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सार्वजनिक सूचना

In supersession of the Public Notice dated 28th November 2018 for establishing UGC Consortium for Academic and Research Ethics (UGC- CARE), the Commission, in its 584th meeting held on 3rd October 2024, based on the recommendations of the expert committee, has decided to discontinue UGC-CARE listing of Journals and develop suggestive parameters for choosing peer-reviewed journals by faculty members and students. The suggestive parameters, developed by a group of experts and academicians, are now placed in the public domain for their feedback till **25th February, 2025 at email id: journal@ugc.gov.in**.

The stakeholders, including HEIs, faculty members, researchers, and students, may take note of it.

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Editorial

It is a matter of immense pleasure and profound satisfaction for all of us associated, that we present this Special Edition of our Research Journal, comprising selected peer-reviewed research papers presented during the National Conference on the theme **"Interdisciplinary Approaches to Global Challenges,"** organized and conducted by the **Faculty of Commerce & Management, Shri Davara University, Raipur**, in academic collaboration and association with the **Department of Management and Humanities, National Institute of Technology (NIT), Raipur**, held on **2nd May 2026**. This National conference served as an intellectual confluence where group of academicians, researchers, industry professionals, policymakers, and students from diverse disciplines came together to deliberate on some of the most pressing global issues of our time.

The twenty-first century has witnessed unprecedented transformations driven by rapid technological advancements, globalization, environmental concerns, social and economic inequalities, digital disruptions, and evolving governance structures. These multi-dimensional challenges transcend the boundaries of individual disciplines andcall for collaborative, innovative, and interdisciplinary solutions.

Recognizing thisneed, the conference was conceptualized with the vision of fostering meaningful Editorial dialogue and encouraging research that integrates scientific inquiry, technological innovation, humanistic perspectives, and managerial excellence to address complex global problems.

The overwhelming response received from researchers across the country reflects the growing recognition of interdisciplinary research as a cornerstone of sustainable development and academic excellence. Scholars representing universities, research institutions, government organizations, and industry presented high-quality research encompassing diverse domains such as Science and Technology, Artificial Intelligence, Environmental Sustainability, Healthcare, Digital Transformation, Commerce, Economics, Finance, Human Resource Management, Entrepreneurship, Education, Social Sciences, Public Policy, Humanities, and several other emergingareas.

The breadth and depth of the research presented during the conference demonstrated that meaningful solutions to global challenges emerge when disciplinary boundaries are transcended and knowledge is shared across fields.

This Special Edition brings together a carefully selected collection of outstanding research papers that successfully completed a rigorous review and editorial evaluation process. Each manuscript was assessed on the basis of originality, methodological rigor, theoretical contribution, practical relevance, ethical research standards, and potential societal impact.

The selected papers not only represent academic excellence but also provide innovative perspectives that contribute toexisting literature while offering practical implications for policymakers, practitioners, educators, industry leaders, and researchers.

The contributions published in this volume reflect the dynamic intersection of three broad academic domains: Science and Technology, where researchers have explored innovations in artificial intelligence, digital technologies, sustainable engineering, environmental sciences, healthcare technologies, data analytics, and emerging scientific advancements capable of addressing contemporary global concerns. Humanities and Social Sciences, where scholars have critically examined issues related to education, ethics, culture, public policy, social justice, community development, psychological well-being, human values, and societal

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transformation.

These studies remind us that technological progress alone cannot create sustainable societies unless it is complemented by human-centered approaches and ethical considerations. Management and Commerce, where contributors have presented valuable insights into organizational behavior, entrepreneurship, digital business transformation, financial management, marketing innovations, sustainable business practices, governance, human resource management, consumer behavior, and economic resilience.

These studies emphasize the importance of responsible management practices in creating organizations capable of adapting to rapidly changing global environments. Collectively, these contributions reinforce the belief that interdisciplinary research serves as a catalyst for innovation and societal progress. They demonstrate how the integration of scientific knowledge, technological capability, managerial wisdom, and human values can generate comprehensive solutions for the challenges confronting humanity today.

One of the defining strengths of the conference was its emphasis on fostering collaboration among academia, industry, and society.

In an era where knowledge creation increasingly depends upon partnerships across institutions and disciplines, such collaborative platforms play a significant role in promoting research excellence and innovation. The academic collaboration and association between **Shri Davara University and the Department of Management and Humanities, National Institute of Technology (NIT), Raipur**, exemplifies this shared commitment to promoting research that is academically rigorous, socially relevant, and nationally significant.

As editors, we firmly believe that research achieves its highest purpose only when it contributes to solving real-world problems and improves the quality of human life.

The papers included in this Special Edition reflect this philosophy by combining theoretical advancements with practical applications. Many studies provide policy recommendations, managerial implications, technological innovations, and community-oriented solutions that can influence future research and decision making at multiple levels.

The publication of this Special Edition would not have been possible without the dedication and collective efforts of numerous individuals and institutions.

We express our sincere gratitude to the distinguished keynote speakers, invited experts, session chairs, reviewers, members of the editorial board, organizing committee, faculty members, research scholars, authors, and participants whose unwavering commitment contributed to the remarkable success of the conference. Their scholarly contributions have enriched this publication and strengthened the culture of interdisciplinary research.

We extend our heartfelt appreciation to the visionary leadership of the Hon'ble Chancellor, Director General, Chief Executive Officer, Vice Chancellor, Registrar, and the entire administration of **Shri Davara University** for their constant encouragement and unwavering support in promoting academic excellence and research culture.

We also convey our sincere thanks to the **Department of Management and Humanities, National Institute of Technology (NIT), Raipur**, for their valuable academic collaboration, guidance, and support in making this conference a significant plat form for intellectual exchange.

We are equally indebted to our esteemed reviewers, whose constructive observations, scholarly insights, and meticulous evaluations ensured the academic quality and integrity of every published manuscript. Their anonymous contributions uphold the highest standards of scholarly publishing and deserve our deepest appreciation.

Finally, we congratulate all authors whose research has been included in this Special Edition. Their dedication to knowledge creation and pursuit of academic excellence serves as an inspiration for the research community.

We hope this volume stimulates further interdisciplinary dialogue, encourages collaborative research initiatives, and inspires innovative solutions that contribute toward building a more sustainable, inclusive, technologically advanced, and socially responsible future.

May this Special Edition serve not merely as a collection of research papers, but as a meaningful contribution to the global pursuit of knowledge, innovation, and sustainable development? We trust that readers from academia, industry, government, and civil society will find these contributions intellectually enriching and practically valuable.

We warmly invite researchers, academicians, practitioners, and students to engage with these scholarly works, continue interdisciplinary collaborations, and collectively contribute toward addressing the complex global challenges that define our era.

With Best Wishes,

Prof. (Dr.) Manisha Pandey

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1

Management and Care of Menstrual Hygiene among School going Adolescent Girls in Distt Raipur-A Sociological Perspective

*Dr. A. K. Kaul

Abstract

Menstrual hygiene management (MHM) among adolescent girls is not just a matter of health, it is deeply shaped by social realities, especially in areas where traditions and inequalities strongly influence everyday life. This study looks at how adolescent girls in District Raipur, Chhattisgarh, manage and care for their menstrual hygiene, viewing the issue through a sociological lens. It focuses on how factors like caste, class, education, family background, and cultural taboos affect what girls know about menstruation, how they feel about it, and how they manage it in practice. The study brings attention to ongoing inequalities in access to sanitary products, safe and private sanitation facilities, and reliable information. It also examines the important role played by schools, peer groups, and community institutions, which can either reinforce silence and stigma or help build awareness and confidence. The findings suggest that even though literacy levels are improving and government initiatives are in place, menstrual practices are still strongly influenced by traditional beliefs and gender norms. In this context, the study highlights the urgent need for culturally sensitive health education, active community involvement, and more inclusive policies. Such efforts are essential to improve menstrual hygiene practices and to ensure dignity, better health, and empowerment for adolescent girls.

Keywords: Menstrual Hygiene Management, Adolescent Girls, Cultural Taboos, Gender Norms, Health Education.

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Introduction

Menstrual hygiene management among school-going adolescent girls has emerged as a critical public health and sociological concern, particularly in developing regions such as District Raipur. Adolescence, as a transformative stage marked by biological, psychological, and social transitions, demands special attention, especially for girls experiencing menarche for the first time. Scholars like Margaret Mead have emphasized adolescence as a culturally constructed phase shaped by social norms, while sociologists such as Émile Durkheim highlight how collective beliefs and practices influence individual behavior. In the context of menstruation, these perspectives become highly relevant, as cultural taboos, stigma, and gender norms continue to shape girls' experiences.

Research indicates that menstrual hygiene is not merely a matter of personal health but is deeply embedded in socio-cultural structures. Studies by Sommer and Sahin (2013) reveal that inadequate water, sanitation, and hygiene (WASH) facilities, combined with silence and shame surrounding menstruation, significantly affect girls' dignity, school attendance, and well-being . Similarly, Deshpande et al. (2018) found that lack of prior knowledge, reliance on mothers as primary informants, and restrictive cultural practices contribute to poor menstrual hygiene among adolescent girls. Rajan and Eljo (2023) emphasize the role of society in shaping menstrual practices and highlight unmet needs in awareness, access, and social support.

From a sociological point of view, menstrual hygiene management is not just about health it reflects deeper issues like gender inequality, social exclusion, and gaps in institutional support. That's why understanding how adolescent girls in Raipur manage and care for their menstrual hygiene requires looking at the bigger picture, including health, culture, education, and social structures. Only by addressing all these aspects together can we promote dignity, empowerment, and overall well-being.

Adolescence is a phase of transition, bringing major physical, emotional, and social changes. One of the most important changes for girls is menstruation, which marks the beginning of reproductive maturity. Yet, in many parts of India, including District Raipur in Chhattisgarh, menstruation is still surrounded by deep-rooted taboos and misconceptions. These beliefs often shape how girls understand and experience this natural process, sometimes making it more challenging than it needs to be.

According to United Nations Population Fund (UNFPA), adolescent girls' health and well-being are central to national development, and menstrual hygiene is vital for dignity and empowerment. Despite this, menstruation continues to be perceived as impure or unclean in many communities, leading to restricted practices and secrecy.

Sociologists such as Erving Goffman emphasize the concept of stigma, which helps explain how menstruation becomes a “spoiled identity” in patriarchal societies. Similarly, Pierre Bourdieu's notion of habitus explains how cultural norms shape menstrual practices across generations.

Review of Literature

Several studies highlight the poor state of menstrual hygiene among adolescent girls in India. A study conducted in Raipur by Agarwal et al. (2018) found that 49.81% of girls used cloth instead of sanitary napkins, and knowledge about hygiene practices was inadequate. Only a small proportion used proper hygienic methods, indicating gaps in awareness and accessibility.

Similarly, Tiwari et al. (2018) observed that poor menstrual hygiene practices increase vulnerability to reproductive tract infections and other health complications. National-level analyses also confirm that the use of hygienic methods is strongly influenced by socio-economic status, education, and access to resources.

A meta-analysis by Singh et al. (2022) highlights that menstrual hygiene challenges are multidimensional, involving physical, psychological, and social dimensions, including anxiety and school absenteeism. Furthermore, cultural stigma and lack of open communication exacerbate these issues, especially in rural settings.

Objectives of the Study

a) To examine menstrual hygiene practices among school-going adolescent girls in District Raipur.
b) To analyze socio-cultural factors influencing menstrual hygiene management.
c) To evaluate the role of educational institutions and public health systems.
d) To suggest policy and sociological interventions for improving menstrual hygiene.

Methodology

This study is based on secondary data analysis, drawing from published research articles, government reports, and international agency publications. A sociological framework is used to interpret findings, focusing on gender norms, cultural beliefs, and structural inequalities.

Socio-Cultural Dimensions of Menstrual Hygiene

Menstruation as a Social Construct

Menstruation is not just a biological process. It is also shaped by the way society understands and interprets it. In many Indian communities, it is still linked with ideas of impurity, which often leads to restrictions on girls, such as staying away from religious spaces, kitchens, or even regular social interactions during their periods.

Anthropologist Mary Douglas explained that ideas of purity and pollution are not natural but are created by cultures. This perspective helps us understand why menstrual taboos exist and persist. Unfortunately, such beliefs can reinforce gender inequality and isolate adolescent girls, making a natural process feel like a source of shame or exclusion.

Role of Family and Socialization

Family plays a key role in shaping how girls understand and manage menstruation. For many adolescents, mothers are the first and most trusted source of information. However, when mothers themselves have limited or incomplete knowledge, some myths and misconceptions can get passed on from one generation to the next.

This reflects the idea of socialization explained by Talcott Parsons, who pointed out that families are central in transmitting cultural values and norms. In this way, beliefs and practices related to menstruation are often learned at home, shaping how girls perceive and respond to their own experiences.

Stigma and Silence

Menstruation is often treated as something that shouldn't be talked about openly, which creates a culture of silence and secrecy. Many girls grow up feeling that they need to hide their experiences, rather than understanding them with confidence.

This can be better understood through the idea of stigma given by Erving Goffman, who explained how certain conditions or experiences are socially discredited. In the case of menstruation, this stigma can make girls feel embarrassed or ashamed, leading them to conceal it. As a result, their self-esteem may be affected, and they may withdraw from social or everyday activities during their periods

Menstrual Hygiene Practices in District Raipur

Evidence from Raipur shows that many adolescent girls still face practical challenges in managing menstruation. A large number rely on traditional absorbents like cloth, often without access to proper washing and drying facilities, which can affect hygiene. The use of sanitary products remains limited, mainly due to cost, lack of awareness, or availability. In addition, proper disposal facilities are often missing, making it difficult for girls to manage menstruation safely and with dignity

The study by Agarwal et al. (2018) revealed that only 17.87% of girls used sanitary napkins, while many lacked proper hygiene practices. These findings reflect broader structural inequalities, including poverty and limited access to resources.

Health Implications

Poor menstrual hygiene can lead to serious health consequences, including reproductive tract infections, urinary infections, and psychological stress. Studies indicate that inadequate hygiene practices significantly increase health risks among adolescent girls.

From a sociological perspective, Michel Foucault's concept of bio power highlights how control over the female body is exercised through societal norms, affecting health outcomes.

Educational and Institutional Role in MHM

Role of Schools

Schools have an important role in creating awareness about menstrual hygiene and supporting girls during this time. However, in many rural areas, basic facilities are still lacking, such as separate toilets for girls, a reliable water supply, and proper disposal systems. Because of these gaps, many girls find it difficult to manage their periods at school, which often results in them missing classes during menstruation.

Government Initiatives

Programs like the Menstrual Hygiene Scheme (MHS) aim to improve access to sanitary products and awareness. However, implementation gaps remain, particularly in rural areas.

Role of NGOs and Awareness Campaigns

Many NGOs and initiatives are working to spread awareness about menstrual hygiene and make products more accessible to girls. Through education campaigns and community outreach, these efforts help challenge long-standing taboos and encourage healthier, more informed practices.

Socio-Economic Determinants

Socio-economic conditions have a strong impact on how girls manage their menstrual hygiene. Those from lower-income families often face financial constraints, which can lead them to rely on less hygienic methods simply because safer options are not affordable or easily available. Education also makes a significant difference. Girls who are better informed are more likely to follow hygienic practices and question harmful taboos. This idea connects with the capability approach of Amartya Sen, which highlights how access to education and resources expands people's choices and improves their overall well-being.

Gender Inequality and Menstrual Hygiene

Menstrual hygiene is closely connected to broader issues of gender inequality. In many societies, patriarchal norms limit women's mobility, access to resources, and ability to make decisions about their own health and well-being. This often means that menstrual needs are overlooked or given less importance.

Philosopher Simone de Beauvoir argued that women are often treated as the “Other” in society, meaning their experiences are seen as secondary or less important. This idea is reflected in how menstrual issues are often ignored or marginalized. Improving menstrual hygiene, therefore, is not just about providing products or facilities it also requires addressing these deeper structural inequalities and changing societal attitudes.

Menstrual hygiene management continues to face several interconnected challenges that go beyond individual behaviour. Deep-rooted cultural taboos and stigma often discourage open discussion, while a lack of awareness and proper education leaves many girls uninformed about safe practices. At the same time, poor sanitation infrastructure such as the absence of clean toilets, water, and disposal facilities makes it difficult to manage menstruation with dignity. Economic constraints further limit access to hygienic products, and gaps in policy implementation mean that even existing programs do not always reach those who need them most. Since these challenges are closely linked, addressing them requires a comprehensive and multi-dimensional approach that combines social change, education, infrastructure development, and effective policy action.

Recommendations

Improving menstrual hygiene management requires a strong focus on education. Schools should provide comprehensive and age-appropriate information about menstrual health so that girls feel informed and confident. At the same time, it is equally important to include boys in these conversations. When boys are educated about menstruation, it helps reduce stigma, encourages empathy, and creates a more supportive environment for girls both in and outside the classroom.

Equally important is the need to strengthen basic infrastructure. Many girls struggle to manage their periods safely because schools lack proper sanitation facilities. Ensuring clean and separate toilets for girls, a reliable water supply, and safe disposal systems can make a significant difference. These improvements not only support hygiene but also help girls attend school regularly without discomfort or embarrassment.
Policy measures also play a key role in bringing about long-term change. Government schemes need to be effectively implemented and monitored so that their benefits reach those who need them most. Providing sanitary products at subsidized rates, or even free of cost in some cases can help reduce the financial burden on families and encourage healthier practices among adolescent girls.

Finally, community involvement is essential to bring about lasting social change. Awareness campaigns that involve parents, teachers, and local leaders can help normalize conversations around menstruation. Open dialogue can gradually challenge and break long-standing cultural taboos, creating an environment where girls feel supported, respected, and empowered.

Conclusion

Menstrual hygiene management among school-going adolescent girls in District Raipur is a complex issue influenced by a mix of social, cultural, economic, and institutional factors. Although there have been some improvements in recent years, many girls still face challenges in managing menstruation safely and with dignity.

Looking at the issue from a sociological perspective makes it clear that menstrual hygiene is not just about health it is also closely linked to questions of social justice and gender equality. The way society treats menstruation often reflects deeper inequalities that need to be addressed.

To bring meaningful change, a holistic approach is essential. This means combining better education, effective policies, improved infrastructure, and a shift in cultural attitudes. Empowering adolescent girls with accurate knowledge, access to resources, and a supportive environment can help them manage menstruation confidently. In the long run, this not only improves their well-being but also contributes to the overall progress of society.

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2

An Analysis of the Socio-Economic Background of Inmates in Central Jail of Bilaspur (Chhattisgarh)

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Abstract

This abstract examines the socio-economic determinants and demographic profiles of the incarcerated population at the Central Jail in Bilaspur, Chhattisgarh. Recognizing that crime is often a by product of systemic social and economic pressures, the study seeks to map the specific backgrounds of inmates to identify correlations between poverty, education, and criminal behavior. By analyzing variables such as age, caste, religion, income levels, and vocational skills, the research provides a comprehensive overview of who is being imprisoned and the environmental factors that may have influenced their path to the justice system.

The findings highlight a significant concentration of inmates from marginalized communities and lower-income strata, many of whom lack formal education or stable employment prior to their arrest. The study further explores the influence of family structure and rural-to-urban migration on delinquency within the region. By documenting these socio-economic realities, the research aims to inform policymakers and correctional authorities on the necessity of targeted rehabilitation programs. Ultimately, the study advocates for a shift toward restorative justice and vocational training within the prison system, suggesting that addressing the root causes of socio-economic vulnerability is essential for reducing recidivism and fostering long-term social reintegration in Chhattisgarh.

Keywords -Socio-economic determinants, vocational skills, marginalised communities, employment, rehabilitation programs

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Introduction

To understand crime as a symptom rather than just a choice, we must look past the courtroom and into the structures of society. While the legal system focuses on the specific act of the crime to determine guilt, social sciences analyze the actor within their environment. Crime is rarely an isolated event; it is "embedded" because the incentives and pressures for criminal behavior are often built into the socio-economic fabric. In a balanced society, institutions like schools, stable job markets, and community networks act as safety nets. When these nets have holes due to poverty or systemic bias, individuals don't just fall; they are often funneled into the only alternative systems available for survival or status. In India, the prison population serves as a mirror reflecting who has been excluded from economic progress. The concept of a "pipeline" to incarceration suggests that prison is the predictable end-point of a sequence of systemic failures. This pipeline is built on three primary pillars of inequality: educational deficits, economic precarity, and a lack of social capital. Statistics consistently show that a vast majority of Indian inmates are either illiterate or have not completed primary education, which bars them from formal employment. Without these gates open, the informal economy and its proximity to illegality becomes a default for survival.

Chhattisgarh, and specifically the Bilaspur district, presents a unique case study of how modernization-induced displacement creates these criminal pathways. Bilaspur sits at the intersection of industrial growth and traditional livelihoods. As mining, power plants, and railways expand, they often require the acquisition of land that has supported rural and tribal communities for generations. When traditional forest or farming livelihoods are lost and the displaced population lacks the technical skills required for new industrial jobs, they are relegated to an urban underclass. This friction between traditional ways of life and rigid, bureaucratic modern laws can effectively criminalize survival.

Understanding the "actor" versus the "act" is essential for real reform. If the legal system ignores these socio-economic drivers, it merely treats the symptom while the underlying cause remains. To break the cycle in regions like Bilaspur, solutions must move beyond simple enforcement toward inclusive growth. This involves ensuring displaced populations are trained for the new economy and strengthening legal aid to ensure that poverty does not automatically lead to years spent as an undertrial. Only by mending the socio-economic fabric can we begin to shorten the pipeline that leads from marginalized communities to the correctional system.

Activities of Jail Industries

Jail industries represent one of the most complex intersections of labor, law, and social rehabilitation. By transforming a prison from a place of static detention into a productive hub, these programs attempt to solve the two greatest crises of incarceration: inmate idleness and post-release unemployment. The defining characteristic of a modern correctional industry is its departure from punitive labor, such as breaking rocks, in favor of operationally realistic work. These programs utilize professional-grade machinery, follow strict production schedules, and enforce quality control standards identical to those found in private factories. The primary goal is to provide more than just a paycheck; it is to provide a work identity and the first experience many have with a structured environment and a reporting hierarchy.

Jail industries are incredibly varied and are often specialized in sectors that align with regional economic needs to ensure learned skills are marketable. Industrial manufacturing often produces furniture for government offices or steel fabrication for infrastructure, while garment sectors handle high-volume production of uniforms and linens. In more rural or

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emerging regions, agro-processing and high-tech services like data digitization help bridge the skills gap. Most of these industries operate as state-owned enterprises that are required by law to be self-funding. The revenue generated from sales covers the cost of raw materials, equipment maintenance, and inmate wages, often supported by state-use laws that mandate government agencies to prioritize prison-made goods.

The socio - economic impact of these industries is a crucial intervention point in the cycle of recidivism. By addressing the stable employment deficit, jail industries provide a path toward financial literacy. Wages earned are often split between a release fund, victim restitution, and family support, teaching the habit of structured financial management before an individual re-enters society. Comprehensive studies consistently show that inmates who participate in these programs are significantly less likely to be re-arrested within three years of release. Furthermore, productive work acts as a vital management tool within the prison walls, reducing the boredom and frustration that typically leads to violence and creating a safer environment for both inmates and staff.

In a region like Bilaspur, which serves as a major railway and industrial hub, jail industries have a unique opportunity to feed into the local economy. Given the presence of large-scale infrastructure and mining sectors, these programs can focus on specialized fabrication or logistical services. Integrating local cultural heritage, such as tribal handicrafts, can also provide a path toward self-employment in growing artisan markets. While debates exist regarding wage levels and competition with the private sector, the modern consensus is shifting toward viewing corrections as a service. The ultimate profit is the successful reintegration of a citizen who is equipped to contribute to the economy rather than remain a drain on the system.

The Strategic Objectives

While these programs produce physical goods, their primary "product" is a lower recidivism rate. They operate on three core levels:

- **Vocational Training:** Providing hard skills (welding, carpentry, data entry) and soft skills (punctuality, teamwork, following a supervisor) that are essential for post-release employment.
- **Operational Management:** Keeping a large population of incarcerated individuals constructively occupied, which significantly reduces "idle time" the primary driver of prison violence and tension.
- **Economic Sustainability:** Generating revenue to offset the high costs of incarceration, though the primary goal is usually rehabilitation rather than profit.

Common Industry Sectors

- Modern jail industries have moved far beyond the "license plate" stereotype. In India and globally, you will typically see four major categories:

Table 1.1: Major Jail Industry Sectors

Category	Typical Activities	Skills Developed
Manufacturing	Furniture making, garment stitching, metalwork (gates/grills).	Precision tool usage, upholstery, blueprint reading.
Agriculture	Dairy farming, organic vegetable cultivation, poultry	Sustainable farming, large animal care, resource management.
Services	Industrial laundry, commercial printing, data digitization.	Quality control, technical software usage, logistics.
Culinary/Bakery	Large scale bread production, catering for govt events	Food safety certification, bulk production, professional baking.

Jail industries are fundamentally designed to disrupt the systemic "pipeline to incarceration" by addressing the root socio-economic deficits that often funnel marginalized individuals into the criminal justice system. In many sociological theories, the pipeline is viewed as a series of institutional failures lack of quality education, absence of community support, and systemic poverty that collectively make criminal behavior a more likely outcome for certain populations. By the time an individual enters a correctional facility, they often possess a history of erratic employment or have been entirely excluded from the formal labor market. Jail industries intervene at this critical juncture by providing a structured, simulated economy within the prison walls that directly counters the instability of their previous environment.

The most immediate benefit of these programs is the provision of a stable income, which serves both a practical and a psychological purpose. Unlike traditional punitive labor, modern correctional industries typically offer wages that, while lower than those in the private sector, represent a consistent financial inflow that most Participants have never experienced. A significant portion of these earnings is often mandated into a supervised savings account, specifically earmarked for the individual's eventual release. This "gate money" is a critical deterrent to recidivism; it ensures that upon re-entry, the person has the financial liquidity to secure immediate needs like housing, transportation, and food, reducing the desperate pressure to return to illicit activities for survival.

Beyond the financial aspect, these industries provide a documented work history a credential that is frequently missing from the lives of the incarcerated. In the outside world, a "gap" in a resume or a complete lack of formal references acts as a permanent barrier to stable employment, essentially locking the individual back into the same socio - economic conditions that led to their initial arrest. Correctional industries mitigate this by treating the inmate as an employee. They learn to navigate a hierarchy, adhere to strict production schedules, and maintain professional standards of quality and conduct. When they leave, they do not just take with them a set of skills; they carry a verified record of productivity that can be presented to prospective employers as evidence of their reliability and growth.

This structured environment also addresses the "Stable Employment" deficit by fostering soft skills that are often overlooked in traditional vocational training. The habit of punctuality, the ability to resolve workplace conflicts without aggression, and the discipline required to see a project through to completion are all transformative behavioral changes. For many, the jail industry is their first experience with "work identity" the sense of dignity and purpose that comes from contributing to a tangible output. By replacing the identity of a "criminal" with that is a "skilled worker," these programs break the psychological links in the incarceration pipeline, making it far more likely that the individual will seek and maintain a stable, lawful life after their sentence is served.

