quantitative study that concluded that parental behavior and emotional states during the divorce process significantly influence relationship anxiety and avoidance in young adult children. This research underscores the importance of parents managing their emotional reactions and behaviors during divorce, as these factors can have lasting effects on their children's attachment styles. Parents' emotional states during this tumultuous time can directly affect their children's psychological outcomes. This highlights the need for parental support systems that can help them navigate their emotions effectively, ultimately benefiting their children's attachment security.

METHOD

This research employs Thematic Analysis as the primary method for analysing qualitative data, drawing on the framework established by Virginia Braun and Victoria Clarke. Thematic analysis is particularly appropriate for this research as it allows for the identification and interpretation of patterns within the qualitative data and provides rich insights into the lived experiences of young adults navigating their relationships with non-residential parents. A combination of purposive and snowball sampling techniques was used to recruit 20 participants (12 women, 8 men) for this research. The inclusion criteria were as follows:

1. Parents had been divorced for at least one year: This ensured that participants had sufficient time to adjust to post-divorce family dynamics and to reflect on their experiences. By focusing on young adults whose parents had been divorced for at least a year, the study aimed to capture the long-term impact of divorce on romantic relationships.
2. Single-parent living arrangement: Participants had to have a non-residential parent after divorce in order to gain insight into this specific relationship. This criterion was critical to understanding the unique challenges and experiences of maintaining a bond with a nonresidential parent.
3. Participant Age Range 18-25: The study focused on young adults because this age group is often overlooked in divorce research despite facing unique challenges in navigating relationships. Young adulthood is a critical time for identity formation and the development of intimate relationships, so it is important to examine the impact of parental divorce on the relationship.

Exclusion Criteria Were:

1. Parents who Remarried: Remarriage could introduce additional factors that affected attachment relationships, such as the presence of stepparents or stepsiblings. By excluding participants whose parents remarried, the study aimed to isolate relationship-specific effects of divorce without the confounding variable of remarriage.
2. Parents who were in the process of divorcing or not divorced but separated: Participants whose parents were still in the process of divorcing or separated may have had different experiences compared to those whose parents had already divorced. This study focused on the post-divorce period to capture the long-term consequences of divorce on affective relationships.

RESULTS

The analysis revealed four overarching themes that captured the contrasting experiences of participants-

1. Behaviour of the non-residential parent
2. Efforts to repair the relationship
3. Similarities with the non-residential parent
4. Encouragement from extended relatives

Theme 1: Behaviour of the non-residential Parent: This behaviour can be their actions and attitudes before, during, and after a divorce. Participants whose non-residential parents were abusive tended to report a poorer attachment to them after the divorce. Eleven participants shared their experiences of how their non-residential parents were abusive, both toward them and their residential parents. As these participants explained *"After all these years and everything we've been through, he never cared about us, never asked how we were. Even a simple question about our well-being would have made a huge difference, but he didn't do that"* So, I don't think I'll be able to build a connection with him in the future".

"But he had anger issues and sometimes he would beat us and verbally abuse us. He had a loving side, but he also abused us a lot". "Additionally, he misbehaved with my mother and my maternal grandparents, which also made me hate him".

"My father was a bit violent towards my mother and there was he was getting violent with me as well. "Young adults whose non-residential parents are not abusive as in they were loving and supportive often have a secure attachment with them after the divorce. As these participants explained:

"He's a very chill person and he allows me and encourages me and motivates me to do a lot of things". "I had some mental issues because of this marriage and he did too. So, he took me to the psychologist and the psychiatrist."

"He gives me a lot of freedom. and encourages me to take my own decisions".

"He's very chill". "My father himself tried his best, I believe, at what he could give".

"He cares about me. It's not that he is not into me or something. He cares about me".

Theme 2: Efforts to repair the relationship: This theme includes active steps such as communication, spending time together, and resolving past conflicts to build a stronger bond. Nine participants highlighted how they and their non-residential parent made an active effort to mend the relationship between them. A lack of active effort on the part of the parent or child to maintain and repair the relationship can further deteriorate the bond, resulting in emotional distance and a weakened bond. Consistent and proactive efforts on the part of both parent and child are essential to building and maintaining a strong and healthy relationship, especially in the context of post-divorce dynamics.

"I got closer to him and I started knowing things about him more and before the divorce". "After the divorce actually came to know more about him. And I think we were we became very close and like I'm very similar to him. And now I know a lot about him and how he is as a person".

"So, then I started meeting him after 10th standard but once a year or something and right now also I meet him twice a year most. But right now, the thing is that I have accepted that he is my biological father and I just look at him as a human being".

"I, as well as my father, have worked actively to try and repair it because whatever may be, whatever the issues between them may be, it does not have to affect the relationship that we have as father and son".

Theme 3: Similarities with the non-residential parent: This theme explores how the recognition of commonalities, interests, and characteristics between a child and a non-residential parent affects their relationship. Positive similarities can foster a sense of connection and understanding, while negative similarities, especially those associated with past negative behaviour, can lead to rejection and distancing. When these similarities are viewed positively and coupled with supportive and caring behaviour of the non-residential parent, they can foster a stronger, healthier bond. Combining these similarities with painful memories and negative emotions undermined any potential for a healthy bond. Combining these similarities with painful memories and negative emotions undermined any potential for a healthy bond.

As Explained by the Participants:

"Things like that I have learned from my father as in his trade or his profession is one that have a certain degree of professionalism. And that profession is one that I have taken up myself as well. So, things like that I am very grateful to him".

"And I think we were we became very close and like I'm very similar to him".

"I feel that now I am more like my father because I am a first child and that can be also one of the factors. My interests, my personality, my behaviour is more similar to him. So, when I talked about, when we went out, we talked a lot of things in the car and I found a lot of similarities with him".

Theme 4: Encouragement from extended relatives: This theme explores the role of extended family members such as grandparents, aunts, uncles and family friends in influencing the relationship between a child and a non-residential parent. Positive encouragement from these relatives can support and motivate the child to maintain or improve the relationship, while negative or discouraging attitudes can inhibit the relationship. As explained by the participants:

"My mother's friends, they actually encouraged me to stay in contact because they were like even though I am your mother's friend or I am your father's friend, I would recommend you stay in contact with both of them because both of them at the end of the day are your blood. They are what created you. You should try to have an equal level of attachment to both of them".

"After my 10th standard my maternal grandfather and grandmother and my mother they insisted that ok now you are old and an adult after 18. So, you can take your decision and if you want to meet him after my 10th. So, if you want you can go ahead if you don't want. It's totally your call".

Conversely, the absence of such support can lead to misunderstandings, unresolved anger, and poor attachment as children struggle to navigate complex emotions and relationships on their own.

DISCUSSION

The study reveals several significant themes regarding the relationships between young adults and their non-residential parents, in relation to divorce. The data suggest that the behaviour of non-residential parents is key to shaping their children's emotional bonds. Young adults with supportive and caring non-residential parents tend to develop secure attachments, while those who experience abusive behaviour report higher levels of emotional distress and poorer relationships. This finding is consistent with attachment theory, which suggests that positive parenting behaviours promote secure emotional bonds, whereas negative behaviours contribute to emotional conflict and distancing.

The analysis identifies four main themes that emerged from the interviews:

1. *Behaviour of the non-residential parent:* Supportive versus abusive behaviour significantly affects attachment quality.
2. *Efforts to mend the relationship:* The active involvement of both parent and child in mending their relationship is essential to fostering positive emotional bonds.
3. *Similarities with the non-residential parent:* Recognizing shared characteristics can strengthen bonds or lead to rejection, depending on the nature of those similarities and the behaviour of the parent.
4. *Encouragement from close relatives:* Positive reinforcement from family members can moderate the negative effects of parental conflict and strengthen emotional connection.

The findings underscore the importance of parental behaviour, active efforts to repair relationships, recognition of similarities, and support from extended family in shaping attachment quality.

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THE IMPACT OF NIGHTTIME SCROLLING ON EMOTIONAL DYSREGULATION, FATIGUE, AND PROCRASTINATION – A STUDY ON YOUNG ADULTS

Aishwarya Ashar and Vianna Pillai

Assistant Professor, Psychology, Department of Humanities and Social Sciences, KES' Shroff College

ABSTRACT

Nighttime scrolling has become a widespread habit, often leading to negative psychological and behavioural outcomes. This study examines the impact of nighttime scrolling on emotional dysregulation, fatigue, and procrastination among individuals aged 18–25 years. Using a quantitative, cross-sectional survey design, data were collected from 152 participants through self-reported measures. Correlation analysis revealed significant positive associations between nighttime scrolling and all three variables: emotional dysregulation ($r = 0.398$), fatigue ($r = 0.388$), and procrastination ($r = 0.503$), with procrastination showing the strongest relationship. Regression analysis further confirmed that nighttime scrolling significantly predicted emotional dysregulation ($\beta = 0.523$, $p < 0.001$), fatigue ($\beta = 0.341$, $p < 0.001$), and procrastination ($\beta = 0.613$, $p < 0.001$). The models explained 15.8% of the variance in emotional dysregulation ($R^2 = 0.158$), 15.1% in fatigue ($R^2 = 0.151$), and 25.3% in procrastination ($R^2 = 0.253$). The findings suggest that excessive nighttime screen exposure may impair emotional stability, contribute to daytime fatigue, and reinforce task avoidance behaviours. These insights emphasize the need for digital consumption awareness, self-regulation strategies, and healthier nighttime routines to mitigate the negative effects of prolonged screen use before sleep. Future research should explore intervention-based approaches and long-term behavioural patterns to further understand and address the consequences of nighttime scrolling.

Keywords: *Nighttime scrolling, emotional dysregulation, fatigue, procrastination, digital well-being.*

INTRODUCTION

In the digital era, smartphones and other electronic devices have become an integral part of daily life, influencing how individuals work, communicate, and relax. One significant behavioral shift that has emerged is the widespread habit of nighttime scrolling, where individuals engage in extended screen time before sleep, primarily using social media, video streaming services, and messaging platforms (Cain & Gradisar, 2022). While this behavior may seem harmless, growing evidence suggests that nighttime scrolling has substantial psychological and physiological effects, contributing to emotional dysregulation, fatigue, and procrastination. The increasing reliance on digital engagement before bedtime raises concerns regarding its impact on mental health, cognitive performance, and productivity.

The prevalence of nighttime scrolling is closely tied to the addictive nature of digital content. Rixen et al. (2023) investigated infinite scrolling behavior in social media applications and the reasons users decide to stop scrolling. Additionally, research by Fisher et al. (2019) examined how the internet, through features like notifications and prompts, affects our attention and cognition. These features encourage prolonged engagement, making it difficult for users to disengage, even when they intend to sleep. Additionally, the Sleep Foundation reports that electronic device use before bedtime can lead to longer sleep onset and sleep deficiency (Attie, & Meyer-Waarden, (2023). This delay can have cascading effects on emotional regulation, leading to heightened stress, irritability, and mood instability. Emotional dysregulation, which refers to difficulties in managing and responding to emotional experiences, has been significantly contributed to challenges in managing emotions, leading to heightened stress, irritability, and mood instability (Wang et al. (2024).

In addition to emotional disturbances, nighttime scrolling contributes to chronic fatigue. The blue light emitted by screens suppresses melatonin production, the hormone responsible for regulating sleep cycles (Brown et al, 2022). As a result, individuals experience fragmented sleep, leading to insufficient rest and increased daytime drowsiness. Fatigue impairs cognitive function, reducing attention span, problem-solving abilities, and overall mental clarity (Hossain, 2024). This decline in cognitive efficiency can extend to academic and professional settings, where individuals struggle to maintain productivity due to sleep deprivation. The cycle of poor sleep and fatigue can further exacerbate emotional dysregulation, creating a negative feedback loop that affects both mental and physical health.

Beyond emotional instability and fatigue, nighttime scrolling also influences procrastination. Research indicates that problematic smartphone use, especially before bedtime, is associated with bedtime procrastination, which in turn leads to sleep problems such as shorter sleep duration and difficulty falling asleep. These sleep disturbances can impair cognitive functions, reducing motivation and self-discipline, making it harder for individuals to initiate tasks the following day (Bozkurt, Demirdöğen, & Akıncı, (2024).

Given the significant implications of nighttime scrolling on emotional regulation, fatigue, and procrastination, there is a pressing need for increased awareness and intervention strategies. Behavioral modifications, such as setting digital curfews, using blue light filters, and engaging in pre-sleep relaxation techniques, may help mitigate the negative effects of nighttime scrolling. Additionally, public health campaigns and educational initiatives should emphasize the importance of sleep hygiene and responsible screen use to promote better mental and physical well-being.

This study aims to explore the relationship between nighttime scrolling and its impact on emotional dysregulation, fatigue, and procrastination. By analyzing recent literature and empirical evidence, this research seeks to provide a comprehensive understanding of how excessive nighttime screen exposure influences sleep quality, emotional stability, and behavioral tendencies. The findings will contribute to ongoing discussions on digital wellness and offer insights into potential interventions that can help individuals develop healthier nighttime routines.

REVIEW OF LIERATURE

With smartphones becoming an inseparable part of daily life, nighttime scrolling has emerged as a common habit, particularly among young adults. Whether it's social media, streaming content, or late-night gaming, the habit of engaging with screens before bed has been steadily increasing. While it may seem like a harmless way to unwind, research suggests that nighttime scrolling can have significant psychological and behavioral consequences. This literature review explores its impact on emotional dysregulation, fatigue, and procrastination, synthesizing existing studies to highlight key findings, identify gaps, and propose directions for future research.

Nighttime Scrolling and Emotional Dysregulation

Emotional regulation plays a crucial role in mental well-being, yet nighttime scrolling may disrupt this process, making it harder for individuals to manage their emotions effectively. Emotional dysregulation has been linked to various psychological disorders, including borderline personality disorder and depression (Iverson et al., 2012; Meaney et al., 2016). Additionally, digital platforms—particularly social media and gaming—are often used as coping mechanisms, which may provide temporary relief but ultimately exacerbate emotional instability (Blasi et al., 2019). This raises concerns about how nighttime scrolling may worsen emotional dysregulation, particularly in individuals already prone to mood disturbances.

Rajappa et al. (2012) found that those with greater emotional dysregulation are more vulnerable to suicidal ideation, highlighting the potentially severe consequences of unchecked emotional distress. However, research also suggests that mindfulness-based strategies can enhance emotional regulation, potentially reducing the negative effects of nighttime scrolling (Hill & Updegraff, 2012; Vujanovic et al., 2010). Despite these insights, the specific ways in which nighttime scrolling contributes to emotional instability remain underexplored, necessitating further investigation.

Nighttime Scrolling and Fatigue

Another significant concern is the impact of nighttime scrolling on fatigue. Excessive screen exposure before bed can disrupt sleep patterns, leading to difficulty falling asleep, reduced sleep quality, and heightened fatigue the next day (Mindell et al., 2017). Young adults, in particular, are highly susceptible to sleep disturbances, with studies showing a direct link between poor sleep quality and increased fatigue levels (Khazaie et al., 2020).

While existing research establishes a clear connection between screen time and sleep disruption, less is known about the specific role of nighttime scrolling in this equation. Unlike general screen use, nighttime scrolling often involves highly engaging and emotionally stimulating content, which may prolong wakefulness and increase cognitive and emotional arousal before bedtime. Furthermore, when combined with emotional dysregulation, nighttime scrolling could have a compounding effect on fatigue, making it even more challenging to recover from sleep loss. Further studies are needed to examine these relationships in greater depth.

Nighttime Scrolling and Procrastination

Procrastination, defined as the voluntary delay of tasks despite knowing the negative consequences, is another behavioral issue that may be closely tied to nighttime scrolling. The endless stream of content available on digital platforms can be highly distracting, causing individuals to delay important academic or professional tasks. Research suggests that emotional dysregulation can contribute to procrastination, as individuals may turn to avoidance strategies to cope with stress or discomfort (Emery et al., 2015). This means that nighttime scrolling may not only serve as a distraction but also as an emotional escape mechanism, reinforcing habitual procrastination patterns.

However, the relationship between nighttime scrolling and procrastination remains largely unexplored. It is unclear whether nighttime scrolling actively increases procrastination or if habitual procrastinators are simply more likely to engage in excessive nighttime scrolling as a form of avoidance. The bidirectional nature of this relationship warrants further research, particularly in how digital habits influence motivation, self-regulation, and time management behaviours.

Understanding the full impact of nighttime scrolling requires a closer look at how it contributes to emotional dysregulation, fatigue, and procrastination over time. While existing research provides strong correlations, the causal pathways remain unclear. Does nighttime scrolling directly disrupt emotional stability and cognitive function, or are there underlying personality traits and behavioural patterns that make some individuals more vulnerable to its effects? These questions underscore the need for longitudinal and experimental studies to better understand the predictive role of nighttime scrolling in shaping emotional and behavioural outcomes.

METHODOLOGY

3.1. Hypothesis

- H₁₁:** There is a significant correlation between nighttime scrolling and emotional dysregulation.
- H₁₂:** There is a significant correlation between nighttime scrolling and fatigue.
- H₁₃:** There is a significant correlation between nighttime scrolling and procrastination.
- H₁₄:** Nighttime scrolling significantly predicts emotional dysregulation.
- H₁₅:** Nighttime scrolling significantly predicts fatigue.
- H₁₆:** Nighttime scrolling significantly predicts procrastination.

3.2. Operational Definition

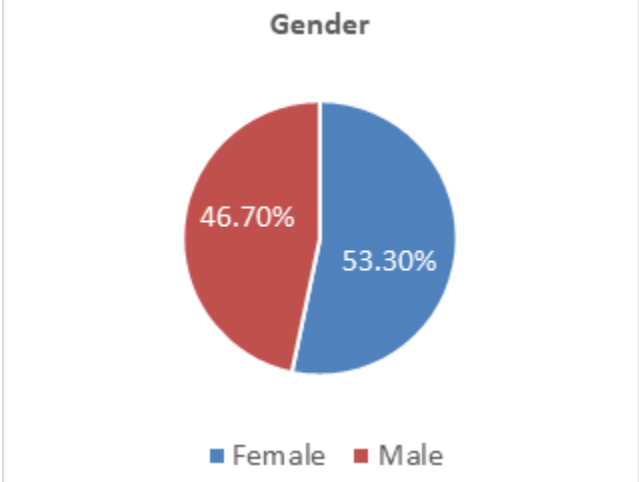
- **Nighttime Scrolling:** Assessed through self-reported responses to questions on nighttime screen usage habits.
- **Emotional Dysregulation:** Measured using the Difficulties in Emotion Regulation Scale (DERS) (Gratz & Roemer, 2004).
- **Cognitive Fatigue:** Evaluated using the Fatigue Assessment Scale (FAS) (Michielsen et al., 2003).
- **Procrastination:** Measured using the General Procrastination Scale (GPS) (Lodha et al., 2016).

3.3. Participants Table 3.1.

Socio-Demographic Characteristics of Participants

	N	Mean	SD	Percent
Age	152	19.7	1.22	-
Gender-Female	81		-	53.2%
Gender-Male	71		-	46.7%

Figure 3a: The proportion of male and female participants



The socio-demographic characteristics of the participants are shown in Table 3.1. The study included a total of 152 participants aged between 18 and 25 years, with a mean age of 19.7 years ($SD = 1.22$). The sample comprised 81 females (53.2%) and 71 males (46.7%), ensuring a balanced gender representation. Participants were recruited from various academic and professional backgrounds, reflecting a diverse sample suitable for examining the effects of nighttime scrolling on emotional dysregulation, cognitive fatigue, and procrastination.

3.4. Research Design

This study employs a quantitative, cross-sectional survey design to examine the relationship between nighttime scrolling and its psychological and behavioural effects, specifically emotional dysregulation, fatigue, and procrastination. A correlational approach is used to analyze the strength and direction of relationships between variables, while simple linear regression analysis assesses whether nighttime scrolling significantly predicts these outcomes.

3.5. Sampling Method

A non-probability purposive sampling method was used, specifically targeting young adults with access to smartphones. Participants were recruited through social media platforms (e.g., WhatsApp, Instagram, LinkedIn).

3.6. Procedure

Participants were recruited through social media platforms such as WhatsApp, Instagram, and LinkedIn. They were provided with a Google Forms link containing the survey and were required to give informed consent before proceeding. Confidentiality was assured, and participants were encouraged to respond honestly. The survey began with a demographic questionnaire, collecting details on age, gender, academic or professional background, and smartphone usage. This was followed by asking 10 questions in Nighttime Scrolling Scale, assessing the frequency, duration, and perceived difficulties of nighttime screen use. Emotional dysregulation was measured using the Difficulties in Emotion Regulation Scale (36 items), which evaluated impulse control, emotional awareness, and regulation strategies. Fatigue levels were assessed through the Fatigue Assessment Scale (10 items), capturing its impact on daily functioning. Lastly, the General Procrastination Scale (23 items) was used to examine habitual procrastination across academic, professional, and personal domains. All responses were recorded on a 5-point Likert scale, with higher scores indicating greater levels of nighttime scrolling, emotional dysregulation, fatigue, and procrastination. Data collected were then analysed using correlation and regression techniques to examine the strength and predictive value of nighttime scrolling on psychological and behavioural outcomes..

3.7. Ethical Consideration

Several ethical issues were addressed during the research process. Permission to use the necessary scales was obtained. The information gathered was solely for the purposes of the current study. The participants provided informed consent. Non-identifying demographic information about the participants was collected to maintain anonymity. If participants did not want their data to be used in the study, they could choose not to share it or withdraw at any time. Only the researcher and the supervisor had access to the data, which was kept private. The collected data will be kept secure for five years before being destroyed.

RESULTS AND DISCUSSION

4.1. Results

The research data was analysed using descriptive and inferential statistics. First, descriptive statistics, including mean, standard deviation (SD), standard error of the mean (SEM), skewness, and kurtosis, were obtained for all study variables. Before performing inferential analyses, tests for linearity and normality were conducted. Since the research design was correlational, Pearson’s product-moment correlation (r) was used to assess relationships among the variables. Simple linear regression analyses were then conducted to determine whether nighttime scrolling significantly predicts emotional dysregulation, cognitive fatigue, and procrastination.

Table 4.1. Descriptive Statistics of nighttime scrolling, emotional dysregulation, cognitive fatigue, and procrastination.

	Scale Range	Mean	Std. Error of Mean	Std. Deviation	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Nighttime Scrolling	10 – 50	30.51	0.62	7.75	0.02	0.2	-0.38	0.4
Emotional Dysregulation	18 – 90	50.14	0.82	10.19	0.77	0.2	0.81	0.4
Fatigue	10 – 50	26.42	0.55	6.81	0.9	0.2	0.39	0.4
Procrastination	22 – 110	57.78	0.76	9.44	-0.31	0.2	0.19	0.4

As seen in Table 4.1, The mean score for nighttime scrolling was 30.51 (SD = 7.75), with a skewness of 0.02 and kurtosis of -0.38, indicating a nearly normal distribution. Emotional dysregulation had a mean score of 50.14 (SD = 10.19), with a slight positive skew (0.77) and a kurtosis of 0.81, suggesting a mildly right-skewed and peaked distribution. Fatigue had a mean score of 26.42 (SD = 6.81), with a moderate positive skew (0.90), indicating that more participants reported lower levels of fatigue. Procrastination had a mean score of 57.78 (SD = 9.44) and was slightly negatively skewed (-0.31), suggesting a minor leftward tail. The skewness and kurtosis values across variables suggest that the data is reasonably normally distributed, supporting the appropriateness of using parametric statistical analyses such as correlation and regression.

Table 4.2. Correlation coefficient between nighttime scrolling, emotional dysregulation, cognitive fatigue, and procrastination.

Variable	Pearson Correlation (r)	Strength & Direction	Significance (p-value)
Emotional Dysregulation	0.398	Weak to moderate positive	p < 0.001
Fatigue	0.388	Weak to moderate positive	p < 0.001
Procrastination	0.503	Moderate positive correlation	p < 0.001

Figure 4a Scatter Plot of Correlation between nighttime scrolling and emotional dysregulation.

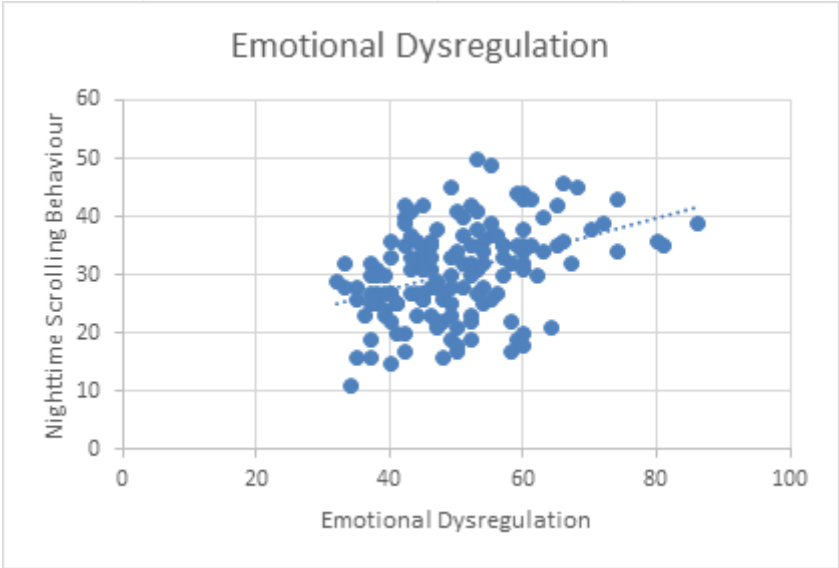


Figure 4b Scatter Plot of Correlation between nighttime scrolling and fatigue.