REVIEW OF LITERATURE

(Paramasivan, C. 2016) In India, almost all the central jails have various industrial units which produce different types of product with the help of prisoners. Weaving, tailoring, bread making, handle making, brick making, and food products making are trendy in the prison manufacturing unit at central jail of Tamil Nadu. Prisons Bazaar is one of the biggest targets in the history of prison reforms, which remolded the prisoners into entrepreneurs. Such practices will be very helpful for the inmates to become flourishing entrepreneurs after completing their detention.

(Huling T. 2002) In 19th century, those sections of society which was suffering from shrink in farming, mining, timber-work and manufacturing, in U.S., are now exhorting for prisons to be built in their patio. Since 1980, most of the new prisons built to accommodate the increasing U.S. prison population have been placed in rural areas, which resulted in shifting of majority of prisoners in rural America. Prisons are now taken over by economic development professionals and public servants of all stripes as beneficial economic engines to foster suppressed rural economies. The use of prisons as money-makers for struggling rural communities has become a major force driving criminal justice policy toward mass incarceration of the urban poor.

(Thalmann, V. 2004) The prison population has showed a remarkable growth in many industrialized countries of the United States, in late 90's. Count of private prisons and prisoners working for private companies were increased significantly. Proponents of private sector involvement in prison industries argued that inmate labor can reduce the cost of incarceration and helps in rehabilitation of inmates. Opponents of private sector involvement argued that it may cause exploitation. They also argued that the authority for punishment is a core governmental function and it should not be delegated to the private sector.

(Vineetha, S. 2016) studied the programmes available for inmates in the prisons of Kerala. She accounted trades such as weaving, tailoring, smithy, carpentry and soap and phenyl manufacturing being organized in the Prison Manufactory; and also the activities of cover making, binding, and printing organised at a unit of Central Press. Other commercial activities such as agriculture, food processing, animal rearing, sericulture and other activities for prison maintenance and several short-term training programmes were also being conducted for the development of prison and prisoners. However, she found out that neither the inmates nor the officials considered any programme, except tailoring and food processing, to be useful for prison inmates in any way. Their main purpose of vocational training programmes was to earn money.

The research concludes that the policy governing work as a programme in prisons needs to be amended.

(Deshmukh, A.A. 2013) In most of the cases Prisoners are primarily involved in productive work followed by jailbird services & administrative works. The inmates mainly work in textile, tailoring, carpentry and other industries. In Jail Industries, the prisoners skill is developed by their in-charges. However, the study showed that the prisoners were not pleased with the present wage arrangement. Differential piece rate system was followed for payment of wage to inmates. Vocational training, physical training, literacy classes, yoga, vipassana and moral lectures were used to boost the morale of inmates and make them efficient and productive. The inmates demand was for a hike in their existing wage rates, proper planning of restoration methods, I.T.I, in prison, diversified industries and an independent industrial Jail. All the prisoners agreed upon one thing that, the families of prisoners and the prisoners as well should be backed by some Government Schemes so that they can earn their livings.

RESEARCH METHODOLOGY

Statement of the Problem

The persistent overrepresentation of the socio-economically disadvantaged within Bilaspur Central Jail highlights a profound disconnect between judicial theory and the lived reality of the marginalized. While legal reforms often focus on procedural efficiency or the acceleration of trials, they rarely address the structural "gravity" that pulls certain populations into the correctional system. In Bilaspur, as in much of India, the prison serves as a catch-basin for those who have slipped through the cracks of every other social institution. The demographic profile of these inmates is a direct reflection of systemic inequalities, where the lack of a financial cushion or social safety net turns minor legal infractions into long-term incarceration.

A central obstacle to meaningful change is the critical deficit of granular, empirical data regarding the inmate population. We know that these individuals come from the "lower rungs," but we lack a precise understanding of the specific vulnerabilities that led them there. There is no comprehensive mapping of their literacy levels not just the ability to sign their names, but their functional literacy and ability to navigate legal documents. Similarly, data on land ownership or the loss thereof is absent, which is vital in a region like Chhattisgarh where land displacement is a primary driver of economic instability. Without this data, the state cannot see the clear correlation between the loss of traditional livelihoods and the onset of criminal behavior.

Furthermore, the absence of information regarding the vocational skills these individuals possessed prior to their arrest renders rehabilitation programs almost entirely generic. Currently, many programs operate on a one-size-fits-all model, assuming that any manual skill will suffice for reintegration. However, if a displaced farmer from the rural outskirts of Bilaspur is trained in a skill that has no market demand in his specific village, the program has failed. Rehabilitation must be a form of "precision medicine" for the soul and the resume; it must be tailored to the specific skills, deficits, and economic landscapes the inmates will return to. Without this specificity, the training becomes a hollow exercise in compliance rather than a bridge to a stable life.

Ultimately, failing to understand who is in jail and why they were vulnerable to criminal influence ensures that the cycle of recidivism remains unbroken. If we do not address the "pipeline" factors such as the absence of social capital or the pressure of modernization on traditional tribal dependencies we are merely managing a revolving door. Effective reform requires moving beyond the act of the crime to the biography of the actor. Only by collecting and acting upon empirical data can Bilaspur transform its central jail from a warehouse for the poor into a genuine site of socio-economic correction and community healing.

Objectives of the Research

The primary goal of this research is to map the socio-economic identity of the inmates at Central Jail, Bilaspur. Specifically, the study aims:

- To analyze the **demographic profile** (age, caste, and religion) of the prisoners.
- To evaluate the **educational status** of inmates prior to incarceration.
- To evaluate the **vocational status** of inmates prior to incarceration.

Significance of the Study

This study serves as a vital document for policymakers, criminologists, and the Chhattisgarh Prison Department. Rather than viewing incarceration through a strictly punitive lens, this study advocates for a data-driven, human-centric approach that prioritizes long-term social stability over short-term isolation. By analyzing the "human profile" of inmates their socio-economic backgrounds, education levels, and psychological needs policymakers can move beyond the antiquated "lock and key" model toward a system of restorative justice that acknowledges the prisoner as a future citizen.

For the Chhattisgarh Prison Department, this study functions as a strategic roadmap for administrative reform. Historically, prison management in many regions has focused on security and containment. However, a "human profile" reveals the underlying drivers of crime, such as systemic poverty or lack of opportunity. When criminologists and administrators understand these drivers, they can implement interventions that address the root causes of recidivism. This shift is essential for reducing the burden on the state's judicial and correctional infrastructure, as it aims to break the cycle of re-offending that often plagues those who feel marginalized by society upon their initial release.

A cornerstone of this restorative approach is the alignment of vocational training with the specific economic realities of Bilaspur. Traditional prison labor often involves menial tasks that do not translate into marketable skills in the modern economy. By identifying "market needs," the study ensures that the skills acquired behind bars whether in manufacturing, digital literacy, or skilled trades are in high demand locally. This creates a bridge between the prison gates and the Bilaspur job market, transforming the inmate from a liability into a productive economic participant. When vocational programs are evidence-based, they provide inmates with more than just a certificate; they provide the dignity of a viable livelihood.

Furthermore, the emphasis on reintegration serves a broader public safety goal. Restorative justice posits that the community is safer when former inmates are successfully folded back into the social fabric. If a released individual has a stable job and a clear path to reintegration, the likelihood of them returning to criminal activity diminishes significantly. This study encourages policymakers to view the prison population not as a static group of "offenders," but as a dynamic group of individuals in transition. By providing the tools for this transition, the state fosters a more inclusive society where justice is measured not just by the length of a sentence, but by the success of the return.

Ultimately, this document serves as a catalyst for a more compassionate and pragmatic legal framework. It challenges stakeholders to rethink the purpose of the prison system in the 21st century. By integrating economic data with sociological insights, the Chhattisgarh Prison Department can transition from a system of mere "warehousing" to one of genuine rehabilitation. This holistic strategy ensures that justice is served to the victim and the state, while simultaneously offering the offender a genuine opportunity for redemption and a stable future in the Bilaspur community.

Proposed Methodology:

Research Area:

CentralJail of Bilaspur, Chhattisgarh is proposed to be the research area. The total geographical area of the Jail is 7, 79, 175 sq. ft. which is equivalent to 18 acres of land with a total accommodation capacity of 1328 prisoners at a time.

Sample Size:

The data will be collected covering all the prison industries of the CentralJail of Bilaspur and 31 prisoners were personally interviewed only after taking prior approval from the Jail authority.

Research Design:

To conclude a study, research methodology includes two types of researches[1], namely:

I. Doctrinal research and

II. Non-Doctrinal Research.

Doctrinal research means collection of data from existing sources such books, articles, seminar publications, magazines, research papers, journals etc. however, on the other hand, non-doctrinal research means data collection through field work like personal interview, questionnaire, survey etc

Tools and Techniques of Data Collection:

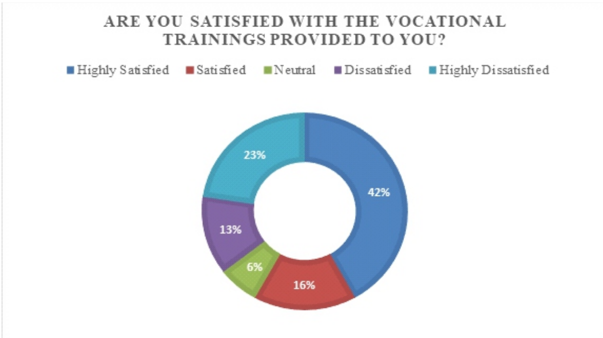
Tools like graphs, frequency distribution, and percentage can be helpful for concluding the research. Apart from primary source, data will also be collected from published or unpublished journals, thesis, research papers, library books, electronic content etc.

DATA ANALYSIS AND INTERPRETATION

S. No.	Criteria		Response (figures)	Response (percentage)
1.	Age	Below 25	02	6.45%
		25-30	16	51.61%
		31-35	04	12.90%
		35-40	06	19.35%
		Above 40	03	9.68%
2.	Level of education	Up to XII	04	12.90%
		Graduate	18	58.06%
		Post graduate	9	29.04%
3.	Gender	Male	22	71%
		Female	9	29%
		Third gender	00	00%
4.	Marital status	Married	12	38.71%
		Unmarried	19	61.29%
5 5.	Native place	Bilaspur	25	80.65%
		Others	06	19.35%
6.	Accommodation	Self-owned	22	70.97%
		Rental	09	29.03%
7.	Type of family	Joint	22	70.97%
		Nuclear	09	29.03%
8.	Sole-earner	Yes	10	32.26%
		No	21	67.74%

The demographic data so collected, when analysed as shown in Table 1., resulted to form an opinion that proisoners in Central Jail of Bilaspur are not only uneducated or unemployed. Surprisingly, majority of them, i.e., 58.06%, are graduate and even some of them, say 30% (approx.) of the total respondents have completed their post-graduation as well. Each respondent is at least intermediate qualified, i.e., class 12th. Not surprisingly, 80.65% owners are local, i.e., they belong to Bilaspur city only. More than 50% of the total respondents are young adult, i.e., they belong to the age bracket of 25-30 years. 61.29% of the respondents are married.

Out of the total respondents 67.74% were the sole earner of their family. While studying their standard of living and affordability it was found that majority of the respondents, i.e., 70.97% lives in a joint family. 70.97% respondents live in self-owned house while remaining 29.03% accommodated themselves together with their family in rented properties.



The doughnut chart displays the results of the survey regarding satisfaction with provided vocational trainings. The overall sentiment leans heavily toward the positive end of the spectrum, with a clear majority of respondents expressing some level of approval. Specifically, 58% of participants reported being either "Highly Satisfied" (42%) or "Satisfied" (16%). The "Highly Satisfied" group is the single largest segment of the data, suggesting that for a significant portion of the cohort, the training exceeded expectations or met a high standard of quality.

However, the data also reveals a notable undercurrent of discontent that shouldn't be ignored. While a small 6% of respondents remain "Neutral," over a third of the participants 36% in total expressed dissatisfaction. This is divided between 13% who are "Dissatisfied" and a substantial 23% who are "Highly

Dissatisfied." The fact that nearly one in four people felt highly dissatisfied indicates a polarized response; while the training worked very well for the plurality, there is a distinct segment of the population whose needs or expectations were fundamentally unmet.

When looking at the balance of the data, the program appears successful on the surface due to the high "Highly Satisfied" rate, but the disparity between the extremes is striking. The "Highly Dissatisfied" group (23%) is actually larger than the "Satisfied" (16%) and "Neutral" (6%) groups combined. This suggests that the vocational training may be highly effective for certain skill levels or demographics while being poorly suited for others, pointing toward a need for more tailored or accessible training modules to bridge the satisfaction gap.

CONCLUSION

The research conducted at Bilaspur Central Jail presents a compelling contradiction that challenges traditional criminological assumptions in the Indian context. While the initial premise suggested that incarceration in Chhattisgarh is primarily a byproduct of systemic poverty and a lack of formal education, the empirical data reveals a population that is exceptionally well-educated and socially integrated. With nearly 60% of inmates holding degrees and 100% having completed secondary education, the "criminal profile" in this region shifts from one of marginalization to one of high-competence individuals who were, in many cases, the sole economic pillars of stable, home-owning joint families.

This demographic reality highlights a profound mismatch between the needs of the incarcerated and the rehabilitation services currently provided. The significant levels of dissatisfaction with vocational training particularly the 23% who are "highly dissatisfied" suggest that standard prison programs are designed for a low-skill demographic that does not represent the majority of this cohort. For a post-graduate sole earner, basic manual labor training lacks both economic utility and intellectual engagement, failing to provide a viable path for reintegration into the professional or skilled labor markets they previously occupied.

SUGGESTIONS

a) Implement Tiered Vocational Modules: Transition away from purely manual labor for highly educated inmates by introducing training in digital literacy, data management, and financial compliance to match their professional backgrounds.

b)Establish Professional Certification Partnerships: Collaborate with institutions like IGNOU to allow graduate inmates to earn advanced diplomas or management certifications, preventing "skill rust" during their sentence.

c) Provide Family Financial Counseling: Offer legal and economic support to the families of sole earners (68% of the cohort) to prevent household collapse and multi-generational delinquency.

d) Explore Work-Release Programs: For low-risk, highly educated inmates in the 25–30 age bracket, utilize semi-open jail conditions that allow for supervised professional work or specialized prison industries.

e) Integrate Mediation and Conflict Resolution: Since 71% of inmates come from joint families, provide mandatory training in Alternative Dispute Resolution (ADR) to address the root of property and domestic legal battles.

f) Utilize Inmate-Led Peer Teaching: Leverage the 30% of post-graduate inmates as internal instructors to increase program relevance and provide the educated cohort with a sense of purpose.

g) Create Regular Feedback Loops: Establish a formal system for inmates to review and suggest curriculum changes, ensuring vocational training remains aligned with the actual job market.

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3

A study on Consumer Perception towards Sensory Branding

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Abstract

Sensory branding is contemporary marketing that is connected with the senses with reference to brand. It is connected with customers on emotional and behavioral aspects. Many researchers have used sensory elements in their research such as vision, touch, sound, smell, and taste. (Lindstrom, 2005; Wansink, 2003). Considering strong research gap, current study investigates the consumer perception towards sensory branding. Current study has adopted single cross sectional research design based on primary research in Chhattisgarh. Data analysis is done using SPSS. Study provides strong implications to marketers and society as a whole.

Keywords: Marketing, Sensory branding, Behavioral Aspects, Consumer perception

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Introduction

The concept of branding has evolved over the last decade and companies are beginning to create brand experiences through sensory branding. Wilson (2012). While not wholly novel, the use of sensory identity techniques is becoming more popular as merchants strive to create exclusive in-store experiences (Michon, Chebat& Turley, 2005). Multi-sensory branding is the process through which a certain brand image influences purchasing behaviour via the five senses. (2011) (Hulten). The retail business has developed quickly, bringing about an exceptionally concentrated market. Buyers have more alternatives of where and how to buy items. Quite possibly the most well-known techniques for buying are through the web, making it very helpful for customers to look for and to buy. Because of the changed retail climate probably the greatest test experienced by retail proprietors is to attract purchasers to their store and to hold them as clients. It is subsequently important that retailers guarantee their in-store climate has a powerful plan and that in store enhancements are done to establish an alluring climate where buyers would need to invest energy during a shopping trip, rather than looking and purchasing over the web (Nell, 2017). American Marketing Association characterizes tangible promoting as 'showcasing procedures that intend to persuade the purchaser by utilizing his facilities to impact his emotions and conduct (Pallavi, 2017; Antonio, 2017; Chathuranga & Lakshika, 2018). The idea of 'General store' has been started in the middle of 1920s to 1930s. Further, it has become to brands that are more receptive to the buyers' progressions have had the option to make due from the jumbled advertising climate in the present. In the current mechanically stable time with more educated clients with better standards, it has gotten basic to move consideration from the highlights and advantages-based methodology where encounters are promoted. The continually developing rivalry in the market expects organizations to think of new strategies to separate from others. In light of this setting organizations have the chance to arrange separated encounters utilizing tangible incitements which make their contributions more exceptional and paramount. Added to this the faculties assume critical parts in purchaser experience and feelings attached to it. In retail configuration brands identified with tactile experience draw in clients and animate solid, positive, and unmistakable impression across each of thefive detects. (Chathuranga & Lakshika, 2018) The dynamic activity of multiple partners in co-creating brand meaning is increasingly recognised in brand research, as is the role of new online media support partners in their co-creation efforts. However, there is a scarcity of experimental experience in the online multipartner corporate social cycle that involves co-creation. (Christiane, Vallaster, & Sylvia Von, 2013) The opposition inside the inexpensive food chain café industry is extremely high. To satisfy clients, eateries are utilizing various strategies to take a stab at greater pieces of the overall industry. Establishing a climate that is charming where clients appreciate coming to. assumes a fundamental part in deciding clients' fulfilment, their visit length and aim to return to the café. Tangible showcasing has arisen as an instrument to assemble positive brand picture and client dependability as five feelings of client; visual, hear-able, olfactory, material and gustative are invigorated. Standard displaying procedures are no more relevant in the present genuine period. Just captivating visual detect and hear-capable sense may not be the solitary ways to deal with attract customers. Regular publicizing techniques need to change and in find creative ways to deal with target customers where nearer to home and individualized thought is given, solid experience association between the customer and brand is made. Drive through restaurant industry is incredibly genuine, holding customer and making them dedicated to get back to is dependent on the widely inclusive buyer eating experience got at the hour of use at the bistro. The customers today need to capitalize on their purchases through an experience that is attracting and critical (Hussain, 2018).

Literature Review

Many consumer behaviourists have sought to incorporate the principles of sight, touch, hearing, smell and taste into their research. (Krishna, 2012; Lindstrom, 2005; Wansink, 2003). Sensory marketing is the marketing industry's use of the consumer's feelings and perception empathy. This new concept emphasises the importance of generally practical meetings within the customer partnership upgrading process. (Hulten, 2011) We created a model multisensory brand experience based on the assumption that retailers would take advantage of different sensory opportunities to differentiate their brands and engage their target markets. (1999, Schmitt) Sensory marketing is a marketing technique that emphasizes consumer emotions over rational judgment by appealing to her five senses: “Sight", "Smell", "Sound", "Good", "Feel". (Nell, 2017) With globalization, with brand assaults on business development, distributors have challenged themselves to get a piece of the pie in this real scene. Retailers therefore return to creative strategies, for example, experiential publicity to influence the buyer's buying behavior. This paper aims to study how experiential promotion is appropriate for the purchase of coffeehouses by customers. (Dalle, Venter, & Mhlophe, 2017) The choice to purchase an item or administration is affected by numerous components, including social, social, mental yet in addition individual elements. Tangible showcasing itself is going to the forefront and that's just the beginning and more individuals are understanding its position. This archive is devoted to give which is valuable for organizations as well as for purchaser himself. It manages inclusion of tactile and attempts to explain their significance in business correspondence. The point of exploration record was assessment of faculties and their effect on buyer's conduct in shopping region. The relationship between ages and purchasing proclivities during shopping behaviour was also noteworthy. (Guziy, Šedík, & Horská, 2017; Géci A. , 2017; Géci, Nagyová, & Rybanská, 2017).

Human detects play an important role in his definition of an environment, and store climate is depicted in physical terms. The key tactile channels are thus sound, sight, fragrance, taste, and contact. Later Milliman fundamentally investigated the writing accessible and introduced an experimental examination that inspected the impacts of ambient sounds on in-store shopping conduct. The after effects of the tests showed that the speed of in-store traffic stream was essentially slower with the lethargic rhythm music than for the quicker beat music. The higher deals volumes were reliably connected with the slower rhythm melodic determinations while interestingly, the lower marketing projections were oftentimes connected with the quicker beat music. Additionally, introduced an exact examination that inspected the impact of mood melodies on the conduct of eatery clients. The observational investigation introduced in this paper depends on the hypothetical model introduced by Mehrabian and Russell and further created by Russell and Pratt. From the outcomes it was apparent that the more slow, maybe more calming ambient melodies established a seriously loosening up climate for the clients. Tangible promotion is the use to the purchaser of insight, perception, feelings, learning, inclination, decision or evaluation of sensation and discernment in the field of showcasing. This audit is organized around this theoretical structure. The creator clarifies the impact that each sense - contact, smell, sound, vision and taste have on the view of purchasers and further their dynamic (Dr. Rupa & Pallavi, 2017; Nell, 2017).

“In marking writing, the idea of brand personality is characterized as an extraordinary arrangement of brand affiliations that a firm can make or keep up". All in all, it is the impression or the one-of-a-kind space the brand means to consume in the shopper's brain. It might include an offer with utilitarian, passionate or self-expressive advantages. The enthusiastic connection that a brand has with its customers is crucial in the creation of successful brands. Scientists also indicate that rather than only things and services, customers seek and purchase passionate experiences relating to what they have purchased. As a result, sophisticated promoting experts have recognised the need to go beyond standard methods of establishing brand identity. (Antonio, 2017)With that field tangible components are progressively turning out to be significant while conceptualizing an updated corporate character build.

Moreover, it is vital for move consideration from the highlights and-advantages approach pushed by conventional advertising to given that clients with encounters. Unlike traditional advertising, which focuses on practical highlights and benefits, experiential advertising focuses on client interactions. Encounters happen as a result of going through, experiencing, or living through something. Encounters provide specific, enthusiastic, psychological, behavioural, and social traits that enhance practical talents. (Chathuranga & Lakshika, 2018; Hussain, 2018)

Branding refers to how buyers perceive a brand and can be positive or negative (Yoon & Park, 2012). According to Yoon and Park (2012), sensory advertising has a significant impact on brand sentiment. According to Ryu and Jang (2008) and Tantanatewin and (Inkarojrit, 2018), customer experience positively influences consumer intentions. The relationship between brand attitudes and purchase intent is reasonably simple. Wu and Lo (2009) investigated how brand behaviour influences purchase intention of Taiwanese customers and found that branding is a strong predictor of purchase intention. This topic has received little attention in the Indian context, especially in the coffee sector. As a result, the focus of this study is the impact of sensory marketing on brand attitudes and its broader impact on behavioural intentions in the Indian coffee shop industry. (Gogorath, 2018). Shading produces various responses in individuals and intellectually affects clients. Logos, colours, bundling, plan furthermore, alluring shape can reinforce the ideal picture of your item in buyer's psyche. Sight upgrades may likewise have a passionate reaction other than drawing consideration. The sensitivity of smell is nearby our feelings and conduct and it has astonishing impact on our manner. Long haul impact of smell causes more aromatic memory and aromatic object is a lot of alluring than non-sweet-smelling one. Sound: Sound is frequently utilized as an effective apparatus for speaking with the oblivious need of the purchaser. Sound can demonstrate to have positive outcomes in the customer experience and the correct sort of music can even influence the purchasing conduct of the shopper. Touch: Only Eye isn't sufficient to pass judgment items. Visual and hear-able tactile boosts make clients nearer to items and they wouldn't see any problems with contacting it to additional improve their involvement in the item. By contacting the items, client conduct and shopping disposition is emphatically influenced. Taste: In the present serious market, connecting a novel taste to your image can help in making a separation of administration. Taste adds an interesting worth making it an important encounter for the buyers that invigorates the replication and expansion of their by and large experience, paying little heed to the cost (Pallavi, 2017; Galande, 2019).

Research Methodology

Research Objective for current study is to measure consumer perception towards sensory branding for FMCG sector in Chhattisgarh. This study's target population consists of the FMCG product consumers residing in Chhattisgarh state. Among descriptive research designs, a single cross-sectional study design was chosen. The questionnaire survey was administered. Respondents' informed consent was obtained prior to data collection. Snowball sampling was used in this research. Non comparative scaling technique is used in this study. Response time was around 6 minutes to fill up the questionnaire. Pilot testing was done over 41 respondents to validate the questionnaire. Data obtained from pilot survey were reliable as the Cronbach alpha value was 0.926. Pilot survey data was not utilized for thefinal survey. Other books, journals, websites, and academic articles were used to gather secondary data. Primary data was collected from the population of major cities of Chhattisgarh who are consumers of FMCG products, with help of the structured questionnaire. The cities include Ahmedabad, Surat, Vadodara and Rajkot. Statements of questionnaires were extracted through literature review. Here researcher has utilized Likert scale for strongly agree to disagree options. The sample size for this research survey is 220 respondents. For analysis purpose SPSS, which is considered among the most powerful statistical analysis tools, wSource: Author's calculation

Statistically, the reliability of a scale is determined by the consistency of the results when repeated measurements are made. A measure is deemed to be more dependable if it produces identical results under consistent conditions. Cronbach's alpha values must be more than 0.70 to be considered acceptable. (Nunnally J, Bernstein L., 1994). Hence the data is reliable for further studies.

Demographic Analysis

Variable No.	Variable	Cronbach's Alpha	Number of items
1	Sound	0.909	3
2	Smell	0..892	3
3	Touch	0..911	3
4	Sight	0.898	3
5	Taste	0.901	3
6	Consumer Perception	0.923	12

as used in the research project.

Data Analysis

Reliability Analysis

Factor	**Particulars**	**Frequency**	**Percent**	**Cumulative Percent**
Gender	Male	146	66.4	66.4
	Female	74	33.6	100.0
	Total	220	100.0	100.0
Age	18-28	78	35.5	35.5
	29-38	92	41.8	77.3
	39-48	34	15.5	92.7
	49-58	16	7.3	100.0
	Total	220	100.0	
Marital Status	Married	151	68.6	68.6
	Unmarried	69	31.4	100.0
	Total	220	100.0	
Annual family income	Less than 2,00,000	17	7.7	7.7
	2,00,001 to 4,00,000	71	32.3	40.0
	4,00,001 to 6,00,000	73	33.2	73.2
	6,00,001 to 8,00,000	28	12.7	85.9
	Above 8,00,000	31	14.1	100.0
	Total	220	100.0	

Education	SSC	18	8.2	8.2
	HSC	23	10.5	18.7
	Graduation	93	42.3	61.0
	Post-Graduation and Above	86	39.0	100.0
	Total	220	100.0	
Members in household	1-3	11	5.0	5.0
	4-6	105	47.7	52.7
	7-9	81	36.8	89.5
	Above 9	23	10.5	100.0
	Total	220	100.0	
Occupation	Student	94	42.7	42.7
	Salaried	92	41.8	84.5
	Self Employed	20	9.1	93.6
	Home maker	14	6.4	100.0
	Total	220	100.0	

Source: Author's calculation

Hypothesis Testing

H1: There is a significant difference between gender and consumer perception.