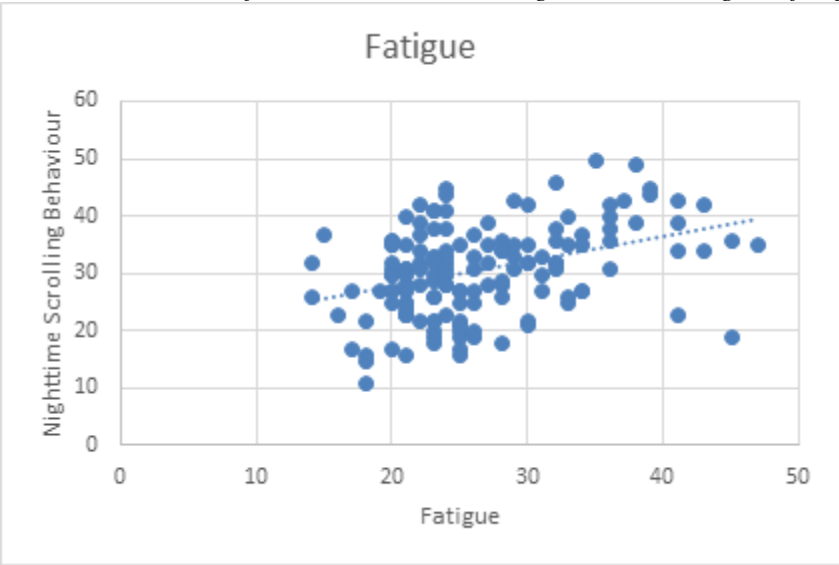
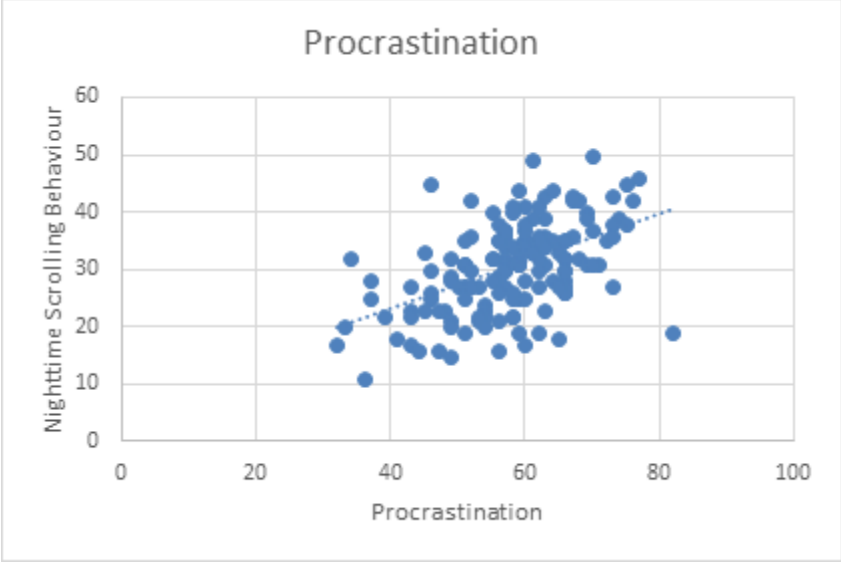


Figure 4c Scatter Plot of Correlation between nighttime scrolling and procrastination.



As seen in Table 4.2, the correlation analysis indicates that nighttime scrolling is significantly associated with emotional dysregulation, fatigue, and procrastination. Specifically, nighttime scrolling showed a weak to moderate positive correlation with emotional dysregulation ($r = 0.398$, $p < 0.001$) and fatigue ($r = 0.388$, $p < 0.001$), suggesting that individuals who engage in more nighttime scrolling tend to experience greater difficulty in regulating emotions and higher levels of fatigue. The strongest association was observed with procrastination, which demonstrated a moderate positive correlation ($r = 0.503$, $p < 0.001$), indicating that higher nighttime scrolling is linked to increased procrastination tendencies. All correlations were statistically significant, reinforcing the idea that excessive nighttime screen use may contribute to psychological and behavioural difficulties.

Therefore, the results are in line with the hypothesis that there is a significant positive relationship between nighttime scrolling and emotional dysregulation, fatigue, and procrastination.

Table 4.3. Linear Regression Model Summary of nighttime scrolling behaviour with emotional dysregulation, fatigue, and procrastination.

Dependent Variable	R Square	Adjusted R Square	F-Value	p-Value	Coefficient (B) for Nighttime Scrolling
Emotional Dysregulation	0.1584	0.1528	28.24	3.81E-07	0.523
Fatigue	0.1506	0.1450	26.60	7.79E-07	0.341
Procrastination	0.2532	0.2482	50.85	3.94E-11	0.613

Figure 4d Bar Graph Representing Explained Variance (R^2) of Emotional Dysregulation, Fatigue, and Procrastination by Nighttime Scrolling

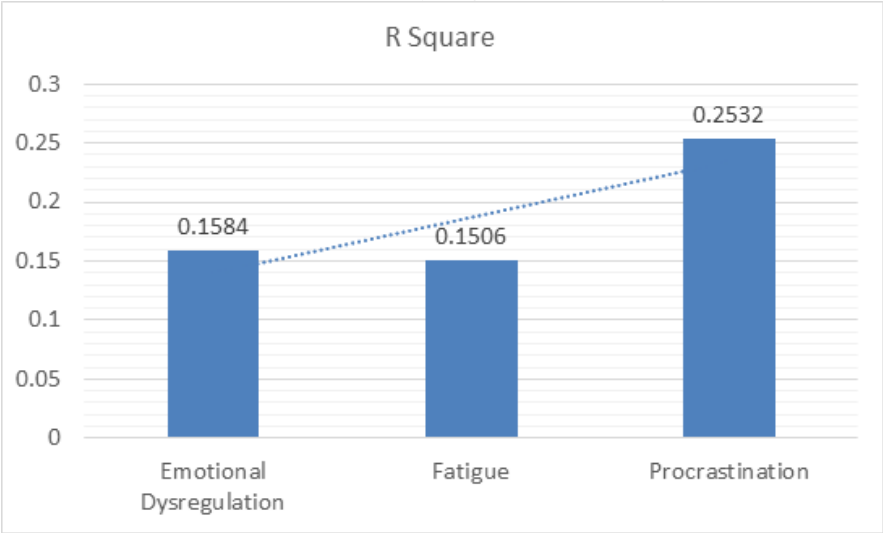


Figure 4e Bar Graph Representing Regression Coefficients (β) for Emotional Dysregulation, Fatigue, and Procrastination Predicted by Nighttime Scrolling

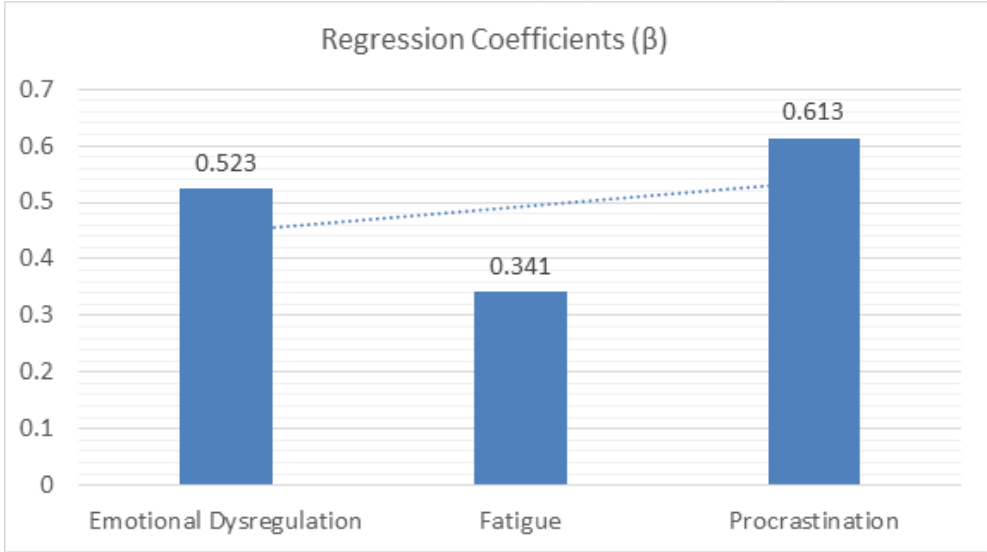


Table 4.3 examines The regression analysis reveals that nighttime scrolling is a significant predictor of emotional dysregulation, fatigue, and procrastination. Nighttime scrolling accounts for 15.84% of the variance in emotional dysregulation ($R^2 = 0.1584$, $F = 28.24$, $p < 0.001$), with a B coefficient of 0.523, indicating that a 1-unit increase in nighttime scrolling leads to a 0.523-unit increase in emotional dysregulation. Similarly, nighttime scrolling explains 15.06% of the variance in fatigue ($R^2 = 0.1506$, $F = 26.60$, $p < 0.001$), with a B coefficient of 0.341, suggesting that higher nighttime scrolling is associated with increased fatigue. The strongest predictive relationship was observed with procrastination, where nighttime scrolling accounts for 25.32% of the variance ($R^2 = 0.2532$, $F = 50.85$, $p < 0.001$) and has a B coefficient of 0.613, meaning that a 1-unit increase in nighttime scrolling results in a 0.613-unit increase in procrastination. These findings highlight the substantial impact of nighttime screen use on emotional regulation, cognitive fatigue, and procrastination behaviours.

Therefore, the results are in line with the hypothesis that nighttime scrolling behaviour significantly predicts emotional dysregulation, fatigue, and procrastination.

4.2. DISCUSSION

The findings of this study support the hypothesis that nighttime scrolling is linked to emotional dysregulation, fatigue, and procrastination. These results align with existing research that highlights the negative psychological and behavioural consequences of excessive screen use before bedtime.

One possible explanation for the association between nighttime scrolling and emotional dysregulation is the overstimulation caused by digital content. Engaging with emotionally charged social media posts, news, or entertainment at night can heighten emotional reactivity and reduce the ability to regulate emotions effectively (Wu et al., 2024). Moreover, nighttime scrolling may delay sleep, leading to insufficient rest, which is known to impair emotional stability and impulse control (Agnete Skovlund Dissing et al., 2022). Sleep deprivation can weaken cognitive resources, making it more challenging to process emotions constructively.

Similarly, the relationship between nighttime scrolling and fatigue can be understood in the context of disrupted sleep patterns. The blue light emitted from screens suppresses melatonin production, leading to delayed sleep onset and poorer sleep quality. Additionally, prolonged engagement with digital content can replace valuable rest time, resulting in chronic fatigue (Arshad et al., 2021). Fatigue, in turn, affects concentration, energy levels, and overall well-being, making it harder to function effectively during the day.

The association between nighttime scrolling and procrastination can be linked to the concept of bedtime procrastination, where individuals delay sleep despite no external constraints preventing them from going to bed (Bozkurt et al., 2024). Digital platforms are designed to be engaging, making it easy to lose track of time while scrolling. This habitual delay in sleep can result in daytime procrastination as well, as reduced energy and cognitive fatigue make it difficult to initiate and complete tasks efficiently (Meng et al., 2024). Additionally, excessive nighttime scrolling may serve as an avoidance strategy, where individuals use screen time to escape responsibilities or stressful thoughts, reinforcing procrastination tendencies (Jennifer & Pychyl, 2001).

These findings align with self-regulation theories, suggesting that nighttime scrolling depletes cognitive resources necessary for maintaining emotional control, managing fatigue, and staying productive. When individuals engage in prolonged scrolling, their ability to self-regulate declines, making them more susceptible to impulsive emotional reactions, exhaustion, and task avoidance. The results also support ego depletion theory, which proposes that exerting self-control in one domain (e.g., resisting the urge to continue scrolling) reduces the ability to regulate Behaviour in other areas, such as managing emotions or completing tasks efficiently.

From a practical perspective, these findings highlight the need for strategies to reduce excessive nighttime screen use. Digital well-being interventions, such as setting screen time limits, using night mode features, and practicing mindful content consumption, could help mitigate the negative effects of nighttime scrolling (Thomas et al., 2022, Pedersen et al., 2022). Awareness campaigns and institutional guidelines can also encourage healthier digital habits, particularly among young adults who are more vulnerable to excessive screen exposure due to academic, social, and professional commitments.

CONCLUSION

This study highlights the significant impact of nighttime scrolling on emotional dysregulation, cognitive fatigue, and procrastination. Findings suggest that excessive screen exposure before bedtime can disrupt self-regulation processes, leading to difficulties in emotional control, increased mental exhaustion, and delays in task completion. These results align with existing research on digital consumption and its psychological effects, emphasizing the need for awareness and behavioural interventions.

Despite its contributions, the study has limitations. The reliance on self-reported data introduces potential recall biases and social desirability effects, which may have influenced participants' responses. Additionally, external factors such as stress levels, sleep patterns, and daily workload were not controlled, which could have played a role in the observed outcomes. Furthermore, the study did not differentiate between various forms of nighttime scrolling (e.g., social media, gaming, reading), which might have varying impacts on cognitive fatigue and procrastination.

From a practical standpoint, these findings underline the importance of promoting digital well-being. Encouraging mindful screen use, implementing digital detox strategies, and setting limits on nighttime scrolling may help reduce its adverse effects. Institutions and workplaces can introduce self-regulation training and productivity-focused tools to combat procrastination linked to excessive nighttime screen use. Parents and educators also play a crucial role in fostering healthy digital habits among young adults, particularly those who are more vulnerable due to academic and professional demands.

Future research should consider a longitudinal approach to establish causal relationships between nighttime scrolling and psychological well-being. Experimental studies testing interventions such as app restrictions, digital curfews, and screen-time monitoring could offer insights into effective strategies for reducing excessive nighttime scrolling. Additionally, exploring personality traits such as impulsivity and cognitive load could help identify individuals most at risk of experiencing the negative effects of nighttime screen use. Examining the role of AI-driven content recommendations in prolonging scrolling behaviours may further contribute to understanding how technology influences procrastination and fatigue.

In conclusion, while nighttime scrolling has become an inevitable part of modern digital lifestyles, it is essential to balance screen use with strategies that promote mental and emotional well-being. Addressing the psychological consequences of nighttime scrolling through research-based interventions can help individuals develop healthier digital consumption habits and improve overall quality of life.

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THE ILLUSION OF CLOSENESS: DO SOCIAL MEDIA INTERACTIONS CREATE FALSE FEELINGS OF FRIENDSHIP?

Dr. Yogesh Dhanjani

Assistant Professor and Head, Department of Multimedia and Mass Communication

N.G Acharya and D.K Marathe College of Arts, Science and Commerce

Chembur, Mumbai 400071, Maharashtra, India

ABSTRACT

The proliferation of social media platforms has transformed the landscape of human interaction, enabling users to establish connections that often mimic traditional friendships. This study investigates whether these digital interactions cultivate illusory feelings of closeness, leading individuals to perceive superficial online relationships as genuine friendships. Utilizing qualitative methodologies, including in-depth interviews and case studies, the research delves into personal experiences of active social media users aged 18-35. The findings reveal that while social media facilitates increased connectivity, it often fosters an illusion of intimacy, with interactions lacking the depth characteristic of offline friendships. Participants reported that curated portrayals of others' lives led to unfavourable self-comparisons, intensifying feelings of loneliness and inadequacy. Additionally, the phenomenon of parasocial interactions emerged, where users perceive one-sided relationships with influencers as reciprocal, further blurring the lines between genuine and illusory friendships. The study underscores the need for heightened awareness regarding the quality of online interactions and encourages individuals to seek authentic connections beyond the digital realm to mitigate potential emotional ramifications associated with superficial online engagements.

Keywords: Social media, Illusory intimacy, Online friendships, Parasocial interactions, Digital relationships, Loneliness, Self-comparison

INTRODUCTION

In the digital age, social media platforms have become integral to daily life, reshaping the ways individuals connect and communicate. Platforms such as Facebook, Instagram, and Twitter offer users the ability to maintain extensive networks of "friends" and "followers," often blurring the lines between genuine relationships and superficial connections. This phenomenon raises critical questions about the authenticity of online interactions and whether they foster false feelings of friendship.

The allure of social media lies in its promise to bridge distances, enabling users to stay connected regardless of geographical barriers. For adolescents and young adults, these platforms serve as pivotal spaces for socialization, with a significant number forming new friendships online. According to a study by the Pew Research Centre, 64% of teens have made new friends through social media, highlighting its role in expanding social circles.

Despite the increased connectivity, concerns have emerged regarding the depth and authenticity of these online relationships. The term "parasocial interaction" describes one-sided relationships where individuals feel a sense of intimacy with media figures who remain unaware of their existence. This concept has evolved with social media, as users develop similar feelings toward influencers and even acquaintances, mistaking digital interactions for genuine friendships. A study highlighted in *Frontiers in Psychology* indicates that such unilateral friendships lack the reciprocal emotional support characteristic of true relationships, potentially leading to feelings of loneliness and isolation.

The curated nature of social media profiles often presents an idealized version of users' lives, prompting comparisons that can adversely affect self-esteem and perceived social standing. Research published in the *Journal of Social and Personal Relationships* found that social media friendship jealousy correlates with lower friendship quality and heightened feelings of envy. This jealousy stems from observing interactions and relationships online, leading individuals to question the authenticity and depth of their own connections.

Media portrayals of tight-knit friend groups, as seen in television shows like "Friends" or "Sex and the City," have established unrealistic expectations about social networks. These portrayals can lead individuals to feel inadequate when their real-life friendships don't mirror these idealized versions. An article in *Self* magazine discusses how the myth of the core friend group contributes to unnecessary pressure and feelings of social deficiency, emphasizing that most people have varied and less interconnected social circles.

The convenience of online communication has, in some cases, supplanted face-to-face interactions, leading to a decline in the quality of social bonds. A report from the New York Post highlights that friendships in America are experiencing a significant decline, with many individuals lacking close confidants. This trend is attributed, in part, to the rise of social media, which, while increasing the quantity of interactions, often diminishes their quality.

The superficial nature of many online interactions can exacerbate feelings of loneliness and inadequacy. Psychotherapist Kathryn Smerling notes that Generation Z, in particular, struggles with social fitness due to their upbringing in the digital era, which has impacted their ability to form deep, meaningful connections. She emphasizes the importance of face-to-face interactions for emotional well-being, suggesting that developing social skills requires conscious effort and practice.

While social media platforms have revolutionized the way we connect, offering unprecedented opportunities for interaction, they also present challenges in distinguishing between genuine friendships and illusory connections. The curated and often superficial nature of online interactions can lead to false feelings of intimacy, social comparison, and a decline in meaningful, face-to-face relationships. As digital interactions continue to permeate daily life, it becomes increasingly important to critically assess the quality of our online relationships and prioritize authentic connections that provide true emotional support and fulfillment.

LITERATURE REVIEW

The advent of social media has fundamentally transformed human interactions, offering platforms for connection that were previously unimaginable. However, this digital revolution has also introduced complexities regarding the authenticity and depth of these connections. This literature review examines the phenomenon of illusory closeness in social media interactions, focusing on parasocial relationships, social comparison, and their impact on genuine friendships.

Parasocial Relationships in the Digital Era

Originally conceptualized by Horton and Wohl (1956), parasocial relationships (PSRs) describe one-sided emotional bonds that individuals form with media figures who are unaware of their existence. The rise of social media has intensified this phenomenon, enabling users to establish perceived intimate connections with influencers, celebrities, and even acquaintances. These platforms facilitate a sense of proximity and familiarity, often leading users to believe in the reciprocity of these relationships. However, the nonreciprocal nature of PSRs means they lack the mutual emotional support characteristic of genuine friendships, potentially leading to feelings of loneliness and unfulfilled social needs (Gleich, 2022).

Recent studies have explored the dual impact of PSRs on well-being. While they can promote healthy attitudes and behaviors, they may also adversely affect mental health through negative self-comparisons (Gleich, 2022). The illusion of intimacy created by PSRs can result in users feeling connected yet isolated, as these relationships do not provide the tangible support found in real-life interactions.

Social Comparison and Its Implications

Social media platforms often present curated and idealized portrayals of users' lives, prompting unfavourable self-comparisons among peers. This exposure can lead to jealousy, decreased self-esteem, and a distorted perception of one's social reality. Research indicates that social media friendship jealousy is associated with lower friendship quality and higher levels of envy (Utz & Beukeboom, 2011). Such jealousy arises from observing interactions and relationships online, leading individuals to question the authenticity and depth of their own connections.

The phenomenon of social comparison is further exacerbated by the "highlight reel" nature of social media, where users predominantly share positive experiences. This selective sharing can create a false narrative that others lead more fulfilling lives, intensifying feelings of inadequacy and loneliness among viewers. Consequently, individuals may strive to project similarly idealized versions of themselves, perpetuating a cycle of superficial interactions and illusory friendships.

Impact on Genuine Friendships

The proliferation of online interactions has coincided with a decline in face-to-face relationships. Studies have shown that the number of close confidants individuals report has decreased significantly over the past few decades. This decline is attributed, in part, to the convenience of digital communication supplanting in-person interactions. While social media allows for the maintenance of a broad network of acquaintances, it often lacks the depth and emotional intimacy required for true friendships. The superficial nature of many online

interactions can exacerbate feelings of loneliness and inadequacy, as they do not provide the same level of support and connection as face-to-face relationships (McPherson, Smith-Lovin, & Brashears, 2006).

Moreover, the myth of the core friend group, perpetuated by media portrayals of tight-knit social circles, has led individuals to feel inadequate when their real-life friendships don't mirror these idealized versions. In reality, most people have varied and less interconnected social circles, and it's uncommon for one's best friends to all be interconnected. Understanding this can help alleviate feelings of inadequacy and improve one's social well-being (Gillespie, 2023).

The literature suggests that while social media platforms have expanded the avenues for connection, they often foster an illusion of closeness that does not equate to genuine friendship. Parasocial relationships and social comparison contribute to this illusion, potentially leading to negative emotional outcomes. As digital interactions continue to permeate daily life, it becomes increasingly important to critically assess the quality of online relationships and prioritize authentic, face-to-face interactions to fulfill social and emotional needs.

METHODOLOGY

This study employs a qualitative research design, utilizing in-depth interviews and case studies to explore whether social media interactions create false feelings of friendship. This approach allows for a comprehensive understanding of individual experiences and perceptions, capturing the nuanced ways in which social media may influence feelings of closeness and friendship.

Participants

A purposive sampling strategy was employed to select 15 participants aged between 18 and 35, active on various social media platforms. This demographic was chosen due to their high engagement with social media and the formative nature of friendships during this life stage. Participants were recruited through university networks and social media advertisements.

Data Collection

Semi-structured interviews were conducted, each lasting approximately 60 minutes. The interview guide included open-ended questions designed to elicit participants' experiences with online interactions and perceptions of friendship quality. Sample questions included:

- Can you describe a time when an online interaction felt like a real friendship?
- Have you ever felt that an online friendship was not as genuine as an offline one?

Additionally, two case studies were developed to provide an in-depth analysis of specific instances where social media interactions led to perceived closeness. These cases were selected based on their illustrative value regarding the research question.

Data Analysis

Interviews were transcribed verbatim and analyzed using thematic analysis. This method involves coding the data to identify patterns and themes related to the research question. The case studies were analyzed through narrative analysis, focusing on the sequence of events and the participants' interpretations of their experiences.

Ethical Considerations

Participants provided informed consent and were assured of confidentiality and the right to withdraw from the study at any time.

This methodology allows for an in-depth exploration of the subjective experiences of individuals regarding their social media interactions and perceptions of friendship, providing rich qualitative data to address the research question.

FINDINGS

The qualitative analysis of in-depth interviews and case studies revealed several key themes regarding the perception of friendship in the context of social media interactions.

Illusion of Closeness

Participants frequently reported experiencing a sense of closeness with online connections, attributing this to constant updates and interactions on social media platforms. However, upon reflection, many acknowledged that these relationships lacked depth and were often based on curated personas rather than genuine connections. This aligns with the concept of parasocial relationships, where individuals form one-sided bonds with media figures or acquaintances, leading to an illusion of intimacy.

Social Comparison and Envy

The study found that social media's highlight reel nature prompted participants to engage in social comparison, leading to feelings of envy and inadequacy. Observing peers' seemingly perfect lives often resulted in negative self-perception and strained offline friendships. This phenomenon has been linked to decreased friendship quality and increased feelings of loneliness.