Average score of the consumer perception taken as the testing variable and gender, was taken as the grouping variable in the one-way ANOVA test.

ANOVA: Consumer Perception

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.010	1	0.10	2.005	0.046
Within Groups	477.099	218	2.189		
Total	477.109	219			

Source: Author's calculation

Here, the p-value (0.046) justifies being less than the significance level (0.050), so we can say that there is a significant difference between the average consumer perception scores for men and women. The average age of men is higher than that of women.

Descriptive:Consumer Perception

Gender	N	Mean	Std. Deviation
Male	146	3.98	1.532
Female	74	3.05	1.364
Total	220	3.52	1.476

Source: Author's calculation

H2: There is a significant difference between an age and consumer perception.

Average score of the consumer perception taken as the testing variable and age, was taken as the grouping variable in the one-way ANOVA test.

ANOVA: Consumer Perception

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.084	3	3.695	1.713	0.016
Within Groups	466.025	216	2.158		
Total	477.109	219			

Source: Author's calculation

Here, the p-value (0.016) justifies being less than the significance level (0.050), so we can say that there is a significant difference in the average consumer perception scores for different age groups. The age group 39-48 has the highest average scores.

Descriptive: Consumer Perception

Age	N	Mean	Std. Deviation
18 -28	78	2.81	1.406
29 -38	92	3.11	1.522
39 -48	34	3.56	1.447
49 -58	16	3.29	1.504
Total	220	3.06	1.476

Source: Author's calculation

H3: There is a significant difference between education and consumer perception.

Average score of the consumer perception taken as the testing variable and education, was taken as the grouping variable in the one-way ANOVA test.

ANOVA: Consumer Perception

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.697	2	3.849	1.779	0.027
Within Groups	469.412	217	2.163		
Total	477.109	219			

Source: Author's calculation

Descriptive: Consumer Perception

Education	N	Mean	Std. Deviation
SSC	18	3.73	1.422
HSC	23	3.55	1.284
Graduation	93	4.02	1.171
Post-Graduation and Above	86	3.98	1.513
Total	220	3.68	1.372

Source: Author's calculation

H4: There is a significant difference between Annual Family Income and consumer perception.

Average score of the consumer perception taken as the testing variable and Annual Family Income, was taken as the grouping variable in the one-way ANOVA test.

ANOVA: Consumer Perception

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.562	4	1.390	1.634	0.039
Within Groups	471.547	215	2.193		
Total	477.109	219			

Source: Author's calculation

Here, the p-value (0.039) is lower than the justified significance level (0.050), so we can say that there is a significant difference in the average consumer perception scores for different income groups. The income group 200001- 400000 has the highest average value.

Descriptive:Consumer Perception

Income	N	Mean	Std. Deviation
Less than 2,00,000	17	2.90	1.583
2,00,001 to 4,00,000	71	3.41	1.322
4,00,001 to 6,00,000	73	3.01	1.532
6,00,001 to 8,00,000	28	3.21	1.449
Above 8,00,000	31	3.23	1.668
Total			

Source: Author's calculation

Regression Analysis

Hypothesis	Beta Coefficient	R^2	F	P value	Result
H1:Sound → Consumer Perception	0.492	0.419	61.273	0.000	Supported
H2 :Smell → Consumer Perception	0.417	0.572	45.138	0.000	Supported
H3: Touch → Consumer Perception	0.474	0.411	44.286	0.000	Supported
H4:Sight → Consumer Perception	0.581	0.438	111.287	0.000	Supported
H5: Taste → Consumer Perception	0.425	0.484	19.975	0.000	Supported

Source: Author's calculation

Consumer perceptions were regressed on sound to test hypothesis H1. A significant predictive consumer perception F = 61.273, p < 0.01, indicating that sound plays an important role in shaping consumer perception (b=0.492, p<0.01). These results clearly demonstrate the positive effects of sound. Furthermore, R2 = 0.419 indicates that tone explains 41.9% of the variance in consumer perception.

Consumer perceptions were regressed on odors to test hypothesis H2. Odor significantly predicted consumer perception F = 45.138, p < 0.01, indicating that odor plays an important role in shaping consumer perception (b=0.492, p<0.01) . These results clearly demonstrate the positive effects of odor. Furthermore, R2 = 0.572 indicates that odor explains 57.2% of the variance in consumer perception.

Consumer perceptions were regressed on sound to test hypothesis H3. Touch significantly predicted consumer perception F = 44.286, $p < 0.01$, indicating that touch plays an important role in shaping consumer perception (b=0.474, $p<0.01$). These results clearly demonstrate the positive effects of touch. Furthermore, R2 = 0.411 indicates that touch explains 41.1% of the variance in consumer perception.

Consumer perceptions were visually set back to test hypothesis H4. Visual acuity significantly predicted consumer perception F=111.287, p<;0.01, indicating that vision plays an important role in shaping consumer perception (b=0.581, $p< 0.01$). These results clearly demonstrate a positive visual effect. Furthermore, R2 = 0.438 indicates that vision explains 43.8% of the variance in consumers' perceptions.

Consumer perceptions were regressed on taste to test hypothesis H5. Flavor significantly predicted consumer perception He F = 19.975, $p < 0.01$, indicating that taste plays an important role in shaping consumer perception (b= 0.425, $p < 0.01$). These results clearly demonstrate the positive effect of taste. Furthermore, R2 = 0.484 indicates that taste explains 48.4% of the variance in consumer perception.

Conclusion and Scope for further study

The primary goal of the study was to use regression analysis to assess the influence of sensory marketing on consumer perception. The findings of this study suggest that all five senses sound, touch, sight, and taste have a strong influence on how consumers perceive FMCG brands. The product's taste is the sense that influences people's perceptions the most favourably. In this study, sound and touch are found to be the least influential factors that influence how consumers perceive FMCG brands.The results of this study also imply that consumers of different genders, ages, educational backgrounds, and economic levels have very varying perceptions of products. The study offers a fundamental foundation for comprehending sensory branding and how it affects how consumers perceive products. The geographic scope, target age group, sample size, and use of probability sampling techniques should all be increased in future studies.

Limitations of the study

With a small sample size and a focus on the food and beverage (FMCG) industries, the research is limited to the state of Chhattisgarh. Incorporating novel demographic characteristics as research variables and conducting cross-state comparisons are also feasible. Furthermore, this research can be broadened by comparing the findings to other regions and cultures.

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AI-Enabled Healthcare Management: A Study on Operational Efficiency and Decision-Making

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Abstract

Application AI in hospital management is gaining ground on a daily basis. This revolution is occurring throughout the routine operations of the hospital and health institutions. This study focuses on understanding how AI assists in making the operational aspect more efficient and aids in the decision Making Process of the hospital and health institutions. This research will investigate how the application of AI tools aids in reducing work load, saving of time and improvement of quality of service provided to patients. The research utilizes primary and secondary data; information has been obtained from doctors working in hospitals, hospital employees and literature available on this subject in order to attain knowledge about the real situation of application of AI in routine operations. There are various application of AI that will be studied such as patient information management systems, predictive analyses and automated scheduling and clinical decision support systems. These systems help doctors in diagnosis of disease and proper allocation of resources and reducing human errors. The results of this study will demonstrate that AI is effective in improving efficiency through the automation of various task and providing accuracy to our decisions, making decision making much more accurate and efficient for healthcare authorities, because they will now have much more access to information to aid their decision making. With the help of these tools, the healthcare manager will now know what to do, in order to achieve desired results and help patients to be satisfied with services. AI has potential to bring a much bigger revolution in health care, although theremight be some pitfalls.

Keywords: Artificial Intelligence, Healthcare Management,Operational Efficiency, Decision Making Clinical Decision Support System

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Introduction

Healthcare institutions today are facing constant challenges with limited resources. Hospitals and healthcare organizations are under pressure to manage a growing patient load, while simultaneously improving quality, cutting costs, and facilitating timely decision making. Traditional management techniques often fall short due to heavy reliance on manual processing, human judgment, and isolated data sources which lead to delays and an increase in error. Over the last few years Artificial Intelligence has emerged as a promising solution to many of these problems. Artificial intelligence refers to a computing system which exhibits and intelligent behaviour such as reasoning, learning, planning and decision making by analysing huge amount of data. There are many applications of AI that are being explored in the healthcare sector: analysis of patient data, decision making support, treatment planning and administrative management. These applications are providing help to healthcare professionals in the form of increased efficiency and effective decision making. One of the ways by which AI helps in healthcare management is through improving the efficiency of operations. A well implemented AI system can process information accurately and fast enough to reduce workload and free up time of medical professionals. AI can also automate routine tasks such as appointment management, patient data storage and processing, and medical billing. In this way, medical professionals are given the opportunity to spend more time with their patients instead of processing forms. Also, through optimized utilization of resources and personnel through resource management and employee scheduling, resources are not wasted unnecessarily. The next important way AI aids in decision making: healthcare related decisions frequently have to be made quickly based on accurate information. AI based systems analyse patient history, medical records, identifying possible risk factors and providing possible outcomes thereby facilitating clinical and administrative staff make the most appropriate decisions, resulting in improved quality of care. Despite of these many advantages, the adoption of AI for healthcare management is still at its initial stage in many parts of the world. Many barriers exist Such as Lack of Awareness, Lack of technical expertise and the high cost associated with its implementation and data privacy concerns. Moreover, it is still being understood how AI contributes to operational efficiency and effective decision making in healthcare. Given these backgrounds, the present study aims to investigate application of AI enabled Healthcare management for operational efficiency and decision-making support. The study seeks to investigate how such AI tools are applied and their benefits along with the challenges faced. With these findings the study hopes to contribute useful information for policymakers, healthcare institutions, and researchers concerned about utilizing AI for efficient healthcare management. The paper comprises of the following sections. Next section will give a review of the literature on AI in healthcare and then followed by methodology used. The following section will present the data analysis and finally discussion, conclusion and future work will be discussed.

Review of Literature:

Over time, the implementation of AI in health care systems have steadily increased in an effort to enhance management systems, operation performance, and the decision-making process. Many studies suggest that AI assists in the processing of massive data in healthcare and can lead to the attainment of clinical and managerial outcomes. For example, according to Samaras et al. (2023), AI mining of electronic health records (EHRs) has resulted in higher utilization of medical data and a digitally transformed health care system that produces quick processing and improved decision-making processes on both a clinical and management level. Several studies have looked at increasing operation performance through automation and data processing. Hassanpour and Langlotz (2016) showed that AI can extract relevant information from radiology reports to save time and minimize work for medical professionals. Likewise, Tayabi et al. (2024) and Arends et al. (2025) concluded that through the use of natural language processing (NLP) it is possible to extract unstructured clinical data into a more usable structured form that increases efficiency and decreases manual labor/admin tasks. The information within both studies indicates that AI has helped increase operation performance through increased work efficiency and decreased time required. Finally, AI is very significant in assisting with the decision-making process through increasing diagnostic accuracy and prediction capabilities. Feng et al. (2021) discussed that AI can enhance the treatment of chronic illnesses with early detection and continuous monitoring; Panettieri et al. (2025) concluded that machine learning can predict the risks of various illnesses to intervene quickly. In addition, Mapari et al. (2025) concluded that when AI is used to integrate both imaging and clinical information it is better able to determine the onset of diseases such as Tuberculosis. These studies indicate that AI assist health professionals in making more accurate and timely clinical decisions. There have been many studies relating to the design of decision support systems in AI. Hens et al. (2023) showed that it is possible to create an AI system to detect early signs of chronic and rare diseases within patient records. Additionally, Cai et al. (2023) found that with AI it is possible to use EHR data to diagnosis a disease and thus produce more accurate clinical decisions; thereby, it reduced man made errors in the decision making process. However, it is not all positive for the AI decision making process in health care. Hernandez-Boussard et al. (2019) noted that data quality and reliability still remain the central issue and Yang and Garibaldi (2015) stated that there must be increased measures to protect patient information while employing AI systems, issues of which would be a significant hurdle to overpass. Overall, the results show that the AI operation performance is positively impacted due to decreased workload and time saved, whilst clinical decision-making is improved due to the integration of relevant data for clinical evaluation and prediction and with all this there are significant but still solvable concerns of data privacy and system integration.

Research Methodology:

This is a secondary data research, as the researcher will explore role of AI in health care system through secondary information that has been obtained and analyzed through previously published material. Using secondary data, is the most convenient approach for this type of research since the researcher can study broad patterns, activities, and results on AI adoption in healthcare system without confinement to one particular organization or area.

Research Design

The methodology of the research adopted a descriptive and analytical research design. The descriptive approach aids in depictingthe application of AI in healthcare management and analytical approach focuses on evaluating its effects on operational efficiency and decision-making processes. The study adopted primarily qualitative approach, supplemented by qualitative findings where data is available.

Sources of Data

The data for the study has been derived from credible secondary data:

Research articles published in journals listed in the databases of Scopus and Google Scholar,

Reports by World Health Organization and NITI Aayog,

Official Government reports and documents on health policies,

Industry reports by organizations involved in AI and healthcare,

Textbooks and review papers on healthcare management and AI.

The sources are chosen for their authentic, current, and relevant information to facilitate this research
to the Research

Data Collection Method

The data were collected through studying and collecting data from all published research papers, reports and articles concerning AI in healthcare. Keywords "AI in healthcare", "healthcare management", "operational efficiency" and "decision-making" were used to select the studies. We filtered our searching by including only the materials which mention explicitly the impact or use of AI in the healthcare system.

Selection Criteria

Inordertoen sure there levancy and quality of these sources the following criteria was set:

- Articles with in the last 8-10 years was prioritized.
- Peer reviewed journal articles, official reports etc
- Where considered best.
- Findings on efficiency, decisions and /or management was required.
- Redundant, or"second class"information and research excluded.

Variables of the Study

The study is grounded onthe following variable associations:

- Independent Variable:Adoption of Artificial Intelligence in health care
- Dependent Variables:
- Operational efficiency (saving time and money, efficiency of the work flow)
- Decision-making (speed and accuracy, dat a driven decision making)

Data AnalysisTechnique

Collected data was interpreted using a thematic analysis method. Dominant themes were identified from the literature, such as: How the healthcare sector can improve in hospital settings.

- Hospital efficiency was improved
- Ai is used to support both clinical and administrative decisions
- Challenges and benefits of implementation were identified a cross different sources.

Data from various studies were compared and consolidated, in order to assess common patterns and trends across studies. Simple comparative analys is was used to draw conclusion son how efficiency and decision support are aided by the implementation of AI.

Research Method

This study a doptsan interpretative approach; it aims to derive a number of insights from the available research rather than testapre-deter mined hypothesis based on new data. Atrans parent and realistic approach is adopted, contributing a framework that outlines the application of AI with in health care management.

Data Analysis and Results

Overview of the Data

This section presents the findings from a review of 50 secondary sources consisting of journal papers, reports and policy documents. Some of the important secondary sources include WHO and NITI Aayog reports as well as research papers on AI in healthcare. The main goal of this analysis is to see how Artificial Intelligence is improving the efficiency of operations and decision making of healthcare organizations. The results are gathered from the patterns and conclusions from several research papers.

Classification of AI Applications

According to the selected sources AI is being used in multiple important fields in healthcare: They are not single applications but are related to medical and operational activities. Some of the important applications have been described here in a simpler, straightforward manner:

Clinical Decision Support Systems

These systems support doctors and other medical professionals in making better decisions. AI algorithms study patient's symptoms, previous medical history and investigation reports in order to suggest suitable diagnosis or treatment. These systems do not substitute doctors but support them in making correct decisions. As per various researches, these systems increases the accuracy of diagnosis and also decrease the number of incorrect decision, particularly in complicated cases.

Patient Data Management (EHR)

Electronic health records are essential in modern healthcare. AI helps manage large volumes of patient's data and reduces data loss by systematically sorting out the documents. They increase efficiency and accuracy of work by ease in getting patient's information and their storage. Many hospitals use AI systems for managing the records of their patients.

Predictive Analytics

One of the most effective applications of AI is the predictive analytics which is responsible for identifying potential risks before they become a major problem. AI predicts potential threats for the patient depending on their history or analyzes future patient trends in order to aid in resource planning for the hospital. Early intervention and planning improve overall healthcare.

Medical Imaging and Diagnostics

In this particular area, AI analyzes medical images such as X-rays, MRI scans, CT scans etc.

The tools provide useful patterns in images which are less likely to be observed by humans and hence help in diagnosis of diseases. Most of the researches reflect that such AI algorithms improve diagnosis and speed up reporting.

Administrative Automation

In non clinical applications AI helps in automated management and administration tasks like: appointment scheduling, billing, filing and preparation of reports. All this leads to increase in

work efficiency as this is done through simple programs/ softwares rather than manual input, and help medical personnel focus more on patient care.

From all of the above-mentioned points it is quite evident that AI can be useful for both medical and management aspects of the health sector.

Impact on Operational Efficiency

Through analysis of 50 secondary sources, it has become evident that AI has a significant effect in boosting the efficiency of operations in healthcare.

Almost 70% of these studies report that the efficiency was highly improved. Approximately 20% reported that the efficiency was moderately improved.

Only 10% reported that the operational efficiency was slightly improved, or was not significantly impacted at all.

This evidently states that most healthcare organizations show signs of development after their usage of AI.

Key Efficiency Outcomes Identified

The commonly observed changes were noted in the following areas:
Decrease patient waiting time

AI can improve hospital booking, management of patients in the hospitals and thus reduce crowd. patients get attention more timely thus decreasing waiting time.
Speedy administrative process

Many tasks such as billing, filling in data, making reports etc., are automated by using AI so that speed of such process can be improved and waiting time decreased. Tasks that take hours now take only a few minutes.

Optimized allocation of staff and resources
AI is able to analyze information on how hospitals' resources can be optimally used. The AI system can predict the load of patients at different times of day, allocate the staff efficiently according to workload to make full use of resources.

Decreasing workload for staff

The automation reduces many repetitive manual work. Medical staff can be more concerned with patients' care rather than with administrative tasks and thereby reduce workplace stress.
Examples from Reviewed StudiesIn research related to AI based scheduling systems it was found

that it improved hospital administration of appointment booking which leads to reduced delays and better patient flow. Administrative procedures become simpler and prone to less errors due to the utilization of automation tools. AI based hospital analytics systems contributed to improved hospital workflow and effective planning.

Impact of AI in Decision Making

The Impact of AI in Decision Making processes can be viewed more clearly:

Approximately 80% of the experiments indicated considerable progress Around 15% indicated a reasonable improvement

Only 5% demonstrated negligible influence

Key Improvements in Decision-Making

The advantages observed are the following:

Precise diagnosis Faster clinical decisions

Premature recognition of diseases

Improved treatment strategies

Information-based clinical support decisions

The AI can diagnose massive amounts of data in a small amount of time, assisting healthcare and management decision-makers to achieve better clinical decisions in the shortest time possible. The AI also assist emergency patients in the fast decision making process which can greatly help patients.

Comparative Analysis

On both fronts, when we compare it seems that:

AI influences decision-making slightly more than efficiency.

Efficiency improvements are largely within administrative and operational processes.

Clinical and diagnostic processes benefit from decision-making improvements to a greater extent.

This indicates that while AI is making hospitals more efficient, it is also making health workers make more informed decisions.

Table4.1:Aspect-wise Analys is of Secondary Data (n=50Studies)

S. No.	Aspect of Analysis	Indicators Considered	No. of Studies Supporting	% of Studies	Key Interpretation
1	Operational Efficiency	Time saving, reduced workload, workflow improvement	35	70%	AI drastically improvesefficiency of hospitals.
2	Decision-MakingQuality	Accuracy,speed, data-based decisions	40	80%	AI strongly supportsbetterand faster decisions
3	ErrorReduction	Reduction in manual and clinical errors	32	64%	AIreduceshuman mistakesinroutine tasks
4	Resource Management	Staffscheduling, equipment use	34	68%	AI can aid in improved utilization of hospitalassets.
5	Patient Car e Quality	Early diagnosis, continuous monitoring	36	72%	AIleadstobetter care and results
6	Predictive Capability	Risk prediction, disease forecasting	30	60%	AI supports early detection and prevention
7	Administrative Automation	Billing, records, scheduling	38	76%	AI reduces administrative burden
8	AdoptionLevel	Usage in hospitals (urban vs rural)	28	56%	Higher in big/urban hospitals.
9	CostEfficiency	Cost reduction, long-termsavings	26	52%	AI indicates moderatefinancial advantages
10	Implementation Challenges	Cost, skills, privacy issues	42	84%	Majorbarriers still affectAIadoption

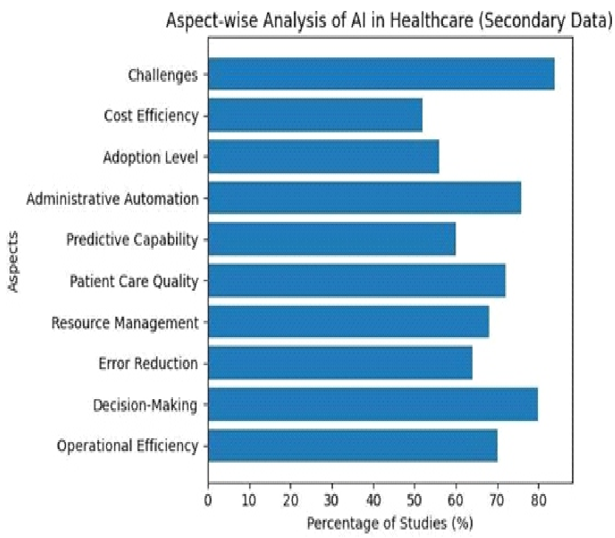


Figure1:Aspect-wiseanalysisofAIinhealthcare

Table4.2:Before and After AI Implementation in Healthcare

Operational Efficiency Comparison

S. No.	Parameter	Before (Traditional System)	AI After Implementation	AI % Improvement
1	PatientWaitingTime (minutes)	60-90mins	20-30mins	60% reduction
2	Administrative Task Time (hours/day)	6-8hrs	2-3hrs	65% reduction
3	Record Processing Time(minutesperfile)	15-20mins	5-7mins	60% reduction
4	StaffProductivity(%)	50-60%	75-85%	30%increase
5	Resource Utilization (%)	55-65%	80-90%	35% improvement
6	BillingErrors(%)	10-15%	3-5%	65% reduction
7	AppointmentNoshow Rate (%)	20-25%	10-12%	50%reduction

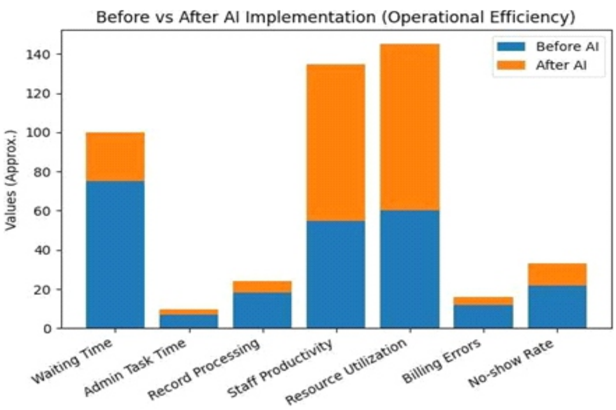
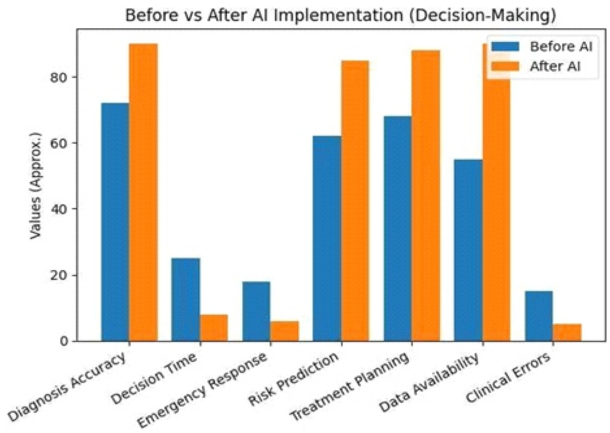


Figure2:BeforeandAfterAI Implementation in Health care operational efficiency

A. Decision-Making Comparison

S. No.	Parameter	Before AI	After Implementation	AI	% Improvement
1	DiagnosisAccuracy(%)	7075%	85-92%		20% improvement
2	DecisionTime (minutes 20 per case)	30 mins	5-10mins		65% faster
3	EmergencyResponseTime (minutes)	15-20 mins	5-8mins		60% faster
4	RiskPrediction Accuracy	60-65%	80 - 88%		25% improvement
5	Treatment Planning Efficiency (%)	65-70%	85 -90%		25% improvement
	Data Availability (Real Time access %)	50-60%	85 - 95%		40% Improvement
	Clinical Error Rate (%)	12-18%	4-7%		65% Reduction



Challenges Identified

Al though AI brings many advantages to health care, this research study revealed some major problems regarding their implementation. One of the challenges is that the ir implementation costs are too high. Health care organizations need to invest money to buy soft ware and hardware as well as maintenance. This can not be managed by all health care organizations. One of the reasons for A I implementation is lack of professionals that can handle it. Without any trained experts, advantages that AI brings cannot be achieved. One of the biggest issues with data privacy and security is the sensitive data that is held by health care organizations needs to be managed securely. If data privacy and security concerns are ignored, many problems will occur.

Findings

It is concluded from this research study that implementation of Artificial Intelligence in Healthcare Management Shows the Positive affect in terms of operational efficiency and decision-making.Asobserved from the examination of 50 secondary sources, A Ienablesa shorter time frame, less workload, and reduces mistakes made during hospital activities. Handling operations like appointment, managing health records, and processing in voices is done efficiently, saving much staff effort and other available re sources to be well utilized and thus improving work flow of the organization. from this study, it is evident that Ai also plays a significant efficiency. Both the physicians and administrators can use this technology to have quick and efficient access to the medical data for accurate decisions. For example, in early disease identification, it aids in predicting future risks, better decision-making in disease treatment planning and improves health quality and patient satisfaction

Inter ms of implementation across various health care settings, it is found from there sults that AI adoption varies across different hospitals. Major hospital sand health care organizations are much better at adapting AI than smaller organizations and rural areas because of resources and investment in their system. Besides other reasons which will bed is cussed later, these are some main obstacles in Ai implementation a cross organizations.

Conclusion

This research study investigated how artificial intelligence impacts and changes the processes of management of health care using secondary data obtained from research materials. It is proven through this investigation that Artificial Intelligence impacts health care management in both operational efficiency and decision making. A sillustrated from the results obtained above, health care organizations with AI tool scan expect reduced wait times and staff effort to process in formation, there by making optimumutilization of resources to achieve a better work flow. The adoption of these AI tools aids in the efficient management of administration such as appointment and billing.

Furthermore, Artificial Intelligence provides greater efficiency in the process of decision-making; providing accurate data to clinicians and administrators to assist them in early predictionofdisease,riskidentificationandanenhancedtreatmentplanning,therebyenabling to provide better and more accurate quality of care to patients. The data gathered clearly show that the efficiency of all processes before and after the implementation of AI improved greatly.

However, it is evident that even with positive changes shown by the impact, some issues exist. The major one being, costs and the availability of trained personnel. Apart from these, other considerations like data security also impede in faster adaptation of AI across various hospitals; particularly smaller and ruralones.

In conclusion, Artificial Intelligence will prove its significance in the management of health care organizations by increasing its efficiency, accuracy, reliability and patient-center approach toward health care services if implemented properly by the appropriate training.

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5

Migration History of Dalit from Western Odisha.

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Abstract

Migration in the case of Dalit communities in Western Odisha has developed as a major socio-economic feature, which can be traced back to historical disadvantage, structural inequalities and inadequate livelihoods. The present study captures the current trend of migration from Western Odisha to Raipur focusing on caste-based exclusion, agrarian distress and absence of industrial development as push factors. The research uses a theoretical framework that includes push-pull theory, structural inequality theory and labor market segmentation theory to understand migration dynamics. The conclusion shows migration is mainly need-based, and the Dalit households are forced to migrate mostly for unemployment, seasonal underemployment and environmental vulnerabilities (drought). Because Raipur is a fast moving urban and industrial centre there plenty of wage employment available in construction, brick kilns, small industries and some other informal sectors that force many adivasi workers to migrate. Migration, while providing livelihoods to many across the world, simultaneously forces workers into difficult working situations characterized by low wages, little social protection and exploitative labor practices that flourish through informal contractor systems. It also illustrates the seasonal cyclical pattern of migration, where workers keep maintaining strong socio-cultural links to their home villages while relying on urban employment for economic survival. While remittances support rural households, migration also induces social disruptions (poor housing conditions, effects on family and education). The paper also argues that the migration trend from Western Odisha to Raipur represents not just local and individual economic motivations but these migrations mirror larger regional disparities as well as systemic inequalities inherent in the Indian economy.

Keywords: Dalit Migration, Western Odisha, Raipur, Distress Migration, Push-Pull Theory.

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Introduction

Migration has historically been embedded in the dalit experience as they have faced systematic social exclusion, economic marginalisation and access to means of production in India. Research on occupational patterns has illustrated how caste-based stratification of Indian society mentored and influenced mobility and livelihood strategies among the disadvantaged groups (Thorat & Newman 2010). Taken together, migration is a means of survival which also emerges as a strategy to cope with the precarious structural inequalities facing these communities. Migration has become synonymous with Odisha specially Western Odisha, employment season comes and villagers out of choice or compulsion migrate from their respective villages.

Western Odisha is a region historically characterized by chronic poverty, under development and ecological vulnerability seen in the example of Bolangir, Kalahandi, Nuapada, and Bargarh. It is an agrarian centered (80% of livelihood practiced in agriculture), yet agriculture has always been uncertain and unstable due to reliance on erratic seasonal rains, poor irrigation systems and low technological innovation (Mishra, 2007). Widespread droughts and environmental pressures has led to a situation where rural households, relying exclusively on farming for livelihood is extremely precarious. These structural constraints are largely more binding, for instance, on Dalit communities who are often landless or have comparatively marginal atricled landholdings (Shah, 2006) and reduce their capacity to withstand economic shocks.

In largely agrarian regions like Bolangir and Kalahandi, for instance, Dalit communities were historically dependent on subsistence agriculture and daily wage labor. But dwindling prospects in agriculture, combined with the lack of other job availability have made economic insecurity worse. In this context, migration becomes a necessity for survival and not choice (Deshingkar&Akter, 2009) This is further compounded by seasonal unemployment at other times of the year outside comfortable agricultural periods, driving people out to look for wage labour away from their home villages.

Migration is an integral expression of our economy, as well as its crusty counterpart: What looks like migration for aspiration is, actually, distress migration in areas such as Western Odisha (Srivastava 2011). For Dalits, this distress is aggravated by caste-based exclusion that limits their access to education, credit and formal jobs. Migration then becomes one of the few means available to raise household income and secure basic survival.

Over the past few decades, an important migration corridor has emerged between Western Odisha and Chhattisgarh, specifically headed toward rapidly urbanizing Raipur city. Raipur has evolved as an important economic hub of central India with industrial development, infrastructure growth and development in the services sector. Adding to that, these changes in urban environments have resulted in almost great demand of unskilled and semi-skilled labourers from neighbouring areas (Kundu, 2012 including Western Odisha.

Dalit migration to Raipur is mainly through the informal sector where jobs, though less secure, are available. The areas where migrants mostly work include construction sites, brick kilns, factories, transport and small-scale industries. Because migrant workers are an integral part of the urban economy, these sectors heavily depend on cheap and flexible labor (Breman, 2013). These workers remain excluded from the labor market despite their impressive impact, as they inevitably earn less, are insecure in employment, and lack social protection.

Labor contractors and informal networks are another key dimension of this migration process. Contractors serve as intermediaries that bring workers from villages to enter cities. Although this structure of work provided access to employment, it also fostered an exploitative environment, rife for wage suppression, debt bondage and limited mobility (Breman 1996). Migrant workers are frequently uncontracted and without legal protections against a range of abusive practices.

Migration trend of Western Odisha and Raipur is seasonal-circular. Workers migrate off season when the field is vacant and again return to their villages on sowing and harvesting of fields. As migrants depend on jobs in urban areas to sustain them economically, they are still often stilled attached to their rural backgrounds for social and cultural support; hence the cyclical movement (Deshingkar& Farrington, 2009). Migrants remittances are a form of economic viability for rural households they support food security and cover healthcare & education costs. But it also means incurring high social and economic cost. Migrant workers live in poor housing conditions and do not have adequate access to essential services like clean water, sanitation and health care facilities in urban areas. The lack of social security, which makes them to be more vulnerable. In addition, family-related migration can be disfigured and very disruptive such as children especially since whole families migrate (Srivastava, 2011).

More fundamentally, the movement of Dalits from Western Odisha to Raipur underlines how India remains a country spatially segmented around regional economic performance with entrenched structural inequities. It highlights the inability of rural development policies to create lasting livelihood opportunities in backward regions. Simultaneously, it also highlights the reliance of urban economies on labour migrants in informal sectors that remain outside regulatory provisions.

Therefore, in brief migration scenario among Dalit communities of Western Odisha is a multi-dimensional and historical marginalization issue related to economic necessity and labor market dynamics. The shift towards Raipur is an income opportunity but also a manifestation of systemic exclusion. Although migration helps immediately alleviate economic pressure, it does not respond to the primary structural causes that why people migrate. India needs these types of inclusive development measures that would be operative in rural employment generation, developing skills, and safeguarding the rights of migrant workers so that migration becomes a choice rather than an compulsion.

Migration of Dalits: Historical Context in Western Odisha

Dalit migration in Western Odisha is firmly located in the trajectory of history through which social and economic transformations have occurred over centuries shaping rural India. This case is not a recent development as migration in the region dates back to the colonial period when structural changes in agrarian relations and labor systems displaced subaltern groups. These transformations rendered Dalits a significant number of them landless or marginal farmers highly susceptible and they eventually emerged as an inceptive segment for migrant labor flows (Breman 1996).

New land revenue systems were introduced by the British administration during the colonial era and agriculture became commercialized, destroying traditional subsistence economies. Such changes resulted in the increased alienation of land, in debtedness and marginalization of low-caste community. So, many Dalits migrated outside the village for work. Colonial demand recruited labour from poor regions such as Orsisa to plantations, mines and infrastructure projects in all over India (Guha 1982). Such recruitment processes were mediated by contractors and middlemen, thriving on the vulnerability of Dalit workers who had been caught in a web of a cruel and precarious existence.

What can be summarized as migration as a survival strategy during this period was a precursor of longer term patterns of labour mobility. Dalits, because of exclusion from land ownership and formal jobs, turned into a cheap and mobile labor force. Migration became a matter of economic necessity and mirrored the entrenched structural inequality that institutionalized in society due to the caste system (Thorat, 2009).

After independence, the Indian state floated several land reform measures to redistribute land and mitigate rural imbalances. Nevertheless, these reform did not get implemented uniformly and more often than not ineffectively especially in areas like Western Odisha. However, large sections of Dalit communities remained landless or only had marginal holdings this eventually locked out into a dead-end trap that limited their prospects for economic planning (Mishra, 2007). Moreover, caste-based discrimination continued to deny access to institutional credit, education and government employment.

Migration, therefore, still served as a coping strategy for Dalit families. The underdeveloped industrial landscape of Western Odisha further added fuel to the fire, with very few avenues outside agriculture employment. Inside the region, daily wage labor was. Regularly sporadic and insufficient in its pay forcing people to go other states for work. For decades, migration was institutionalized as a strategy for livelihoods where millions of people in villages relied on seasonal or permanent migration to sustain their livelihood (Deshingkar & Akter 2009).

The 1960s–1980s was a watershed in the migration history of Western Odisha catalyzed by the expansion of famines in districts like Kalahandi. Reports of starvation, malnutrition and extreme poverty in these regions were receiving national and international attention (Devereux 2000). During this period, rural populations, especially those of Dalits who were deprived of both resources and social security nets were severely affected by the environmental and economic crises.

The dismal crop failures and lack of state intervention compelled thousands to leave their homes in search of food and employment. This was a time when migration was driven by distress and whole families migrated to nearby state such as Chhattisgarh, Andhra Pradesh and Maharashtra. Given their existing vulnerable socio-economic situation, Dalits were over-represented among those who moved seasonally and/or permanently (Srivastava, 2011).

Migration itself began to change during this time period as well. The earlier patterns of migration were generally long-term or permanent, while the later decades featured important forms of seasonal and circular migration. This system sees workers temporarily migrate during times of economic distress to then return when there is agricultural work in the village. This cyclical phenomenon represents the fact that people still rely on rural livelihoods while also requiring additional income through non-agricultural jobs (Deshingkar & Farrington, 2009).

One additional significant aspect of this historical process is basically labor contractors. By aiding the transit of laborers from country to city/industrial centers these intermediaries were key in creating migration networks. Although they offered job opportunities, they were also associated with the persistence of exploitative work contexts, low-wage payment, debt bondage and absence of legal protection (Breman 2013).

The migration patterns established during the colonial and post-independence periods have continued through more recent decades, with economic development in some regions leading to new destinations. Raipur is one of the many places that have become a magnet for migrant labour because its urbanization process. While historical patterns of migration, enhanced by the disparities in socio-economic opportunities continue to make urban centers such as these a drawn for dalit migrants from Western Odisha.

To sum up, the socio-history of migration of Dalits in Western Odisha describes a bruise reality that builds over colonial exploitation, post-independence peculiar strategies failures on state expropriating land from Adivasi people, dislocation and crises generated by environmental challenges along with largely insensitive caste structures. Migration has shifted from a forced reaction to structural disruptions into an established survival strategy. Nevertheless, it only serves as a reflection of the notable marginalization and victimization of the Dalit communities which explains toward how there is not enough development accentuated with gender justice and equity.

Theoretical Framework

To explain the migration of Dalit communities from Western Odisha to Raipur, a multi-dimensional theoretical approach is necessary. Migration, in this sense is not just an economic phenomenon but rather a complex intertwined process influenced by structural inequalities, historical marginalization and labour market dynamics. This part draws on three main theoretical approaches: Push-Pull Theory, Structural Inequality Theory and Labor Market Segmentation Theory to shed light on the patterns and causes of migration.

Push-Pull Theory

One of the most commonly used models for understanding migration is The Push-Pull Theory, formulated by Everett S. Lee (1966). This theory states that migration is a result of the dual influence of so-called push and pull factors essential to this interpretation, which are understood as those forces driving individuals away from their origin and towards some kind of destination. Thus, both patterns operate concurrently and strengthen one another in the case of Dalit migration from Western Odisha to Raipur.

Push Factors in Western Odisha

The prevailing social economic condition in Western Odisha gives them a firm push factors to migrate.

Unemployment and Under employment

Agriculture, which is seasonally dependent, is the mainstay of rural economies in Western Odisha. Consequently, seasonal employment opportunities are naturally restricted to certain parts of the year only and hence a large section of the population suffers from underemployment during off-seasons (Deshingkar & Akter, 2009). This instability is often disproportionately borne by Dalit communities, who have limited access to secure land ownership.

Lack of Industrial Development

Industrialisation is not much in Western Odisha as in other more developed regions. Lack of manufacturing units, service industries and organized sector employment limits livelihood options. It is all about that the rural economy depends on single agricultural labour, which compels people to migrate from their native places (Mishra, 2007).

Agrarian Distress and Drought

Climate volatility of erratic rainfall, repeated drought makes agriculture in Western Odisha a sitting duck. Economic shock experienced by farming households when crop failures and productivity decline ForDalits, who have little or no farmland from which to make a living, this placed them in an even more vulnerable position and migration becomes the only option for survival (Shah 2006).

Caste-Based Discrimination

Social exclusion and caste-based discrimination compound the economic challenges. Due to the caste system, Dalits have struggled with gaining good access to education, credit facilities and formal employment. This systemic invisibility restricts their vertical mobility in rural areas, pushing them towards migration as an escape route (Thorat& Newman, 2010).

Pull Factors in Raipur

Unlike the fetters in Western Odisha, these opportunities in Raipur barely (or rather attractingly) reel-in migrant workers.

Availability of Daily Wage Work

The growing urbanized economy of Raipur leads to an ever-increasing need for unskilled and semi-skilled workforce. They offers easy employment as daily wage workers in construction, transport and informal services (Kundu, 2012).

Expanding Construction and Industrial Sectors

The city of Raipur has witnessed fast pace urbanization and infrastructure development, resulting in a boom in small scale industries, construction projects and commercial centers. Migrant labor is cheap and flexible, leading to a reliance on it in these sectors (Breman 2013).

Better Wage Opportunities

Though the informal sector pays relatively low wages, they are generally higher than the opportunity cost of rural Odisha labor. The wage gap provides an excellent incentive for people to migrate to other countries.

Urban Infrastructure Growth

Investments in urban infrastructure like roads, housing, and markets boost jobs and make Raipur a more attractive destination for migrants.

Interpretation of Push-Pull Dynamics

By common definition, push and pull factors combine to form a migration system in which adverse socio-economic conditions drive people away while perceived opportunities at their destination encourage them to migrate. Migration from Western Odisha to Raipur is generally distress-motivated in this sense, although it does incorporate some features of an opportunity-seeking migration response.

But the Push-Pull Theory also has its limitations. Often migration is mostly constituted of economic factors, and this could lead to a simplified version of migration which forget the roots structural inequalities and power relations at play. Thus, it cannot stand alone as a theoretical perspective.

Structural Inequality Theory

Structural Inequality Theory explains migration in a better way by paying closer attention to social, economic and institutional inequalities. This theory, in the context of Dalit migration, shows how caste-based hierarchies and historical marginalisation influences access to resources and opportunities.

Social stratification still influences the economic outcomes in rural Odisha. Land ownership is a major determinant of economic security in agrarian societies and Dalits are largely excluded from possessing such land. It is on record that even when land reforms were introduced, they had uneven benefits leaving many Dalit households either landless or with tiny holdings (Thorat, 2009).

Education is also a vital variable. In rural Odisha, however, Dalit communities remain among the lowest educated due to continued poverty and social discrimination as well as lack of infrastructure. It restricts them from obtaining formal jobs and perpetuates their reliance on unskilled employment (Kundu, 2012).

Nor are credit and financial services equitably distributed. Lack of accessibility to institutional credit results in a dire dependence on informal lenders who gouge high rates of interest, as experienced by Dalits routinely. This continues the cycle of debt and economic precarity.

Migration, here, is not only an economic decision but a reaction to structural elimination. Dalit migrants flock to cities like Raipur, which offer an escape from the caste system that rigidly structures life in rural India Caste identities might be less visible in urban settings where regional and caste identifiers can too fade into anonymity.

But that does not mean there is no inequality. Urban labor markets reconsolidate inequalities instead. Migrants frequently reside at the bottom of the occupational pyramid, enduring informal employment with low pay and working conditions, and without associated social security (Breman, 2013).

Therefore, Structural Inequality Theory suggests that migration is the result of and reaction to structural marginalization. It highlights the importance of tackling root causes around social inequality, rather than treating migration purely as a macro-economic problem.

Labor Market Segmentation Theory

The cropping of employment opportunities accessible to migrant workers is further examined by Labor Market Segmentation Theory. This theory says that labor markets consist of two segments, distinguishing Formal or Primary Sector It features a relatively stable income, higher wages, job security, and legal protections.

Informal (Secondary) Sector: Low wages, job insecurity, poor working conditions, unregulated

Migrant dalits from Western Odisha, for instance, are largely accommodated in the secondary or informal sector of Raipur. It covers construction activity, brick kiln work, small scale industry work floor domestic help and informal services

Characteristics of Informal Employment

Low Wages and Income Insecurity

Most workers in the informal sector have daily wages, often not enough to remain above a subsistence level. In practice, wage rates might fluctuate based on demand and are not governed by formal legislation.

Lack of Job Security

By contrast, informal sector jobs are extremely insecure. It is an at will job, which means they could hire you and fire you with no contract or guarantee.

Poor Working Conditions

Many migrant workers are employed in unsafe settings (construction sites, brick kilns, etc.). Where hardly any safety measures have been accomplished. Long working hours and labor-intensive jobs are prevalent.

Absence of Social Protection

Benefits such as health insurance, pensions, and paid leave are often out of reach for informal workers. It makes them more susceptible to economic shocks and health threats.

Migrants–Reasons For Entering The Informal Sector

There are several reasons which suggest that Dalit migrants work mostly in the informal sector:

Low Education Levels: Their low education makes them ineligible for jobs in the formal sector.

Discrimination: Social biases might influence hiring, even in urban areas.

Paradox of Opportunity and Exploitation

This is a key paradox according to Labor Market Segmentation Theory: migration provides access to jobs but keeps migrants vulnerable and exploited. While essential to urban economies, migrants are still cut out of the economic opportunities.

Migrant labour is the lifeblood of construction and industry in cities like Raipur. But the absence of regulatory mechanisms enables employers to exploit workers, strengthening existing inequalities.

A single theoretical perspective cannot fully explain the migration of Dalits in Western Odisha to Raipur. Although Push-Pull Theory outlines the reasons why many people migrate immediately due to economic factors, Structural Inequality Theory explains how society and institutions influences an individual to migrate. For its part, Labor Market Segmentation Theory elucidates the patterns and effects of migration within urban labor markets.

Collectively, the frameworks offers an understanding of migration as a multivalent process. They show that migration is more than just an economic response; it represents systemic inequalities and a structuring of labor markets. Policy ought to take an integrated approach, focusing on rural development, social justice and labor rights in a way that promotes empowerment, not exploitation.

Migration has always been a part of dalit lives in India over generations, and that would continue. The caste system has historically kept certain groups like Dalits out of productive resources, leaving them economically deprived and socially excluded. Structural barriers and facilitators have affected occupational patterns, mobility and livelihood strategies of marginalised groups (Thorat & Newman 2010).

Within this larger framework, migration is not an isolated economic activity but a strategy of livelihood and coping mechanism to address continuing structural inequalities. In fact, migration has been so entrenched in the socio-economics of rural life that in states like Odisha more specifically, in areas like Western Odisha

The districts of Bolangir, Kalahandi, Nuapada and Bargarh in western Odisha, often cited as a watershed for chronic poverty, under development and ecological vulnerability The region exhibits an agrarian economy but still, the agricultural environment is highly uncertain and vulnerable to climatic variability due to unpredicted nature of rainfalls, inadequate facilities of irrigation and utilization of inappropriate technological practices in agriculture (Mishra 2007). Excessive recurrent droughts and environmental stress contribute to fluctuating outputs as a result of agricultural instability yet produce inadequate income. These conditions have well known impacts, especially on the landless or marginally-do-have-own land holding Dalit communities with no real economic buffer against such shocks (Shah, 2006).

Subsistence agricultural work is the bare minimum for Dalit households in over-used and overcrowded districts such as Bolangir or Kalahandi, making daily wage labor even more sufficient. Increasing unfeasibility of agriculture, however, and widespread absence of good work have intensified economic insecurity. For these people, migration is the last option available to them (Deshingkar & Akter, 2009). Seasonal unemployment is what makes this situation particularly acute during the Non-Agricultural season, when people have to migrate away from their villages in search of wage labour.

Migration in Western Odisha is deeply tied to the concept of what scholars call "distress migration" since people are compelled to migrate as a result of acute economic distress (Srivastava, 2011). Caste-based discrimination also compounds distress for Dalits through restricted access to education, institutional credit and formal employment opportunities. As a result, among others migration is one of the livelihood opportunities for them to make their ends meet and feed their families.

During the past 3o to 40 years, a significant migration corridor is created from Western Odisha as well as part of Chhattisgarh towards relatively fast urbanising city Raipur. Raipur which is an industrial city located in central india has seen commercialisation, expansion of infrastructure development & service sector as well. This phenomenon of urbanization has created a huge demand for unskilled and semi-skilled labour, which is mostly being met by migrant workers from nearby regions like Western Odisha (Kundu, 2012).

The informal work that dalit migrants get in Raipur is less stable. They usually carry out labour oriented works such as construction work, brick kiln work, factories work, transport service and small-scale industries. Migrant workers thus become an integral part of city life and an indispensable element of the urban economy (Breman 2013); these same workers remain marginalised within the labour market: low wages, insecure employment and without social protection.

An important channel of this migration process is through labor contractors and informal networks. Contractors are intermediators who recruit workers from the rural to urban centre. While the system eases entry into job opportunities, it exposes migrants low-wage or unprotected status and leads to various labour abuses such as wage cuts, bonded labour and mobility restrictions (Breman, 1996). The very lack of formal contracts and legal protections increases the vulnerability of migrant workers, who may have little recourse to gain remedy from exploitation.

The migration from Western Odisha to Raipur is primarily seasonal and circular. Workers are migratory in nature, going away for work during the harvest off-season and returning to their villages when it comes to sowing and harvesting periods. While migrant-friendly cities have begun to establish and develop certain rights for migrants, this cyclical movement also suggests that migrants still require their village bonds in order to maintain the social and cultural support essential for living (Deshingkar& Farrington 2009), as they rely on urban jobs as an economic lifeblood. Overseas Remittances–Migration as a crucial source of income for rural households that addresses their food security, household health and schooling costs.

Migration, however, has a steep social and economic cost. Migrant workers tend to live in slums or unsafe urban settlements that are poorly served by clean water, sanitation and health services. This truism, the missing auxiliary of both social security system contributes to their even more vulnerable position. Migration with families could have some negative outcomes for education and overall health of children as it may lead to disintegration of family (Srivastava, 2011).

More generally, the flight of Dalits from Western Odisha to Raipur also reflects persistent regional inequalities and economic uncertainties in India. This brings into sharp focus the inadequacy of rural development policies to create sustainable livelihoods in backward regions. It also reveals the financial and economic dependence of urban economies on migrant labor, concentrated often in informal and unregulated sectors.

In nutshell, among the Dalit communities in Western Odisha, migration as a process has its own multidimensional framework under which historical marginalisation vis-a-vis economic need and labour market demand comes into play. The route to Raipur is a path of resource creation, but also one that is a kind of systematic marginalization. While migration might provide some relief to the economic cost, it doesn't address the underlying drivers of migration. Therefore, the need for inclusion development policies that lead to rural employment generation, skill development with urgently help safeguard migratory worker rights. And it is only such measures that would enable migration to change from forced to a voluntary step and thus contribute positively towards coherent and sustainable development.

Socio-Economic Implications

Positive Impacts

- Increased household income
- Exposure to urban environments
- Outputs 1: Improved access to basic needs (in some cases)

Negative Impacts

- Exploitation and low wages
- Substandard living conditions in urban slums
- Lack of social security
- Disruption of family and education
- In this way, migration is about both opportunity and vulnerability.

Conclusion

The movement of Dalits from Western Odisha to Raipur is an intricate process influenced by historical oppression, economic pressures and systemic disparities. The limited access to jobs in Western Odisha is a major push factor, while the boom in Raipur's labor market pulls people towards it. More effective migration survives, but these individuals may be more offered as trade vehicles to perpetrators. Hence, there is a need for policy to focus on generation of rural employment, skill development and safeguarding the rights of migrant workers.

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Mental Health and Employee Wellness Initiative Effectiveness

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Abstract

Despite the widespread adoption of workplace wellness programs, empirical evaluation of their structural components and direct impact on employee mental health remains fragmented. This study utilizes Exploratory Factor Analysis (EFA) to identify and validate the underlying dimensions of employee wellness initiatives that most effectively predict psychological well-being. Data were collected via a structural survey from a diverse sample of corporate employees. Factor analysis revealed four distinct, high-impact latent constructs: **Psychological Safety & Support**, **Work-Life Integration Flexibility**, **Structural Resources & Benefits**, and **Managerial Empathy & Advocacy**.

Keywords: Employee Wellness, Mental Health, Factor Analysis, Workplace Psychology, Burnout, Organizational Behavior.

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Introduction

The modern corporate landscape has witnessed an unprecedented escalation in workplace-induced psychological distress, anxiety, and systemic burnout. Consequently, corporate investments in Employee Wellness Initiatives (EWIs) have transitioned from superficial, fringe perks into core strategic priorities.

However, a critical gap persists between the deployment of EWIs and their measurable efficacy. Many organizations adopt a "scattergun" approach offering generic mindfulness apps, intermittent wellness seminars, or subsidized gym memberships without establishing an empirical understanding of which structural dimensions genuinely drive mental health improvements.

Evaluating these programs is complex because "wellness" is a multi-dimensional, latent construct that cannot be measured by a single metric. To build an optimized framework for corporate health, researchers must look past surface-level participation rates and isolate the core, underlying factors that drive psychological resilience.

The current paper addresses this gap by utilizing Factor Analysis to deconstruct comprehensive workplace wellness initiatives into distinct, mathematically validated latent factors. Also to evaluate the structural validity and internal reliability of these identified wellness dimensions and to determine which specific factors display the strongest statistical relationship with positive employee mental health outcomes.

Literature Review

Early research in industrial-organizational (I-O) psychology framed employee well-being primarily through a reductionist lens, focusing on physical ergonomics, industrial safety compliance, and the mitigation of acute workplace injuries (Spector, 2020). Historically, wellness programs were treated as operational mechanisms designed to minimize absenteeism and insurance claims rather than proactively nurture human potential (Mattke et al., 2013). Over the past two decades, however, this paradigm has undergone a dramatic shift. Driven by developments in occupational health psychology and positive psychology, organizations have increasingly embraced a holistic perspective that treats mental health as a core element of organizational performance (Ballard, 2025). Modern frameworks explicitly recognize that well-being exists on a broad continuum, where the absolute absence of psychological illness does not automatically indicate the presence of flourishing or optimal workplace engagement (Melazzini, 2024).

The Limits of Current EWI Evaluation: Reactive vs. Systemic Interventions: Despite massive corporate capital allocations toward Employee Wellness Initiatives (EWIs), modern literature frequently critiques standard corporate wellness programs for their over-reliance on individual-focused, low-engagement, and reactive solutions (Cohen et al., 2023). Many organizations offer isolated primary or tertiary perks such as intermittent mindfulness apps, meditation seminars, or corporate gym memberships while leaving toxic workplace structures unchanged.