Impact on Offline Friendships

A significant number of participants reported that their online interactions detracted from face-to-face relationships. The convenience of digital communication often replaced in-person meetings, leading to weaker offline bonds. This trend contributes to the broader issue of declining close friendships and increased social isolation.

Low-Maintenance Friendships

Some participants valued low-maintenance friendships facilitated by social media, appreciating the ability to stay connected without frequent interaction. However, concerns were raised that such relationships might lack depth and fail to provide substantial emotional support when needed. This reflects the notion that while low-maintenance friendships offer flexibility, they require active nurturing to remain meaningful.

Cultural Differences in Online Interactions

The study also highlighted cultural variations in how individuals perceive and engage in online friendships. Participants from collectivist cultures emphasized the importance of offline interactions for genuine friendship, whereas those from individualist cultures were more comfortable with online-only relationships. This finding underscores the role of cultural context in shaping social media behaviors and perceptions of friendship.

FUTURE RESEARCH

Further research is warranted to explore the long-term effects of social media on friendship quality across diverse demographics. Investigating strategies that effectively balance online and offline interactions could provide valuable insights into maintaining authentic relationships in the digital age.

CONCLUSION

In conclusion, while social media offers valuable tools for staying connected, it is imperative to recognize and address the limitations of these platforms in fostering genuine friendships. By consciously engaging in meaningful offline interactions and being aware of the potential pitfalls of digital communication, individuals can cultivate deeper, more fulfilling relationships.

The findings suggest that while social media platforms facilitate a sense of closeness, this often constitutes an illusion lacking the depth of genuine friendships. The propensity for social comparison can negatively impact self-esteem and offline relationships. Additionally, cultural factors play a significant role in how individuals perceive and value online interactions. To mitigate the illusion of closeness, it is essential to balance online engagements with meaningful offline interactions, fostering authentic connections.

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OMEGA-3 FATTY ACIDS AND STRESS REACTIVITY: A REVIEW OF CURRENT EVIDENCE

Gaikwad Aditya

MA Psychology Part I, Vivekanand Education Society's College of Arts, Science & Commerce (Autonomous)

ABSTRACT

This review examines the relationship between omega-3 polyunsaturated fatty acids (n-3 PUFAs) and stress reactivity in humans. Stress reactivity, defined as physiological and psychological responses to stressors, represents a critical factor in mental health outcomes. This paper synthesizes evidence from experimental, observational, and intervention studies investigating how omega-3 status and supplementation may modulate stress response systems, including the hypothalamic-pituitary-adrenal (HPA) axis, autonomic nervous system activity, and inflammatory pathways. Current findings suggest omega-3 fatty acids may attenuate stress reactivity through multiple mechanisms, including regulation of neuroinflammation, neurotransmitter function, and HPA axis activity. Clinical implications, limitations of existing research, and directions for future studies are discussed.

Keywords: omega-3 fatty acids, stress reactivity, HPA axis, inflammation, cortisol, EPA, DHA

INTRODUCTION

Psychological stress is a pervasive factor in modern life that contributes significantly to both physical and mental health disorders (Cohen et al., 2007). The physiological stress response involves complex interactions between the central nervous system, neuroendocrine pathways, and immune function (Chrousos, 2009). Stress reactivity—the magnitude and pattern of an individual's physiological and psychological responses to stressors—has been identified as a key factor in vulnerability to stress-related disorders, including depression, anxiety, and cardiovascular disease (McEwen et al., 2015). Interest in nutritional approaches to stress management has grown substantially in recent years (Jacka, 2017). Among various nutritional factors, omega-3 polyunsaturated fatty acids (n-3 PUFAs) have emerged as promising candidates for modulating stress reactivity (Su, 2009). These essential fatty acids, primarily eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are integral components of neural membranes and precursors to bioactive lipid mediators involved in inflammation resolution and neuroprotection (Calder, 2015). This review aims to synthesize current evidence regarding the relationship between omega-3 fatty acids and stress reactivity, examining potential mechanisms of action and evaluating the clinical implications of findings from both laboratory and naturalistic studies.

Omega-3 fatty acids are long-chain polyunsaturated fatty acids characterized by a double bond at the third carbon position from the methyl end of the carbon chain (Swanson et al., 2012). The three main types relevant to human health are Alpha-linolenic acid (ALA), found in plant sources such as flaxseeds, chia seeds, and walnuts; Eicosapentaenoic acid (EPA), primarily derived from marine sources including fatty fish and algae; and Docosahexaenoic acid (DHA), also derived from marine sources and particularly concentrated in brain tissue. While humans can convert ALA to EPA and DHA, this conversion is inefficient, with estimated rates of less than 5-10% (Burdge & Calder, 2005). Thus, direct consumption of preformed EPA and DHA is considered optimal for maintaining adequate levels (Arterburn et al., 2006).

Omega-3 fatty acids, particularly DHA, are integral components of neuronal membranes, comprising approximately 30% of brain gray matter (McNamara & Carlson, 2006). Their presence affects membrane fluidity, receptor function, and neurotransmission (Ander et al., 2014). Additionally, EPA and DHA serve as precursors to specialized pro-resolving mediators (SPMs) including resolvins, protectins, and maresins that facilitate resolution of inflammation and promote tissue homeostasis (Serhan et al., 2015). Key neurobiological functions of omega-3 fatty acids include regulation of neurotransmitter systems, including serotonergic, dopaminergic, and glutamatergic pathways (Chalon, 2006); modulation of neuroinflammation via effects on microglial activity and cytokine production (Orr et al., 2013); support of neurogenesis and synaptogenesis (Dyall, 2015); and regulation of hypothalamic-pituitary-adrenal (HPA) axis function (Larrieu et al., 2014).

The stress response involves two primary systems: the HPA axis, which culminates in cortisol release (Smith & Vale, 2006), and the sympathetic-adrenal-medullary (SAM) system, which triggers catecholamine release (Ulrich-Lai & Herman, 2009). Activation of these systems initiates a cascade of physiological changes including increased heart rate, blood pressure, glucose mobilization, and immune system modulation (Tsigos & Chrousos, 2002). While these responses are adaptive in acute situations, chronic or excessive activation can lead to allostatic load and increased vulnerability to disease (McEwen, 2017). Stress reactivity is commonly assessed through neuroendocrine measures such as salivary, blood, or urinary cortisol, dehydroepiandrosterone (DHEA),

and adrenocorticotrophic hormone (ACTH) (Allen et al., 2014); autonomic measures including heart rate variability (HRV), skin conductance, and blood pressure (Thayer et al., 2012); immune parameters like pro-inflammatory cytokines (IL-6, TNF- α) and C-reactive protein (Steptoe et al., 2007); subjective measures of self-reported stress, anxiety, or negative affect (Campbell & Ehlers, 2012); and laboratory stress paradigms such as standardized stressors like the Trier Social Stress Test (TSST), Cold Pressor Test, or Montreal Imaging Stress Task (Dickerson & Kemeny, 2004).

Stress induces neuroinflammation, which can be modulated by omega-3 fatty acids through several mechanisms: competitive inhibition of arachidonic acid metabolism, reducing pro-inflammatory eicosanoid production (Calder, 2009); synthesis of specialized pro-resolving mediators (SPMs) that actively resolve inflammation (Serhan & Levy, 2018); modification of microglial phenotypes toward anti-inflammatory states (Chen et al., 2014); and reduction of nuclear factor- κ B (NF- κ B) signaling, a key regulator of inflammatory gene expression (Kiecolt-Glaser et al., 2012). Kiecolt-Glaser et al. (2007) demonstrated that omega-3 supplementation reduced stress-induced increases in pro-inflammatory cytokines IL-6 and TNF- α following a laboratory stressor, providing evidence that omega-3 fatty acids can buffer inflammatory responses to acute stress. Omega-3 fatty acids may modulate HPA axis function through several mechanisms: alteration of glucocorticoid receptor sensitivity and function (Larrieu et al., 2016), modulation of corticotropin-releasing hormone (CRH) expression (Ferraz et al., 2011), and influence on stress hormone metabolism (Jackson et al., 2019). Delarue et al. (2003) conducted one of the first studies demonstrating that fish oil supplementation reduced cortisol and adrenocorticotrophic hormone (ACTH) responses to a mental arithmetic stress test, suggesting attenuated HPA axis reactivity.

Omega-3 fatty acids affect neurotransmitter systems involved in stress regulation through enhanced serotonergic neurotransmission by increasing serotonin receptor sensitivity (Patrick & Ames, 2015), modulation of dopaminergic function, which plays a role in stress response (Chalon, 2006), and regulation of glutamatergic transmission and prevention of excitotoxicity (Dyall & Michael-Titus, 2008). Omega-3 status has been associated with autonomic function, particularly heart rate variability (HRV), a measure of parasympathetic nervous system activity. Higher HRV indicates greater autonomic flexibility and enhanced stress resilience (Hansen et al., 2014).

Several laboratory studies have examined the impact of omega-3 supplementation on physiological responses to acute stressors. Matsumura et al. (2021) conducted a randomized controlled trial in which 30 healthy adults received either EPA-rich fish oil (2.5g/day) or placebo for 12 weeks. Participants completed the Trier Social Stress Test before and after supplementation. The EPA group showed significantly reduced cortisol responses and subjective stress ratings post-supplementation compared to placebo. Similarly, a study by Ginty and Conklin (2012) found that individuals with higher blood levels of omega-3 fatty acids exhibited lower cardiovascular reactivity to acute laboratory stressors. This relationship remained significant after controlling for potential confounders such as age, sex, and physical activity levels. Dang et al. (2018) investigated the effects of 8-week DHA supplementation (1.5g/day) on stress responses in medical students. The DHA group demonstrated attenuated increases in interleukin-6 and cortisol during examination stress compared to the placebo group, suggesting anti-inflammatory and HPA-modulatory effects.

Research examining omega-3 status and responses to real-life stressors has yielded consistent findings. Kiecolt-Glaser et al. (2011) found that dietary omega-3 intake was inversely associated with stress-induced inflammatory responses among caregivers of dementia patients, a chronically stressed population. In a prospective study of pregnant women, Markhus et al. (2013) observed that lower omega-3 index in late pregnancy predicted higher levels of postpartum perceived stress and more pronounced HPA axis dysregulation, as measured by the cortisol awakening response. Larrieu and Layé (2018) reviewed evidence suggesting that omega-3 deficiency increases vulnerability to stress-induced neurobiological alterations, particularly in early life and adolescence, potentially predisposing individuals to stress-related disorders later in life.

The ability of omega-3 fatty acids to modulate stress reactivity has implications for prevention and treatment of stress-related disorders. Meta-analyses indicate that omega-3 supplementation, particularly with EPA-predominant formulations, may reduce depressive symptoms (Liao et al., 2019). The stress-buffering effects described in this review potentially contribute to these antidepressant effects. Preliminary research suggests omega-3 supplementation may reduce symptom severity in PTSD, potentially through modulation of fear conditioning and stress reactivity (Matsuoka et al., 2015). Exaggerated cardiovascular reactivity to stress predicts future hypertension and cardiovascular events. Omega-3 fatty acids may protect against stress-induced cardiovascular dysfunction (O'Keefe et al., 2006). Certain populations may particularly benefit from omega-3 interventions for stress management: individuals with chronic stress exposure such as caregivers, healthcare

workers, and those in high-stress occupations (Kiecolt-Glaser et al., 2021); pregnant and postpartum women for prevention of prenatal stress effects on offspring and postpartum mood disorders (Hsu et al., 2018); and aging populations who may experience heightened stress reactivity and inflammation (Kiecolt-Glaser et al., 2012).

METHODOLOGY

This systematic review sought to examine the relationship between omega-3 polyunsaturated fatty acids (n-3 PUFAs) and stress reactivity in humans. The following methodology was employed to identify, select, and critically analyze relevant literature.

Search Strategy

A comprehensive literature search was conducted using electronic databases including PubMed/MEDLINE, PsycINFO, Embase, and Cochrane Library. The search was performed using combinations of the following keywords: "omega-3," "n-3 PUFA," "EPA," "DHA," "polyunsaturated fatty acids," "fish oil," "stress reactivity," "stress response," "cortisol," "HPA axis," "inflammatory markers," "heart rate variability," and "autonomic function." Additional studies were identified through manual searches of reference lists from retrieved articles and relevant review papers.

Inclusion and Exclusion Criteria

Studies were included if they met the following criteria: (1) published in English in peer-reviewed journals between 2000 and 2024; (2) examined the relationship between omega-3 fatty acids and measures of stress reactivity; (3) included human participants; and (4) used experimental, observational, or intervention designs. Studies were excluded if they: (1) were conducted exclusively in animal models; (2) did not include specific measures of stress reactivity; (3) were case reports or series with fewer than 10 participants; or (4) were published only as abstracts or conference proceedings.

Study Selection

The initial search yielded 547 articles. After removing duplicates, 342 articles remained for screening. After screening titles and abstracts, resulting in 78 articles for full-text assessment. Following full-text review, 42 studies met the inclusion criteria and were included in this review.

Several methodological issues were considered when evaluating the literature. These included variations in omega-3 formulations (EPA:DHA ratios), dosage, and supplementation duration; differences in stress induction protocols; timing of outcome assessments; control for potential confounders such as diet, exercise, and baseline omega-3 status; and statistical approaches to analyzing stress reactivity data. These considerations informed the critical evaluation of findings and identification of limitations and research gaps discussed in later sections of this review.

Limitations and Research Gaps

Despite promising findings, several limitations and knowledge gaps remain regarding omega-3 supplementation and its effects on stress reactivity. First, there is uncertainty regarding the optimal dosage and formulation, particularly the ideal EPA:DHA ratios and dosages for modulating stress reactivity (Sublette et al., 2011). Additionally, individual differences, such as genetic variations, can affect omega-3 metabolism and incorporation into tissues, potentially influencing the response to supplementation (Chilton et al., 2014). Furthermore, there is a lack of longitudinal data on the sustained effects of omega-3 supplementation on stress reactivity (Grosso et al., 2014). Mechanistic clarity is also needed, as further research is required to elucidate the precise molecular mechanisms underlying the stress-modulating effects of omega-3s (Calder, 2016). Lastly, the timing of intervention remains a critical area of exploration, as the specific periods when omega-3 supplementation may be most effective have yet to be defined (Weiser et al., 2016).

Future Research Should Address:

To address the existing gaps in knowledge regarding omega-3 supplementation and stress reactivity, several promising avenues for future research can be pursued. First, personalized approaches that consider baseline omega-3 status and genetic factors may enhance the effectiveness of interventions (Cormier et al., 2019). Additionally, combined interventions that examine omega-3 fatty acids alongside other stress management techniques could provide a more comprehensive understanding of their effects (Su et al., 2018). Advanced neuroimaging studies are also needed to elucidate the central nervous system mechanisms involved in the stress-modulating effects of omega-3s (McNamara et al., 2013). Furthermore, the development of biomarkers to identify individuals most likely to benefit from omega-3 supplementation for stress resilience could facilitate more targeted interventions (Wani et al., 2017). Lastly, investigating the specific effects of EPA versus DHA on different components of the stress response may yield valuable insights into their distinct roles (Dyall, 2015).

CONCLUSION

Current evidence suggests omega-3 fatty acids can attenuate physiological and psychological reactivity to acute stressors, potentially through modulation of neuroinflammatory pathways, HPA axis function, and neurotransmitter systems (Larrieu & Layé, 2018). These stress-buffering effects may contribute to the observed benefits of omega-3 supplementation in stress-related disorders such as depression and cardiovascular disease (Grosso et al., 2014).

While limitations and knowledge gaps remain, the existing literature provides a compelling rationale for considering omega-3 status in the context of stress vulnerability and resilience (Borsini et al., 2020). Future research should focus on clarifying optimal intervention strategies, identifying responsive subpopulations, and elucidating underlying mechanisms to maximize clinical applications of these findings.

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UNDERSTANDING EMOTIONAL INTELLIGENCE: ITS EVOLUTION, THEORETICAL PERSPECTIVES AND APPLICATIONS ON MARITAL RELATIONSHIPS

Nidhi Pandey¹ and Dr. Rubi Singh²¹Research Scholar, Banasthali Vidyapith²Assistant Professor, Banasthali Vidyapith**ABSTRACT**

Twentieth century has been a witness to all round growth in almost all areas, including psychology, and the concept of Emotional Intelligence (EI) is just one of them. With contributions of Salovey and Mayer, Goleman and Bar-On, emotional Intelligence has emerged as a critical factor in personal, professional, and social success. Defined as the ability to perceive, understand, and manage emotions effectively, it influences communication, conflict resolution, and emotional bonding between people by helping them get a clearer picture about themselves as well as others.

This paper explores the theoretical foundations of EI, tracing its historical evolution from philosophical roots in ancient traditions to modern psychological models, including the works of Mayer and Salovey (1990) and Daniel Goleman (1995). It examines how key components of EI—self-awareness, empathy, emotional regulation, and social skills—enhance relational well-being and thereby create happier people and society. Couples with high EI exhibit better conflict management, increased emotional connect, and greater resilience in navigating challenges.

Drawing from psychological studies and real-world applications, this research underscores the importance of integrating EI-based interventions in couple therapy and relationship counselling. By enhancing emotional awareness and regulation, partners can build healthier, more fulfilling relationships, thereby creating a better society.

Keywords: Emotional Intelligence, Relationship Satisfaction, Conflict Resolution, Marital Adjustment, Emotional Regulation, Empathy

1. INTRODUCTION:

Emotions shape human experiences, influencing decision-making, relationships, and overall well-being. Emotional Intelligence (EI) is the capacity to understand and regulate emotions in oneself and others, facilitating better communication, empathy, and social interactions. Since its emergence as a psychological construct, EI has been extensively researched for its role in personal and professional success. While traditional views on intelligence emphasized cognitive abilities, modern perspectives recognize the significance of emotional competencies in navigating complex social environments.

The concept of EI has historical roots in both Western and Eastern philosophies. Ancient texts like the *Bhagavad Gita* and Buddhist scriptures highlighted emotional regulation as a path to wisdom and liberation. In the West, early philosophers such as Aristotle, Plato and Socrates emphasized the importance of balancing emotions with rational thought. The modern scientific study of EI began with researchers like Edward Thorndike, who introduced social intelligence, followed by the influential models developed by Mayer and Salovey (1990) and popularized by Daniel Goleman (1995).

This paper explores the theoretical foundations of EI, tracing its historical development and key psychological models. Additionally, it examines its practical implications, particularly in relationships and mental health. By understanding EI's role in emotional regulation and interpersonal dynamics, individuals can enhance their personal and social effectiveness, leading to improved well-being and professional success.

2. HISTORICAL BACKGROUND AND THEORETICAL MODELS AS PRECURSOR TO EMOTIONAL INTELLIGENCE

Emotional Intelligence (EI) is the ability to recognize, understand, and regulate one's own emotions while also effectively managing interpersonal relationships. The concept gained prominence in psychology and leadership studies following the works of Peter Salovey and John Mayer (1990), and later, Daniel Goleman (1995).

However, the roots of the concept can be traced back to the times of Socrates and Plato in west, and Geeta and Buddhism in India.

“Indian emotions and their strong relation with virtues can be found in the lives and situations illustrated by the Great epics, Mahābhārata and Rāmāyana (Sinha 2008). Both the books are examples of their heroes being able

to understand, manage and use their emotions, to such an extent that they became an epitome of emotionally intelligent human.

However, in Indian philosophy, emotions have always been viewed as causes of attachment or bondage, creating barriers to obtaining true knowledge. “Yoga philosophy identifies unregulated emotions as afflictions (kleśas) that affect the mind and create obstacles. Patañjali named these afflictions ignorance (avidyā), egoism (asmitā), attachment (rāga), aversion (dveṣa), and adherence [to mundane existence] (abhiniveśa)” (Sinha 2008). So, emotional attitudes are the cause of desire and attachment and therefore lead to bondage, is what the learned suggested.

“Cognition and emotion flow as continuous processes in the mind (Yogācāra-bhūmi) and produce kleśas. These kleśas are associated with one or more of five possible feelings, i.e., pleasant (sukha), unpleasant (duḥkha), neutral (upekṣā), happiness (sau-manasya) or unhappiness (daurmanasya) (Gombrich 2006).”

‘Passion’ or ‘attachment’ (rāga); ‘hatred’ or ‘repulsion’ (dveṣa); and ‘delusion’ (moha) are derived from three primitive causes for afflictions (kleśas) (Bilimoria and Wenta 2015). “The first two are associated with the effective notion of emotion and the last one results from ignorance (cognition) Here emotions hold the same status and location as cognition. To get rid of these afflictions, Buddhism prescribes the cultivation of the highest feeling of love, which derives from calmness of mind, bringing kindness and love from a distance so as to not generate any attachment or sensory reactions that might result in affliction and attachment” (Flood 2004). “Such a calm, disassociated, compassionate, embodied soul can achieve liberation”. (Pandit and Krieger 2024).

Similarly in the western world, “Plato generally viewed emotions negatively”. Aristotle focuses on “finding a balance point for our emotional selves and is the first one who recognizes the emotional worth of virtue in the domain of morality” (Aristotle 1954). “As per the doctrine of virtue by Aristotle, an emotional response with its intellectual component of balance is considered as virtue. However, both Plato and Aristotle accepted that uncontrollable emotions lead to the destruction of one’s moral worth, so emotions need to be controlled by wisdom” (Pandit and Krieger 2024). Later, even the Stoics viewed emotion as a barrier to reasonable cognition (because of the unruly nature) and as something to be avoided.

Moving forward to a little recent time, in 1870’s, Charles Darwin wrote extensively about how do we express our emotions through our body. In his work “The Expression of the Emotions in Man and Animals,” Darwin states “Certain complex actions are of direct or indirect service under certain states of the mind, in order to relieve or gratify certain sensations, desires, &c.; and whenever the same state of mind is induced, however feebly, there is a tendency through the force of habit and association for the same movements to be performed, though they may not then be of the least use. Some actions ordinarily associated through habit with certain states of the mind may be partially repressed through the will, and in such cases the muscles which are least under the separate control of the will are the most liable still to act, causing movements which we recognize as expressive” (The Expression and Emotions in Man and Animals, 1899). With the aid of technology of taking pictures, he could explain how the physiology of the body works to physically express what the mind is thinking and feeling (emotion). The basis of modern think tank for Emotional Intelligence was thus laid here.

“In 1890, William James in his book The Principles of Psychology, proposed that emotions are the sensation of bodily changes, or as he put it, “*the bodily changes follow directly the perception of the exciting fact, and that our feeling of the same changes as they occur is the emotion* (Vol. 2, p. 449, italics original)” (Lacasse 2017). So emotions follow the fluctuations in the body like a change in expression, a movement, or a change in the physiology. He further adds that ‘without bodily manifestations’, emotions cannot be felt, and all that would remain “would be purely cognitive in form, pale, colourless, destitute of emotional warmth (Vol. 2, p. 450). Through this description, James acknowledged that cognitions co-occur with emotions, but are not a direct part of the experience of an emotional feeling., and that emotional feelings serve as useful function. By comparing their bodily and reflexive nature to instincts, James suggested that emotions and their expression have adaptive value. James also proposed that anticipating an emotion can bring the sensations of that emotion into being. Therefore, emotions that have become associated with a particular experience may be anticipated and triggered when an individual is placed in a similar scenario again. Finally, James pointed to individual differences in emotional feeling, suggesting that people differ in what triggers their emotions, and, more importantly, in what particular bodily changes lead to a specific emotional feeling. Individuals may display different outward and physiological symptoms while reporting that they are experiencing the same emotion”. (Lacasse 2017).

This was taken forward by Sigmund Freud (1896), whose psychoanalysis spoke about the emotions in the conscious and subconscious mind. “Psychoanalysis begins with the assertion of unconscious mental life in all humans. The unconscious is the part of the psyche that contains emotional conflicts, memories, and

uncomfortable wishes. The unconscious's hidden or "repressed" contents are rooted in childhood and not directly accessible to conscious awareness. The unconscious has a major influence on our lives. It moves us around in the world and our relationships with a dynamic force on our thoughts and behaviour". (Castelloe, 2022).

In 1900s a bunch of psychologists like Edward Thorndike (1920) Michel Beldoch (1964), Leuner (1966), Howard Gardner (1983), Wayne Payne (1985) and Stanley Greenspan (1989) in their different domains worked on emotions and the intelligence associated with it. While Greenspan spoke of emotional experiences and their interpretation by the child at birth, Leuner spoke about how self-awareness can lead to psychological liberty.

Thus from 3rd century BC to 20th century AD, to till date, history is witness to the struggle of mankind to manage emotions. While the earlier ones strongly advocate getting rid of them to attain liberation, the latter ones talk about recognizing all kinds of emotions, i.e. having their awareness and skills for intelligent management, and thus the term Emotional Intelligence.

2.1 Early Foundations of Emotional Intelligence:

The twentieth century saw psychologists starting to accept emotions as an integral part of human system and how they affect the physiology and psychology of a person. The fact that unpleasant emotions create a problem with people's behaviour and health, was accepted here too, but they had started looking at channelizing them. During the same time, theories of intelligence by Spearman (Two factor theory; general and specific intelligence, 1902), Thorndike (Multi factor theory, 1920) and Gardner (8 kinds of intelligence, 1983) surfaced up. While their models differed from each other, they all explained intelligence in terms of ability of the mind to

- 1) Recognise a problem
- 2) Solve the problem
- 3) Learn from experiences

Which is also the case with Mayer and Salovey's Model of Emotional intelligence which talks about perceiving emotion (recognizing a problem), using and understanding emotions (solve the problem) and managing emotions (shift to the new emotion and learn from experiences). For example, a person is frustrated at a colleague for not responding to emails, he can recognise the emotion as frustration, understand it is disadvantageous because it is disturbing his calm, and advantageous (use) because it will push him towards talking to the colleague and resolve the problem, and manage it by keeping calm while talking so as to not escalate the issue. This understanding of managing his frustration can be a result of a past experience, and based on what the outcome of his talking to the colleague will be, he can learn from that experience as well.

In their paper on Emotional Intelligence, Salovey and Mayer start with the models of intelligence and then connect with social intelligence. "Thorndike originally defined it as the ability of men and women, and boys and girls – to act wisely in human relations... In essence, the ability to perceive one's own and other's internal states, motives, and behaviours, and to act towards them optimally on the basis of that information". They go on to add "We find these conceptualizations of social intelligence exciting and useful" (Salovey, Mayer, 1990).

2.2 The Mayer-Salovey Model (1990)

"We define emotional intelligence as the subset of social intelligence, as well as of Gardner's personal intelligences", write Mayer and Salovey, and then also sum up emotions as "organised responses, crossing the boundaries of many psychological subsystems, including the physiological, cognitive, motivational, and experiential systems. Emotions typically arise in response to an event, either internal or external, that has positively or negatively valenced meaning for an individual. Emotions can be distinguished from the closely related concept of mood in that emotions are shorter and generally more intense" (Salovey, Mayer 1990).

Mayer – Salovey Model is also known as the ability model. Ability, to be able to recognize and express, either verbally through language, or non-verbally through gestures, facial expressions or body language. But when it comes to understanding the emotions of others, whether expressed verbally or non-verbally, presence of empathy was considered central. Empathy, is the ability to comprehend another's feelings and to re-experience them oneself. It is supposed to be developed during positive interactions with friends, family and strangers, while growing up.

However, researchers also suggest dependence of empathy on 'subsidiary in built abilities' which are like expressing emotion, understanding the other's opinion, identify others' emotions, experience an appropriate response to them, and lastly also communicate and act on the experience the person has internally.

To conclude, emotionally Intelligent individuals can successfully:

- **Appraise** (Evaluate and learn from events) and express their emotions accurately. A minimum level of these skills is important for a person's successful functioning in his society. Although there would always be some differences in interpreting emotions through facial expression, one should be able to estimate emotions in people who are around them.
- **Empathise**, i.e. understand another person's views and emotions, experience a response which is either same or similar emotion and take action based on that. This would contribute towards making a person comfortable to be with, and in turn help the person witness more positive experiences.
- **Be able to gauge a situation and regulate their own response** and behave in a manner to incite the same in others. Goffman, in his work 'The Art of Impression Management' has written about the skills a person can use while interaction with others, so as to get the desired result from a person.

To sum up, Salovey and Mayer (1990) defined EI as a cognitive ability comprising four key skills:

- **Perceiving Emotions** – Identifying emotions in oneself and others.
- **Understanding Emotions** – Recognizing emotional transitions and complexities.
- **Using Emotions** – Employing own emotions to facilitate thinking and problem-solving.
- **Managing Emotions** – Regulating emotions for personal and social well-being.

2.3 Goleman's Model of Emotional Intelligence (1995)

Daniel Goleman, who is a psychologist, journalist, and author, is best known for his work as an author for his internationally best selling book 'Emotional Intelligence (Bantam Books, 1995). Through this book, he stressed upon the fact that non cognitive skills like EQ are equally important as IQ for success, be it in relationships, personal growth, or professional growth. Goleman expanded on the cognitive approach by integrating EI into leadership and workplace success. His model includes:

- **Self-awareness** – Recognizing one's own emotions.
- **Self-regulation** – Managing emotional impulses.
- **Motivation** – Using emotions to drive achievement.
- **Empathy** – Understanding the emotions of others.
- **Social Skills** – Navigating interpersonal interactions effectively.

Based on these skills, the further subscales are:

- a) The Self-awareness group includes Emotional Awareness; Accurate Self-assessment; and Self-confidence.
- b) The Self-regulation group includes Self-control, Trustworthiness, Conscientiousness, Adaptability, and Innovation.
- c) The Motivation group includes Achievement Drive, Commitment, Initiative, and Optimism.
- d) The Empathy group includes Understanding Others, Developing Others, Service Orientation, Leveraging Diversity, and Political Awareness.
- e) The Social Skills group includes Influence, Communication, Conflict Management, Leadership, Change Catalyst, Building Bonds, Collaboration and Cooperation, and Team Capabilities.

To sum it up, through the analyses of these 5 components mentioned above, Goleman explains how the various parts of the brain work in creating emotions and taking actions, how do emotions hijack rational thinking and how they impact decision-making, relationships, and leadership. He highlights that **EQ can be developed** and is crucial for personal and professional growth.

2.4 Bar-On's Emotional-Social Intelligence Model (1997)

Reuven Bar-On conceptualized EI as a combination of emotional and social competencies that influence overall well-being. His model emphasizes that "emotional-social intelligence is composed of a number of intrapersonal and interpersonal competencies, skills and facilitators that combine to determine effective human behaviour (Bar-On, 1988, 1997b, 2000). Based on the above, it is more accurate to refer to this construct as "emotional-social intelligence" rather than "emotional intelligence" or "social intelligence". He explains further that "while a person's intra personal abilities do form the basis of Bar-On's model, at inter personal level, being

emotionally and socially intelligent encompasses the ability to be aware of others' emotions, feelings and needs, and to establish and maintain cooperative, constructive and mutually satisfying relationships (Bar-on, 2006)".

The basis of developing this model is his Emotional Quotient Inventory, a self-reporting measure for individuals above 17 years, to estimate the same. It contains 133 items as short sentences and has a 5-point response scale. The 5 composite scales and their subscales (total 15) are:

- a) Intrapersonal (comprising Self-Regard, Emotional Self-Awareness, Assertiveness, Independence, and Self-Actualization);
- b) Interpersonal (comprising Empathy, Social Responsibility, and Interpersonal Relationship);
- c) Stress Management (comprising Stress Tolerance and Impulse Control);
- d) Adaptability (comprising Reality-Testing, Flexibility, and Problem-Solving);
- e) General Mood (comprising Optimism and Happiness).

Once tested and computed, the model helps in predicting:

- Relationship between EQi and physical health.
- Relationship between EQi and psychological health
- Relationship between EQi and social interaction
- Relationship between EQi and performance at school
- Relationship between EQi and performance at work place
- Relationship between EQi and self actualization
- Relationship between EQi and subjective well being.

To sum up, Bar-On's Emotional (Social) Intelligence model is a multi-factorial array of interrelated emotional and social competencies, skills and facilitators that influence one's ability to recognize, understand and manage emotions, to relate with others, to adapt to change and solve problems of a personal and interpersonal nature, and to efficiently cope with daily demands, challenges and pressures. It is both teachable and learnable.

3. Measuring Emotional Intelligence

Assessing EI is complex due to its multifaceted nature. Several psychometric tools have been developed, including:

- **Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT)** – Measures ability-based EI through tasks evaluating emotional perception and reasoning.
- **Emotional Quotient Inventory (EQ-i)** – A self-report tool measuring emotional and social competencies.
- **Goleman's Emotional Competency Inventory (ECI)** – Used in organizational settings to assess leadership capabilities.

Despite these tools, measuring EI remains a debated issue due to concerns about self-report bias and the subjective nature of emotional experiences.

4. Utilization and Application of Emotional Intelligence

An emotionally intelligent person is supposed to be skilled at managing their own emotions as well as that of others. Once this skill is mastered, they naturally start using it in various areas of life, especially in building better relationships with people around them. Also, what can be seen as a side effect of being able to exist in a balanced positive state is better cognition, attention on self, problem solving and reduced moods like anxiety and depression.

The Salovey- Mayer duo, in their paper on Emotional Intelligence mention 4 areas where Emotional Intelligence can be utilized, besides having good relationships.

1. **Planning and Self Accountability** – They call this flexible planning. People who can manage their own emotions, will have lesser mood swings and consequently stick to their plans, and even in case of giving in to such mental states, they can think how best they can achieve the outcome through some other way instead.

2. **Creative Thinking** – Balanced positive emotions help an individual think in different directions and consider all possible outcomes of a difficult situation, and in many a case these outcomes can be unusual and creative too. What we call ‘out of the box thinking’ in today’s time.
3. Attention can be redirected to areas of more importance – Being able to understand emotions of self as well as others, and acting as per the requirement of the situation, helps an emotionally intelligent person to limit focus on energy draining situations and refocus on ‘most important stimuli’ around them.
4. **Self Motivation** – Even negative mood can be channelised to do some other more important tasks. A person going through broken marriage can repurpose their pain and push themselves a little more at work and use that achievement to nourish them. Even good emotions can be used to improve their confidence and be prepared for adverse situations.

People who do not learn to regulate their own emotions become a slave to them. They may also try to overpower others to keep their own selves in a positive state. Also, the ones who cannot recognise their own emotions, aren’t clear of what they want, and so planning their own life becomes a bit challenging.

5. Application of Emotional Intelligence in Enhancing Couple Relationships

Emotional Intelligence plays a crucial role in fostering healthy and fulfilling couple relationships. The ability to recognize, understand, and regulate one’s own emotions—as well as perceive and respond appropriately to a partner’s emotions—enhances relationship satisfaction and long-term stability. It allows couples to navigate conflicts, improve communication, and foster emotional intimacy, all of which are fundamental to sustaining a strong partnership.

Case: *Ganesh (name changed), a 45-year-old JCO in the Indian Army, and his wife, Riddhi (name changed), a 39-year-old homemaker, had been married for 21 years. They had two children—a 19-year-old daughter (living in a hostel) and a 14-year-old son. Their son had been diagnosed with paraplegia, a condition that significantly impacted the family’s emotional and psychological well-being. Riddhi was brought to counselling due to severe anger issues, which were affecting her relationships within the family.*

The emotional strain of caregiving, coupled with the challenges of managing a household with a child requiring specialized care, had contributed to her heightened stress levels and frequent emotional outbursts. Ganesh, often away due to military duties, struggled to provide consistent emotional support, leading to a communication gap between the couple. He was also very fond of alcohol.

The counselling process focused on understanding the underlying emotional triggers, which in this case was majorly alcohol.

Interventions based on Emotional Intelligence

i) Emotional Awareness: which enables individuals to understand their emotional triggers and reactions. Additionally, emotionally intelligent partners actively listen, validate their partner’s emotions, and use non-defensive communication, thereby reducing misunderstandings and emotional distress.

Ridhi was made to analyse her daily schedule and all the triggers that made her angry. She became aware of the exact points where she would start losing her temper, made aware of her step-by-step reactions as her anger rose, and their consequences. She was also made to analyse the emotional impact of all this on her husband and son.

ii) Creating Empathy: the ability to understand and share the feelings of another—is another cornerstone of EI that strengthens couple relationships. When partners can empathize with each other, they create an emotionally safe environment that fosters trust and intimacy.

Emotional validation, where one acknowledges their partner’s emotions without judgment, reinforces emotional connection and prevents feelings of neglect or invalidation.

After much questioning and introspection, Ridhi concluded that her entire focus was on her physical and emotional discomfort. She decided to pay attention to her husband by paying attention to his words and actions (active listening), validate his pain and pleasure without being sarcastic.

iii) Conflict Resolution and Emotional Regulation

Conflict is inevitable in any relationship, but emotionally intelligent couples manage disagreements with greater effectiveness. EI equips individuals with emotional regulation skills, allowing them to remain calm during heated discussions, avoid harsh criticism or defensiveness, and work towards a mutually beneficial resolution.

The ability to de-escalate conflicts and approach issues with a problem-solving mindset reduces resentment and strengthens the relationship.

Riddhi resolved to talk as gently as was possible for her (she was given emotional regulation strategies). After being helped with anger release through plenty of venting out and catharsis she was guided towards adopting healthier coping mechanisms.

iv) Building Emotional Intimacy

Beyond conflict resolution, EI enhances emotional intimacy by fostering vulnerability and emotional expression. Couples who practice emotional openness, sharing both positive and negative emotions without fear of judgment, experience deeper connection and relationship satisfaction. Emotionally intelligent partners also recognize and appreciate each other's emotional needs, reinforcing emotional security and support.

Tools and techniques for enabling mutual understanding were shared and Ganesh and Riddhi were made to practice them. This also helped in reducing stress-related conflicts, and equipping them with skills to navigate their family's unique challenges together.

v) Relationship Satisfaction and Longevity

By integrating EI into their daily interactions, couples can build stronger, healthier, and more fulfilling relationships. Developing emotional awareness, empathy, and regulation skills can significantly enhance relationship quality, fostering deeper bonds and long-term happiness.

Gradually the anger episodes of Riddhi came down drastically, her face showed a smile of calmness and she enjoyed her time with her son at home now. The couple started spending happy times together, and the biggest surprise here was that Ganesh's drinking came down drastically too, that too, without directly working on it.

This case study highlights the role of Emotional Intelligence in addressing emotional distress within a marriage, demonstrating how EI-driven interventions can improve personal resilience and relationship dynamics in the face of adversity.

6. CONCLUSION:

From ancient philosophies to contemporary psychology, the evolution of Emotional Intelligence highlights humanity's ongoing struggle to understand and manage emotions. Early perspectives emphasized emotional detachment for spiritual growth, whereas modern theories focus on recognizing and channelizing emotions productively. Models by Mayer-Salovey and Goleman provide practical frameworks for enhancing emotional competence, with applications in relationships, leadership, and mental well-being.

Thus emotional intelligence is a vital psychological construct influencing personal growth, relationships, leadership, and mental health. While various models and assessment tools exist, further research is needed to refine EI measurement and application. Understanding and developing EI can lead to better emotional regulation, improved social interactions, and enhanced overall well-being.

Future research should explore EI's role in digital communication, cross-cultural interactions, and artificial intelligence to further refine its impact on human behaviour.

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UNDERSTANDING THE RELATION BETWEEN SELF-COMPASSION AND HOPE AMONG YOUTH

Rasika Dhupkar¹, Priya Usha Avinash Tarade² and Ankita Sherkane³¹K.V. Pendharkar College of Arts, Science and Commerce (Autonomous).²D.G. Ruparel College of Arts, Science and Commerce.³Psychologist, Accenture.**ABSTRACT**

Hope and Self-Compassion are two constructs from Positive Psychology essential to Psychological Well-Being. According to Neff (2003), Self-compassion involves being kind towards oneself during suffering, seeing one's suffering as a part of a larger human experience, and having a balanced awareness of one's negative thoughts/suffering. As given by Snyder(1991), hope is defined cognitively, as generating pathways (Pathway) and one's perceived capacity to use those pathways and sustain on the pathways despite obstacles (Agency). Hope is a positive state of mind and the world at large. The present study aimed to study the relation between Self-Compassion and Hope. Pearson r is used to study the relationship between self-compassion and hope. A significant positive correlation was found between Self-Compassion and Hope. All the positive subscales of Self-Compassion showed a significant moderate positive correlation with the Agency and Pathway subscale of Hope. For the negative subscales of Self-Compassion, we found a significant negative correlation between the Pathway and Self-judgement scale. Regression analysis showed that all the positive subscales of self-compassion significantly predicted Hope, with Mindfulness being the best predictor.

Keywords: Self-compassion, Hope, Youth, Survey.

INTRODUCTION

One important Buddhist concept relevant to those interested in self-concepts and self-attitudes is the construct of Compassion. Compassion is not completely equivalent to empathy, although there is an overlap. Compassion involves being kind towards others, understanding other people's suffering, and having a desire to alleviate their suffering. Self-compassion involves being open to and moved by one's suffering, experiencing feelings of caring and kindness toward oneself, taking an understanding, nonjudgmental attitude toward one's inadequacies and failures, and recognizing that one's own experience is a part of the common human experiences.

Being self-compassionate does not mean being selfish or prioritizing personal needs over those of others. Instead, self-compassion means acknowledging that suffering, failure, and inadequacies are part of the human condition and that all people—oneself included—are worthy of compassion. Self-compassion is also distinct from self-pity (Goldstein & Kornfield, 1987).

Kristin Neff (2003) developed the Self-Compassion scale and also said that it has 3 distinct components, namely, 1) extending kindness and understanding to oneself rather than harsh self-criticism and judgment; 2) seeing one's experiences as part of the larger human experience rather than as separating and isolating. 3) Holding one's painful thoughts and feelings in balanced awareness rather than over-identifying with them. These aspects of self-compassion are experienced differently and are conceptually distinct, but they also tend to engender one another. For instance, the accepting, detached stance of mindfulness lessens self-judgment. Suppose one stops judging and berating oneself long enough to experience a degree of self-kindness. In that case, the impact of negative emotional experiences will be lessened, making it easier to maintain a balanced awareness of one's thoughts and emotions. Similarly, realizing that suffering and personal failures are shared with others lessens the degree of blame and harsh judgment placed on oneself, just as a lessening of self-judgment can soften feelings of uniqueness and isolation. Thus, truly having compassion for oneself entails desiring health and well-being for oneself, which means gently encouraging change where needed and rectifying harmful or unproductive patterns of behavior.

Self-compassion can be viewed as a useful emotional regulation strategy where painful or distressing feelings are not avoided but are held in awareness with kindness, understanding, and a sense of shared humanity. It allows for a clearer apprehension of one's immediate situation and the adoption of actions that change oneself and or the environment in appropriate and effective ways (Folkman & Moskowitz, 2000; Isen, 2000).

For this reason, self-compassion may be an important aspect of Emotional Intelligence, which involves the ability to monitor one's own emotions and skillfully use this information to guide one's thinking and actions (Salovey & Mayer, 1990). Self-compassionate individuals should show better mental health outcomes than those who lack self-compassion, such as lower rates of anxiety and depression, because their experiences of

pain and failure are not amplified and perpetuated through harsh self-condemnation. It is found that women had significantly lower overall self-compassion scores than men because research evidence suggests that females tend to be more self-critical and to have more of a ruminative coping style than males (Leadbeater, Kuperminc, Blatt, & Hertzog, 1999).

The construct of Self-compassion has a negative correlation with depression, anxiety, rumination, and thought suppression since self-compassion requires that one take a balanced approach to one's emotional experience—that one neither runs away with nor runs away from one's feelings. Also, higher levels of self-compassion is related to higher levels of Psychological Well-Being, job satisfaction (Barnard & Curry, 2011), relational well-being (Neff & Beretvas, 2013), healthy social functioning, and successful aging (Allen, Goldwasser, & Leary, 2012). Self-compassion is also positively related to emotional intelligence. One study showed that in male and female adolescents, traumatic memories are associated with more depressive symptoms when there are lower levels of self-compassion and emotional intelligence. (Castilho et al, 2016).

Unlike high self-esteem, which has been associated with egoistic illusions and self-regulation failure (e.g., adopting inappropriate goals that are beyond performance capabilities; Baumeister, Heatherton, & Tice, 1993), self-compassion should be linked to greater knowledge and clarity about one's limitations because individuals do not have to hide their shortcomings from themselves to maintain a positive self-image.

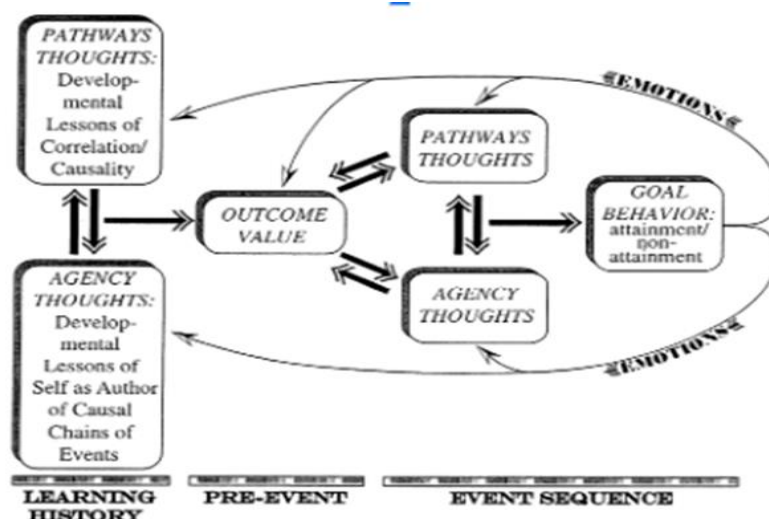
Hope is an "enduring pattern of thinking about oneself concerning life goals" (Snyder, 1994, p. 68). "Hope" is a "positive motivational state that is based on an interactively derived sense of successful (1) agency (goal-directed energy) and (2) pathways (planning to meet goals)" (Snyder, Irving, & Anderson, 1991, p. 287). Snyder considers hope to be trait-like and cyclical- Pathways thinking increases agency thinking, which, in turn, yields further pathways thinking, and so on, leading to goal behaviour/action, and goal behaviour/action increases agency and pathway in turn. People with high hopes encounter an immutable goal blockage, but they are flexible enough to find alternative goals. In contrast, people with low hope tend to ruminate unproductively about being stuck. Pathway thinking refers to an individual's belief that they are capable of formulating pathways for obtaining their goals. Agency thinking pertains to a person's perceived ability to utilize these pathways to successfully achieve their desired goals.

Pathway thinking involves the strategies that lead to the perusal of a goal. People who have hope can generate multiple, alternative pathways to achieve their goals. They are more likely to attain them even when obstacles block one or more of those pathways (Grewal & Porter, 2007). Agency thinking is proactive confidence and motivation. It provides "the belief that one can begin and sustain movement along the envisioned pathways toward a given goal" (Snyder et al., 2000, p. 749). Agency is the self-efficacy and stamina needed to pursue multiple alternative pathways, overcome numerous obstacles, and ultimately obtain the goal (Snyder, 2000). It is cyclical- as, when a goal is of sufficient importance, it generates agency and pathway thoughts in high-hope individuals, as well as, having high agency and pathway thoughts keeps the goal sufficiently important to warrant goal-directed processing (Snyder, 2002).

Hope overlaps with the construct of Optimism, but various definitions of optimism exist as given by Seligman, Scheier, and Carver, etc. Optimism differs from hope in that it can be an attributional style that focuses on the past, explaining past failures as unstable, specific, and external, along with the expectations of positive outcomes in the future. It can also be defined as the confidence that a goal important to the individual can be achieved. It does not specifically emphasize pathway thinking, which Snyder's Hope model does.

Research also shows that hope positively affects psychological well-being, life satisfaction, self-esteem, and happiness (Kapoor, 2020). Personality traits of extraversion, agreeableness, neuroticism, and openness were associated with self-compassion. Booker and Perlin (2020) found that the strengths of hope and forgiveness had incremental effects on self-compassion beyond the effects of other strengths or Big Five traits.

Results showed that hope and forgiveness were robustly associated with self-compassion when these strengths were studied simultaneously. One of their studies also showed that the effects of hope and forgiveness on self-compassion were comparable between college- and community-recruited young adults.



Adapted from: *Handbook Of Positive Psychology*(p. 259), by Snyder C.R., Rand K.L., Sigmond D.R., 2002, Oxford University Press.

Hope was negatively related to parenting stress and moderated the relationship between self-compassion and parenting stress(Garcia et al., 2022). Self-compassion is about the present (Neff, 2003), and hope involves cognitions about the self and the future (Snyder et al., 1991). Self-compassion is positively associated with hope (Umphrey & Sherblom, 2014) and predictive of life satisfaction (Neff & Faso, 2015). Hope has been found to mediate the relationship between self-compassion and life satisfaction (Yang et al., 2016). Hope and self-compassion are negatively associated with depression, stress, and anxiety (Todorov et al., 2019). Hope is also positively associated with adaptive problem-solving and coping, negatively associated with depression, and predicts success in psychotherapy. In support groups, hope leads to the use of inclusive words such as "we" and "our," more communally focused group interaction, and positive change over time (Peterson, 2009). Hope is also positively associated with greater academic achievement, athletic success, and job performance.

Kapoor (2020) found that there is no association between hope, self-compassion, and religious attitude. It can be inferred that a person's hope and self-compassion are unaffected by their religious views and attitudes, regardless of age.

Overall, people who are more hopeful about their goals appear likely to be more positive in their inner self-talk and less critical of themselves when faced with a challenge, obstacle, or initial failure. Both components of hope, i.e., Agency and Pathway, significantly positively correlate with self-compassion; hope contributes to an 11% variance in self-compassion. Agency thinking predicts less self-blaming, less self-criticism, and fewer unrealistic demands on oneself. A hopeful person who engages in agency thinking is more likely to be accepting of personal inadequacies and take a more mindful view of life(Umphrey and Sherblom, 2014).