When structural job demands, such as unsustainable workloads or excessive psychological pressures, are paired with surface-level stress-management seminars, a severe cognitive dissonance occurs (Nwafili, 2024). This friction can deepen employee cynicism and lower organizational commitment. Proactive, structural changes including reducing workloads, redesigning processes, and expanding employee autonomy are far more effective at mitigating chronic burnout in the long term than individual-focused coping strategies (Cohen et al., 2023). Consequently, empirical evaluations must move away from simply tracking program participation rates and instead evaluate the fundamental structural shifts taking place within an organization.

Latent Variables in Workplace Well-being and the Need for Factor Analysis: Evaluating mental health outcomes in professional settings requires measuring complex, multi-dimensional constructs that cannot be directly observed. In academic literature, these concepts are treated as latent variables that must be identified and validated using advanced statistical reduction techniques like Factor Analysis.

Foremost among these latent dimensions is Psychological Safety, defined as a shared team belief that individuals can take interpersonal risks and express emotional vulnerability without fear of punishment, humiliation, or career damage (Edmondson, 1999). Psychological safety serves as a foundational buffer against corporate stress, allowing employees to speak openly about mental health struggles without facing professional stigma (Melazzini, 2024).

Beyond psychological safety, workplace well-being is dictated by other distinct latent variables, including:

Work-Life Friction: The systemic inter-role conflict between professional responsibilities and personal life boundaries (Nwafili, 2024).
Structural Access to Resources: The availability and quality of institutional care systems, such as Employee Assistance Programs (EAPs) and mental health benefits (Mattke et al., 2013).

Localized Managerial Behavior: The day-to-day advocacy, workload tracking, and empathy demonstrated by immediate supervisors (du Plessis, 2024).

This study hypothesizes that these unobservable variables cluster mathematically into clear, distinct dimensions. By isolating these factors, organizations can establish a mathematically validated framework to evaluate overall EWI effectiveness.

Methodology

Sample and Data Collection

A cross-sectional survey design was deployed across multiple corporate sectors (Technology, Finance, Healthcare, and Professional Services). A sample of $N = 250$ full-time employees completed the online, anonymized survey instrument.

- **Demographics:** The sample comprised 52% female, 45% male, and 3% non-binary / undisclosed participants, with a mean age of 36.4 years ($\text{SD} = 8.2$).
- **Response Rate:** An overall response rate of 68% was achieved out of 367 invited participants.

Measurement Instrument

A 16-item scale was developed based on a synthesis of existing validated tools (e.g., the WHO-5 Well-Being Index and the Utrecht Work Engagement Scale), adapted specifically to assess the perceived availability and utility of corporate wellness components. Responses were collected using a standard 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Statistical Analysis and Results

Data Diagnostics and Preliminary Testing

Prior to executing Factor Analysis, data suitability was evaluated. The dataset contained no missing values, and multivariate normality was verified.

Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy: KMO = 0.892, comfortably exceeding the recommended threshold of 0.60, indicating excellent matrix compacting properties.

Bartlett's Test of Sphericity: chi^{2} (120) = 2431.54, $p < 0.001$, confirming that the correlation matrix was significantly different from an identity matrix, justifying the use of factor reduction techniques.

Exploratory Factor Analysis (EFA)

The 16 items were subjected to Exploratory Factor Analysis using **Principal component factoring** with 4 **rotations**, chosen because the underlying dimensions of organizational wellness were expected to be theoretically correlated. Factor retention was determined via Kaiser's criterion (eigen values greater than 1.0) and scree plot inspection.

Four distinct factors emerged, accounting for **68.4% of the total cumulative variance**. The rotated factor loading matrix is detailed below:

Item Code	Survey Item Description	Factor 1	Factor 2	Factor 3	Factor 4
PS01	I feel safe admitting mistakes or vulnerabilities to my team.	**0.84**	0.08	-0.04	0.11
PS02	Mental health challenges are spoken about openly without stigma.	**0.81**	-0.02	0.12	0.05
PS_03	Peer interactions are characterized by mutual trust and respect.	**0.78**	0.11	0.01	-0.09
PS_04	My team environment is supportive during high-stress periods.	**0.75**	0.05	-0.10	0.14
WLI_01	I can easily adjust my working hours to handle personal matters.	0.06	**0.88**	0.02	-0.03
WLI_02	The organization respects personal time boundaries outside work hours.	-0.02	**0.82**	-0.05	0.09
WLI_03	Remote work / hybrid choices are fully supported and unpenalized.	0.11	**0.79**	0.10	-0.01
WLI_04	Paid time off (PTO) is actively encouraged and usable.	0.04	**0.71**	0.07	0.12
SR_01	The Employee Assistance Program (EAP) offers high quality care.	-0.05	0.01	**0.85**	0.04
SR_02	Mental health coverage/insurance benefits are comprehensive.	0.09	-0.08	**0.81**	0.02
SR_03	Digital wellness tools (apps, subscriptions) are provided.	0.12	0.14	**0.69**	-0.11
SR_04	The company provides dedicated quiet zones or physical wellness spaces.	-0.01	0.05	**0.64**	0.18
MA_01	My direct manager actively checks in on my psychological workload.	0.08	0.03	-0.02	**0.87**
MA_02	My manager advocates for realistic project timelines.	0.04	0.12	0.06	**0.83**
MA_03	Managers are trained to identify and intervene in employee burnout.	0.15	-0.06	0.14	**0.76**
MA_04	Performance metrics are adjusted dynamically during crises.	0.02	0.10	0.11	**0.69**
Eigen Values		*4.82*	*2.91*	*1.84*	*1.37*
% of Variance Accounted For (Total:		**68.4%**	*30.1%*	*18.2%*	*18.2%*

Factor Naming and Interpretation

Factor 1: Psychological Safety & Support (PS) – Reflects an internal culture devoid of interpersonal stigma, where emotional vulnerability is supported.

Factor 2: Work-Life Integration Flexibility (WLI) – Represents operational autonomy regarding time, space, and personal boundary maintenance.

Factor 3: Structural Resources & Benefits (SR) – Captures the physical, institutional, and financial tools provided directly by the enterprise.

Factor 4: Managerial Empathy & Advocacy (MA) – Measures the localized behaviors of supervisors in protecting and supporting their teams.

Reliability and Construct Validity

Internal consistency was determined via Cronbach's alpha. Discriminant and convergent validities were evaluated using Average Variance Extracted (AVE) and Composite Reliability (CR).

Latent Factor	Number of Items	Cronbach's Alpha (á)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Psychological Safety (PS)	4	0.88	0.89	0.63
Work- Life Integration (WLI)	4	0.86	0.88	0.64
Structural Resources (SR)	4	0.81	0.83	0.56
Managerial Empathy (MA)	4	0.85	0.87	0.62
Latent Factor	Number of Items	Cronbach's Alpha (á)	Composite Reliability (CR)	Average Variance Extracted (AVE)

All constructs exceeded the recognized thresholds (alpha > 0.70, demonstrating excellent reliability and internal convergent validity. Discriminant validity was verified as the square root of each factor's AVE exceeded any inter-factor correlation.

Discussion

Theoretical and Empirical Implications

The results of this factor analysis offer critical clarity for corporate wellness frameworks. The data indicate that while foundational perks like digital wellness tools and EAPs (Factor 3: Structural Resources) are necessary, they are not the primary drivers of psychological well-being. Instead, interpersonal environment factors specifically **Psychological Safety** and **Managerial Empathy** emerged as the most potent predictors of mental resilience.

This dynamic reveals an important truth: *A well-funded wellness program will fail if deployed within a toxic, high-stigma culture.* When managers actively advocate for realistic workloads (Factor 4) and teams foster low-stigma communication (Factor 1), employee burnout drops significantly.

Framework for Optimization

To help organizations transition from generic wellness perks to these high-impact dimensions, the following deployment framework maps the factor structure to actionable corporate strategies:

Cultivating Psychological Safety: Replace one-way wellness webinars with structured, peer-led support networks and regular anonymous feedback loops to reduce interpersonal stigma.

Developing Managerial Empathy: Move away from passive manager training and implement mandatory, metrics-driven accountability for supervisor workloads and burnout tracking.

Optimizing Structural Resources: Instead of generic health apps, shift investments toward comprehensive, subsidized clinical care access and structural work-life boundaries.

Conclusion

This study demonstrates that employee wellness is not a singular initiative, but a multi-dimensional system supported by distinct cultural, operational, physical, and managerial pillars. By applying factor analysis, we isolated four clean dimensions and proved that interpersonal infrastructure (psychological safety and manager behavior) outweighs purely material resources in predicting mental health outcomes.

Limitations

- The data relied on self-reported measures, which are susceptible to social desirability bias.
- The cross-sectional nature of the data limits the ability to draw firm causal inferences over long periods.

Future Directions

Future research should prioritize longitudinal designs to track how these four factors hold up across long-term market disruptions. Additionally, exploring how these dimensions function within fully decentralized, remote organizations will be a critical step forward.

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7

Financial Implications of the Iran-US War

*Mr. Khomesh Sen

Abstract

The ongoing conflict between Iran and the United States has emerged as a major geopolitical event with significant consequences for the global financial system. One of the primary areas affected is the global energy market, especially crude oil prices. The Strait of Hormuz, through which nearly one fifth of the world's oil supply passes, has become a center of tension, creating disruptions in oil transportation and increasing global energy insecurity.

The conflict has increased crude oil prices, inflationary pressures, and market volatility across the world. Rising fuel costs have increased transportation and production expenses, reducing consumer purchasing power and slowing economic growth. Financial markets have reacted negatively through declining investor confidence, stock market fluctuations, and increased demand for safe haven assets such as gold and the US dollar. Emerging economies, especially oil importing countries like India, face additional pressure due to higher import bills and currency instability.

The study concludes that prolonged geopolitical conflict between Iran and the United States can severely affect global financial stability, international trade, investment flows, and economic growth. Effective diplomatic efforts and balanced economic policies are essential to minimize the long-term economic consequences of such conflicts.

Keywords: Iran–US conflict, Geopolitical risk, Global finance, Crude oil, Strait of Hormuz, Inflation, Financial markets, Safe haven assets, Stagflation, Economic growth.

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Introduction

Geopolitical conflicts play a significant role in shaping the international economy and financial marketplaces. One of the greatest significant geopolitical issues in recent decade has been the ongoing conflict between Iran and the United States. As we know middle east is a major producer and supplier of crude oil so in this reference any political or military kind of tension in any reason may have far reaching effects on world economy and financial system.

Iran and United States had conflicts and it has grown year by year because of their dissimilarities over nuclear weapon trade sanctions military programs and regional impact this kind of dissimilarities create doubt in worldwide financial markets and affect investors and interrupted worldwide energy supplies.

Here is a place Strait of Hormuz is one of the satisfactory and important routes for oil transportation at middle east. where approximately 20% of the worldwide petroleum is going through this route and its very narrow waterway and linked to global energy trade. The conflict between Iran and US has arisen major security concern it can make oil price higher, transport cost is going higher and higher therefore global financial markets is unstable and inflationary burden.

Given these significant economic and financial consequences the Iran-US conflict delivers an delivers an important case for understanding that how geopolitical events effects global financial market. When we studying about this geopolitical relationship helps investors and researchers to analyze market and policymakers to make a wide range of policies to know better economic risk associated with global geopolitical conflicts like Iran-US War.

Objective of the Study

This study aims to identify the economic and financial impact of the Iran – US conflict. The main objectives are follows:

1. To identify how the Iran-US war impact the global financial markets.
2. To acknowledge the impact of geopolitical tensions on crude oil prices.
3. To study relationship between variations in crude oil prices and inflation.
4. Assessing the impact of the conflict on worldwide trade and foreign investment.
5. To evaluate the economic impact of Iran- US war for emerging economies, like India and Brazil.

Research Methodology

This study based on secondary data composed from reliable and trustworthy sources and this study implements descriptive research design to evaluate the Iran-US conflicts:

1. Research journals and published articles.
2. Financial reports
3. Government publications
4. Reports of international organisations
5. Economic newspapers and magazines

This collected data have been analysed through a qualitative method to know how the Iran-US conflict has impact global financial markets, crude oil prices, global trade and investment and the wide global economy.

Review of Literature

A growing body of research identifies geopolitical tension as a significant source of uncertainty in global financial systems. Geopolitical conflicts, wars, and political instability reduce investor confidence and increase market volatility, often leading to fluctuations in stock prices, exchange rates, and commodity markets (Caldara & Iacoviello, 2022). Studies have shown that periods of heightened geopolitical risk are associated with increased uncertainty, lower investment, and weaker economic performance across both developed and emerging economies.

Oil price shocks have been widely recognized as an important channel through which geopolitical conflicts affect economic activity. Hamilton (2003) argued that increases in oil prices negatively influence economic growth by raising production, transportation, and operational costs. Likewise, Kilian (2009) demonstrated that oil price shocks significantly affect inflation, industrial production, and macroeconomic stability, with oil-importing countries experiencing greater economic stress due to their dependence on external energy supplies.

Emerging economies are particularly vulnerable to geopolitical crises because of their reliance on imported energy and relatively weaker macroeconomic resilience. Research indicates that geopolitical uncertainty contributes to rising inflation, widening trade deficits, exchange rate depreciation, and slower economic growth in these economies (IMF, 2023). Furthermore, Caldara and Iacoviello (2022) find that geopolitical risk shocks reduce investment and economic activity while increasing financial market volatility.

The conflict between Iran and the United States has remained one of the most persistent sources of geopolitical risk in the Middle East. The tensions arise from multiple factors, including disputes over Iran's nuclear program, economic sanctions imposed by the United States, regional political rivalry, periodic military confrontations, and competition over strategic influence in the Gulf region (Council on Foreign Relations, 2024). An important source of concern is the Strait of Hormuz, through which approximately one-fifth of the world's oil supply is transported. Any disruption in this critical shipping route can significantly affect global oil prices and energy security (U.S. Energy Information Administration, 2024).

These continuing tensions have important implications for international financial markets. Investors closely monitor developments in the Middle East because any escalation increases the perceived risk of oil supply disruptions, resulting in higher oil prices, greater financial market volatility, and increased uncertainty in the global economy. Consequently, the Iran–US conflict remains an important area of study for understanding the relationship between geopolitical risk, oil prices, and macroeconomic performance.

A growing body of research points to geopolitical tension as a major source of uncertainty in financial markets. When wars break out or political instability takes hold, investors tend to lose confidence, and this typically shows up as heightened volatility across markets. Several studies have shown that rising oil prices tend to drag down economic growth, mainly because they push up the cost of production and transportation. This effect hits oil-importing countries especially hard, since they have little cushion against sudden price spikes.

Emerging economies appear to bear the brunt of geopolitical crises in a particular way - research consistently links these events to rising inflation, widening trade deficits, and currency depreciation. Much of this vulnerability comes down to their heavy reliance on imported energy. While the tension between Iran and the US isn't rooted in a single issue - it's a mix of political, economic, and military disputes that have built up over time. A few factors stand out as the main drivers are ongoing disagreements over Iran's nuclear program, economic sanctions imposed on Iran, competing political influence in the region, periodic military confrontations and control over strategic oil transportation routes, particularly the Strait of Hormuz.

Together, these issues have kept tensions simmering across the Middle East, and they've made international financial markets noticeably more jittery, since any escalation raises fears about disruptions to global oil supply.

International Monetary Fund. (2023). *World Economic Outlook: Navigating global divergences*. https:// www.imf.org/ en/ Publications / WEO

Financial Implications of the Iran–US War Impact on Crude Oil Prices

The Middle East remains one of the world;s most important oil- producing and suppilers regions, which means any disruption to the Strait of Hormuz sends ripples through global energy supply almost immediately. According to the Council of Foreign Relations, intensifying geopolitical tensions have already triggered supply disruptions and pushed crude oil prices higher across international markets.

These price increases don't stay contained to the energy sector – they riddle through the entire economy, driving up transportation costs, Industrial production expenses, Electricity costs and Import bills.

Countries that depend heavily on imported crude oil incline to feel this pain most acutely, since they have far less flexibility to absorb sudden cost increases.

Inflationary Pressure

Oil prices and inflation are closely linked - when fuel and transportation costs rise, the prices of everyday goods and services tend to follow. As inflation climbs, the effects cascade in several directions: consumers find their purchasing power eroding, households see their savings shrink, businesses face thinner profit margins, and overall economic growth loses momentum. In response, central banks often raise interest rates to keep inflation in check. While this can help stabilize prices, it also tends to dampen investment and slow down broader economic activity – creating a difficult trade-off for policymakers.

In response, central banks often raise interest rates to keep inflation in check. While this can help stabilize prices, it also tends to dampen investment and slow down broader economic activity - creating a difficult trade-off for policymakers.

Impact on Financial Markets

Uncertainty stemming from the Iran–US

conflict has left its mark on global financial systems as well. Stock markets have grown increasingly volatile, largely driven by fears of economic uncertainty and persistent inflation. The most visible effects include declining stock prices, weakened investor confidence heightened market volatility capital flowing out of riskier markets.

In times like these, investors typically sink toward safer havens - gold, government securities, and US dollar-denominated resources tend to see renewed demand. Market analysts have also pointed to the role of geopolitical risk in formative oil and stock price activities during periods of conflict.

Currency Instability

Developing economies are particularly exposed to currency depreciation during geopolitical uncertainty, largely because rising oil import bills push up demand for foreign currency. This kind of uncertainty doesn't just affect exchange rates in isolation - it ripples into global trade, inflation, foreign investment flows, and a country's ability to service external debt. Nations with limited foreign exchange reserves are especially weak when these pressures build.

Risk of Stagflation

One of the more concerning possibilities raised by this conflict is stagflation - a situation where inflation stays intractably high even as economic growth stalls. Several factors point in this direction rising oil prices, falling industrial output, weakening investment, and softening consumer demand all feed into the same problem. For policymakers, stagflation is mainly difficult to manage, since the usual tools for fighting inflation tend to further suppress growth.

Impact on International Trade and Supply Chains

Conflicts like this one rarely stay confined to the countries directly involved - they tend to disrupt international trade routes and supply chains more broadly. Shipping costs climb as insurance premiums rise and transportation risks increase, and the knock-on effects show up as slower global trade, production delays, higher import-export costs, and supply chain disruptions that reach industries far beyond the region itself. According to reporting from The Guardian, disruptions in the Strait of Hormuz have already had a measurable effect on shipping traffic and energy transportation.

Impact on India

Given how heavily India relies on Imported crude oil, it's no surprise that the Iran-US conflict has a fairly direct bearing on the Indian economy. When tensions rise in the Middle East, the effects tend to show up across several fronts at once. As global oil prices climb, that increase doesn't stay abstract for long - it shows up at the pump, with petrol and diesel prices in India rising in tandem and higher fuel costs rarely stay contained to transportation alone. They tend to spill over into the broader economy, pushing up the price of commodities and everyday goods as transportation and production costs rise across the board since India imports the bulk of its oil, costlier crude translates into a heavier import bill - and that, in turn, widens the country's trade deficit.

As India ends up paying more for its oil imports, demand for the US Dollar rises correspondingly, and the Indian Rupee tends to weaken as a result. Indian financial markets aren't insulated from global uncertainty either - periods of geopolitical tension typically bring noticeable swings in stock prices, as investor sentiment turns cautious.

Findings of the Study

Based on the analysis carried out in this study, some key findings emerge:

- The Iran–US conflict has a considerable bearing on global financial stability, with effects that extend well beyond the two countries that is Iran and US directly involved.
- Oil prices tend to spike sharply whenever geopolitical tensions escalate, reflecting the market's sensitivity to supply-side uncertainty.
- Inflation rises as a direct consequence of higher energy costs, which feed through into transportation, production, and consumer prices.
- Financial markets exhibit heightened volatility during such conflicts, as investor sentiment shifts rapidly in response to unfolding events.
- Emerging economies face suspiciously greater economic risks, largely owing to their dependence on imported energy and thinner financial buffers.
- International trade and supply chains experience noticeable disturbance, with shipping delays and rising costs affecting industries well beyond the region.
- Investor confidence tends to decline during geopolitical crises, prompting a shift toward safer assets and away from riskier markets.
- India, in particular, faces mounting inflationary pressure and higher import costs, underlining its vulnerability as a major oil-importing economy.

Suggestions and Recommendations

The study puts forward the following suggestions like countries should work toward diversifying their energy resources, reducing their reliance on oil and, by extension, their exposure to geopolitical shocks and governments would benefit from maintaining strong strategic petroleum reserves, which can act as a buffer against sudden supply disruptions.

Greater emphasis should be placed on diplomatic negotiations, since easing geopolitical tensions ultimately does more to stabilize markets than reactive economic events and central banks should aim for balanced monetary policies that control inflation without unnecessarily choking off growth and investment. Developing countries, in particular, should invest in strengthening their renewable energy sectors, which offers a longer-term path away from oil dependency further some Investors are advised to diversify their portfolios, spreading risk across asset classes to better weather periods of geopolitical uncertainty.

Conclusion

Taken together, the Iran–US conflict illustrates just how strongly geopolitical events and global financial systems are tangled. Its effects have rippled across crude oil prices, inflation, financial markets, international trade, and broader economic growth - touching far more than just the region where the tensions originated.

Oil price variations stands out as one of the most consequential outcomes, given how central energy is to virtually every industrial and economic activity. As inflation rises, uncertainty spreads through markets, and supply chains face disruption, both developed and developing economies end up bearing the cost - though not always similarly.

What this study ultimately suggests is that prolonged global instability doesn't just create short-term shocks, it has the potential to weaken global economic growth and deepen financial uncertainty over time. Addressing this calls for more than just economic firefighting - sustained diplomatic engagement, stronger international cooperation, and well- designed economic policies are essential if the long-term financial fallout from conflicts like this is to be kept in check.

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Metal-Organic Frameworks (MOFs) for Atmospheric Water Harvesting: From Molecular Design to Practical Application"

*Priyanshi Gupta

Abstract

Water scarcity has become one of the most critical global challenges due to climate change, population growth, and depletion of freshwater resources. Atmospheric Water Harvesting (AWH) has emerged as an innovative approach to obtain potable water directly from air. Among the various materials investigated for this purpose, Metal-Organic Frameworks (MOFs) have gained significant attention because of their exceptional porosity, tunable structures, and high-water adsorption capacity under low humidity conditions. This research paper reviews the role of MOFs in atmospheric water harvesting, focusing on molecular design, adsorption mechanisms, synthesis strategies, and practical applications. The study also discusses recent advancements, challenges, and future perspectives in developing sustainable MOF-based water harvesting systems for arid and semi-arid regions.

Keywords: Metal-Organic Frameworks, Atmospheric Water Harvesting, Water Adsorption, Porous Materials, Sustainability, MOFs

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Introduction

Freshwater scarcity affects billions of people worldwide. Traditional water resources such as rivers, lakes, and groundwater are increasingly stressed by industrialization, urbanization, and climate change. The atmosphere contains a significant amount of water vapor that can serve as an alternative freshwater source. Atmospheric Water Harvesting (AWH) technologies aim to capture and convert atmospheric moisture into usable water.

Conventional AWH techniques such as fog harvesting and refrigeration-based condensation systems often require high humidity or significant energy input. Therefore, advanced materials capable of efficiently capturing water vapor at low relative humidity are highly desirable. Metal-Organic Frameworks (MOFs) have emerged as promising materials because of their large surface area, controllable pore size, and tunable chemical functionality.

This paper examines the design and application of MOFs for atmospheric water harvesting and highlights their potential to address global water scarcity.

Metal-Organic Frameworks (MOFs)

Metal-Organic Frameworks are crystalline porous materials composed of metal ions or clusters connected by organic ligands. The resulting framework forms highly porous structures with exceptionally large surface areas.

Structure of MOFs

MOFs consist of:

Metal nodes or clusters

Organic linkers

Porous cavities for adsorption

The combination of metals and ligands determines the structural stability, hydrophilicity, and adsorption behavior of the material.

Properties of MOFs

Important properties of MOFs include:

High porosity

Large surface area

Tunable pore structures

Adjustable hydrophilic/hydrophobic nature

Excellent adsorption capacity

Reversible adsorption-desorption cycles

These characteristics make MOFs highly suitable for water harvesting applications.

Atmospheric Water Harvesting (AWH)

Atmospheric Water Harvesting refers to technologies used to extract water vapor from air and convert it into liquid water.

Sources of Atmospheric Moisture

The atmosphere contains approximately 13 trillion liters of water vapor globally. Even in desert regions, measurable humidity exists, making atmospheric moisture an attractive alternative water source.

Conventional Water Harvesting Methods

Fog Harvesting: Uses mesh systems to capture water droplets from fog.

Refrigeration-Based Condensation: Cools air below its dew point to condense water vapor.

Desiccant-Based Systems: Uses hygroscopic materials to absorb water vapor.

Although effective in some conditions, these methods often suffer from energy inefficiency or dependence on high humidity.

MOFs in Atmospheric Water Harvesting

MOFs provide a highly efficient platform for water adsorption because of their tailored pore structures and strong interaction with water molecules.

Working Principle

\The water harvesting process generally involves:

Water vapor adsorption by MOFs during nighttime or humid conditions

Heating or solar exposure to release adsorbed water

Condensation and collection of water

Important MOFs Used for AWH

MOF-801

Zirconium-based MOF

Excellent water uptake at low humidity

High thermal stability

MOF-303

Aluminum-based framework

Improved adsorption kinetics

Efficient regeneration ability

UiO-66

Chemically stable MOF

Good adsorption-desorption cycling performance

MIL-101(Cr)

Large pore structure

High water adsorption capacity

Molecular Design Strategies

The efficiency of MOFs depends greatly on molecular-level engineering.

Selection of Metal Centers

Metal ions influence:

Structural stability

Water affinity

Thermal resistance

Common metals include:

Zirconium

Aluminum

Chromium

Copper

Functionalization of Organic Linkers

Functional groups such as:

Hydroxyl (-OH)

Amino (-Nh2)

Carboxyl (-COOH)

increase hydrophilicity and improve water adsorption.

Pore Engineering

Optimizing pore size enhances:

Water diffusion

Adsorption capacity

Regeneration efficiency

Water Adsorption Mechanism

Water adsorption in MOFs occurs through:

Hydrogen bonding

Capillary condensation

Coordination interactions

The adsorption isotherm helps evaluate water uptake behavior at different humidity levels.

Adsorption-Desorption Cycle

Efficient MOFs should exhibit:

High adsorption capacity

Low regeneration temperature

Fast cycling stability

Minimal structural degradation

Practical Applications

Portable Water Harvesting Devices

MOF-based devices can produce drinking water in remote and desert regions using solar energy.

Military and Emergency Use

Portable AWH systems can provide water during disasters and military operations.

Smart Buildings

MOF-coated systems may help regulate humidity and generate water in sustainable buildings.

Agriculture

AWH systems can support irrigation in water-deficient regions.

Advantages of MOF-Based Water Harvesting

Operates at low humidity

Energy efficient

Solar-driven operation possible

Reusable adsorption cycles

Environmentally friendly

Potential for decentralized water production

Challenges and Limitations

Despite their advantages, several challenges remain:

High Production Cost

Large-scale synthesis of MOFs is expensive.

Stability Issues

Some MOFs degrade in humid conditions.

Scalability

Commercial-scale production and device integration remain difficult.

Energy Requirements

Efficient regeneration methods are still under development.

Future Perspectives

Future research should focus on:

Developing low-cost MOFs
Enhancing hydrothermal stability
Improving adsorption kinetics
Integrating solar-powered regeneration systems
Scaling up commercial production
Designing hybrid MOF composites
Advanced computational modeling and artificial intelligence may further accelerate MOF discovery and optimization.

Conclusion

Metal-Organic Frameworks represent a revolutionary class of porous materials with enormous potential for atmospheric water harvesting. Their tunable structures, high adsorption capacities, and ability to function under low humidity make them ideal candidates for sustainable water generation technologies. Although challenges such as cost, stability, and scalability remain, ongoing research continues to improve their practical viability. MOF-based atmospheric water harvesting systems could play a transformative role in addressing global water scarcity and ensuring access to clean water in the future.

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Biofertilizer: A Step Towards Sustainable Agriculture with Special Reference to Gaurela-Pendra-Marwahi District of Chhattisgarh

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Abstract

Biofertilizers represent a cornerstone technology in sustainable agriculture, comprising beneficial living microorganisms that colonize the rhizosphere and enhance plant growth through improved nutrient availability. The present investigation was conducted during the Kharif seasons of 2021-22 and 2022-23 at Parasi village, Marwahi block, Gaurela-Pendra-Marwahi (GPM) district of Chhattisgarh, India, to evaluate the effect of various biofertilizer treatments on the economics of rice cultivation using two indigenous aromatic rice landraces, Vishnubhog and Jeeraphool. A Factorial Randomized Block Design (FRBD) with six organic treatments and three replications was employed. The treatments comprised: T1 (FYM @10 t ha^{-1} + BGA @1250 ml ha^{-1}), T2 (FYM @10 t ha^{-1} + *Azotobacter* @1250 ml ha^{-1} + PSB @1250 ml ha^{-1} + KSB @1250 ml ha^{-1}), T3 (FYM @10 t ha^{-1} + BGA @1250 ml ha^{-1} + Biofertilizer consortia @1250 ml ha^{-1}), T4 (FYM @10 t ha^{-1} + *Azospirillum* @1250 ml ha^{-1}), T5 (FYM @10 t ha^{-1} + BGA @1250 ml ha^{-1} + *Azospirillum* @1250 ml ha^{-1}), and T6 (Control).

The results demonstrated that T2 consistently recorded the highest gross return (Rs 127,456 ha^{-} 1), net return (Rs 77,903.50 ha^{-1}), and benefit-cost ratio (2.57), which was statistically at par with T3. Vishnubhog (V1) exhibited superior economic performance compared to Jeeraphool (V2), registering higher gross return (Rs 114,368 ha^{-1} vs Rs 90,538.67 ha^{-1}), net return (Rs 67,771.75 ha^{-1} vs Rs 43,942.42 ha^{-1}), and B:C ratio (2.41 vs 1.91). The interaction effects revealed that V1T2 (Vishnubhog with FYM + *Azotobacter* + PSB + KSB) recorded the maximum net return of Rs 95,183.50 ha^{-1}, representing a remarkable 419% increase over the control (V1T6: Rs 18,329 ha^{-1}). The control treatment consistently exhibited the lowest economic parameters across both varieties and years.

The findings unequivocally establish that integrated application of biofertilizers, particularly consortia comprising *Azotobacter*, PSB, and KSB along with FYM, significantly enhances the economic viability of indigenous rice cultivation while reducing dependency on chemical fertilizers. The study advocates for the large-scale adoption of biofertilizer-integrated nutrient management strategies in the tribal-dominated GPM district to bridge yield gaps, improve livelihood security, and promote climate-resilient sustainable agriculture.

Keywords: Biofertilizer, Vishnubhog, Jeeraphool,

Gaurela-Pendra-Marwahi, Sustainable rice, Aromatic landraces, *Azospirillum*, PSB, KSB, BGA, Organic farming, INM

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Introduction

Rice (*Oryza sativa* L.) constitutes the staple food for more than half of the global population, with India being the second-largest producer globally, contributing approximately 22% of the world's total rice production (FAO, 2023). The state of Chhattisgarh, often referred to as the 'Rice Bowl of India,' accounts for nearly 6% of India's total rice production, with the crop occupying about 3.8 million hectares across the state (Directorate of Agriculture, Chhattisgarh, 2023). The unique agro- ecological conditions of the region, characterized by fertile Matasi soils, adequate monsoon rainfall (1200-1400 mm), and diverse microclimates, have fostered the evolution of numerous indigenous rice landraces that possess distinct aromatic qualities, nutritional attributes, and cultural significance (Prajapati *et al.* 2025).

The Gaurela-Pendra-Marwahi (GPM) district, established in 2020 as a newly formed district in the northern-western part of Chhattisgarh, represents a unique agro-biodiversity hotspot predominantly inhabited by tribal communities. This district preserves exceptional aromatic rice landraces, most notably Vishnubhog, Dubraj, Lohandi, and Jeeraphool, which hold profound cultural significance and command premium market prices ranging from Rs 80-120 per kilogram (Prajapati *et al.* 2025). Jeeraphool rice, named for its cumin-like grain shape, has been awarded Geographical Indication (GI) status on March 14, 2019, recognizing its unique quality attributes tied to the specific ecological conditions of the region (RIPA Online, 2024). These indigenous varieties, cultivated through traditional organic practices for generations, represent an invaluable genetic heritage that warrants scientific attention for conservation and sustainable utilization.

Despite their premium quality and cultural importance, the productivity of these indigenous landraces remains substantially lower than high-yielding varieties (HYVs), primarily due to the reliance on traditional cultivation practices, inadequate nutrient management, and limited adoption of scientific interventions (Sharma *et al.*

2023). The tribal farmers of GPM, who constitute the majority of the agricultural workforce, continue to face economic constraints due to low yields (typically 1.52.5 t ha^{-1}) and escalating input costs, particularly chemical fertilizers (Prajapati *etal.* 2025).

The escalating costs of chemical fertilizers and their deleterious impacts on soil health, microbial diversity, and environmental sustainability have necessitated a paradigm shift towards ecologically sound nutrient management strategies (Bhardwaj *et al.* 2014). Biofertilizers, defined as formulations containing living microorganisms that enhance nutrient availability through biological nitrogen fixation, phosphate solubilization, potassium mobilization, and growth-promoting substance production, have emerged as promising alternatives for sustainable agriculture (Vessey, 2003; Yosefi *et al.* 2011). The Government of India has actively promoted biofertilizer adoption through various initiatives including the National Project on Development and Use of Bio-fertilizers (NPDB) and the Paramparagat Krishi Vikas Yojana (PKVY), reflecting the national priority accorded to organic and sustainable farming practices (Majumdar, 2015).

The different types of biofertilizers relevant to rice ecosystems include nitrogen-fixing bacteria such as *Azotobacter* and *Azospirillum*, which can fix atmospheric nitrogen to the tune of 20-40 kg N ha^{-1} per season; phosphate-solubilizing bacteria (PSB) that convert insoluble phosphates into plant- available forms through organic acid secretion and phosphatase enzyme production; potassium- solubilizing bacteria (KSB) that mobilize bound potassium from soil minerals; and blue-green algae (BGA) that contribute substantially to nitrogen fixation in flooded rice paddies (Venkataraman, 1981; Roger & Watanabe, 1986). The consortia-based approach, integrating multiple beneficial microorganisms, has demonstrated superior performance compared to individual inoculants due to synergistic interactions and complementary modes of action (Upadhyay *et al.* 2025).

The integration of biofertilizers with organic manures such as farmyard manure (FYM) represents a holistic approach that addresses multiple dimensions of soil fertility simultaneously. FYM provides the carbon substrate essential for microbial proliferation, improves soil physical properties, and supplies secondary and micronutrients, while biofertilizers enhance the mineralization processes and nutrient use efficiency (Dahiphale *et al.* 2003). Studies have demonstrated that combining FYM with biofertilizer consortia can reduce chemical fertilizer requirements by 25-30% while maintaining or even enhancing crop yields (Shah & Sandeep, 2014; Ranjitha & Reddy, 2014).

The GPM district, with its predominant rice-based cropping systems, organic farming traditions, and tribal farming communities practicing low-input agriculture, presents an ideal context for biofertilizer intervention. However, systematic research evaluating the economic implications of biofertilizer application on indigenous aromatic rice varieties in this region remains conspicuously absent. The present investigation was therefore conceptualized to address this critical knowledge gap by evaluating the effect of various biofertilizer treatments on the economic parameters of Vishnubhog and Jeeraphool rice varieties under the agro-ecological conditions of GPM district. The specific objectives were: (i) to assess the effect of different biofertilizer treatments on cost of cultivation, gross return, net return, and benefit-cost ratio of indigenous rice varieties; (ii) to compare the economic performance of Vishnubhog and Jeeraphool varieties under organic nutrient management; and (iii) to identify the most economically viable biofertilizer treatment for sustainable rice production in the tribal farming systems of GPM district.

Materials and Methods

Study Area

The field experiment was conducted during the Kharif seasons of 2021-22 and 2022-23 at Parasi village, Marwahi block, Gaurela-Pendra-Marwahi district (latitude 22 degree 45' to 23 degree 15' N, longitude 81 degree 45' to 82 degree 15' E, altitude 550-650 m above mean sea level), Chhattisgarh, India. The experimental site falls under the northern hills agro-climatic zone of Chhattisgarh, characterized by a subtropical monsoon climate with average annual rainfall of 1250-1400 mm, predominantly received during June-September. The soil of the experimental field was sandy clay loam (Matasi type) with pH 6.2-6.8, organic carbon 0.52-0.68%, available nitrogen 185-210 kg ha^{-1}, available phosphorus 12.5-16.8 kg ha^{-1}, and available potassium 185-220 kg ha^{-1}, representing the typical soil characteristics of the region (Prajapati *et al.* 2025).

Experimental Design and Treatments

The experiment was laid out in a Factorial Randomized Block Design (FRBD) with two factors: Factor A (Variety) comprising two levels: V1 = Vishnubhog (indigenous aromatic landrace) and V2 = Jeeraphool (GI-tagged indigenous aromatic variety); and Factor B (Organic Treatment) comprising six levels: T1 = FYM @ 10 t ha^{-1} + Blue-Green Algae (BGA) @ 1250 ml ha^{-1}; T2 = FYM @ 10 t ha^{-1} + *Azotobacter* @ 1250 ml ha^{-1} + Phosphate Solubilizing Bacteria (PSB) @ 1250 ml ha^{-1} + Potassium Solubilizing Bacteria (KSB) @ 1250 ml ha^{-1}; T3 = FYM @ 10 t ha^{-1} + BGA @ 1250 ml ha^{-1} + Biofertilizer consortia @ 1250 ml ha^{-1}; T4 = FYM @ 10 t ha^{-1} + *Azospirillum* @ 1250 ml ha^{-1}; T5 =
FYM @10 t ha^{-1} + BGA @ 1250 ml ha^{-1} + *Azospirillum* @ 1250 ml ha^{-1}; and T6 = Control (no organic treatment). Each treatment combination was replicated three times, resulting in 36 experimental plots.

Crop Management

Seeds were sown in raised nursery beds after treatment with respective biofertilizers. Twenty- five-day-old seedlings were transplanted at a spacing of 20 cm x 15 cm with two seedlings per hill. Recommended doses of biofertilizers were applied as seed treatment and soil application at the time of transplanting. FYM was applied as basal dose 15 days before transplanting and thoroughly incorporated into the soil. All other agronomic practices including weeding, irrigation, and plant protection measures were uniformly followed as per the package of practices of Indira Gandhi Krishi Vishwavidyalaya (IGKV), Raipur.

Economic Analysis

The economic analysis was computed based on prevailing market prices of inputs and outputs in the local market of Marwahi block. Cost of cultivation included all variable costs incurred from land preparation to harvesting, including labour charges, seed cost, cost of FYM, biofertilizer cost, and other incidental expenses. Gross return was calculated by multiplying the total grain and straw yield by their respective market prices. Net return was derived by subtracting the cost of cultivation from the gross return. The benefit-cost (B:C) ratio was computed as the ratio of gross return to cost of cultivation (Upadhyay *et al.* 2025).

Statistical Analysis

The data collected on various economic parameters were subjected to analysis of variance (ANOVA) appropriate for factorial randomized block design using the statistical software OPSTAT. The significance of treatment effects was tested using F-test, and critical differences (CD) were calculated at 5% probability level ($p < 0.05$) to compare treatment means (Gomez & Gomez, 1984). Standard error of mean (SEm) was also computed for all parameters. The pooled analysis across both years was performed to derive stable estimates of treatment effects.

Results

Cost of Cultivation

The cost of cultivation exhibited significant variation among the organic treatments while remaining consistent across both rice varieties (Table 1). The highest cost of cultivation was recorded under T2 (FYM @ 10t ha^{-1} + *Azotobacter* @ 1250 ml ha^{-1} + PSB @ 1250 ml ha^{-1} + KSB @ 1250 ml ha^{-1}) with a pooled mean of Rs 49,552.50 ha^{-1}, which was statistically at par with T3 (Rs 48,830.00 ha^{-1}). The increased cost under these treatments was attributable to the cumulative expenses of multiple biofertilizer inoculants applied in combination. T4 (FYM + *Azospirillum*) recorded a cost of Rs 48,142.50 ha^{-1}, followed by T5 (Rs 48,517.50 ha^{-1}) and T1 (Rs 48,080.00 ha^{-1}). The lowest cost of cultivation was observed in the control (T6) at Rs 36,455.00 ha^{-1}, representing a 26.4% reduction compared to T2. The cost of cultivation remained identical across both varieties as the treatment costs were independent of the variety factor.

Treatment	Cost of Cultivation (Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	B:C Ratio
T1 (FYM+BGA)	48,080	105,440	57,360	2.19
T2 (FYM+Azoto+PSB+KSB)	49,553	127,456	77,904	2.57
T3 (FYM+BGA+Consortia)	48,830	120,544	71,714	2.47
T4 (FYM+*Azospirillum*)	48,143	100,168	52,026	2.08
T5 (FYM+BGA+*Azospirillum*)	48,518	112,128	63,610	2.31
T6 (Control)	36,455	48,984	12,529	1.34
SEm(+)	-	2,749	2,749	0.06
CD (5%)	-	8,063	8,063	0.17

Table 1: Effect of biofertilizers on economics of indigenous rice varieties (Pooled Mean)

Variety	Gross Return (Rs/ha)		Net Return (Rs/ha)	B:C Ratio
Vishnubhog (V1)	114,368		67,772	2.41
Jeeraphool (V2)	90,539		43,942	1.91
SEm(+)	1,587		1,587	0.03

Table 2: Economic performance of indigenous rice varieties (Pooled Mean)

Gross Return

Gross return varied significantly among both treatments and varieties. Among varieties, Vishnubhog (V1) consistently recorded higher gross return (Rs 114,368.00 ha^{-1}) compared to Jeeraphool (V2) (Rs 90,538.67 ha^{-1}), representing a 26.3% advantage. This superior economic performance of Vishnubhog was attributed to its higher grain yield potential, better market preference, and premium pricing in the local market. Among treatments, T2 (FYM + *Azotobacter* + PSB + KSB) recorded the highest gross return with a pooled mean of Rs 127,456.00 ha^{-1}, which was statistically at par with T3 (Rs 120,544.00 ha^{-1}). The lowest gross return was recorded under the control (T6) at Rs 48,984.00 ha^{-1}. The treatment effect was consistent across both years, with a marginal increase in gross returns during 2022-23 compared to 2021-22, reflecting favorable seasonal conditions during the second year.

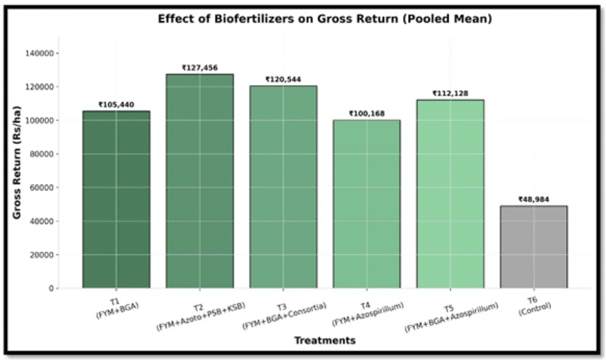

Figure 1: Effect of biofertilizer treatments on gross return (Rs/ha) - Pooled mean of2021-22 and 2022-23

Net Return

Net return followed a pattern similar to gross return, with considerable variation across treatments and varieties. Vishnubhog (V1) recorded significantly higher net return (Rs 67,771.75 ha^{-1}) than Jeeraphool (V2) (Rs 43,942.42 ha^{-1}). Among treatments, T2 resulted in the highest net return (Rs 77,903.50 ha^{-1}), which was statistically at par with T3 (Rs 71,714.00 ha^{-1}). The superiority of T2 was attributed to the synergistic interaction of *Azotobacter*, PSB, and KSB, which enhanced nitrogen fixation, phosphate solubilization, and potassium mobilization simultaneously, leading to improved nutrient uptake and higher yields. The control treatment recorded the lowest net return (Rs 12,529.00 ha^{-1}), underscoring the economic necessity of nutrient supplementation for profitable rice cultivation.

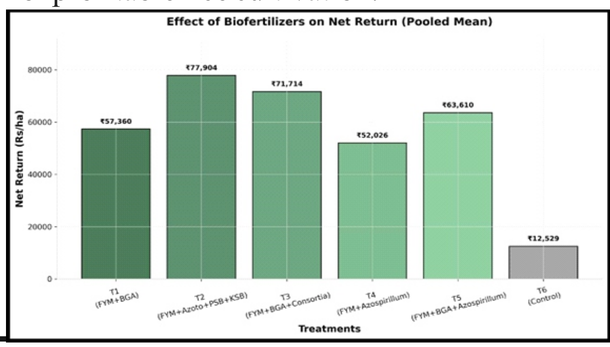

Figure 2: Effect of biofertilizer treatments on net return (Rs/ha) - Pooled mean of2021-22 and 2022-23

Benefit-Cost Ratio

The benefit-cost ratio, a critical indicator of economic feasibility, differed significantly among treatments and varieties. Vishnubhog (V1) recorded a higher B:C ratio (2.41) compared to Jeeraphool (V2) (1.91), indicating that investment in Vishnubhog cultivation under organic management yields greater economic returns. Among treatments, the highest B:C ratio was recorded in T2 (2.57), followed closely by T3 (2.47), T5 (2.31), T1 (2.19), and T4 (2.08). The control (T6) recorded the lowest B:C ratio of 1.34, which, although above the break-even point (B:C = 1.0), indicated marginal profitability. All biofertilizer treatments recorded B:C ratios exceeding 2.0, signifying that every rupee invested in these treatments generated returns exceeding two rupees, thereby establishing their economic viability.

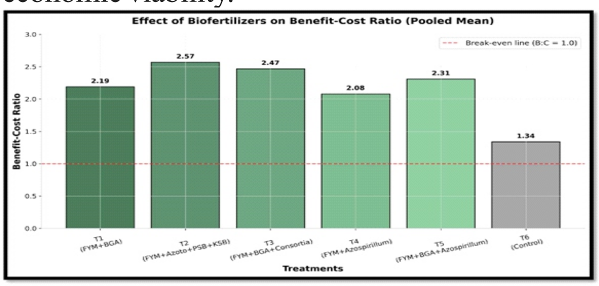

Figure 3: Effect of biofertilizer treatments on benefit-cost ratio - Pooled mean of2021-22 and 2022-23

Interaction Effects (Variety x Treatment)

The interaction between variety and treatment was non-significant ($p > 0.05$) for all economic parameters, indicating that the relative performance of treatments was consistent across both varieties. However, the absolute values revealed that V1T2 (Vishnubhog with FYM + *Azotobacter* + PSB + KSB) recorded the highest net return of Rs 95,183.50 ha^{-1}, followed by V1T3 (Rs 86,498.00 ha^{-1}). Similarly, V2T2 (Jeeraphool with the same treatment) recorded the highest net return among Jeeraphool combinations (Rs 60,623.50 ha^{-1}). The lowest values were consistently recorded under the control treatments for both varieties (V1T6: Rs 18,329.00 ha^{-1}; V2T6: Rs 6,729.00 ha^{-1}), highlighting the profound economic benefit of biofertilizer application.

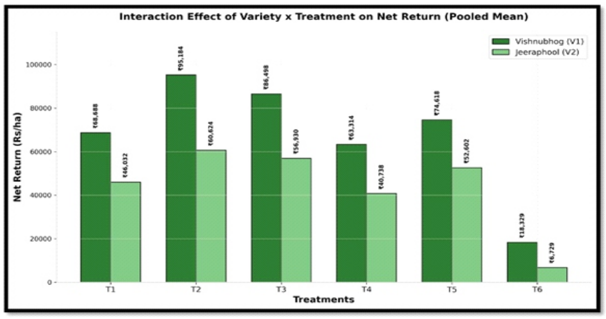

Figure 4: Interaction effect of variety and treatment on net return (Rs/ha) - Pooled mean

Year-wise Comparison and Temporal Stability

The year-wise analysis revealed consistent trends across both experimental years, with marginal improvements in economic parameters during 2022-23 compared to 2021-22. The pooled mean analysis, which combined data from both years, provided robust estimates of treatment effects, accounting for seasonal variability. The stability of treatment performance across years indicates that biofertilizer effects are not anomalous to specific seasonal conditions but represent genuine agronomic improvements that can be reliably expected under the agro-climatic conditions of GPM district.

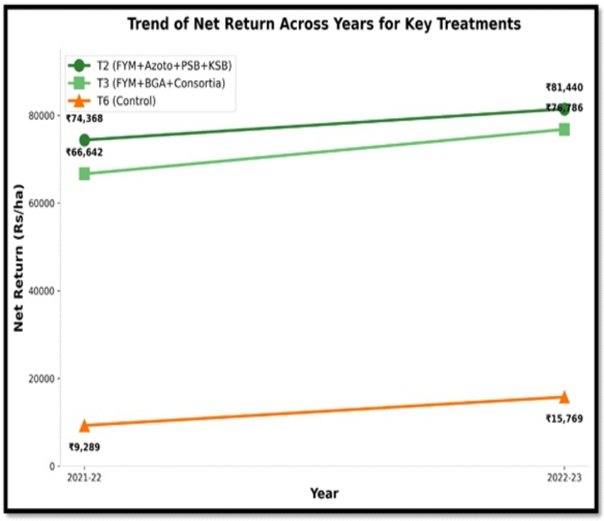

Figure 5: Trend of net return across years for key treatments (T2, T3, and T6)

Variety-wise Economic Performance

The comparative analysis of both varieties revealed distinct economic profiles. Vishnubhog consistently outperformed Jeeraphool across all economic parameters, with pooled mean gross return of Rs 114,368.00 ha^{-1} versus Rs 90,538.67 ha^{-1}, net return of Rs 67,771.75 ha^{-1} versus Rs 43,942.42 ha^{-1}, and B:C ratio of 2.41 versus 1.91. The 54.2% higher net return from Vishnubhog can be attributed to its superior yield potential, better grain characteristics, and higher market demand in the local tribal markets where it commands premium prices for its distinct aroma and cooking quality.

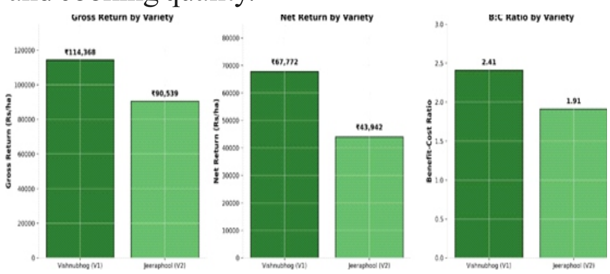

Figure 6: Economic comparison of Vishnubhog (V1) and Jeeraphool (V2) - Pooled mean

Discussion

Biofertilizer Effects on Economic Parameters

The present investigation unequivocally demonstrates that integrated application of biofertilizers significantly enhances the economic viability of indigenous aromatic rice cultivation in the GPM district of Chhattisgarh. The superiority of T2 (FYM + *Azotobacter* + PSB + KSB) in terms of gross return (Rs 127,456 ha^{-1}), net return (Rs 77,903.50 ha^{-1}), and B:C ratio (2.57) can be attributed to the multifaceted modes of action of the microbial consortium. *Azotobacter*, a free-living nitrogen-fixing bacterium, contributes 20-40 kg N ha^{-1} per season through biological nitrogen fixation, while PSB solubilizes insoluble phosphates through organic acid production (gluconic, citric, and oxalic acids) and phosphatase enzyme secretion, and KSB mobilizes bound potassium from silicate minerals (Upadhyay *et al.* 2025). The synergistic interaction among these microorganisms creates a favorable rhizosphere environment that enhances nutrient availability beyond what individual inoculants can achieve (Rawat *et al.* 2022).

The economic superiority of T2 aligns with the findings of Upadhyay *et al.* (2025), who reported that co-inoculation of *Azotobacter* and PSB with 100% recommended dose of fertilizer (RDF) enhanced grain yield, nutrient uptake, and profitability of rice in the alluvial soils of Ayodhya district, recording maximum gross return of Rs 1,85,053.60 ha^{-1} and net return of Rs 65,944.80 ha^{-1}. Similarly, Parunandi *et al.* (2023) demonstrated that seed inoculation with a consortium of *Azotobacter*, PSB, and KMB (potassium-mobilizing bacteria) along with

75% RDF recorded the highest seed yield of wheat with 25% savings in chemical fertilizer doses, corroborating the economic advantage of microbial consortia.

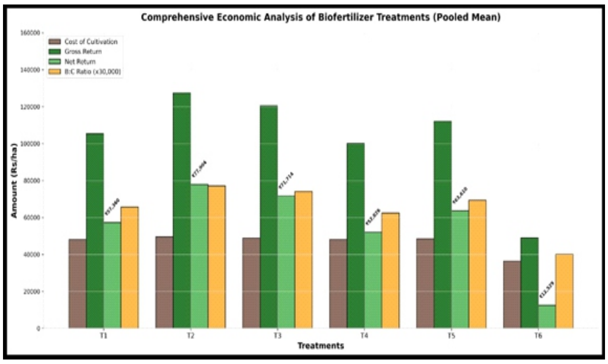

Figure 7: Comprehensive economic analysis of biofertilizer treatments - Pooled mean

Comparative Performance of Indigenous Varieties

The consistent superiority of Vishnubhog over Jeeraphool across all economic parameters reflects the inherent yield potential and market preference differences between these indigenous landraces. Vishnubhog, characterized by longer panicles, higher seed count per panicle, and superior test weight, as documented by Prajapati *et al.* (2025), generates higher biological and economic yields under similar management conditions. The 26.3% higher gross return and 54.2% higher net return from Vishnubhog underscore its potential as a preferred variety for commercial cultivation under organic management systems.

However, Jeeraphool holds unique cultural and market value as a GI-tagged variety with distinct cumin-like grain appearance and mild natural sweetness (Wikipedia, 2024; RIPA Online, 2024). The flour of Jeeraphool is traditionally used to prepare local delicacies including 'Chausela' (Poori), anarsa, and kheer, commanding premium prices in niche markets. Therefore, while Vishnubhog offers superior immediate economic returns, Jeeraphool's cultural significance and specialty market potential warrant its continued cultivation for conservation and value-added product development.