Hope and Self-compassion were also found to be positively related in a sample of College students, and the level of self-compassion and hope did not differ based on gender (Shiren and Luke, 2023). Hope was also found as a mediator between self-compassion and life satisfaction in Chinese adults(Yang, Zhang, Kou, 2016). Also, self-compassion was positively correlated with trait hope in parents of children with autism. The mechanism proposed is that since self-compassionate individuals are mindful, it will keep them protected from fully absorbing the dramatic and exaggerated storylines of hopelessness and despair, facilitating hope. They also found that the degree of difficulty faced by parents of autistic children does not appear to be as important to parental well-being as how parents relate to themselves to the difficulties, i.e., self-compassion. (Neff & Faso, 2015)

Hopeful individuals, by their awareness of multiple pathways to achieve desired goals in the face of setbacks, may be better equipped to recognize how other individuals with similar goals have experienced setbacks on the journey to eventual success. In this way, hope may facilitate a feeling of common humanity. The feeling of common humanity serves as a resource for building relationships with others, which in turn become additional pathways for hopeful individuals to use in times of goal failure. Because one knows that one's concerns are not unique, one can think and see that other individuals are also there who face obstacles and so motivates them to look for the pathways these individuals have used to solve the problems, encouraging pathway thinking. So, it is a two-way relationship. Thus, because of high levels of hope, one can imagine different pathways to achieve a goal and probable multiple setbacks, so one can understand the common human struggles faced. Similarly,

understanding that all humans face struggles and are imperfect can facilitate pathway thinking that one can overcome difficulties, as these difficulties are not extremely deviant or unique.

More self-compassionate individuals can withhold judgment when they are not sure how to proceed with a problem, limiting rumination and eventually finding alternative solutions in the future, thus facilitating hope. Similarly, the other way round, being hopeful also can put oneself in a meta-cognitive stance of monitoring obstacles and generating pathways objectively, facilitating mindfulness. The Mindfulness component of self-compassion predicts that highly self-compassionate people will ruminate less, generate a nonjudgmental attitude, not over-identify with negative emotions, and can distance themselves effectively from extreme negative self-talk or emotions, which increases confidence, in turn facilitating pathway and agency thinking.

Self-kindness generates positive self-talk, which can lead to an increase in the pathway and agency thinking, and an increase in the pathway and agency thinking can then improve positive self-talk.

Research has also found that self-compassionate people were protected from the detrimental effects of hopelessness on depressive symptoms. The buffering effect of self-compassion on the relation between decreases in pathways of thinking and increases in depression is also consistent with Buddhist theories that self-compassionate individuals relate to negative cognitions through offering kindness to oneself and recognizing their connection to humanity. Also, self-compassionate loving-kindness meditation increases the possibility of identifying desirable goals and confidence about producing effective pathways to achieve them, which increases the level of perceived hope.

Research by Akin and Akin in 2014 also showed that Self-compassion predicted hope. Akin and Akin 2014 found that self-compassion predicted a 30% variation in hope. All the negative subscales also significantly negatively predicted hope. Self-kindness and Mindfulness also predicted hope significantly, whereas common humanity did not predict hope significantly.

We assumed that hope will be positively related to self-compassion because, people with low levels of hope, tend to catastrophize about the future and over-identify with them and those with high levels of hope can think effectively about the future, with the knowledge that they, at times, will need to face major life stressors, facilitating self-compassion. We also assumed that self-compassion would predict hope since being higher on self-kindness, being mindful, and regarding one's suffering as a part of universal human experience can lead to an increase in agency and pathway thinking. When one's self-talk is positive, when one is mindful and does not over-identify with suffering, and when one regards one's failures as not deviant or unique but a part of the common human struggle, one is in a better position to think of alternate pathways and perceived capacity to use them.

Thus, all in all, self-compassionate people have less fear of failure, which makes them more hopeful to think of themselves as agents who can not only effectively think that he/she can achieve their goals and generate multiple pathways, but also, strengthen the belief and action that one can sustain those pathways in the face of obstacles.

OBJECTIVES

1. To study self-compassion among youth.
2. To study hope among youth.
3. To study the relationship between self-compassion and hope.
4. To study the relation between all the subscales/components of the Self-Compassion scale with all the subscales/components of the Hope scale.
5. To conduct a Stepwise Regression to see whether the subscales of Self-Compassion significantly predict hope.

METHOD:

Design

The design of the study is Quantitative and correlational.

Sample

The sample consisted of 104 participants between the ages of 18 to 30. It was dominated by Female participants (Female =74, Male = 30). The sample was recruited with the inclusion criteria that a participant must be an Indian citizen aged between 18 and 30 with a basic comprehension of English. Informed consent was obtained from participants in the age group of 18-30. Sample characteristics involved UG, PG, and working adults.

Convenience and Snowball sampling were employed to gather data.

Materials / Measures

The Self-Report measures were employed to explore the association between Self-compassion and Hope among individuals aged 18-30 years. The Self-Compassion Scale consists of 26 items rated on a 5-point scale (1=Almost Never 5 = Almost Always), with higher scores indicating higher levels of self-compassion. The self-report 26-item(5-point Likert scale) SCS explicitly represents the thoughts, emotions, and behaviors associated with the three components of self-compassion and includes items that measure how often people respond to feelings of inadequacy or suffering with each of the six components. Good Test-Retest reliability was obtained when participants' responses to the Self-Compassion Scale were compared across Time 1 and Time 2.- 0.93 (For overall scale), Kindness subscale: .88; Self-Judgment subscale: .88; Common Humanity subscale: .80; Isolation subscale: .85; Mindfulness Subscale: .85; and Over-Identification subscale: .88. Convergent Validity for the scale was also obtained. Self-compassion scale scores had a significant positive correlation with a sense of social connectedness(Neff, 2003; Hameed M., et al, 2023) Discriminant Validity of the scale was also established as the Self-Compassion Scale The SCS was found to have a significant negative correlation with the Beck Depression Inventory(Neff, 2003).

Additionally, the Adult Hope Scale was employed to measure the variable of Hope. This scale contains 12 (including 4 Filler items) items rated on an 8-point rating scale (1=Definitely False 8 = Definitely True), with higher scores indicating higher levels of Hope. In a 12-item measure of hope, each item is answered using an 8-point Likert-type scale. In particular, the scale is divided into two subscales that comprise Snyder's cognitive model of hope: (1) Agency (i.e., goal-directed energy) and (2) Pathways (i.e., planning to accomplish goals). The scale employed has Good reliability and convergent and discriminant validity. For the total scale, Cronbach's alphas ranged from .74 to .84 (item-remainder coefficients of .23 to .63). For the Agency subscale, Cronbach's alphas ranged from .71 to .76 (item-remainder coefficients of .40 to .72); moreover, for the Pathways subscale, Cronbach's alphas ranged from .63 to .80. For convergent validity, The Life Orientation Test(a measure of dispositional optimism) correlated .60 and .50 ($p < .005$) with the Hope Scale. For Discriminant validity, the Hope Scale correlated -.51 ($p < .005$) with the Hopelessness Scale (Gibb, 1990).

For Preliminary data sorting and categorization, Google Sheets (Google, 2021) were used, followed by Microsoft Excel 365 (Microsoft Corp., 2021). For advanced statistical analysis, R software Version 4.4.3 (R Core Team, 2023) was used.

PROCEDURE:

The data was collected using the Survey method through Google Forms. Informed consent was obtained from all the participants before they proceeded with the survey. Participants were made aware of the aspect of confidentiality. It was assured that their identity would not be shared with anyone and the results would be used for academic purposes only. Participants were informed through the Introductory section of Google Forms that they could withdraw from the study at any point in time if they felt uncomfortable; however, the study itself does not pose any potential harm or any external monetary or tangible benefit or reward.

RESULTS

Data Cleaning

Before Analysis, data was scanned for the possible presence of outliers or instances of missing data. There were no cases of missing data. To check the presence of outliers, Boxplot was plotted for both the Self-Compassion Scale and Adult Hope Scale. It revealed that there were four outliers on the Self-Compassion Scale and one outlier on the Hope scale. Outliers were not removed as the sample size was limited. The final data considered for statistical analysis consisted of a sample size of 104 participants. Figure 1 shows the boxplot for the same.

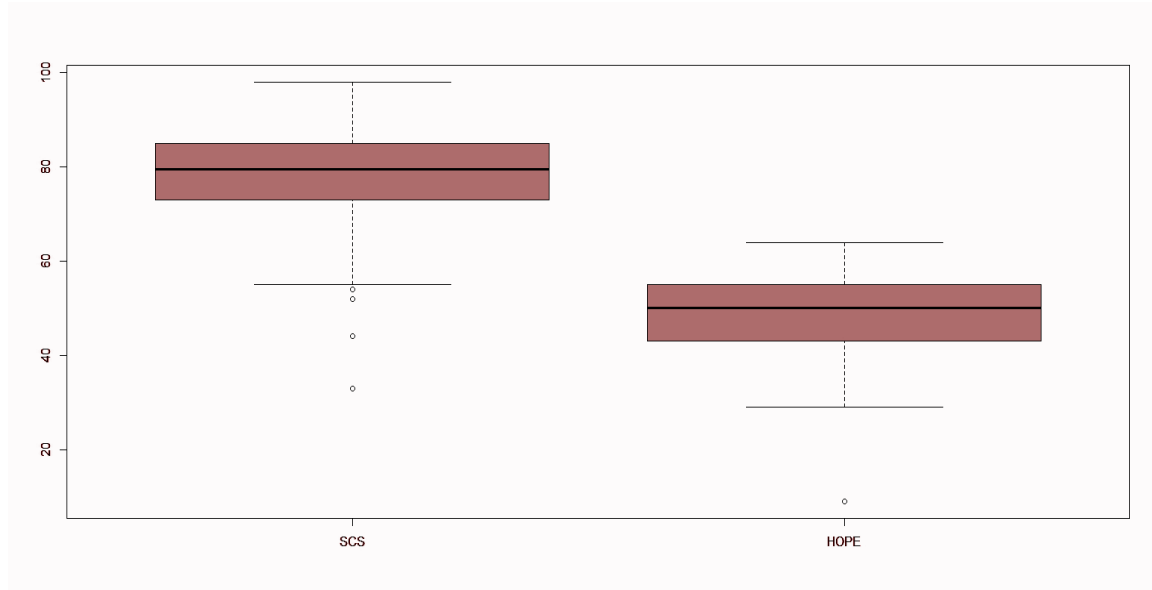


Figure 1: Boxplot of Outliers for Self-Compassion Scale and Adult Hope Scale.

Descriptive Statistics

The descriptive statistics were calculated for both scales. As shown in Table 1, the mean self-compassion score was $M=77.78$, $SD=10.61$, while the mean Hope scale score was $M=48.99$, $SD=09.02$.

Pearson Product Moment Correlation

Since both the variables were continuous, the Inferential Statistic further used was the Pearson product-moment correlation coefficient to discern the relationship between all the variables. As reported in Table 1 and Figure 1, results indicated that there was a significant moderate positive correlation between Self-Compassion and Hope $r(102) = +0.503$, $p < 0.01$).

Table 1: Pearson Product Moment Correlation Summary

Scales		
	Self-Compassion Scale	Adult Hope Scale
Mean	77.78	48.99
Median	79.5	50
Mode	84	43
SD	10.61	9.024
$r_{(102)}$	+0.503*	

*Indicates significance at 0.05 level, **Indicates significance at 0.01 level.

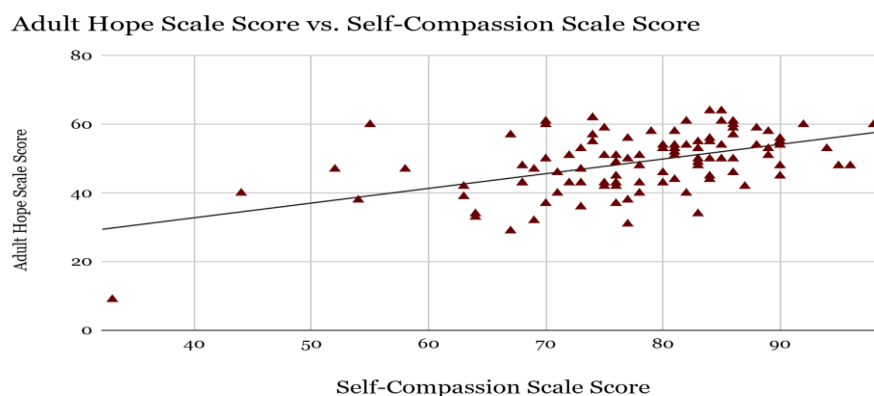


Figure 2: Scatterplot showing the relationship between the Self- Compassion Score and Adult Hope Scale Score

To understand the dynamics between individual subscales of Self-Compassion and Hope, we correlated every subscale of Self-Compassion with every subscale of Hope. Tables 2 and 3 report the correlations observed for each combination. As shown in Table 2, a significant positive correlation was reported between each subscale of self-kindness, common humanity, and mindfulness with the subscale of Agency. None of the negative

subscales of Self-Compassion showed a significant negative correlation with the Agency subscale of Hope. As shown in Table 3, the Self-Kindness, common Humanity, and Mindfulness subscales of Self-Compassion were significantly positively correlated with the Pathway subscale of Hope. Only the Self-Judgement scale was significantly negatively correlated with Pathway. The rest of the negative subscale of Isolation and Overidentification showed a near zero or a non-significant correlation.

Table 2: Correlation between all the subscales of Self-Compassion and Agency subscales of Hope.

Agency/ Willpower				
	Pearson r	p value	Degree of Correlation	Remarks
Self Kindness	0.53**	0.01	Moderate	Significant
Self Judgement	-0.07	ns	Low	Non-significant
Common-Humanity	0.49**	0.01	Moderate	Significant
Isolation	0.05	ns	Low	Non-significant
Mindfulness	0.44**	0.01	Low	Significant
Over-Identification	0.03	ns	Low	Non-significant

*Indicates significance at 0.05 level, **Indicates significance at 0.01 level.

Table 3: Correlation between all the subscales of Self-Compassion and Pathway subscale of Hope.

Pathway				
	Pearson r	p-value	Degree of Correlation	Remarks
Self Kindness	0.42**	0.01	Low	Significant
Self Judgement	-0.18*	0.05	Low	Significant
Common-Humanity	0.53**	0.01	Moderate	Significant
Isolation	-0.13	ns	Low	Non-significant
Mindfulness	0.63**	0.01	Moderate	Significant
Over-Identification	0.06	ns	Low	Non-significant

*Indicates significance at 0.05 level, **Indicates significance at 0.01 level.

Regression Analysis

Additionally, to examine which individual subscales of the Self Compassion Scale significantly predicted Hope and to identify which subscale made a significant contribution, a Stepwise Multiple Regression was conducted using R 4.4.3 software.

The assumptions of Stepwise Multiple Regression were tested before Regression analysis to ensure the validity of the results.

Multivariate Normality

Multivariate normality was analyzed using the Henze-Zirkler test. The results indicated ($HZ = 1.14$, $p = 0.0177$) that the assumption of multivariate normality was unmet. The Anderson-Darling Test of Univariate Normality was also employed for both tests. For the Self-Compassion Scale (SCS) ($A^2 = 1.40$, $p = 0.0012$), it was shown that the data is not normally distributed; however, for the Adult Hope scale (HOPE) ($A^2 = 0.71$, $p = 0.0612$) it was observed that the data did not significantly deviate from normality, i.e., univariate normality was met. As can be seen in Table 4, the assumption of Multivariate Normality was partially met.

Table 4: Summary of Multivariate Normality Assumption Testing

Test	Statistics	p-value	Multivariate Normality
Henze-Zirkler	1.136626	0.0177	Not Met
Anderson Darling Test	1.4047 (SCS)	0.0012	No
	0.7125 (Hope)	0.0612	Yes

Homogeneity of Variance

To determine whether the homogeneity of variance assumption was fulfilled or not, Bartlett's test of homogeneity of variances was conducted. Bartlett's test revealed that the variances of Self-compassion and Hope were equal. Bartlett's test fails to reject the null hypothesis ($p = 0.1021 > 0.05$), which suggests that the variance of the residuals is not significantly different across groups (Table 5).

Table 5: Summary of Homogeneity of Variance Assumption Testing

Test	Statistics	df	p-value	Interpretation
Bartlett's K-Squared	2.6732	1	0.1021	Assumption fulfilled

Multicollinearity

The variance-inflation-factor test was employed to check for multicollinearity. The results showed that there was no multicollinearity between predictor variables (Self Kindness VIF 1.73, Common Humanity =1.51, Mindfulness 1.83, Table 6).

Table 6: Summary of Homogeneity of Variance Assumption Testing

Test	VIF Value	Interpretation
Self Kindness	1.73	No Multicollinearity
Common Humanity	1.51	No Multicollinearity
Mindfulness	1.83	No Multicollinearity

Regression Model

To determine which predictors remain significant when all are included in the model and to identify the best-fitting model with the highest R^2 , it is necessary to run all iterations and compare model performance. This process helps in selecting the optimal model that maximizes explanatory power. Conducting multiple regression without using stepwise selection would not allow for the identification of variables that may lose significance when additional predictors are included in the model. The Self-Kindness, Common Humanity, and Mindfulness subscales of Self-Compassion were selected as predictors, and the total score on Hope was considered as the criterion in the regression analysis due to their significant positive correlations with the Hope scale.

It was observed that the regression model was significant. The results of Stepwise Regression are reported in Table 7.

Table 7: Regression Model Estimates

	Estimate	Standard error	t value	p-value
Intercept	15.6413	3.6792	4.251	4.78e-05 ***
Self-Kindness	0.4351	0.2129	2.044	0.04359 *
Common Humanity	0.8863	0.2634	3.365	0.00109 **
Mindfulness	0.9017	0.2961	3.045	0.00298 **

*Indicates significance at 0.05 level, **Indicates significance at 0.01 level.

As seen in Table 7, all the 3 subscales of self-compassion, i.e., Self-Kindness, Common Humanity, and Mindfulness, were significant predictors of Hope with an estimate of 0.43, 0.88, and 0.90, respectively. Within the 3, the most significant predictor was Mindfulness followed by Common Humanity, and then by Self-Kindness. The Multiple R-square of the model was 0.4592, the Adjusted R-square was 0.443, and the F-statistic (df=100) was 28.3 on 3, p-value: 2.473e-13. This indicates that the model was significant, meaning that the 44% variation in Hope was explained by Positive Subscales of Self-Compassion. Thus, all the positive subscales of Self-Compassion positively predicted Hope, with Mindfulness being the best predictor.

DISCUSSION

The present study hypothesized that self-compassion and hope will have a positive correlation based on Self-Compassion Theory, given by Kristin Neff, and Snyder's Hope Theory. It was expected that when an Individual scores high on self-compassion, he/she will also show associative broadened thinking and facilitate thinking of multiple strategies to solve the problem (Hope). The study found a significant moderate positive correlation between self-compassion and hope. These findings corroborate existing literature, which reports a positive association between self-compassion and hope as well as between self-compassion and life satisfaction. Furthermore, hope has been identified as a full mediator in the relationship between self-compassion and life satisfaction (Yang et al., 2016; Umphrey & Sherblom, 2014).

The potential association between subscales of hope and each subscale of self-compassion was also examined. We found a significant positive relation between the subscales of self-kindness, common humanity, and mindfulness with the subscales of agency as well as pathway.

When the self-judgment, isolation, and overidentification subscales were considered, we found a significant negative correlation between the pathway subscale and self-judgment subscale of self-compassion, suggesting that individuals exhibiting higher self-criticism may experience a reduced capacity to generate alternative strategies for goal attainment, again indicating that as one is high on self-judgment, the self-critical talk will

reduce one's ability to think about alternative ways to achieve one's goal. Or, as one thinks/ generates few solutions or paths to the goal, it may increase self-judgemental thinking. Correlations of other scales with pathways were near zero or non-significant.

The present study shows that as one is kind towards oneself, it increases both, one generating multiple pathways and one's perceived capacity to use the pathways (later stronger). So, self-kindness improves agentic thinking, or agentic thinking improves self-kindness, which makes sense, as one positive self-talk will increase, "I can and will do it," and negative self-critical talk will decrease, boosting self-efficacy. This implies that individuals who generate more positive self-talk are better at formulating multiple pathways and possess greater confidence in their ability to utilize these pathways effectively. Also, generating multiple pathways makes one's self-talk positive once again, and self-kindness increases, i.e., a cyclical relation. This aligns with the notion that self-compassion enhances agentic thinking, thereby boosting self-efficacy and vice-versa.

The Common Humanity scale shows a significant positive correlation with agency and pathway subscales. As one scores higher on common humanity, one also scores high on pathway and agency thinking. And, this relation is stronger for pathway thinking, which is what was expected, i.e., as self-compassionate Individuals think that they are not alone, and their concerns are shared more or less by others too, they may understand that other individuals too might have faced setbacks, thus, freeing them to think of new pathways or look at others as what alternate pathways they used instead of isolating their failures. It encourages individuals to view their struggles as part of a common human experience, potentially reducing isolation and fostering creative problem-solving. It can also be the other way round, i.e., having generated multiple pathways(Pathway) and a perceived capacity to utilize them(Agency), may allow one to regard one's failures, and obstacles not as unique and a part of universal human experience as one can see that there are many ways to achieve goals which means, lot other people also might have faced same or different obstacles and overcame them, fostering the feeling of common humanity.

The Mindfulness Scale also shows a significant positive correlation with Agency and Pathway subscales and more with Pathway. Again, this makes sense, as one does not overly exaggerate or over-identify with one's suffering/obstacles, which frees one to be objective, leading one to think of multiple ways to achieve the goal and the perceived confidence to do so. This suggests that maintaining a balanced awareness of one's thoughts and feelings, without over-identifying with them, can promote objective thinking and the development of multiple goal-directed strategies. Such mindfulness may free individuals from being overly critical or fixated on obstacles, thereby enhancing their perceived ability to achieve goals. Again, the other way around, having generated multiple pathways and having an efficacy to use them may foster a meta-cognitive and objective awareness of monitoring one's abilities and pathways in the process, which can improve one's mindfulness-based thinking.

To understand the relation between Hope and subscales of Self-Compassion, Stepwise Regression analysis was conducted. The model was significant, and all the 3 subscales of Self-compassion(Self-kindness, Common HUmanity, and Mindfulness) significantly predicted Hope. Out of the 3, Mindfulness emerged as the best predictor, explaining the most variation in Hope. This is in line with the prediction that being self-compassionate facilitates or enables one to be more hopeful. Those who are self-kind, regard one's concerns as a part of universal human struggles, and are mindful will generate multiple pathways to achieve their goal and have efficacy and energy to sustain on the pathways as well. Being mindful enables one to think of different solutions to reach the goal(Pathway) as well as the perceived capacity to utilize and sustain on the pathways, despite obstacles(Agency). Being mindful increases one's meta-cognitive awareness, taking an objective perspective which gives a crucial cognitive space for one to generate multiple solutions and a sense of efficacy to use them. Even if obstacles do arise, mindfulness will protect one from absorbing and over-identifying with worries/obstacles, which puts one in a frame to think of multiple solutions and a perceived capacity to utilize them.

Previous research found that all the positive subscales of Self-Compassion significantly predicted Hope(Akin and Akin, 2014). Self-compassion accounted for a 30% variation in hope(Akin and Akin, 2014). In their research, they also found that self-kindness and mindfulness predicted hope, with mindfulness being the best predictor, as found by current research. They also found that self-judgement, isolation, and over-identification were significant negative predictors of hope. Common humanity did not emerge as a significant predictor of hope. However, their research involved a different scale, the "Integrative Hope Scale". Current research involved the Adult Hope Scale and defined hope in terms of agency and pathway thinking.

These findings collectively underscore the importance of self-compassion components—self-kindness, common humanity, and mindfulness—in fostering effective goal-directed thinking and perceived agency. They highlight the potential benefits of cultivating self-compassionate and hopeful attitudes as well as mindfulness practices to enhance adaptive cognitive processes and overall Psychological Well-being. Improving self-compassion will, in turn, facilitate hope.

IMPLICATIONS:

Self-compassion and Hope are Positive Psychology constructs, both essential for one's Psychological Well-Being. The study highlights the need for interventions to boost self-compassion and hope among youth since youth is a time when one's developmental abilities are at their fullest. Post-COVID-19, there is a need to enhance both components in the young population as a mechanism for fostering resilience, growth, and overall mental health.

LIMITATIONS:

This research study uses non-probability convenience and a snowball sampling procedure, which might limit the applicability and generalizability of the research findings to a larger population. The research sample is highly dominated by urban and semi-urban populations. This makes it difficult to generalize the results to the rural population. The use of self-report techniques may also bring some biases as individuals may exaggerate their responses.

Efforts were made to control random sampling and social desirability by using an Adult Hope scale with filler items and reverse scoring in the Self-Compassion scale, but bias may persist.