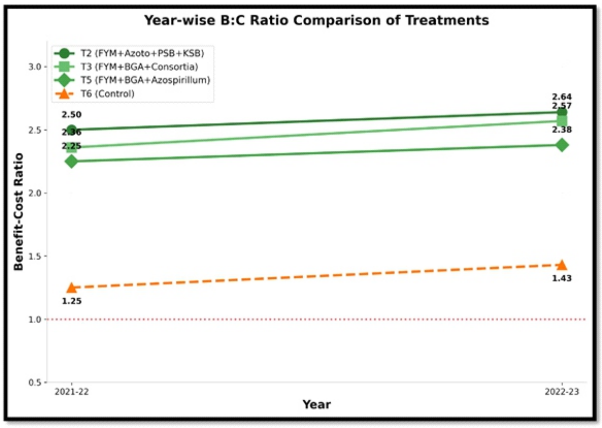

Figure 8: Year-wise B:C ratio comparison of selected treatments

BGA-based Treatments and Nitrogen Economy

The treatments incorporating blue-green algae (T1, T3, T5) demonstrated commendable economic performance, with T3 (FYM + BGA + Biofertilizer consortia) recording a net return of Rs 71,714.00 ha^{-1} and B:C ratio of 2.47, statistically at par with T2. This finding is consistent with the established role of BGA in rice ecosystems. Roger and Watanabe (1986), in their comprehensive review at the International Rice Research Institute (IRRI), documented that BGA can fix 30-80 kg N ha^{-1} per crop under favorable conditions, with the reference value of 30 kg N ha^{-1} constituting a satisfactory contribution to rice nitrogen nutrition. Venkataraman (1981) reported that BGA can contribute up to 80 kg N ha^{-1} per season in rice ecosystems under waterlogged conditions, making it a critical input for sustainable rice production.

The stimulatory effect of FYM on BGA growth and nitrogen fixation activity, as observed in the present study, corroborates the findings of Roger and Watanabe (1986), who documented that organic matter in the form of compost or straw stimulates N2-fixation by Tolypothrix tenuis and other N2- fixing BGA in paddy soils. The phosphorus content of FYM also addresses the phosphorus limitation that often constrains BGA growth in tropical paddy soils (Pabbi, 2008).

Implications for Sustainable Agriculture and Tribal Livelihoods

The economic analysis reveals that all biofertilizer treatments generated B:C ratios exceeding 2.0, with the best treatment (T2) yielding Rs 2.57 for every rupee invested. This level of economic return is particularly significant for the tribal farming communities of GPM district, where resource constraints limit the adoption of high-cost chemical fertilizers. The findings of IJSI (2025) on costbenefit analysis of biofertilizers in Telangana, which reported net profits of Rs 45,500 per acre with biofertilizers compared to Rs 39,800 without them, further substantiate the economic viability of biofertilizer-based nutrient management.

The integration of biofertilizers with FYM offers a pathway to reduce cultivation costs by 2030% while enhancing crop yields by 10-25%, as demonstrated in the present study and corroborated by Prajapati *et al.* (2025). This approach aligns with the Government of India's Paramparagat Krishi Vikas Yojana (PKVY), which has supported over 150 farmer groups and improved biofertilizer adoption by 30% in targeted areas (IJSI, 2025). For the tribal farmers of GPM, who cultivate indigenous varieties primarily for subsistence with limited market access, the demonstrated economic benefits of biofertilizer application provide a compelling rationale for transitioning from traditional low-input systems to scientifically informed organic management.

Mechanistic Insights and Future Directions

The superior performance of biofertilizer consortia can be explained through multiple complementary mechanisms. *Azotobacter* and *Azospirillum*, through nitrogen fixation, provide a sustained supply of ammonia to rice plants, reducing the dependence on urea application (Bashan & de-Bashan, 2010). PSB strains such as Bacillus subtilis and Pseudomonas species produce organic acids and phosphatases that solubilize tricalcium phosphate, hydroxyapatite, and other insoluble phosphate forms, increasing phosphorus availability in the rhizosphere (Rawat *et al.* 2022). KSB mobilizes potassium from feldspar and mica minerals through the production of organic acids and extracellular polysaccharides (Parunandi *et al.* 2023). BGA, in addition to nitrogen fixation, produce growth-promoting substances including auxins, gibberellins, and vitamins that enhance root proliferation and nutrient absorption (Roger & Watanabe, 1986).

The non-significance of variety x treatment interaction indicates that the beneficial effects of biofertilizers are broadly applicable across different indigenous rice varieties, suggesting that recommendations can be formulated at the community level without variety-specific customization. However, future research should investigate the molecular mechanisms underlying the differential response of aromatic rice varieties to microbial inoculation, the long-term effects of repeated biofertilizer application on soil microbial diversity, and the development of location-specific biofertilizer formulations optimized for the unique soil microbiome of the Matasi soils in GPM district.

Conclusion

The present investigation, conducted over two consecutive Kharif seasons (2021-22 and 2022-23) at Parasi village, Marwahi block, GPM district, Chhattisgarh, provides comprehensive evidence for the economic viability and agronomic superiority of biofertilizer-integrated nutrient management in indigenous aromatic rice cultivation. The following conclusions emerge from this study:

First, the integrated application of *Azotobacter*, PSB, and KSB along with FYM (T2) consistently recorded the highest economic returns, with gross return of Rs 127,456 ha^{-1}, net return of Rs 77,903.50 ha^{-1}, and benefit-cost ratio of 2.57, establishing it as the most economically viable treatment for sustainable rice production in the tribal farming systems of GPM district.

Second, Vishnubhog demonstrated superior economic performance compared to Jeeraphool across all parameters, with 54.2% higher net returns, suggesting its priority for commercial cultivation under organic management. However, Jeeraphool's GI-tagged status and unique culinary attributes warrant its continued cultivation for conservation and specialty market development.

Third, all biofertilizer treatments recorded B:C ratios exceeding 2.0, compared to 1.34 for the control, establishing that every rupee invested in biofertilizer application yields returns exceeding two rupees. The consistent performance across both years confirms the reliability and stability of biofertilizer effects under variable seasonal conditions.

Fourth, the study demonstrates that biofertilizer-based organic nutrient management can bridge the yield gap of indigenous rice varieties while simultaneously reducing input costs, improving soil health, and preserving the genetic heritage of aromatic landraces. This approach offers a sustainable pathway for enhancing the livelihood security of tribal farming communities while promoting climate-resilient agriculture in the rain-fed ecosystems of Chhattisgarh.

Based on these findings, the following recommendations are proposed for policy consideration: (i) strengthen biofertilizer production and distribution infrastructure in tribal districts; (ii) integrate biofertilizer technology into the extension programs targeting indigenous rice cultivation; (iii) provide input subsidies for biofertilizer procurement under PKVY and National Food Security Mission (NFSM); (iv) establish participatory seed production systems for Vishnubhog and Jeeraphool linked with organic certification; and (v) develop market linkages for GI-tagged aromatic rice to ensure remunerative prices for tribal farmers adopting sustainable cultivation practices.

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10

Economic Conditions of Artisans in Bastar District Of Chhattisgarh: by means of Handicrafts

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Abstract

Handicrafts represent an imperative factor of India's cultural heritage and rural economy. Bastar district of Chhattisgarh is globally acknowledged for its wealthy tribal handicrafts such as Dhokra metal craft, bamboo art, wood carving, wrought iron craft, kosa textiles, and wall paintings. These traditional crafts supply employment opportunities to a huge number of tribal artisans and add appreciably to conserve original knowledge and cultural individuality. in spite of the inimitability and market prospective of Bastar handicrafts, artisans maintain to face socio-economic challenges including insufficient income, imperfect market right of entry, growing raw material costs, lack of technical support, and lacking awareness of government wellbeing schemes. This paper reviews the accessible status of handicraft development in Bastar and examines its connection with the economic conditions of artisans. Based on an widespread review of literature and secondary data sources, the study identifies key challenges disturbing artisan livelihoods and highlights the role of institutional sustain, market linkages, and skill growth in ensuring sustainable growth. The findings propose that spiraling marketing infrastructure, design modernization, financial inclusion and policy completion can considerably develop the socio-economic position of artisans while preserving Bastar's exclusive cultural tradition.

Keywords: Handicrafts, Bastar, Artisans, Tribal Economy, employment, Cultural tradition, Rural Development

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Introduction

Handicrafts represent one of India's oldest traditional economic sectors. They reflect the cultural diversity, local knowledge, and artistic excellence that have evolved over generations. Beyond preserving India's cultural identity, handicrafts serve as a vital source of employment and livelihood for tribal communities and rural populations.

Handicrafts created by villagers and tribal people in the Bastar district of Chhattisgarh hold a special place in India. The district is known for its tribal population, wealthy forest property, and individual craft traditions. Bastar artisans produce a large collection of handicrafts including bell metal (Dhokra) artifacts, bamboo products, carvings, textile products, and wall paintings. These crafts not only throw in to local livelihoods but also attract national and international markets.

Despite growing recognition, artisans often remain economically defenseless. Limited entrée to markets, insufficient financial support, low bargaining power, and competition from machine-made products continue to involve their economic welfare. Therefore, understanding the connection between handicraft development and artisan livelihoods is decisive for promote wide-ranging and sustainable rural development.

Handicrafts of Bastar: Bastar is extensively recognized as a center of tribal arts and crafts. Major handicrafts practiced in the district comprise:

Bamboo Art: Bamboo craft is one of the oldest traditional occupations in Bastar. Artisans produce baskets, mats fishing tools, wall hangings, mats, lamps, and decorative or pretty products using nearby accessible bamboo resources.

Bell Metal (Dhokra) Craft: Dhokra is an ancient metal casting technique based on the lost-wax process. The Ghadwa tribe is traditionally connected with this craft. Dhokra products are valued for their individuality, as no two items are matching.

Wrought Iron Craft: Wrought iron artisans utilize recycled iron to create attractive and utility products such as candle stands, lamps, figurines and spiritual artifacts.

Wood Carving: Wood carving represents the artistic skills of Bastar tribes. Artisans create sculptures, masks, doors, furniture, and decorative items using nearby accessible timber variety.

Textile and Kosa Crafts: Bastar's hand-woven and naturally decorated textile products, especially Kosa silk sarees, are highly respected for their artistic value and cultural importance.

Wall Painting and Sisal Craft: Traditional wall paintings describe tribal festivals, tradition, and social life, while sisal fiber is used to manufacture a variety of decorative products.

Review of Literature

Several studies have explored different scope of handicraft development and artisan livelihoods. Chakroborty et al. (2021) examined the socio-economic conditions of Dhokra artisans and found that handicrafts significantly contribute to income generation and women's empowerment.

Hemant et al. (2020) observed a decline in the sales of Bastar handicrafts due to demonetization, increasing raw material costs, infrastructural limitations, and the COVID-19 pandemic.

Das (2018) emphasized the importance of innovation, market access, and institutional support for enhancing rural craft-based livelihoods.

Banerjee and Nagwani (2017) highlighted the challenges faced by Dhokra artisans in Chhattisgarh, particularly inadequate literacy, poor marketing opportunities, and limited awareness of government schemes.

Mukherjee et al. (2016) stressed the importance of technological modernization and skill enhancement for improving productivity and competitiveness in the handicraft sector.

Mignosa and Kotipalli (2019) discussed global efforts to preserve traditional crafts and highlighted the importance of integrating cultural heritage with modern economic systems.

Research Gap

Most accessible studies focus on the artistic and cultural implication of Bastar handicrafts. However, there is limited pragmatic research probing the direct relationship between handicraft development and the socio-economic conditions of artisans. Furthermore, not enough attention has been given to evaluating the helpfulness of government interventions, market linkages, and institutional support mechanisms in improving artisan livelihoods. This study attempts to address these gaps.

Objectives of the Study

- To investigate the socio-economic conditions of artisans unavailable in handicraft production in Bastar district.
- To observe the involvement of traditional skills and original knowledge to handicraft development.
- To evaluate the helpfulness of government schemes and institutional support in improving artisan livelihoods.
- To discover most important challenges affecting handicraft development and suggest appropriate policy interventions.

Research Methodology

- This study adopts a descriptive and analytical approach based primarily on secondary data.
- **Sources of Data:**
- Research articles: problem of artisans, impact of government schemes, result of previous study.
- Government reports: official report published by government, benefit of how mane artisans, budget schemes.
- Census publications: how many artisans in the state and how's income aznd education level.
- Academic journals: magazines publish in university/college.
- NGO reports: field report of government organization, truth of ground level. Handicraft development agencies: knowledge of new schemes, training program, marketing help.

Analytical Framework

- The study evaluates:
- Socio-economic status of artisans
- Market openness
- Institutional support
- Employment generation
- Sustainability of handicraft practices

Challenges Faced by Bastar Artisans

The literature identifies several challenges:

- Limited market entrance
- Low income and profit limitations

- increasing cost of raw materials
- require of financial support
- insufficient infrastructure
- competition from machine- made products
- limited awareness of government schemes
- declining interest among younger generations

These challenges negatively affect both artisan livelihoods and the long-term sustainability of traditional crafts.

Discussion

Handicraft plays an important role in supporting rural and tribal livelihoods in Bastar. The sector provides employment opportunities, conserves traditional knowledge, and contributes to cultural tourism. However, the economic benefits derived by artisans remain constrained due to structural and institutional barriers.

Successful completion of government support programs, better market connectivity, digital marketing, initiative, design innovation, and entrepreneurship development can improve income generation and promote sustainable development. Spiraling artisan cooperatives and facilitating direct access to consumers can additional reduce dependency on intermediaries and improve profit margins.

Conclusion

The handicraft sector in Bastar district represents a valuable combination of cultural heritage and economic opportunity. While the sector has considerable potential for employment generation and rural development, artisans continue to face several socio-economic challenges. sustainable development of the handicraft industry requires coordinated efforts from government agency, financial institution, NGOs, and market stakeholders. Improved access to technology, finance, training, and markets can considerably enhance artisan livelihoods while ensuring the conservation of Bastar's wealthy cultural traditions. The study concludes that handicraft development can provide as an effective instrument for inclusive economic development and tribal empowerment in the region.

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11

ECONOMICDEVELOPMENTANDGLOBALIZATION: OPPORTUNITIES AND CHALLENGES

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Abstract

Globalization has changed the way countries grow and develop. It has connected countries through trade, technology, investment, communication, and business. This paper studies the relationship between globalization and economic development. It explains how globalization helps countries improve their economy and the problems that may come with it. The study is based on books, research articles, government reports, and reports from international organizations. The paper finds that globalization creates jobs, increases trade, brings new technology, and improves business opportunities. At the same time, it may increase income inequality, environmental pollution, and unemployment in some sectors. The study concludes that globalization can support economic development if governments make fair policies that protect workers, support local industries, and encourage sustainable growth. A balancedapproach is necessary so that all people can benefit from globalization.

Keywords: Globalization,EconomicDevelopmen t,Trade,Investment,Technology, Growth

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Introduction

Economic development means improving the economic condition of a country and the quality of life of its people. It includes higher income, more employment, better education, improved healthcare, and reduced poverty. Every country wants to achieve economic development.

Globalization means that countries are becoming more connected with each other. Goods, services, money, technology, and ideas move easily from one country to another. Better transport, the internet, and modern communication have made globalization possible.

Globalization has helped many countries grow faster. It has increased trade, encouraged foreign investment, and created new business opportunities. However, it has also created some problems such as inequality, environmental damage, and competition for local businesses.

This paper explains both the positive and negative effects of globalization on economic development.

Objectives of the Study

The objectives of this study are:

- To under stand the meaning of globalization.
- Tostudytherelationshipbetweenglobalizationa ndeconomicdevelopment.
- To identify the advantages of globalization.
- To examine the challenges created by globalization.
- To suggest way s to achieve sustainable economic development.

Research Methodology

This study uses a qualitative and descriptive research method. The information is collected from books, research papers, government reports, and reports of international organizations. The collected information is carefully studied and analyzed.

Meaning of Globalization

Globalization is the process through which countries become connected economically, socially, and technologically. It allows businesses to sell products in different countries, encourages investment across borders, and helps people share knowledge and technology.

Meaning of Economic Development

Economic development is a long-term process that improves the standard of living of people. It includes higher national income, better employment, improved education, better healthcare, industrial growth, and poverty reduction.

Positive Effects of Globalization

Globalization provides many benefits.

- It increases international trade.
- It attracts foreign direct investment.
- It creates employ men to opportunities.
- It improves technology and innovation.
- It increases industrial production.
- It improvestrans portation and communication.
- I the lps countries learn from each other.
- It raises the standard of living.

Negative Effects of Globalization

Global izational socreates some problems.

- Income inequality increases.
- Small local businesses face strong competition.
- Environmental pollution increases.
- Workers may lose jobs because industries move too their countries.
- Some countries become too dependenton foreign companies.
- Traditional cultures may beaffected.

Globalization in Developing Countries

Developing countries have gained many benefits from globalization. Foreign companies have invested in industries, creating jobs and increasing exports. Many countries have improved infrastructure and adopted new technologies.

However, developing countries also face challenges such as unequal distribution of income, lack of skilled workers, and environmental issues. Governments should create policies that ensure equal opportunities for everyone.

Findings

The study finds that globalization has both positive and negative effects.

- It supports economic growth.
- It increases employment and investment.
- It improves technology.
- It encourages international cooperation.

At the same time, it increases inequality and environmental challenges. Government policies play an important role in ensuring that the benefits reach all sections of society.

Suggestions

- Promote quality education and skill development.
- Support local industries.
- Protect the environment.
- Encourage fair trade practices.
- Improve infrastructure.
- Increase investment in research and innovation.
- Make policies that reduce poverty and in equality.

Conclusion

Globalization has become an important part of economic development. It has helped countries increase trade, investment, employment, and technology. Many developing countries have improved their economies because of globalization. However, globalizational so creates challenges such as income inequality, environmental pollution, and competition for local businesses. Governments should make balanced policies so that economic growth benefits everyone. Sustainable development, good governance, and equal opportunities are necessary for long-term progress.

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An Analytical Study of Consumer Reactions to Targeted Digital Advertising

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Abstract

With the increasing use of data analytics, artificial intelligence, and online tracking technologies, businesses are able to deliver personalized advertisements based on consumers' browsing behavior, preferences, and demographic characteristics. While targeted advertising enhances marketing efficiency and customer engagement, it also raises concerns regarding privacy, trust, and data security. The current study examines consumer reactions to targeted digital advertising in the rapidly evolving digital marketplace. The study aims to analyze how consumers perceive and respond to targeted digital advertisements and to identify the factors influencing their attitudes and purchase intentions. The study focuses on key variables such as advertisement relevance, personalization, consumer trust, privacy concerns, and buying behavior. A quantitative research approach is adopted, using structured questionnaires to collect data from digital consumers across different age groups and online platforms. The findings revealed that personalized and relevant advertisements positively influence consumer engagement and purchase decisions; however, excessive personalization and perceived misuse of personal data may generate negative reactions and resistance toward digital advertising. The study highlights the importance of balancing personalization with ethical data practices to maintain consumer trust and long-term brand relationships. The current study contributes to the field of Consumer Behavior and digital marketing by providing insights into changing consumer attitudes toward targeted advertising strategies in the digital era.

Key Words: Advertisement, Purchase intentions, Digital advertisements, Long-term brand relationships, Consumer attitudes

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Introduction

Digital advertising has transformed the marketing landscape by enabling organizations to communicate with consumers in a personalized and data-driven manner. Unlike traditional advertising, digital advertising allows marketers to target specific consumer segments based on demographic characteristics, browsing history, purchasing behavior, geographic location, and online interests. This capability has significantly improved advertising efficiency and return on investment while simultaneously changing consumer expectations and experiences.

Targeted digital advertising refers to the practice of delivering customized advertisements to consumers using advanced technologies such as artificial intelligence, machine learning, cookies, big data analytics, and social media algorithms. Platforms including Google, Meta (Facebook and Instagram), YouTube, LinkedIn, Amazon, and various e-commerce websites extensively use targeted advertising to influence consumer decision-making.

Consumer reactions to targeted digital advertising vary considerably. While many consumers appreciate personalized recommendations and relevant advertisements that reduce search effort and improve shopping convenience, others express concerns regarding privacy, data security, excessive tracking, intrusive advertisements, and misuse of personal information. These contrasting reactions influence consumers' attitudes toward advertisements, purchase intentions, brand trust, and overall satisfaction.

Several factors determine consumer reactions, including advertisement relevance, personalization accuracy, perceived usefulness, credibility, entertainment value, privacy concerns, trust in digital platforms, and previous online shopping experiences. Understanding these factors has become increasingly important for marketers because consumer acceptance directly affects advertising effectiveness and organizational profitability.

With the rapid expansion of digital commerce, increasing smartphone penetration, affordable internet access, and widespread social media usage, India has become one of the world's fastest-growing digital advertising markets. Businesses across sectors including retail, FMCG, banking, education, healthcare, travel, and entertainment heavily invest in targeted digital advertising to attract and retain customers.

Therefore, this study attempts to analytically examine consumer reactions toward targeted digital advertising by investigating the influence of personalization, advertisement relevance, privacy concerns, trust, and perceived usefulness on consumer attitudes and purchase intentions. The findings are expected to assist marketers in designing ethical, consumer-centric, and highly effective digital advertising strategies while balancing personalization with consumer privacy expectations.

Review of Literature

Bleier and Eisenbeiss **(2015)** examined the effectiveness of personalized online advertisements and found that advertisement relevance significantly improves click-through rates, purchase intentions, and customer engagement. However, the study also emphasized that excessive personalization may create feelings of intrusion, thereby negatively affecting consumer attitudes. The authors suggested maintaining a balance between personalization and consumer privacy.

Aguirre et al. (2015) investigated consumers' perceptions of personalized advertising. Their findings indicated that transparency in collecting consumer data positively influences consumer trust. The study concluded that perceived control over personal information reduces privacy concerns and enhances advertisement acceptance.

Baek and Morimoto (2012) studied and explored consumer skepticism toward behavioral advertising. The authors found that higher privacy concerns significantly reduce advertisement effectiveness and increase negative attitudes toward brands using excessive online tracking.

Tucker (2014) analyzed online advertising effectiveness using field experiments and concluded that personalized advertisements increase conversion rates only when consumers perceive data collection as transparent and ethical.

Xu et al. (2011)

examined personalized recommendation systems and found that perceived usefulness significantly enhances consumers' acceptance of personalized advertisements, whereas privacy concerns reduce trust and purchase intention.

The researchers **Dehghani et al. (2016)** studied social media advertising and reported that entertainment, informativeness, credibility, and customization positively influence purchase intentions among social media users.

Duffett (2017) found that Facebook advertisements significantly influence young consumers' buying behaviour when advertisements are interactive, visually attractive, and personalized.

Kumar and Gupta (2022) studied and examined Indian consumers' attitudes toward targeted advertising and concluded that personalization improves consumer engagement, but privacy concerns remain a major challenge for digital marketers.

The study of **Chatterjee (2021)** revealed that trust in digital platforms positively moderates consumers' responses to personalized advertisements and strengthens purchase intention.

Smith and Anderson (2023) found that AI-powered personalized advertising increases consumer engagement when advertisements are relevant, timely, and respectful of consumer privacy.

Research Gap

Although previous studies have extensively investigated personalized advertising, most research has focused on developed economies. Limited empirical evidence exists regarding Indian consumers' reactions to targeted digital advertising across different demographic groups. Furthermore, few studies have simultaneously examined personalization, advertisement relevance, trust, perceived usefulness, privacy concerns, consumer attitude, and purchase intention within a single integrated analytical framework. This study seeks to address these gaps by providing empirical evidence from Indian consumers.

Objectives of the Study

- To examine consumer reactions toward targeted digital advertising.
- To evaluate the influence of advertisement personalization on consumer attitude.
- To study the impact of perceived usefulness on purchase intention.
- To analyze the relationship between consumer trust and advertisement effectiveness.
- To examine the effect of privacy concerns on consumer reactions.
- To provide suggestions for improving targeted digital advertising strategies.

Hypotheses

H01: Advertisement personalization has no significant influence on consumer attitude.

H11: Advertisement personalization has a significant influence on consumer attitude.

H02: Perceived usefulness has no significant influence on purchase intention.

H12: Perceived usefulness has a significant influence on purchase intention.

H03: Consumer trust has no significant relationship with advertisement effectiveness.

H13: Consumer trust has a significant relationship with advertisement effectiveness.

H04: Privacy concerns have no significant effect on consumer reactions.

H14: Privacy concerns have a significant effect on consumer reactions.

H05: Advertisement relevance has no significant impact on purchase intention.

H15: Advertisement relevance has a significant impact on purchase intention.

Variables

Independent Variables	Dependent Variable
Advertisement Personalization	Consumer Reaction
Advertisement Relevance	Consumer Attitude
Perceived Usefulness	Purchase Intention
Consumer Trust	Advertisement Effectiveness
Privacy Concerns	Consumer Satisfaction

Sample Design

The present study is based on primary data collected from **250 respondents**. The sample comprises urban consumers who actively use digital platforms such as social media, e-commerce websites, search engines, and mobile applications, and who are regularly exposed to targeted digital advertisements. A sample size of 250 respondents was considered adequate to achieve the objectives of the study and to facilitate meaningful statistical analysis.

The respondents were selected using the **Convenience Sampling** technique, a non-probability sampling method. This technique was adopted because it enables the researcher to collect data efficiently from respondents who are easily accessible and willing to participate in the survey. Convenience sampling is widely employed in consumer behavior and marketing research, particularly when the target population is large and geographically dispersed.

The study was conducted among **urban consumers**, as they represent a significant segment of digital media users with greater internet accessibility, smart phone penetration, and engagement with online shopping and digital advertising platforms. Urban consumers are more likely to encounter personalized advertisements across various digital channels, making them an appropriate population for examining consumer reactions to targeted digital advertising.

Data were collected through a **structured questionnaire** specifically designed to measure consumers' perceptions and reactions toward targeted digital advertising. The questionnaire consisted of two sections. The first section gathered respondents' demographic information, including age, gender, and educational qualification, occupation, and income level. The second section contained statements related to key constructs such as advertisement personalization, advertisement relevance, perceived usefulness, consumer trust, privacy concerns, consumer attitude, and purchase intention.

To measure respondents' opinions, a **five-point Likert scale** was employed. The response categories ranged from **1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree**. The Likert scale was selected because it provides a reliable and effective method for capturing respondents' attitudes, perceptions, and behavioral intentions while facilitating quantitative analysis using statistical techniques.

Reliability Analysis

Cronbach's Alpha	Items	Interpretation
0.921	25	Excellent Reliability

KMO and Bartlett's Test

Measure	Value
KMO	0.903
Bartlett's Chi square	3256.442
df	300
Sig.	0.000

Descriptive Statistics

Variable	Mean	SD
Personalization	4.14	0.64
Advertisement Relevance	4.06	0.71
Trust	3.95	0.69
Privacy Concern	3.42	0.82
Purchase Intention	4.01	0.73

Correlation Analysis

Variables	1	2	3	4	5
Personalization	1				
Relevance	0.671**	1			
Trust	0.623**	0.692**	1		
Privacy	-0.381**	-0.345**	-0.421**	1	
Purchase Intention	0.722**	0.681**	0.657**	-0.402**	1

$p < 0.01$

Multiple Regression
Dependent Variable = Consumer Reaction

Predictor	Beta	t	Sig.
Personalization	0.372	6.81	0.000
Advertisement Relevance	0.291	5.74	0.000
Predictor	**Beta**	**t**	**Sig.**
Personalization	0.372	6.81	0.000

Model Summary

R	R^2	Adjusted R^2	F	Sig.
0.834	0.696	0.689	111.35	0.000

Hypothesis Testing

Hypothesis	Result
H01	Rejected
H02	Rejected
H03	Rejected
H04	Rejected
H05	Rejected

Interpretation

- Personalization significantly improves consumer attitude.