FUTURE SCOPE:

The study can be conducted even with a larger population. The study can be made more representative by including the rural population. Qualitative analysis can be conducted.

CONCLUSION:

The present study aimed to study the relation between Self-Compassion and Hope. A significant positive correlation was found between Self-Compassion and Hope. All the positive subscales of Self-Compassion correlated significantly positively with the Agency and Pathway subscales of hope. For the negative subscales of Self-Compassion, we found a significant negative correlation between the Pathway and Self-judgement scale. All the positive subscales of Self-Compassion predicted Hope, with Mindfulness being the best predictor.

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UNDERSTANDING THE RELATION BETWEEN SELF-ESTEEM & PERCEIVED SOCIAL SUPPORT AMONG MUMBAI YOUTH

Ishita Kushwaha¹, Parth Rodrigues² and Priya Tarade³¹Department of Psychology, Modern Education Society's D.G. Ruparel College of Arts, Science and Commerce, Mumbai University²Department of English, Modern Education Society's D.G. Ruparel College of Arts, Science and Commerce, Mumbai University³Department of Psychology, Modern Education Society's D.G. Ruparel College of Arts, Science and Commerce, Mumbai University**ABSTRACT**

The social support system of any individual presents a foundational element for a stable and healthy level of their self-esteem. Urban populations in late adolescence and early young adulthood are a key social group subject to modern dynamics of digital, industrial and other socio-cultural influences on both micro and macro systems of society. This paper undertakes primarily a quantitative survey to analyze the correlation between self-esteem and perceived social support. This is contextualized within a brief review of contemporary and relevant literature in the field of Social and Positive Psychology. Most previous studies have found a positive correlation between these constructs. So, we attempt to revisit the rationale of this correlation and analyze it within a renewed context. The sample was urban middle and lower class youth (18 to 26 years old) of Mumbai in the state of Maharashtra (India), $n = 131$. They were administered Rosenberg Self-esteem scale and Multidimensional Scale of Perceived Social Support. The Pearson r was found to be $+0.33$ between the two constructs. Results are discussed in the context of prior research studies on self-esteem and social support.

Keywords: Positive Psychology · Self-esteem · Social support · Indian youth · Correlation · Survey

INTRODUCTION

Urban Indian youth has recently fronted an unusual upsurge of interest in the development of 'self-knowledge' in keeping with various colloquial and digital terminologies. This emergent focus on pedagogical, commercial and feminist discourse on confidence or self-esteem marks a key point of reference to the formation of social norms of the upcoming generation. Self-esteem remains a longstanding aspect of individual identity, professional performance, quality of life as well as overall satisfaction and happiness.

Contrary to growing popular belief, though the Indian self has a personal aspect, it is predominantly subject to social facets of life. Group membership, exclusion and isolation act as powerful stimulants to individual self-esteem. Though contemporary literature bears a thorough documentation of the correlational analyses of self-esteem and social support systems, the dynamic current trends demand a statistical revisiting of this arena of Social and Positive Psychology

This paper aims to examine the correlation between self-esteem and perceived social support in the present context for urban Indian youth. Though the United Nations considers adolescents as persons of age 10 to 19, the National Youth Policy of India defines "youth" as individuals falling in the age range of 15 to 29 years. (Ministry of Health and Family Welfare, 2021). For the purposes of this study, two development indices were chosen: Self-Esteem (SE) and Perceived Self Support (PSS). The role of perceived social support in influencing individual self-esteem is assessed in this paper by means of surveying for each element. By also reviewing the prevailing as well as contemporary scientific literature related to the scope of this paper, a suitable context is established for an evidence based interpretation of the results of the survey.

Self-esteem denotes an individual's subjective evaluation of their worth as a person. (Orth, Ulrich and Robins, 2014). While it may be derived from a third person observer point of view, it is generally conceptualized as a degree of introspective affective confidence in being 'good enough'. People who have a positive outlook of themselves have high self-esteem. Unconditional self-acceptance and self-respect are notions often associated with a high level of self-esteem. However, people who view themselves negatively have low self-esteem. It forms an indispensable area of concern relating to healthy relationships with others, a firm sense of identity and personal and professional success. Low self-esteem is not only a reliable predictor of feelings of despondentness, isolation and helplessness but also a symptom of operational definition of depressive disorders (Abramson, Seligman and Teasdale, 1978; American Psychiatric Association, 2000). Career, family and education are few dimensions of life where issues with self-esteem manifest and produce lasting impact. Various psychologists have supplied definitions of self-esteem, and provided examination methods of evaluating self-esteem objectively.

Self-esteem is merely a single component of the self-concept, which Rosenberg (1965), who is regarded as one of the pioneers in this domain, stated that self-esteem refers to an individual positive evaluation of the overall self. He added that high self-esteem incorporates an individual not only respecting himself but also considering himself worthy.

He defines it as "totality of the individual's thoughts and feelings with reference to himself as an object." However, There are four components that define self-esteem: self-confidence, identity, feeling of belonging, and feeling of competence.

The foundation of self-esteem is based in self-confidence which manifests from feeling secured, loved and when needs are met. Identity shapes the knowledge one has of oneself. Individuals identify their needs, traits, abilities, and feelings through learning, trial and error, and receiving feedback from different people. Identity is usually divided into distinct parts: physical, social and emotional. Individuals define their identity by belonging to groups like family, friends, school, sports team and so on. Interpersonal relationships and the experiences in these groups also contribute to this process. This enables a person to feel understood and know that there are other people similar to them. To feel competent, learning opportunities in various fields are required. The feeling of competence is concerned with motivation: a person is motivated when they face challenges that they have the capacity and ability to meet. Success results in a feeling of efficacy and pride that promotes self-esteem and pushes the individual to accept new challenges. Self-esteem is not set in stone; it can change and stabilize based on lived experiences. Although it can be a challenge during adolescence, one thing is certain: the more different situations an individual faces, the more that individual may learn about himself.

There are two theories of self-esteem. The unidimensional perspective focuses on a single, global domain of self-concept, commonly referred to as self-esteem. In one study two self-esteem scales were used which profess to be unidimensional: the Rosenberg and Eagly revision scale of the Feelings of Inadequacy Scale. The study had 206 female undergraduates. The results were in favor of Rosenberg as a unidimensional. Multidimensional perspective is based on multiple, relatively distinct components of self-concept with a weak hierarchical ordering. The case for a multidimensional self-concept perspective is especially compelling because the various dimensions of self-concept are so distinct that they cannot be explained in terms of a single global component. Shavelson et al. proposed a multidimensional hierarchical model in which general self-concept is divided into academic and non-academic components. The academic component is divided into self-concepts specific to general school subjects, while the non-academic self-concept is divided into physical, social, and emotional components, which are further divided into more specific components of self-concept and self-esteem. It is assumed to be more useful than a unidimensional perspective. Self-esteem is affected by short-term response biases, situation-specific context effects, short-term mood fluctuations, and other short-term time-specific influences. Therefore, Self-esteem apparently cannot adequately reflect the diversity of specific self domains. Educational psychology and Developmental Psychology provide particularly compelling support for the multidimensional perspective. Although there is overwhelming empirical support for a multidimensional perspective on self-concept, it is not necessary that researchers should abandon self-esteem measures that have been used so widely. It means that individuals may have different self-esteem in different contexts.

Social support is defined as the degree of perceived satisfaction with social relationships (Cohen & Wills, 1985). It refers to the psychological and material resources provided by a social network to help individuals cope with stress, build healthy relationships and develop good habits. Significantly, social support forms key groundwork to adolescent and young adult self-esteem (Hosogi, Okada and Fujii, 2012). Non-conscious sources of such influences include familial and peer group interactions, workplace environment and other interpersonal relationships. Young adults whose parents were consistently nurturing reported higher implicit self-esteem than those whose parents were less nurturing or conversely overprotective (DeHart, Pelham and Tennen, 2006). Experiences elicited from the social sphere of life constitute largely implicit associations between the self and positive attributes as well as the self and negative attributes (Baron and Branscombe, 2016). Social support has been shown to promote health by improving individuals' coping abilities, health, and quality of life when dealing with stress; these associations have been observed in a wide range of populations, including both healthy and sick people. The salutogenic nursing approach focuses on identifying the individual's health resources and taking actions to shift the person's health processes to the positive end of the disease/ease continuum. Antonovsky introduced the salutogenic concept Sense of Coherence (SOC), which along with generalized resistance resources (GRRs) represent the central ideas of Antonovsky's (2002) salutogenesis.

These concepts, in keeping with the Ottawa Charter (1986), state health as a process enabling people to develop health through their assets and thus having the opportunity to lead a good life (Eriksson and Lindstrom, 2008). The way individuals perceive the world influences their capacity to control their tension and stress. The result

(health) is determined by the available GRRs (material, ego identity, and social support) and the perceived SOC. The SOC consists of three dimensions: comprehensibility, manageability, and meaningfulness, reflecting the interaction between the individual and the environment.

Evidence shows that SOC is strongly associated with perceived health, especially mental health (Haugan, 2013). Social support is viewed as a salutogenic concept because it is an essential generalized resistance resource. Close supportive relations is, according to Antonovsky, a prerequisite for developing a strong SOC. Different populations may place varying values on the various facets of supportive relationships or social support. According to a systematic review, social support from partners, friends, and medical professionals played a significant role in helping people with diabetes develop and stick to healthy eating and lifestyle habits (Mohebi et al., 2013). Social support from close friends is considered a "buffer" between mental disorders and physical impairments like hearing impairment and has been shown to have a positive effect on mental health problems in older adults (65 years of age or older). In the same study, social support was significantly independently associated with psychological distress. Wang, Mann, Lloyd-Evans, Ma, and Johnson (2018) found substantial evidence from prospective studies that people with depression who perceive their social support as poorer have worse outcomes in terms of depressive symptoms, recovery, and social functioning. Additional research demonstrates the significance of social support—which is interpreted as emotional support and affirmation of one's value—for loneliness and quality of life in older adults living at home as well as in nursing home patients with and without cancer.

A cross-sectional study by Lämås and colleagues (2020) with 136 participants (mean age of 82 years) demonstrated a significant relationship between thriving and social relations participation and the sense of self-determination in domestic activities. Furthermore, among individuals 75 years of age or older who live at home, the experience of social support has been found to be health-promoting; the frequency of home nursing was also found to be important for health promotion (Saevar Reid, Thygesen, and Lindstrom, 2010). Higher educated individuals who received strong social support reported requiring less home care than those who did not. This suggests that social network support plays a role in health promotion in addition to higher education.

Ikiz and Cakar (2010) discovered a statistically significant positive correlation between adolescents' perceived social support and self-esteem. A lack of social support, as well as other complications in the family ecosystem, can have a negative impact on the SE of adolescents and early young adults. Parental support, particularly the role of the maternal figure, was found to have a stronger influence on adolescents' self-esteem (Hoffman, Ushpiz, & Levy-Shiff, 1988). Gecas (1972) demonstrated that the social environment was an important source of SE for adolescents. Gecas (1971) also emphasized the interactionist proposition that self-concept develops through interpersonal interaction, which is especially important for the adolescent child—most notably with parents. In cases of unreported family conflicts or issues, measures of self-esteem can be reasonable indicators of developmental problems in the child's history.

Rubin and Chung (2006) argued that socio-cultural environments influence parenting strategies and parent-child relationships. Family is given a uniquely central importance in Asian and parenting, with parental authority playing a major role. Smokowski, Bacallao, Cotter, and Evans (2014) investigated the relationship between parenting practices and adolescent positive and negative mental health outcomes in a multicultural rural population. Positive interactions with significant others in the micro-system were associated with high self-esteem, while negative interactions were associated with low self-esteem in at-risk male adolescents (Enger, Howerton, & Cobbs, 1994).

A study of 60 rural adolescent girls from Telangana showed that the pandemic COVID-19 had a huge impact on self esteem. They were seen to be confused about their feelings, reaction and moods. Most also showed a lot of self doubt and negative self view that hindered school performance. They were likely to compare themselves, lack independence, time management, goal setting, and planning. (Sana bari et alv, 2021)

The respondents of an Indian study done in 2020, reported a decline in their preexisting mental health and identified disruption of routine and loss of social connection, it was seen that individuals with higher social support were more likely to cope better with the impact of the pandemic.

The trend of Individualism has been rising in modern societies across the world, despite dramatic shifts towards greater individualism cultural differences have been shown to remain sizable. (Santos et al, 2017). The process of West-led modernisation indicates the existence of individualistic as well as collectivistic tendencies amongst the educated professionals of India (Gupta and Panda, 2003).

A study indicated that during the pandemic, young adults who showed greater use of social media were less likely to seek social support in times of distress (Lisitsa et al 2020).

Meshi and Ellithorpe (2021) also found that the problematic use of social media was negatively associated with real-life social support. Despite the fact that social media allows people to connect and obtain social rewards it can also induce problematic use with symptoms similar to substance use disorders. Social media has also been found to be correlated with self-esteem, a study showed that the number of likes people received on their Facebook profile pictures was positively associated with self-esteem. (Burrow, Rainone 2017)

METHODOLOGY

Sample

We aimed to analyze the relationship of self-esteem with perceived social support on a sample of participants with female and male of the age group 18-26 years. Age and gender of the participants were asked after informed consent. The sample was conveniently selected from the urban areas of Mumbai, Maharashtra (India). Demographic information, on the socio-economic-status of the participants, was excluded in the data collection process. This enabled us to prevent the respondent's unwarranted feelings of perplexity or comparison that may have resulted from questioning about their socioeconomic or class status.

Design

A convenient sample was used and a Quantitative analysis (Correlation) was opted to measure the two variables. The Design was correlational.

Instruments

Rosenberg Self-Esteem Scale (RSS)

The 10-item Rosenberg Self-Esteem Scale, developed by psychologist Morris Rosenberg in 1965, is the most widely used indicator of self-esteem among positive psychology researchers. This is a ten-item Likert scale, with four levels for each item: strongly agree, agree, disagree, and strongly disagree. The test has a maximum score of 40 and a minimum of 10. The Rosenberg self-esteem scale has been used to quantify global self-esteem, and it has acceptable levels of reliability (with a test-retest reliability score of 0.85 and an internal consistency score of 0.88), as well as validity in adolescent populations. Schmitt and Allik (2005) found that the scale is useful for measuring global self-esteem and can be replicated across Asian and African cultures

Multidimensional Scale of Perceived Social Support (MSPSS)

The survey for this paper used the multidimensional scale of perceived social support (MSPSS). The minimum possible score on the test is 12 and the highest possible score is 84 with options. 1) Very strongly disagree, 2) strongly disagree, 3) mildly disagree, or 4) neutral.

5) Mildly agree, 6) strongly agree, and 7) very strongly concur. A mean scale score of 1 to 2.9 is considered low support; 3 to 5 is considered moderate support; and 5.1 to 7 is considered high support (Zimet, 2016). The Multidimensional Scale of Social Support has good internal validity as a whole, and the values obtained for the three subscales were .85 for the whole scale (.72, .85, and .75 for its subscales). Overall, the MSPSS demonstrated good internal reliability and adequate stability over the time period specified. Construct Validity: Perceived family support was significantly inversely related to depression ($-0.24, p < 0.01$) and anxiety ($0.18, p < 0.01$). Friends' perceived support was related to depression symptoms ($r = -0.24, p < 0.01$) but not anxiety. The Significant Other subscale ($0.13, p < 0.05$) and the scale as a whole ($r = -0.25, p < 0.01$) had a minimal but significant negative relationship with depression.

PROCEDURE

The survey was conducted online. Google forms were circulated among the sample.

Informed consent of the participants was taken.

STATISTICAL ANALYSIS

The Mean, Median, Mode was calculated for both the test scores. Pearson r correlation coefficient was computed to check the correlation between self-esteem and social support.

RESULTS

As it can be seen in Table 1, the Mean score of the group on the Rosenberg Self-esteem Scale was 27.03 (SD = 18.88), and on the Multidimensional Scale of Perceived Social Support it was 57.93 (SD = 14.64). The variance of the sample on RSS was found to be 356.646 and on MSPSS was 214.59. The Range for the Rosenberg Self-esteem scale was 26, and 72 for the Multidimensional Scale of Perceived Social Support. Compared to the possible range of scores on the RSS (10 to 40). The shared variance was 0.115.

The mean score of women on the Rosenberg self esteem scale was 27.06 and of men it was 26.93. On the Multidimensional Scale of Perceived Social Support the mean was found to be 58.96 (women) and 54.94 (men).

We calculated a Pearson r to measure the correlation between two variables. The Pearson r calculated for the data showed that the two variables, self esteem and social support show a high significant positive correlation.

$\therefore r(129) = 0.338, p < 0.01$, one tailed.

Pearson r was also calculated between self esteem and the subscales of MSPSS, which were as following, family : +0.44, $p < 0.01$, one tailed significant other : +0.19, $p < 0.05$, one tailed friends : +0.13, ns.

Table 1: Statistical Analysis of Group

	Self Esteem (RSS)	Social Support (MSPSS)
Total	3568	7647
Mean	27	57.93
Median	27	60
Mode	28	62
Standard Deviation	18.88	14.64
Variance	356.64	214.59

Table 2: Pearson r calculations

	' r ' value	Significance Level
Self esteem (SE) vs Social support (SS)	0.338	$p < 0.01$
Gender		
SE vs Female SS	0.340	$p < 0.01$
SE vs Male SS	0.342	
Subscales		
SE vs family	0.440	$p < 0.01$
SE vs Significant other	-0.192	$p < 0.05$
SE vs Friends	0.130	ns

DISCUSSION

The purpose of this survey was to determine whether social support and self-esteem are related to each other. There are two tests: the Rosenberg self-esteem scale and the Multidimensional Scale of Perceived Social Support that were given to a group of 131 people (98 women and 33 men) to assess the variables of self-esteem and social support. We expected a positive correlation between the two variables. Our results were as expected, high correlation was found.

Pearson r was calculated and found to be statistically significant at the 0.01 level for $df(129)$, indicating a high significant positive correlation between self-esteem and social support. Pearson r was also calculated for Self Esteem and MSPSS subscales showing perceived social support by family(+0.44), significant other (+0.19), and friends (+0.13) - meaning individuals who perceived that they had high social support from their family and significant other(s) showed higher levels of self esteem, even though a positive relation was found between self esteem and perceived social support of friends it was not significant enough.

Despite various studies pointing at lower levels of self esteem and social support amongst people we found that the mean levels of self esteem in this population was almost high. Perceived social support levels of participants were also seen to be moderate, even with research about individualism indicating otherwise.

In a study by Valsala, Devanathan and Kuttappan (2018) of 90 adolescents with a roughly equal distribution of males and females, ages 14 to 15 a positive correlation (0.40, with $p < .05$) between SE and PSS was found. The study focused on one primary independent categorical variable (family challenges), two quantitative moderator variables (age and gender), and two quantitative dependent variables (SE and PSS).

The Rosenberg Self-Esteem Scale was used in a research survey of eighth-grade students. In a study conducted by Therese and Prasila (2019) the majority of the students (93.3%) who are 13-14 years old, Hindu, live in urban areas, are first in birth order, and have 1-2 siblings who have moderate self-esteem levels. Only 6.7% reported high self-esteem.

This demonstrated that demographic factors have a statistically significant impact on self-esteem levels.

Megha Dhillon (2016) and colleagues conducted a semi-structured interview with these 32 girls ranging in age from 14 to 16 years old, and discovered that factors such as parents, peer role, school, body esteem issues, comparison with others, and so on influence self-esteem and maintenance. Differences in reported responses between the two groups can be seen. However, because the sample was limited to girls from primarily middle-income families, this study cannot be generalized to all adolescent girls. Additionally, many other factors such as sexuality, socioeconomic strata, and minority status were not addressed.

CONCLUSION

In the current study, the sample of urban Indian youth reported the level of their self-esteem (RSS) as well as perceived social support (MSPSS). We found that self-esteem is positively correlated to perceived social support in agreement to the findings of prior studies (Ikiz and Cakar, 2010; Hoffman, Ushpiz, & Levy-Shiff, 1988; Gecas 1971; Valsala, Devanathan and Kuttappan, 2018). It was also seen that men and women both had similar levels of self esteem and in accordance with social support.

In summary, our analysis supports the proposition that self-esteem is influenced by the presence of social support and vice versa. In this direction, it can be said that young people who have high self-esteem perceive more social support and vice-versa. Self-esteem is also dependent on the support received from family and friends.

LIMITATIONS OF THE STUDY AND FUTURE SCOPE

Limitation

The survey used a convenient sample instead of a randomized one which may lead to low generalisability.

The survey was conducted online and therefore observable behaviour of the participants was not recorded.

Future Scope

A longitudinal study could be undertaken by future attempts at research within this field in order to draw conclusions about causes and effects. Further studies can also focus on mediator or moderator variables between the two, like socioeconomic status, level of self disclosure, active involvement in society, etc. The sample can be larger for further generalization, the study can be expanded to all India. All the tests were self-report measures, so future studies can focus on the qualitative dimension..

Despite certain limitations it can be decisively concluded that this study has demonstrated a positive correlation between self-esteem and perceived social support.

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Appendices

Informed Consent

I acknowledge that I have read and understood the above information and I agree to participate in this survey *

☐ Yes

Sample Questions

Rosenberg Self Esteem Scale

1. On the whole, I am satisfied with myself
2. I certainly feel useless at times
3. I take a positive attitude towards myself

Multidimensional Scale of Perceived Social Support

1. My friends really try to help me
2. I can talk about my problems with my family
3. There is a special person in my life who cares about my feelings

Social support study lit rev <https://sci-hub.se/10.1186/s12888-018-1736-5>

A STUDY ON SELF-COMPASSION, SOCIOCULTURAL ATTITUDES TOWARDS APPEARANCE, APPEARANCE BASED REJECTION SENSITIVITY AND DISORDERED EATING AMONG WORKING MOTHERS

Ms. Khushi Sanjay Jain¹ and Dr. Rubi Singh²

¹Ph.D. Research Scholar and ²Assistant Professor, Department of Psychology, Banasthali Vidyapith, Rajasthan

ABSTRACT

Disordered eating is a subclinical maladaptive eating pattern, more common than clinical eating disorders. Working mothers often face unique pressures, balancing professional and family responsibilities while navigating societal expectations regarding appearance. These pressures—reinforced by family, peers, workplace norms, and media—can contribute to body image concerns, low self-esteem, and unhealthy eating behaviors. Self-compassion may serve as a protective factor against these challenges.

This study examined the associations among self-compassion, sociocultural attitudes toward appearance, appearance-based rejection sensitivity, and disordered eating among working mothers. A sample of 100 participants completed an online survey, including the Self-Compassion Scale-Short Form, Sociocultural Attitudes Towards Appearance-4, Appearance-Based Rejection Sensitivity Scale-Short Form, and Disordered Eating Attitude Scale-Short Version.

Correlational analysis revealed a positive relationship between sociocultural attitudes toward appearance, appearance-based rejection sensitivity, and disordered eating, while self-compassion negatively correlated with all three variables. Regression analysis confirmed that self-compassion, sociocultural attitudes toward appearance, and appearance-based rejection sensitivity predicted disordered eating, with sociocultural attitudes being the strongest predictor.

These findings emphasize the importance of self-compassion-based interventions tailored for working mothers to help them manage societal pressures, foster body appreciation, and developing healthier relationships, particularly beneficial for working mothers in managing sociocultural influences on body image and eating habits.

Keywords: *Self-compassion, Sociocultural Attitudes, Rejection Sensitivity, Disordered Eating*

INTRODUCTION**Overview**

Working mothers face significant sociocultural pressures related to appearance, often balancing professional and personal responsibilities while navigating societal beauty standards. These pressures can lead to negative outcomes such as mood disturbances, guilt, body image concerns, self-esteem issues, and disordered eating patterns. The ideal beauty standard impacts eating attitudes, with many mothers either excessively worrying about weight gain or engaging in emotional or binge eating due to stress. Social media, family, and peer influences further reinforce the need to maintain a certain appearance, adding to their daily challenges. In an effort to conform, many working mothers adopt dietary trends and workout routines, often driven by self-judgment and self-criticism rather than self-care. The constant pressure to meet unrealistic beauty ideals may prevent them from embracing self-compassion and body acceptance, affecting their overall well-being. Encouraging a self-compassionate approach can help working mothers prioritize health over external expectations and foster a more positive body image.

There are a wide range of studies focusing on how sociocultural pressures leads to development of eating disorders but there are barely any studies focuses on disordered eating patterns, dietary behavior, purging, unhealthy weight control, attitude about body shape and maladaptive eating behaviors, which is why the current study focuses on a newer concept, disordered eating (Reba-Harrelson, Von Holle, Hamer, Swann, Reyes, & Bulik, 2009).

Disordered Eating is defined as the subclinical, maladaptive eating patterns that shares symptoms with eating disorder, such as restrictive dieting and binge eating (Stirling & Kerr, 2012) where as an eating disorder is characterized as a serious mental illness which causes disturbances in an individual's eating behavior. An individual is diagnosed with an eating disorder based on the Diagnostic Statistical Manual of Mental Disorders (DSM) criteria (National Institute of Mental Health, n.d.).

A series of studies have been conducted on eating disorders and their types around the globe. Most of these studies explain how an eating disorder is a huge concern in adolescents and young adults. However, very few

studies have described the prevalence of disordered eating. Studies have shown that 3.2% of Australian women endorsed current episodes of binge eating, 1.6% of them were regularly on a strict diet or were fasting and 0.8 % of them purged. 13.7% of Canadian women showed sub threshold purging behavior and 9.3% showed fear of gaining weight and 2.1 % of them reported sub threshold purging behavior (Reba-Harrelson, Von Holle, Hamer, Swann, Reyes, & Bulik, 2009).

There are various risk factors linked to disordered eating. Body image perception proves to be a risk factor, where an individual indulges in behaviors like restrictive diet, binge eating, over or under evaluation of their body type, concerns with regard to body weight, shape and so on. Another core factor may be the sociocultural attitudes, the western phenomenon of beauty ideals leading to extreme internalization of an ideal thin body, body objectification, discrepancy between real and ideal self. Pressures from media, family and peers have been implicated as risk factors for disordered eating which may lead to eating disorders too (Striegel-Moore, & Bulik, 2007).

Since there are very limited studies conducted on disordered eating. The current study focuses on understanding the relationship between sociocultural attitudes towards appearance, appearance based rejection sensitivity, disordered eating and it will also focus on how self-compassion ameliorates disordered eating.

The Tripartite influence model explaining sociocultural attitudes, appearance based rejection sensitivity and disordered eating

The Tripartite Influence Model developed in the western culture helps in understanding the factors that play a role in development and maintenance of disordered eating and body dissatisfaction. As the name suggest the model has three primary influences – parents, peers and media which lead to body image issues, abnormal eating attitudes and disordered eating. These influences have both direct and indirect impact on body dissatisfaction. Physical appearance comparison and thin ideal internalization prove to be two meditational pathways having an impact on body dissatisfaction.

Major studies have revealed that more than family influences, the peers and media influences can lead to disordered eating. The model has also been replicated in varied ranges of population, including adolescents and females. Research indicates that majorly media has a negative impact on young girls to adolescents; they also stated adhering to beauty standards has a negative impact on both boys and girls (Keery, Van den Berg, & Thompson, 2004). In addition, to the formative influences a group of researchers theorized Appearance based rejection sensitivity may be associated with the extent to which the pressures are perceived by the individuals to be of a higher value if associated with conditional acceptance based on appearance (Park, DiRaddo, & Calogero, 2009).

The Tripartite Influence model proves to be a recognized theoretical framework in understanding body image issues and disordered eating. However, one limitation of the model is that it has been developed keeping in mind only the western cultural context.

Thus, the present study thus seems relevant, because the study focuses on the non-western population. Also, in the current times of pandemic individuals might not have access to healthy coping mechanisms thus leading to abnormal eating attitudes. Moreover, adhering to societal pressure of looking a certain way or being less compassionate towards themselves may lead to unhealthy eating habits. The current study attempted to explore these constructs and fill the gap in the existing literature.

REVIEW OF LITERATURE

The current study focused on studying the relationship between Self- Compassion, Sociocultural attitude towards Appearance, Appearance based rejection sensitivity and Disordered Eating. Past research studies on the variables being studied are discussed below in brief:

Self-Compassion and Sociocultural Attitudes towards Appearance

Pressures from media and adhering to ideal standards of ‘beauty’ are frequently experienced at an early age. Past studies revealed that women fall prey to the western perception of beauty because they engage in internalization of ‘ideal thin’ body. In a study by Slater, Varsani, & Diedrichs (2017) conducted a research on 160 female undergraduate students to study the impact of exposure to fitspiration images and self- compassion quotes on social media on women’s body satisfaction, body appreciation, negative mood and self- compassion. The results showed that there was a difference between female viewing fitspiration images and neutral images only when they had lower level of self-compassion, otherwise there was no significant difference found. They also stated that women viewing self- compassion quotes led to high body satisfaction, body appreciation, and self-compassion and low negative mood, in comparison to females viewing neutral images. When females

viewed a combination of images it led to positive outcomes. In conclusion, the researcher's state that practicing self-compassion may neutralize the negative impact of social media on female body dissatisfaction. Furthermore, intervention programs on how to deal with personal inadequacy and failures by being kind to one self may alleviate the pressures.

Another group of researchers conducted a similar study on 145 college women to examine the effects of exposure to the thin-ideal body image on women's affect, self-esteem, body satisfaction, eating disorder symptoms, and level of internalization of the thin-ideal. The participants were exposed to photographs from various magazines and media depicting thin ideal images or neutral images. The results showed that women who were exposed to thin-ideal images from magazines had higher levels of body dissatisfaction, negative mood states, and eating disorder symptoms and lower levels of self-esteem. A significant negative impact of media images has caused higher body dissatisfaction, negative moods, low self-esteem has contributes to symptoms of eating disorders (Hawkins, Richards, Granley, & Stein, 2004).

A research study was conducted by Tylka et al. (2015) on 435 US women to examine the associations between thinness related pressures, ideal internalization of the body and disordered eating. They also studied if self-compassion was a protective factor. The researcher's conceptualized thinness related pressure as situational threats to individual's personal adequacy. The results suggested that women with higher levels of self-compassion were not related to thinness related pressure from media, ideal internalization and disordered eating. Moreover, the researchers also stated that the interaction between family related pressure and disordered eating was not significant with self-compassion. The researchers concluded that self-compassion helps individuals judge themselves less harshly, deviating from social expectations and serves as a protective factor to eating disorders.

Self-Compassion and Appearance based Rejection Sensitivity

Very few studies have examined the role of self-compassion in relation to appearance comparison. A study conducted among 232 women from an urban university to investigate if self-compassion proved to be a protective factor against body image concerns, appearance comparison, eating pathology, disordered eating and so on. The results suggest that self-compassion proved to be a protective factor for appearance related concerns. Moreover, the researchers found a significant gender difference, where boys were highly affected with certain risk factors like appearance esteem and girls perceived themselves as overweight. The results also suggested that self-compassion levels were high among boys. The researchers concluded by saying that late adolescence and emerging adulthood is the time to develop self, body image, social perception and therefore, leading individuals to indulge in disordered eating (Rodgers, Franko, Donovan, Cousineau, Yates, McGowan, & Lowy, 2017).

A similar study conducted on 263 young women from USA explained that self-compassion mediated the relationship between body comparison and body appreciation. They revealed that individuals with higher levels of self-compassion proved to be a protective factor against appearance comparison and body appreciation. In addition, they also stated that self-compassion helps in deviating individuals from engaging in appearance comparison. The researchers also found that body related social comparison and self -worth in relation to appearance was found to be negatively correlated with body appreciation. Moreover, a qualitative analysis explained that women who showed positive body image were able to filter out the negative appearance related pressure and information which included body related comparisons and appearance comparison. The results also suggested that self-compassion helped eliciting positive feelings of kindness and self-worth leading to less harsh judgments about self, further leading to body appreciation (Homan, & Tylka, 2015).

The present study focused on Working Mothers from Mumbai, Maharashtra in India. The study also measured if there is any significant relationship between the two variables of self-compassion and appearance based rejection sensitivity to add to the limited literature at present.

Self-Compassion and Disordered Eating

Kelly et al. (2014) conducted a research study on 155 female undergraduate students from university participant pool and 97 female eating disorder patients undergoing treatment at Toronto General Hospital's eating disorders program. The researchers aimed to investigate the role of self-compassion, fear of self-compassion and self-esteem in eating disorder pathology. The results indicated that levels of self-compassion did play a role in eating disorder symptoms for both female undergraduate students and female eating disorder patients. Self-compassion was comparatively lower in eating disorder patients, compared to undergraduate students. The researchers also found that undergraduate students who were low on self-compassion were at a risk of developing eating disorder symptoms. In conclusion, the researchers stated that intervention and treatment to enhance self-

compassion would be useful in preventing and treating individuals with eating disorders or abnormal eating attitudes

Self-compassion is a healthy way to relate to the self especially when a person is experiencing difficult life situations, irrespective of gender they belong to. Bell et al. conducted a comparative study in the year 2019 between 97 gay men, 82 lesbian women and 138 transgender and gender non-conforming (TGNC) adults in USA. The researchers aimed to examine the eating disorder symptoms and proneness to an eating disorder and compared the risk and protective factors. Furthermore, the researchers also wanted to see if there were any mediating variables. The results showed that self-compassion inversely associated with ED proneness in Gay men and TGNC group. The researchers concluded by saying that intervention programs promoting self-compassion would help individuals deal with eating disorders.

METHODOLOGY

Design

A correlational design was used to see the association among Self-Compassion, Sociocultural Attitudes towards Appearance, Appearance based Rejection Sensitivity and Disordered Eating

Hypotheses

1. There will be a significant negative relationship between Self-Compassion and Internalization-Masculine/Athlete among Working Mothers.
2. There will be a significant negative relationship between Self-Compassion and Internalization- Thin/ Low Body Fat among Working Mothers.
3. There will be a significant negative relationship between Self-Compassion and Pressures from Family among Working Mothers.
4. There will be a significant negative relationship between Self-Compassion and Pressures from Peers among Working Mothers.
5. There will be a significant negative relationship between Self-Compassion and Pressures from Media among Working Mothers.
6. There will be a significant negative relationship between Self-Compassion and Appearance based Rejection Sensitivity among Working Mothers.
7. There will be a significant negative relationship between Self-Compassion and Disordered Eating among Working Mothers.
8. There will be a significant positive relationship between Internalization- Masculine/Athlete and Appearance based Rejection Sensitivity among Working Mothers.
9. There will be a significant positive relationship between Internalization- Thin/ Low Body Fat and Appearance based Rejection Sensitivity among Working Mothers.
10. There will be a significant positive relationship between Pressures from Family and Appearance based Rejection Sensitivity among Working Mothers.
11. There will be a significant positive relationship between Pressures from Peers and Appearance based Rejection Sensitivity among Working Mothers.
12. There will be a significant positive relationship between Pressures from Media and Appearance based Rejection Sensitivity among Working Mothers.
13. There will be a significant positive relationship between Internalization- Masculine/Athlete and Disorder Eating among Working Mothers.
14. There will be a significant positive relationship between Internalization- Thin/ Low Body and Disordered Eating among Working Mothers.
15. There will be a significant positive relationship between Pressures from Family and Disordered Eating among Working Mothers.
16. There will be a significant positive relationship between Pressures from Peers and Disordered Eating among Working Mothers.

17. There will be a significant positive relationship between Pressures from Media and Disordered Eating among Working Mothers.
18. There will be a significant positive relationship between Appearance based Rejection Sensitivity and Disordered Eating among Working Mothers.
19. There will be a significant prediction of Disordered Eating by Self-Compassion, Sociocultural Attitudes Towards Appearance and Appearance based Rejection Sensitivity.

Sample and its Statistical Analysis

Convenience sampling method was used for the purpose of data collection. The total data collected was 113. Working mothers residing in Mumbai filled the survey form consisting of their demographic details followed by standardized questionnaires. The questionnaires were given in the following order – Self-Compassion Scale – Short Form, Sociocultural Attitudes Towards Appearance – 4, Appearance based Rejection Sensitivity Scale-Short Form and Disordered Eating Attitudes Scale – Short version.

Descriptive statistics such as mean, standard deviation were found out for describing the nature of data.

A Pearson product-moment correlation was done to find the relationship between the variables. Furthermore, a regression analysis was done to check if disordered eating was significantly predicted by self-compassion, sociocultural attitudes towards appearance and appearance based rejection sensitivity.

RESULTS AND DISCUSSION

Table 1: Pearson correlation coefficients for Self-Compassion, Internalization – Masculine / Athletic body, Internalization – Low/ Thin Body Fat, Pressures from Family, Pressures from Peers, Pressures from Media, Appearance based Rejection Sensitivity and Disordered Eating.

Measures	1.	2.	3.	4.	5.	6.	7.	8.
1. Self- Compassion	1	-.195*	-.172*	-.198*	-.190*	-.338**	-.403**	-.269**
2. Internalization – Masculine / Athletic body	-.159	-	-	-	-	-	.299**	.249*
3. Internalization – Low/ Thin Body Fat	-.017	-	-	-	-	-	.206*	.241*
4. Pressures from Family	-.198*	-	-	-	-	-	.260**	.354**
5. Pressures from Peers	-.190	-	-	-	-	-	.390**	.388**
6. Pressures from Media	-.338**	-	-	-	-	-	.408**	.193*
7. Appearance based Rejection Sensitivity	-.403**	.299**	.206*	.260**	.390**	.408**	1	.293**
8. Disordered Eating	-.269**	.249*	.241*	.354**	.388**	.185	.293**	1

**Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

A correlation analysis was done to examine the relationships between the variables. Table 1 indicates Pearson correlation coefficients for the variables being studied.

With reference to Table 1, the correlation reveals that as predicted self-compassion has a significant negative relationship with Internalization – Masculine / Athletic body [$r(98) = -0.195$; $p < 0.053$], Internalization – Low/ Thin Body Fat [$r(98) = -0.172$; $p < 0.034$], Pressures from Family [$r(98) = -0.198$; $p < 0.048$], Pressures from Peers [$r(98) = -0.190$; $p < 0.052$] and Pressures from Media [$r(98) = -0.338$; $p < 0.001$]. Hence, the data obtained validated hypotheses 1, 2, 3, 4 and 5 which indicated that there will be a negative relationship between Self-Compassion and the subscales of Sociocultural Attitudes towards Appearance.

Interpretation of correlation coefficient between Self-Compassion and Appearance based Rejection Sensitivity revealed that, as predicted, there is a significant negative correlation [$r(98) = -0.403$; $p < 0.001$] between the two variables validating hypothesis 6 which states, 'There will be a significant negative relationship between Self-Compassion and Appearance based Rejection Sensitivity among Working Mothers.'

Interpretation of correlation coefficient between Self-Compassion and Disordered Eating revealed that, as predicted, there is a significant negative correlation [$r(98) = -0.269$; $p < 0.007$] between the two variables validating hypothesis 7 which stated that, 'There will be a significant negative relationship between Self-Compassion and Disordered Eating among Working Mothers.'

The correlation coefficients for Appearance based Rejection Sensitivity revealed that, as predicted there is a significant positive correlation with Internalization – Masculine / Athletic body [$r(98) = 0.299$; $p < 0.03$], Internalization – Low/ Thin Body Fat [$r(98) = 0.206$; $p < 0.040$], Pressures from Family [$r(98) = 0.260$; $p < 0.009$], Pressures from Peers [$r(98) = 0.390$; $p < 0.001$], and Pressures from Media [$r(98) = 0.408$; $p < 0.001$]. Hence, the data obtained validated hypotheses 8, 9, 10, 11 and 12 which indicated that there will be a positive relationship between Appearance based rejection Sensitivity and the subscales of Sociocultural Attitudes towards Appearance.

The correlation coefficients for Disordered Eating revealed that, as predicted, there is a significant positive correlation with Internalization – Masculine / Athletic body [$r(98) = 0.249$; $p < 0.012$], Internalization – Low/ Thin Body Fat [$r(98) = 0.241$; $p < 0.016$], Pressures from Family [$r(98) = 0.354$; $p < 0.000$], Pressures from Peers [$r(98) = 0.388$; $p < 0.001$] and Pressures from Media [$r(98) = 0.193$; $p < 0.054$]. Hence, the data obtained validated hypotheses 13,14,15,16 and 17 which indicated that there will be a positive relationship between Disordered Eating and the subscales of Sociocultural Attitudes towards Appearance.

Interpretation of correlation coefficient between Appearance based Rejection Sensitivity and Disordered Eating revealed that, as predicted, there is a significant positive correlation [$r(98) = 0.293$; $p < 0.003$] between the two variables validating hypothesis 18 which stated that, 'There will be a significant positive relationship between Appearance based Rejection Sensitivity and Disordered Eating among Working Mothers.'

Since significant correlations were found, a regression analysis was done to check if disordered eating was significantly predicted by self-compassion, sociocultural attitudes towards appearance and appearance based rejection sensitivity.

Table 2: Model summary for the predictors of Disordered Eating.

R	R Square	Adjusted R Square	Std. Error of the Estimate
.437 ^a	.191	.166	10.451

Table 2 indicates the model summary for the predictors of disordered eating. As seen in the Table, it can be observed that self-compassion, sociocultural attitudes towards appearance and appearance based rejection sensitivity accounts for 16.6% variance in disordered eating.

Table 3: Significance of the regression model for predicting disordered eating.

	Sum of Squares	df	Mean Square	F	Sig.
Regression	2478.364	3	826.121	7.564	.000 ^b
Residual	10484.946	96	109.218		
Total	12963.310	99			

Table 3 shows the significance of the regression model for predicting disordered eating. The adjusted R value is found to be 0.166 which is indicative of 16.6 % of the variance in disordered eating as explained by the model and $F = 7.564$; $p < 0.001$ level indicative of the model being significant. Thus, validating the regression analysis hypothesis which stated, 'There will be a significant prediction of Disordered Eating by Self-Compassion, Sociocultural Attitudes Towards Appearance and Appearance based Rejection Sensitivity.'

Table 4: Beta coefficients of the regression model predicting disordered eating.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	26.261	8.405		3.124	0.002
Self-Compassion	-3.006	2.08	-.150	-1.489	0.140
Sociocultural Attitudes towards Appearance	.196	.064	.313	3.044	0.003
Appearance based Rejection Sensitivity	.017	.019	.094	.869	0.387

Table 4 indicates the Beta coefficients of the regression model predicting disordered eating. The current study looked at identifying predictors of disordered eating among Working Mothers. As seen in Table 5, sociocultural

attitudes towards appearance ($t= 3.044$, $p < 0.003$) has a significant impact on disordered eating. Moreover, the beta value ($\beta=.223$) was found to be highest for sociocultural attitudes towards appearance which indicates that sociocultural attitudes towards appearance in the key predictor of disordered eating in the present study.

CONCLUSION

The findings indicated that self-compassion was negatively correlated with sociocultural attitudes towards appearance measured in terms of its subscales (Internalization – Masculine / Athletic body, Internalization – Low/ Thin Body Fat, Pressures from Family, Pressures from Peers and Pressures from Media), appearance based rejection sensitivity and disordered eating.

Sociocultural attitudes towards appearance measured in terms of its subscales (Internalization – Masculine / Athletic body, Internalization – Low/ Thin Body Fat, Pressures from Family, Pressures from Peers and Pressures from Media), appearance based rejection sensitivity and disordered eating were positively correlated with one another. Further, a regression analysis revealed that the model was a good fit and the variables studied did predict disordered eating. However, the results showed that sociocultural attitudes towards appearance proved to be the key predictor of disordered eating.

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THE WEB SERIES EFFECT: CHANGING THOUGHTS, ACTIONS & HABITS IN ADOLESCENTS

Rina Patel¹ and Bhumika Gaonkar²¹Assistant Professor, Bhavan's H. Somani College²Student, Bhavan's H. Somani College**ABSTRACT**

Web series have emerged as a new way of entertainment, captivating audiences across various age groups, particularly the adolescents. In today's era of digitization, various streaming platforms provide unlimited access to diverse genres, narratives, stories and characters, catering to the unique interests and emotions of the young viewers. For adolescents, web series may go beyond mere entertainment, affecting their lives. Thus, the growing trend of web series raises questions about its impact on adolescents' mental, physical and social health and their lifestyle in general. The present qualitative research is conducted to understand the impact of the web series consumption of the adolescents. 14 adolescents both girls and boys between the age of 13-20 years from Mumbai were interviewed using semi-structured interview schedule to understand the impact of watching the web series on the behaviours, emotions and lifestyles of the adolescents. Results reveal that Binge-watching of web series alters sleep cycles, reduces physical activity, and causes shifts in social behaviours of the adolescents. Adolescents use web series as a form of escapism as well as inspiration. Peer influence strongly affects content choices, reinforcing trends and social discussions. The results show that with the growing dependence on digital entertainment, mindful consumption is essential to maintain a healthy balance between screen time and real-world engagement.

INTRODUCTION

With the rapid rise of streaming platforms, the way in which teenagers consume entertainment has dramatically transformed. Gone are the days when cable television was the go-to source for entertainment. In today's digital age, platforms like Netflix, Amazon Prime Video, Hotstar, and others have revolutionized the way people access and consume entertainment. This shift in viewing habits is supported by the availability of affordable and fast internet and easy access to smartphones, which have made streaming platforms easily accessible even in the remotest corners of the country. This transformation has drastically altered how people of all age groups, especially teenagers, engage with media. The younger generation, particularly teenagers aged between 12 and 20 years and young adults aged 21 to 30 years, are among the most dedicated viewers of online content (Wagh, V., et.al., 2022; Dhanuka, A., & Bohra, A., 2019; Collins, R. L., Martino, S. C. & Shaw, R., 2011).

For many teenagers, watching web series has become more than just a form of entertainment—it has become a daily habit, a social activity, and sometimes even an escape from the challenges of reality. They binge-watch their favourite shows, keep up with trending series, and immerse themselves in the lives of the characters they admire. These shows have the power to stir deep emotional responses, and viewers often relate to certain characters or storylines on a personal level (Lind, A., 2015), follow their language and lifestyle. The prolonged hours spent in front of screens go beyond just being a passive activity and have a profound impact on the psychological, behavioural, and social well-being of teenagers developing unrealistic expectations from life and, relationships. Additionally, such binge-watching can disrupt sleep schedules and lead to poor physical health, further affecting their overall well-being. Teenagers tend to pick up trends, fashion styles, new slang, and even ways of speaking from their favourite shows. (Rao K.S., Chandana, M.H. & Rao, M.E., 2023).

On the behavioural level, web series often influence how teenagers interact with the world around them. The constant exposure to popular shows and characters, making it easy for teenagers to mimic the behaviours, language, and personalities of the characters they admire. This social mimicry can result in shifts in how teenagers communicate and interact with their friends and family. They may normalize the use of slang or objectionable phrases from their favourite web series, attempt to mirror the fashion trends of certain characters, or even adopt wrong behaviours and attitudes based on what they see on screen. While this can be harmless in moderation, it can sometimes foster unrealistic views about relationships, friendships, and social interactions.

These web series often also have a socio-cultural impact on their viewer, especially when they are in a raw age of teen years. In India, where family dynamics and social expectations hold significant value, web series often portray more liberal and modern ideologies, which may clash with traditional values. (De Leeuw, S., 2005) This cultural shift can lead to internal conflict in teenagers as they navigate the balance between cultural expectations and the influence of the media. For some, it can spark a sense of empowerment, but for others, it may cause confusion or feelings of inadequacy if their real lives don't align with the seemingly perfect lives portrayed on screen. Due to the constant engagement with web series, teenagers may begin to prioritize screen time over

spending time with family and friends, leading to isolation or reduced face-to-face socialization. The lack of genuine, real-life social interaction, especially in a culturally rich country like India, may have negative consequences on emotional intelligence and social maturity of the developing adolescent.

REVIEW OF LITERATURE

Lot of research has been conducted on the use and impact of web-series on adolescents. These studies have looked at the emotional, psychological, socio-cultural and lifestyle related impact of Indian and International Web Series on Indian adolescents. Studies reveal that Indian Adolescents spend a lot of time consuming the content available on different OTT platforms. In India, the average person spends approximately 8 hours and 29 minutes each day watching online videos, which is higher than the global average (Dhiman,2021). By being constantly exposed to the different characters, language, lifestyle, stories, etc. presented by the web-series, adolescents are often primed by certain type of content that has a huge impact on the way they relate to others and make important lifestyle choices and decisions.

A study conducted by Chattopadhyay, A. (2020) highlights that with the advent of digital streaming, audiences now have greater control over their viewing habits, which has led to an increase in "binge-watching" behaviour. According to a survey conducted 80% admitted to watching web series regularly and 70% of participants engaged in binge-watching, often consuming an entire season in one sitting. This behavioural shift is attributed to the interactive and personalized nature of online streaming. The content they watched influenced their thoughts, emotions, and behaviour. Many participants also reported experiencing lifestyle disruptions, such as sleep deprivation, loss of productivity, and changes in social interactions.

Studies have revealed how web series has an impact on career choices of the adolescents. Mehrotra, P. (2023) investigated how exposure to Western web series influences the mindset of Indian teenagers. The study found that while concerns exist regarding exposure to explicit content, drugs, alcohol, and violence, most students did not attempt to replicate such behaviours. Instead, they were more influenced by the academic and social aspects portrayed in these series and expressed a desire to study abroad after being exposed to the depiction of foreign education systems in Western series.

Lifestyle of an adolescent is often influenced by the type of content being watched by the teens. Rout, D. et al. (2023) explored the impact of web series consumption on youth. They found that prolonged exposure has contributed to the normalization of certain behaviours, including increased tolerance for violence, abusive language, and unconventional social norms.

However, streaming services have introduced new narrative techniques that encourage prolonged engagement, making binge-watching a common practice. Forni, D. (2020) in their research examined how TV series have evolved into a dominant form of visual storytelling, particularly with the rise of streaming platforms like Netflix. He also explores the psychological impact of binge-watching, noting that while it enhances storytelling immersion, it can lead to negative consequences such as sleep deprivation and reduced physical activity.

Global media has exposed India adolescents to the world. Adolescents are now immersed in content from Korean, Japanese, American and the Indian adolescents often get attracted to the western life style and web series is not an exception. Certain international web series have had a huge fan following leading to these series having a huge impact on the viewers. Chauhan, D. & Mahajan, S. (2022) analysed the influence of 'Money Heist' on young viewers in Gujarat, highlighting changes in entertainment consumption patterns due to international web series. The fast-paced screenplay, suspenseful plot twists, and strong character development keep the adolescent constantly glued to the screens.

Thus, the research conducted so far show mixed effects of web series on the adolescent. The present study is an attempt to understand the impact that web series and its content has on the adolescents of Mumbai.

RESEARCH QUESTIONS

1. What is the level of web series engagement among adolescents?
2. What is the psychological impact of web series on adolescents?
3. How do web series impact adolescents' behaviours?
4. How does web series influence the lifestyle choices and preferences of adolescents?

RESEARCH AIM AND OBJECTIVES

Aim: To study the impact of web series on adolescents.

Objectives:

1. To study the psychological impact of web series on the adolescents.
2. To understand the impact that web series have on the behavioural aspects of adolescents.
3. To explore the impact of web series on adolescents' life style choices and preferences.

Operational Definition of important concepts

1. **Web-Series consumption-** A web-series is a series of scripted or non-scripted digital video content primarily available on online streaming platforms such as OTT services, YouTube, or social media. In this study, web series consumption includes the frequency, duration, and preferred genres of viewing.
2. **Behavioural impact** - This includes impact of web series consumption on daily habits, routines, actions, changes in sleep patterns, productivity, academic performance and engagement in other activities.
4. **Psychological impact-** The psychological impact refers to the emotional and cognitive effects of web series on individuals. It includes mood fluctuations, emotional attachments to fictional characters, and influence of narratives on thoughts, perceptions, and decision-making.
5. **Impact on lifestyle** - Lifestyle choices and preferences explores impact of web series on leisure activities, social interactions, and physical activity levels, personal interests, hobbies, and aspirations, communication style, body language, overall appearance, etc.

METHODOLOGY**Research Design:**

This study adopts a qualitative research approach with a phenomenological design to explore how web series influence the psychological, behavioural, and lifestyle aspects of adolescents. The phenomenological approach enables an in-depth understanding of how adolescents perceive, experience, and interpret web series consumption in their daily lives.

Sample- A purposive sample of 14 adolescents (male to female ratio 1:1) aged 13 to 20 years residing in the City and suburbs of Mumbai was selected for conducting semi-structured interviews.

Tools- A semi structured interview schedule was developed by the researchers. The interview includes questions on the web series content consumption among the adolescents. The questions are based on understanding the impact of web series on the psychological, behavioural aspects and lifestyle pattern of the adolescents.

Inclusion Criteria:

1. Adolescents (girls and boys) in the age group of 13 to 20 years.
2. Regular engagement with web series (at least 15 hours per week).
3. Adolescents belonging to middle socio-economic group.

Procedure:

The sample was selected on the basis of the inclusion criteria. They were coded as R1 to R14 to keep their identity confidential. The study employed semi-structured interviews as the primary data collection method. The data collected was then analysed to understand different themes.

RESULTS AND DISCUSSION

The rise in the trend of web series has transformed the way the adolescents consume entertainment, bringing a mix of opportunities and challenges with it. The genre of web series, characters, stories, dialogues, etc. have a huge impact on the audience especially the adolescents. The present study results show that the adolescents indeed spend a lot of time watching web series on different online platform. The average daily viewing time is approximately 5 hours, though it varies from a minimum of 1.5 hrs to as high as 7-8 hours per day depending on academic schedules and personal routines. On an average three to four episodes are watched per day, with some respondents watching up to 10-15 episodes in a single sitting. During weekends and holidays, the time spent watching web series nearly doubles, with some respondents watching for 8-9 hours straight in one go. Binge watching is like psychological addiction, it makes the adolescent think about what is being watched all the time. Binge watching is an all-consuming experience which is often done at the cost of daily life activities (Pierce-Grove, R., 2017). Thus, the content watched has a significant impact on the behaviour, thoughts and emotions of the viewers.

The most popular genres among respondents were romance and comedy, with many also showing interest in drama, action, adventure, and thriller. The findings indicate a gendered pattern in preferences, where girls predominantly gravitate toward romance, K-dramas, and comedy, while boys show a higher preference for action, adventure, and thrillers. This is very similar to the results of the study conducted by Starosta, J. A., & Izydorczyk, B. in 2020. The preference for romance among adolescents can be attributed to their developmental stage, where emotional exploration and curiosity about romantic relationships are heightened. Adolescents often seek content that resonates with their own desires and emotions, which is why romantic narratives appeal more to them. Research suggests that romantic media influences adolescents' expectations of love, relationships, and emotional experiences. Comedy is a preferred genre across genders, likely due to its stress-relieving and entertaining nature. Respondents mentioned that watching comedy helps them cope with stress and lighten their mood, making it an essential part of their viewing habits. The heavy consumption of romantic and comedic content reflects an emotional and psychological need for connection, escapism, and stress relief.

One of the most significant observations in this study was the strong emotional influence web series had on respondents. Many adolescents reported forming deep connections with characters. Girls, in particular, resonated more with themes of love, emotions, and relationships, getting feeling strongly attached to characters, empathizing with them, experiencing their feelings, crying and over thinking about the fictional instances for two-three days (R1, R3, R5, R7). Several respondents admitted that watching web series often led them to compare their lives with idealized portrayals of romance, friendships, and success. Some girls expressed that they felt a lack of affection in their real lives, which made them more drawn to romantic narratives. Meanwhile, boys were more likely to admire themes of independence and ambition, balancing both relationships and friendships as priorities. Additionally, one unique response came from a female respondent who felt inspired by strong female protagonists and aspired for independence and personal growth. This suggests that while most girls focused on emotional aspects, some resonated with empowerment and self-reliance instead.

Web series shaped how teenagers chose to spend their leisure time and social interactions. Responses indicated that web series consumption often replaced outdoor activities. Instead of engaging in sports or social gatherings, many respondents preferred staying at home to watch content. While girls were more likely to discuss web series with their peers, making it a social bonding experience, boys often viewed it as a personal entertainment habit. Interestingly, some respondents reported that watching web series helped them feel less lonely by immersing them in fictional worlds. However, this also led to a cycle of escapism, where they avoided real-life responsibilities and experiences and instead immersed themselves in the reel life.

Web series have a profound effect on the behaviour of adolescents. This is reflected in the responses of the participants. One of the most common findings of this research was that binge-watching affected sleep and daily routines, making them feel exhausted and unproductive the next day. Nearly all respondents admitted that they had stayed up late at some point to finish a series, even when they knew it would negatively impact their schedule. They even prioritized it over their studies. Web series also had impact on the eating patterns. Many respondents reported that they cannot eat food without watching a web series, as it has become a habitual part of their mealtime routine. They feel uncomfortable or distracted when eating without entertainment.

According to the study, boys were more influenced behaviourally than girls. This was evident in the way they adopted speech styles, mannerisms, slang, catchphrases, or fashion styles, sarcastic humour, aggressive dialogue delivery, and confident body language from characters they liked. Girls, on the other hand were more likely to imitate fashion trends and communication styles from the characters. Observational learning and vicarious reinforcement seem to play a key role here. In a hope to receive the same rewards in terms of relationship, power, money, etc., they model the behaviours of these characters. As mentioned by R11, such behaviours also help in seeking the attention of family and friends.

The life choices and preferences of the adolescents also get influenced by the web series consumption. For instance, few respondents became more conscious of dressing style, skincare and her body after watching web series and started experimenting with fashion. R13 mentioned being inspired by Money Heist's Professor, started dressing and talking like him, adopting a more composed and strategic mindset. While many admire fictional characters, few incorporate their style and mannerisms into daily life. This finding resembles that of the study conducted by Chauhan, D., & Mahajan, S. (2022).

Web series not only had impact on the fashion, but also on their career choices. R8 mentioned that watching web series about entrepreneurship motivated him to consider starting his own business in the future while R6 wanted to learn legal hacking after watching a tech-based series. This highlights how web series can sometimes act as a source of motivation beyond entertainment. Web series thus spark new passion in the adolescents, but

only a few turn them into real actions. Although this impact looks very significant, it may be temporary in nature.

CONCLUSION

Binge-watching has become a widespread habit among adolescents, often leading to various psychological, behavioural and life style related impacts on the adolescents. There seem to be a gender difference in the influence of web series. Psychological impact is stronger among girls than boys. Web series have a negative impact on the physical health, emotions, thoughts, behaviours and habits of the adolescents, whereas the impact on lifestyle is neutral. Peer pressure play a key role in content choices, as many teenagers watch trending series to stay socially engaged. The study raises concerns over excessive web series usage and consumption. Balanced screen time, real-world engagement, and conscious content selection is thus a key to moderate the impact of web series on adolescents. Encouraging discussions on media influence and promoting healthier consumption habits can help adolescents enjoy entertainment without compromising their psychological and social well-being.

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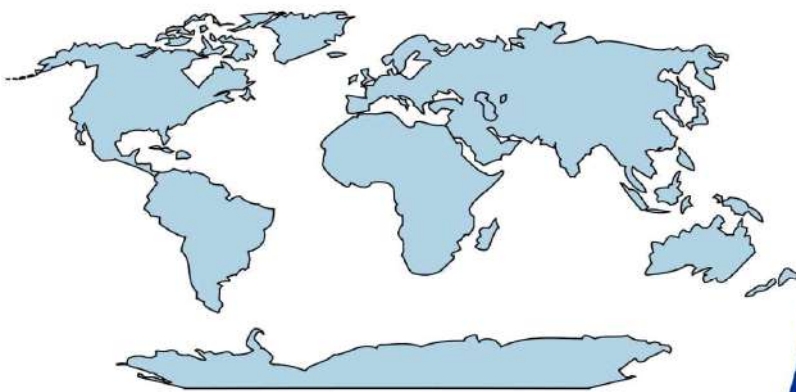
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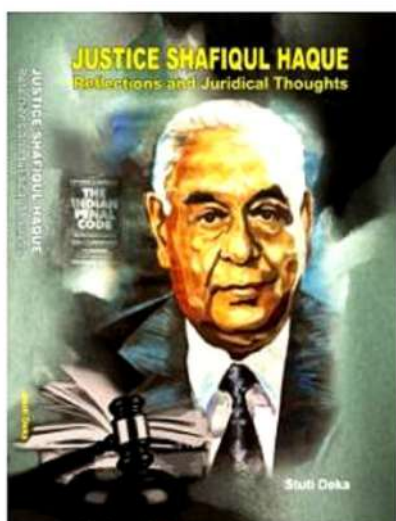


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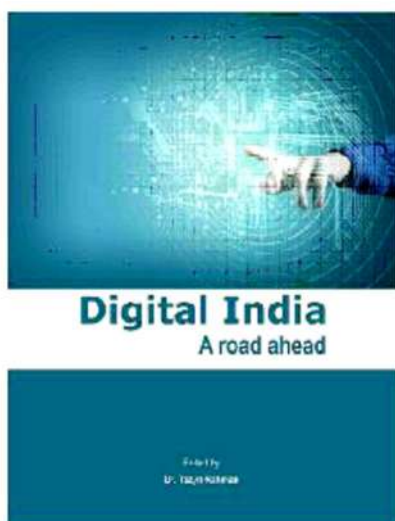
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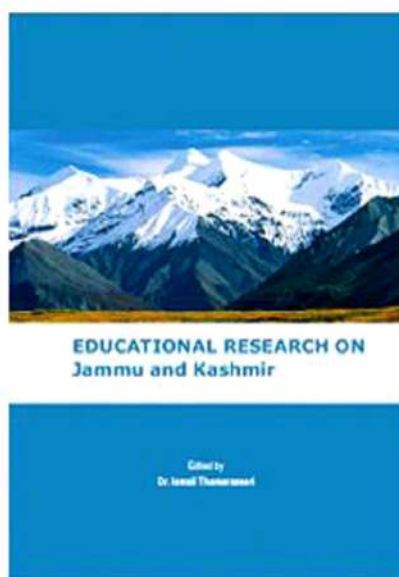
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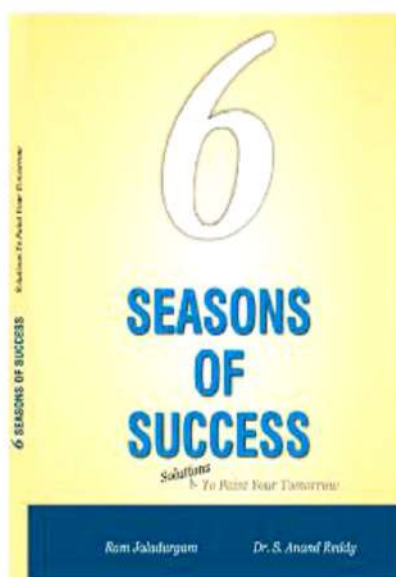
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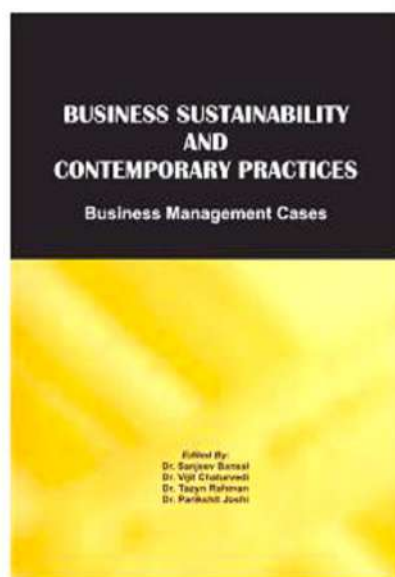
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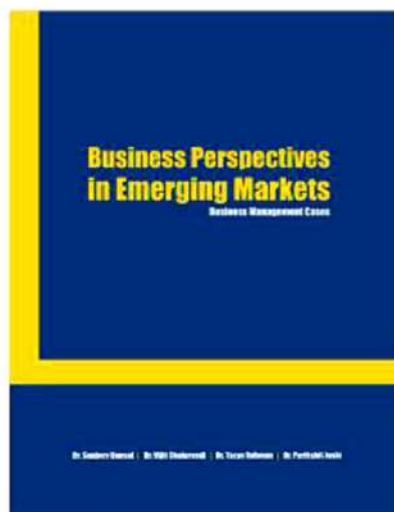
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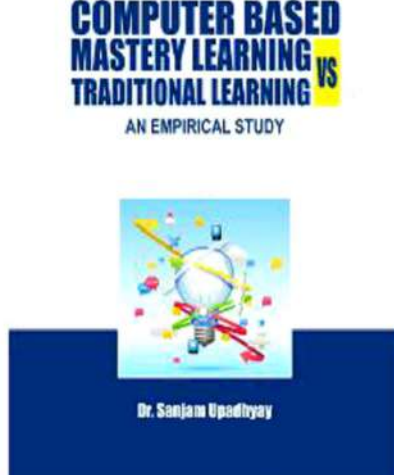
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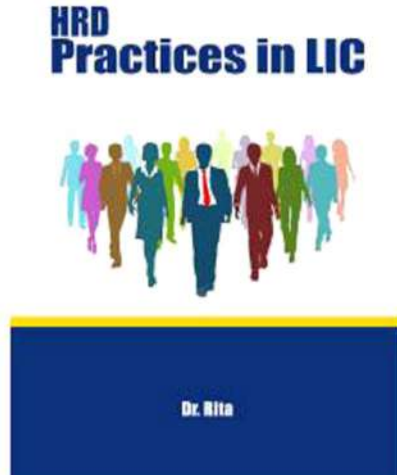
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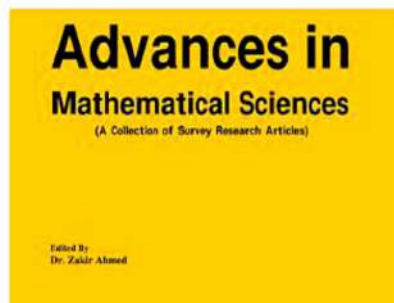
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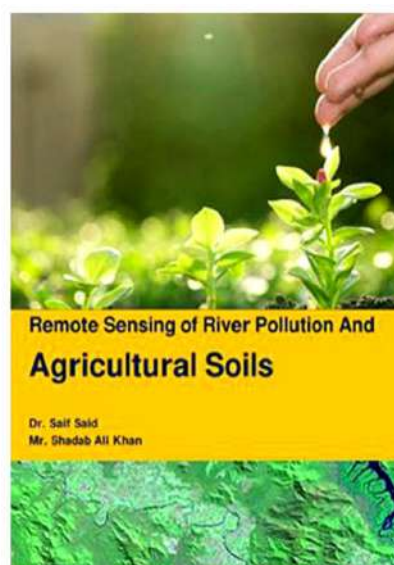
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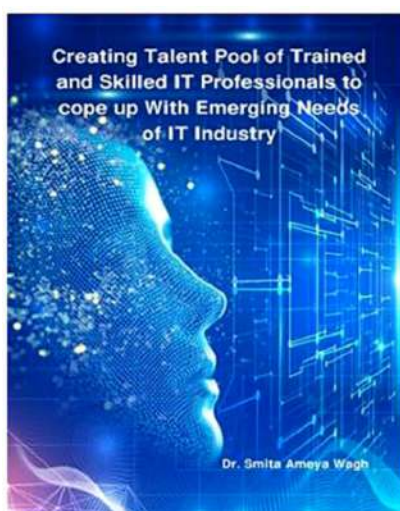
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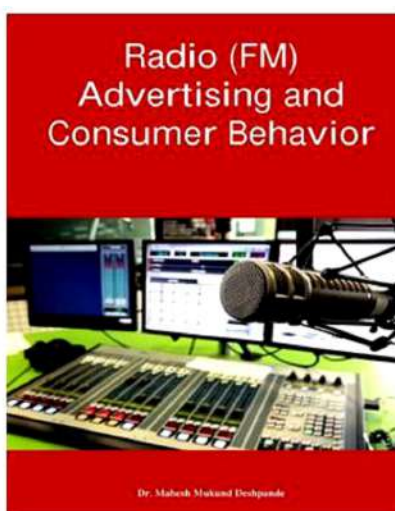
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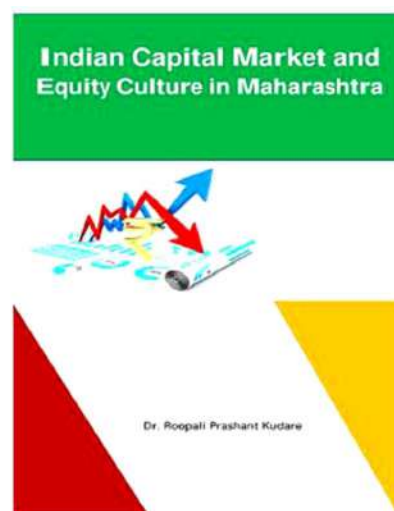
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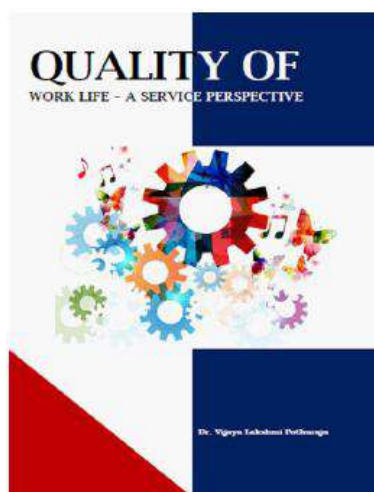


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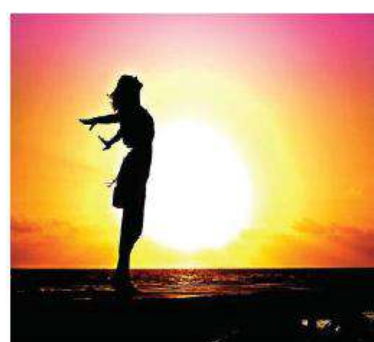
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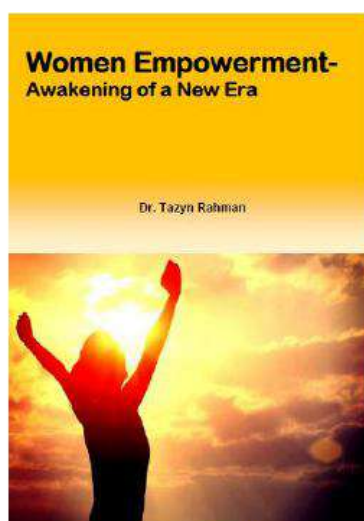


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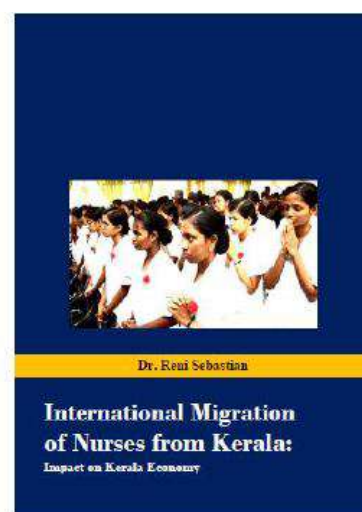
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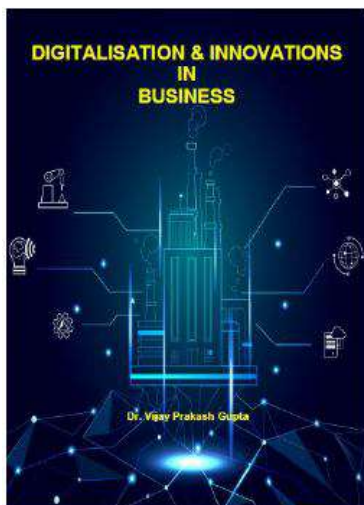


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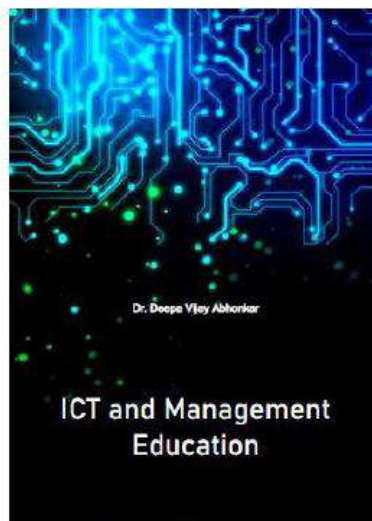
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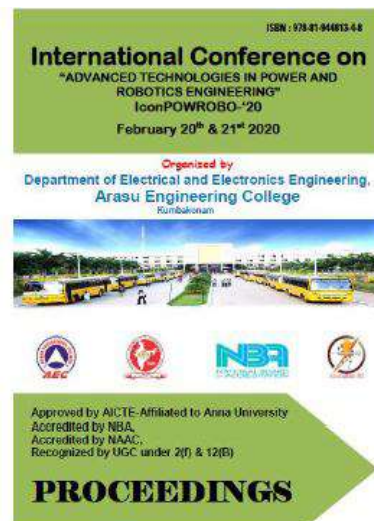
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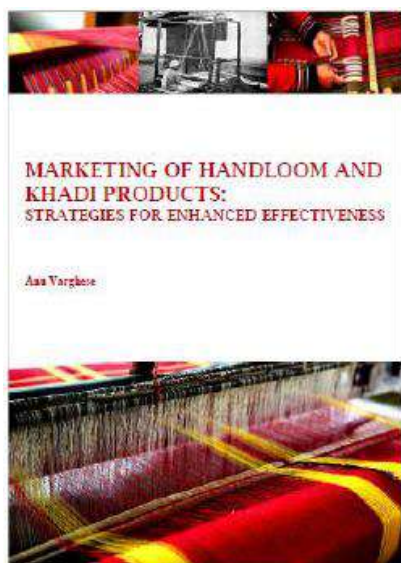
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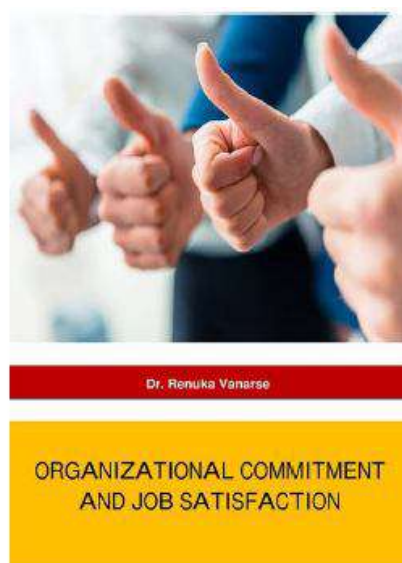
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