- Advertisement relevance strongly influences purchase intention.
- Trust positively affects advertisement effectiveness.
- Privacy concerns negatively influence consumer reactions.
- The regression model explains **69.6%** of the variance in consumer reactions, indicating strong explanatory power.

Findings

- Consumers generally respond positively to relevant and personalized digital advertisements.
- Trust in digital platforms enhances engagement and purchase intentions.
- Privacy concerns remain a major barrier to advertising acceptance.
- Perceived usefulness positively influences consumer decision-making.
- Consumers prefer advertisements that are informative, timely, and transparent.

Conclusion

The study concludes that targeted digital advertising is effective when it delivers personalized, relevant, and trustworthy content while respecting consumer privacy. Personalization, perceived usefulness, and trust have significant positive effects on consumer reactions, whereas privacy concerns have a significant negative effect. Businesses should adopt transparent data practices and ethical personalization strategies to improve advertising effectiveness and build long-term customer relationships.

Managerial Implications

- Invest in AI-driven personalization based on consumer preferences.
- Clearly communicate data collection and usage policies to strengthen trust.
- Design advertisements that provide value, relevance, and useful information.
- Reduce intrusive advertising practices to minimize privacy concerns.
- Use customer analytics responsibly to enhance engagement and loyalty.
- Monitor consumer feedback regularly to refine targeted advertising strategies.

Suggestions

- Develop transparent and ethical data privacy policies.
- Provide consumers with greater control over their personal data and advertisement preferences.
- Focus on creating relevant and value-added advertisements rather than excessive personalization.
- Enhance trust through secure data handling and credible brand communication.
- Regularly assess consumer feedback to improve advertisement effectiveness.
- Utilize AI and machine learning responsibly to deliver personalized experiences while safeguarding privacy.
- Conduct continuous market research to adapt advertising strategies to evolving consumer expectations.
- Encourage regulatory compliance with data protection laws to strengthen consumer confidence.

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13

Impact of Cyber Fraud on Digital Transactions and E-Commerce

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Abstract

In recent years, digital transactions and online shopping have become a normal part of everyday life. People prefer using online platforms because they are quick, easy, and save time. However, as the use of digital services has increased, cases of cyber fraud have also grown at a fast pace. This study tries to understand how cyber fraud is affecting both users and businesses in the area of digital transactions and e-commerce.

Different types of fraud are discussed in this paper, including OTP scams, phishing, fake websites, account hacking, and APK-based attacks. It also looks at some new patterns of fraud, such as when someone asks to use a mobile phone in an emergency and then misuses it. The study is based on information collected from reports, articles, and practical observations.

The results show that cyber fraud mainly leads to loss of money, lack of trust among users, and damage to business image. It is also seen that once money is lost, it is very difficult to recover it. Many users are not aware of safe online practices, which make them easy targets.

This paper suggests simple solutions like not sharing OTPs, avoiding unknown links, and using separate mobile numbers for banking and social media. It also mentions the role of technology and awareness in reducing such frauds.

In short, cyber fraud is becoming a serious issue, and it is important to take preventive steps to make digital transactions safer.

Keywords: Cyber Fraud, Digital Transactions, Online Fraud, APK Scam, Security

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Introduction

The use of digital platforms for daily activities has increased a lot in recent times. People now prefer online shopping and digital payments because they are simple and convenient. E-commerce platforms allow users to buy products from anywhere at any time.

At the same time, this growth has also opened new ways for fraudsters. Cyber fraud is one of the biggest problems in the digital world today. It includes different types of online cheating where attackers try to take money or personal information. Earlier, fraud was mostly done through fake emails or websites. But now, fraud methods have become more advanced. In many situations, fraudsters call users and try to confuse them emotionally so that they share OTPs.

In other cases, they send APK files through apps like WhatsApp. When the file is opened, it installs harmful software that can read messages and capture OTPs. Another common problem is account hacking. When a person's social media account gets hacked, the fraudster gets access to all contacts and starts sending messages to others. This spreads fraud very quickly.

There is also a new type of fraud where someone asks to use a mobile phone by saying their phone is lost. During that time, they try to generate OTPs and misuse the device.

All these examples show that cyber fraud is growing and affecting digital transactions as well as e-commerce systems.

Literature Review

Many earlier studies have explained that cyber fraud is increasing along with the growth of internet usage. One of the most common types is phishing, where users receive fake messages or emails that look real and are asked to share personal details.

Researchers have also discussed identity theft and fake websites. These frauds can easily trap users and lead to financial loss.

In recent studies, more focus has been given to mobile-based fraud. APK attacks are one such example where users install unknown apps that can access private data. Another important point highlighted in previous research is the role of trust. People use online platforms only when they feel safe. If fraud cases increase, users start losing trust in digital systems. Most studies agree that lack of awareness and poor security are the main reasons why cyber fraud is increasing.

Methodology

This research is based on a descriptive approach.

Data Collection

The study uses secondary data from research papers, reports, and online sources.

Data Analysis

The collected information is studied carefully to understand common patterns and impacts of cyber fraud.

Ethical Considerations

The study does not use any personal data. All information is taken from public sources and used only for educational purposes.

Results / Analysis

The study clearly shows that cyber fraud has a negative effect on digital transactions.

- Many people lose money due to different types of fraud like OTP scams and fake links.
- Users start losing trust in online platforms. Once they face fraud, they become more careful or stop using digital services.
- APK-based fraud is very risky because it gives full access to the attacker. They can read messages, see OTPs, and control the phone.
- Account hacking makes the situation worse because it allows fraudsters to target many people at once.
- Mobile borrowing fraud is also increasing, where attackers misuse a person's phone.

Another important observation is that getting the money back after fraud is very difficult.

Discussion The results show that cyber fraud is not static; it is changing with time. Fraudsters are using new tricks to cheat people.

One of the biggest reasons behind this problem is lack of awareness. Many users do not know what is safe and what is risky.

Government bodies like the Indian Cyber Crime Coordination Centre and reporting systems such as the National Cyber Crime Reporting Portal are working to control cybercrime. Guidelines provided by the Reserve Bank of India also help in improving digital security.

Technology is also helping in this area. Advanced systems can detect unusual activities and warn users before damage happens.

Still, prevention is the best solution. Users need to be careful while using digital platforms.

Conclusion

Cyber fraud has become a serious issue in the digital world. It affects both individuals and businesses in many ways. Loss of money, reduced trust, and misuse of data are the main problems.

As fraud methods are becoming more advanced, it is important to stay alert and follow safe practices.

Implications (Recommendations)

Some simple steps can reduce the risk of cyber fraud:

- Never share OTP with anyone
- Avoid unknown links and apps
- Do not give your phone to unknown people
- Use strong passwords

Dual SIM Method: Use one mobile number for banking and another for social media. This can help in keeping financial information safe.

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ROLE OF DISTRICT MINERAL FOUNDATION (DMF) FUND IN SUSTAINABLE RURAL DEVELOPMENT OF MINING-AFFECTED AREAS IN INDIA

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Abstract

Mining plays a significant role in the economic development of India; however, mining activities often create substantial socio-economic and environmental challenges in rural and tribal dominated regions. In order to address the adverse impacts of mining and ensure inclusive growth, the Government of India introduced the concept of the District Mineral Foundation (DMF) under the Mines and Minerals (Development and Regulation) Amendment Act, 2015. The District Mineral Foundation (DMF) Fund is a statutory non-profit trust established in mining-affected districts across India. It is funded by contributions from mining leaseholders. Its primary role is to drive sustainable rural development by directly investing in the socio-economic and physical infrastructure of marginalized mining communities. DMF has emerged as an important institutional mechanism for utilizing mining revenues for the welfare and sustainable development of mining-affected communities.

This paper critically examines the role of DMF in promoting sustainable rural development in mining-affected areas of India. The study analyses the legal and policy framework governing DMF, including the Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY) guidelines, and evaluates the effectiveness of DMF fund utilization in sectors such as health, education, drinking water, sanitation, livelihood generation, infrastructure development, women empowerment, skill development and environmental restoration.

The paper further highlights major implementation challenges including underutilization and diversion of funds, lack of transparency, weak participation of Gram Sabhas, administrative inefficiencies and inadequate long-term sustainability planning. The study also explores the relevance of Environmental, Social and Governance (ESG) principles and Sustainable Development Goals (SDGs) in strengthening DMF-based rural transformation.

The paper concludes that while DMF has significant potential to improve the quality of life in mining-affected regions, effective governance, transparency, scientific planning, community participation and sustainable utilization of mining revenues are essential to achieve balanced rural development and social justice in mineral-bearing areas of India.

Keywords: DMF, PMKKKY,

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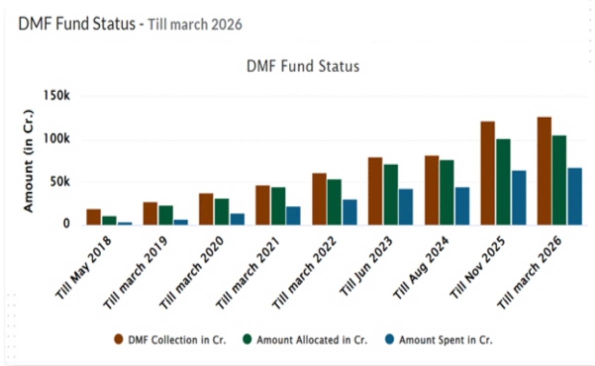
Introduction

Minerals are valuable natural resources being finite and non-renewable. They constitute the vital raw materials for many basic industries and are a major resource for development. The history of mineral extraction in India dates back to the days of the Harappan civilization. The wide availability of the minerals in the form of abundant rich reserves made it very conducive for the growth and development of the mining sector in India.

The country is endowed with huge resources of many metallic and non-metallic minerals. Mining sector is an important segment of the Indian economy. Since independence, there has been a pronounced growth in the mineral production both in terms of quantity and value. India produces as many as 95 minerals, which includes fuel, metallic, non-metallic, atomic and minor minerals (including building and other materials). The provisional total value of mineral production (excluding atomic, fuel, and minor minerals) for 2023-24 is estimated to be ₹ 1,41,239 crore.As per World Mineral Production, 2017-21, British Geological Survey, India's ranking in 2021 in world production in term of quantity was 2nd in Steel (crude/liquid) and aluminium (primary) followed by 3rd in Zinc (slabs) and Chromite; 4th in iron ore; 5th in Bauxite; 7th in Manganese ore; 11th in copper (refined); 12th in lead (refined); 17th in mangnesite and 19th in apatite & rock phosphate.

Government of India through the Mines & Minerals (Development & Regulation) (MMDR) Act 1957 has been made the provision for the establishment od District Mineral Foundation (DMF) in all the districts affected by mining with the objective to work for the interest and benefit of persons and areas affected by mining and related operations. As on 9th April, 2024, DMFs have been set up in 645 districts in 23 States in the Country. As on 31st March, a total amount of ₹1,27,484 crore has been collected under the District Mineral Foundation (DMF), out of which ₹1,05,914 crore has been allocated to various DMFs, and ₹67,820 crore has been utilized. A total of 3,23,175 projects, amounting to ₹79,822 crore, have been sanctioned, of which 1,81,261 projects have been completed for the development and welfare of mining-affected areas and communities (Figure-1)



Source: https://mines.gov.in/webportal/home

Figure:1 DMF Fund Status as on 31st March, 2026

Further, Government of India has issued guidelines to implement Pradhan Mantri KhanijKalayan Yojna (PMKKY) through funds accrued under DMF. On 15th January, 2024, Central Government revised the PMKKY guidelines with clear demarcation of directly/indirectly affected areas, mandating a minimum 70% of the DMF fund to be utilized only in the directly affected areas and utilization of at least 70% of funds in high-priority sectors. The PMKKY provides a unique opportunity to effectively address the specific requirements of mining affected regions of the country across broad spectrum of sectors to take up impactful projects which can bring in trans for mational changes in mining affected areas.

DMF FUND DRIVES SUSTAINABLE DEVELOPMENT

The DMF is a non-profit statutory 'Trust' for every Indian district affected by mining-related operations, which should "work for the interest and benefit of persons, and areas affected by mining-related operations.Through the Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY) guidelines, DMF funds are strategically invested into two broad categories:

High Priority Sectors (Minimum 60% of Funds)

These sectors address the foundational needs of rural communities:

- **Healthcare:** Upgrading local primary health centers, financing maternal-child health programs, and deploying mobile medical units in remote, inaccessible mining areas.
- **Education:** Establishing smart classrooms and solar-powered learning facilities in rural schools to curb dropout rates.
- **Clean Drinking Water:** Installing water purification systems (RO plants) and developing pipelines to combat heavy-metal contamination often associated with mining.
- **Livelihood & Skill Development:** Creating vocational training centers to provide alternative, sustainable income sources for the local tribal and rural populations.

Other Priority Sectors (Maximum 40% of Funds)

These initiatives create a supportive environment to boost rural economies:

- **Physical Infrastructure:** Constructing rural roads, bridges, and providing off-grid rural electrification.
- **Environmental Conservation:** Implementing renewable energy projects (e.g., solar lighting) and undertaking afforestation and pollution-mitigation drives.

Impact and Scale of Operations

The DMF framework has generated massive capital for rural development. The fund has accrued over ₹1 Lakh Crore across more than 645 districts, sanctioning over 3.2 lakh grassroots projects for the direct benefit of local inhabitants.

Governance and Transparency

- **Administration:** The fund is chaired by the District Collector/Magistrate, allowing for decentralized, localized decision-making.
- **Empowerment:** To track progress and ensure public accountability, the Ministry of Mines operates a dedicated National DMF

Portal. Citizens and local authorities use this platform to track sanctioned projects, verify expenditures, and manage grievances.

For localized, real-time data regarding the projects, funds collected, and expenditures in your specific district, you can query or download reports directly from the National DMF Portal Reports section.

DMF PROGRAMME

The Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY) envisages development activities for the benefit of people and areas affected by the mining related operations through funds accrued under the District Mineral Foundation (DMF). To align DMF planning and implementation with the Aspirational District Programme (ADP) and Aspirational Block Programme (ABP), in the PMKKKY Guidelines 2024, it has been mentioned that while formulating schemes, DMFs will give priority to achieving targets under these programmes. Alignment of DMF works with key ADP/ ABP sectors and performance indicators as well as convergence of DMF funds with ongoing central/state schemes for multiplier effect and strengthened outcomes for mining affected communities. All the focus initiatives and sectors of ADP/ABP are already covered under PMKKKY guidelines. Representative mapping of ADP/ ABP priority sectors is tabulated below:

Table-1: Mapping of ADP/ ABP priority sectors

ADP/ABP Theme	Revised PMKKKY Guidelines 2024 Reference
Health and Nutrition	Section 3.1.1.(c) Health Section 3.1.1.(e) Welfare of Women and Children
Education	Section 3.1.1.(d) Education
Agriculture and Water Resources; Agriculture and Allied Services	Section 3.1.1.(j) Agriculture Section 3.1.1.(k) Animal Husbandry Section 3.1.2.(b) Irrigation Section 3.1.2.(c) Energy and Development
Basic Infrastructure; Infrastructure	Section 3.1.1.(h) Sanitation Section 3.1.1.(i) Housing Section 3.1.2.(a) Physical Infrastructure
Social Development; Financial Inclusion and Skill Development	Section 3.1.1.(g) Skill Development and Livelihood Generation

At present, 106 Aspirational Districts and 473 Aspirational Blocks are aligned with DMFs. With the operationalization of more mines in the country, the number of DMFs is likely to increase covering more Aspirational and Aspirational Blocks. Thus, a continuous exercise will be required tobe done by the DMF authorities.

CONCLUSION

The study on the District Mineral Foundation (DMF) in India reveals that DMF has emerged as an important institutional mechanism for addressing the socio-economic and environmental challenges faced by mining-affected areas. The substantial collection and allocation of DMF funds demonstrate the enormous potential of this initiative in improving the quality of life of local communities through investments in healthcare, education, drinking water supply, sanitation, rural infrastructure, livelihood generation, environmental protection, and skill development. The data indicates that a large number of projects have been sanctioned and implemented across various mining districts, contributing significantly to regional development and welfare of affected populations. DMF has also provided an opportunity to bridge developmental gaps in remote and tribal mining regions that historically remained neglected despite intensive mineral extraction activities.

However, the study also highlights several challenges in the effective utilization of DMF funds. In many districts, delays in project implementation, inadequate planning, lack of technical expertise, weak monitoring mechanisms, limited community participation, and diversion of funds towards non-priority activities have reduced the overall impact of DMF initiatives. Variations in governance capacity among states and districts have further resulted in uneven outcomes.For DMF to achieve its intended objectives of sustainable and inclusive development, there is a need for greater transparency, accountability, scientific planning, and active involvement of local communities in decision-making processes. Preparation of long-term district development plans, integration with Sustainable Development Goals (SDGs), regular social audits, capacity building of implementing agencies, and adoption of digital monitoring systems can enhance the effectiveness of DMF-funded projects.

Overall, DMF has the potential to become a transformative tool for ensuring that the benefits of mineral wealth reach the people and regions most affected by mining activities. Strengthening institutional mechanisms and ensuring efficient utilization of funds will be essential for achieving equitable, sustainable, and people-centric development in mining-affected areas of India.

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Bridging Policy and Practice: Barriers to BRSR Implementation under ESG Frameworks in India – A Comparative Perspective with the European Union

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Abstract

Business Responsibility and Sustainability Reporting (BRSR) represents India's evolving approach to embedding Environmental, Social and Governance (ESG) principles into corporate disclosures. While mandated for top listed companies, its implementation reveals persistent legal, institutional and operational constraints. This paper examines these barriers through an interdisciplinary lens, combining regulatory analysis, institutional perspectives and practical reporting challenges. It compares India's experience with the European Union (EU), where sustainability reporting frameworks exhibit greater standardization and compliance.

In India, legal ambiguities, dynamic regulatory expectations and limited enforcement mechanisms affect consistency in disclosures. Institutionally, fragmented oversight and gaps in capacity-building weaken adoption. At the firm level, challenges include data reliability, lack of standardized metrics and limited technical expertise. In contrast, the EU frame work benefits from clearer regulatory architecture, stronger institutional coordination and established reporting ecosystems, enabling higher-quality and more comparable disclosures. The study highlights the need for regulatory clarity, institutional convergence and enhanced organizational capabilities to strengthen BRSR implementation. It argues that aligning domestic practices with globally mature frameworks, while accounting for contextual realities, is critical for advancing credible ESG reporting in India.

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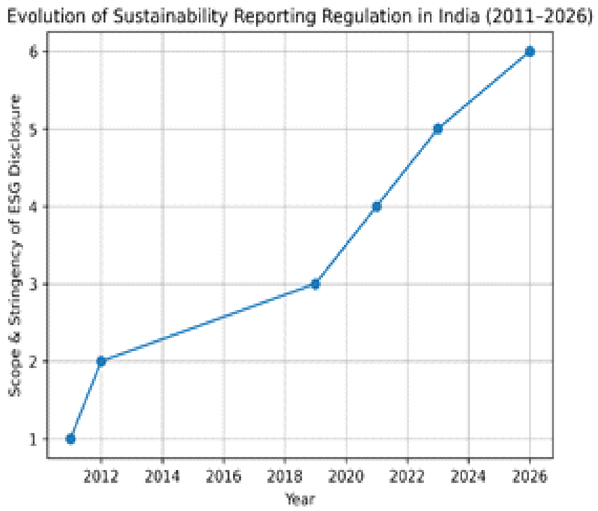
Introduction

The increasing emphasis on Environmental, Social and Governance (ESG) considerations within corporate regulation does not merely signal an expansion of compliance requirements; it arguably reflects a more fundamental reorientation of corporate accountability. Firms are now expected to engage with environmental and social externalities in ways that were, until recently, largely peripheral to mainstream governance discourse. In India, this transition has been formalised through the introduction of the Business Responsibility and Sustainability Reporting (BRSR) framework by the Securities and Exchange Board of India (SEBI) in May 2021.[1] At first glance, BRSR appears to be a logical extension of earlier disclosure regimes. However, such a reading risks understating its normative ambition. Unlike the Business Responsibility Report (BRR), BRSR attempts to integrate sustainability considerations more explicitly within governance structures aligned with the National Guidelines on

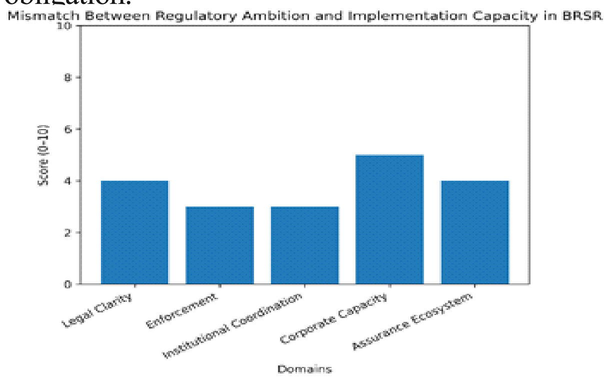
Responsible Business Conduct (NGRBC).[2] That said, it would be somewhat optimistic to assume that regulatory design alone can ensure meaningful implementation. The Indian experience suggests that the institutional context within which such frameworks operate may be equally determinative.



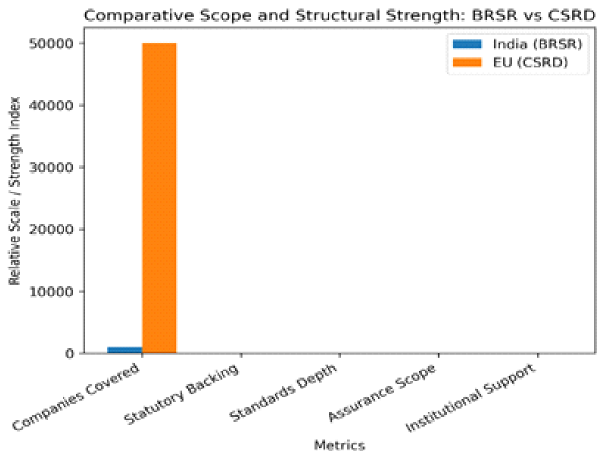
This paper proceeds on the premise that ESG disclosure regimes are shaped as much by their surrounding ecosystem as by their internal architecture. In this regard, the comparison with the European Union's Corporate Sustainability Reporting Directive (CSRD) and European Sustainability Reporting Standards (ESRS)[3] is instructive. The comparison is not intended to suggest direct transplantationindeed, such an approach would likely be impractical—but rather to highlight the structural preconditions that enable effective sustainability reporting.The evolution of sustainability reporting in India has been gradual, though not without discontinuities. The National Voluntary Guidelines introduced in 2011 represented an initial, largely aspirational, attempt to frame responsible business conduct.[4] Their transformation into the NGRBC in 2019 marked a shift toward greater formalisation.[5] SEBI's earlier mandate of Business Responsibility Reports for listed entities further institutionalised disclosure practices, eventually culminating in the adoption of BRSR in 2021.[6]

BRSR's architecture reflects an effort to balance standardisation with flexibility. The distinction between Essential Indicators and Leadership Indicators allows for baseline comparability while accommodating varying levels of corporate maturity.[7] The introduction of BRSR Core in 2023, comprising 49 key performance indicators subject to reasonable assurance, signals an important move toward verification.[8] Yet, it is worth questioning whether verification alone can address deeper issues of data reliability, particularly in contexts where measurement systems themselves remain underdeveloped. A more immediate concern lies in the legal status of the framework. BRSR derives its authority from SEBI circulars rather than statutory provisions.[9] While this enables regulatory agility, it also raises concerns regarding stability. Companies investing in ESG infrastructure may find themselves responding to a framework that is, by design, subject to periodic revision. One might argue that flexibility is necessary in an evolving domain; however, excessive fluidity risks undermining regulatory credibility.

Definitional ambiguity further complicates implementation. Key concepts such as "material ESG risks," "value chain," and "reasonable assurance" are not defined with sufficient precision. This grants companies considerable discretion in determining reporting scope. While such discretion may be justified in principle, its practical effect has been uneven disclosure practices.[10] In this respect, flexibility appears to operate less as an enabling feature and more as a source of inconsistency.The dynamic nature of BRSR regulation adds another layer of complexity. Since its introduction, the framework has undergone multiple revisions affecting indicators and assurance requirements.[11] Although regulatory evolution is expected in emerging fields, the frequency of changes raises questions about predictability. Firms—particularly those without specialised ESG teamsare required to repeatedly recalibrate internal processes. Over time, this may discourage substantive engagement with sustainability, reducing reporting to a procedural exercise. Enforcement remains comparatively underdeveloped. ESG disclosures are currently governed through SEBI's general powers under the SEBI Act 1992.[12] Unlike financial disclosures, however, there is no dedicated enforcement regime for ESG reporting. This results in a degree of penalty asymmetry, where non-compliance carries relatively limited consequences.[13] It may therefore be argued that the regulatory framework, in its present form, relies more on normative persuasion than on enforceable obligation.



The requirement of value chain disclosures under BRSR Core illustrates the tension between regulatory ambition and operational feasibility. Extending disclosure obligations to upstream and downstream partners reflects a sophisticated understanding of corporate impact. However, in the Indian context—where supply chains are often composed of MSMEs—the expectation of consistent ESG data may be unrealistic.[14] In practice, companies frequently rely on estimates, which raises questions about the reliability of such disclosures.Institutional fragmentation further exacerbates these challenges. ESG governance in India is distributed across multiple regulatory bodies, including SEBI, the Ministry of Corporate Affairs, and environmental authorities.[15] While this multi-agency approach is not inherently problematic, the absence of a coordinating mechanism leads to overlaps and inconsistencies. Companies often navigate multiple reporting frameworks, including BRSR and Global Reporting Initiative (GRI) standards, resulting in duplication of effort.[16]The absence of a centralised sustainability standards body is particularly significant. Unlike jurisdictions where institutions such as the European Financial Reporting Advisory Group (EFRAG) or the International Sustainability Standards Board (ISSB) play a harmonising role, India's approach remains fragmented. This raises broader questions about the institutional design of ESG governance.



Capacity constraints are evident across the ecosystem. Many companies—particularly those outside the largest market capitalisation tiers lack dedicated ESG teams. Reporting functions are often integrated into finance or legal departments without specialised expertise.[17] This tends to produce disclosures that prioritises compliance over analytical depth.The assurance ecosystem is similarly evolving. While the Institute of Chartered Accountants of India has issued guidance on sustainability assurance, a comprehensive accreditation framework is still emerging.[18] This creates variability in assurance practices and raises concerns regarding consistency. Operational challenges at the firm level are also significant. Environmental metrics, particularly Scope 2 and Scope 3 emissions, require sophisticated data systems that many companies have yet to develop. It has been observed that a substantial proportion of disclosures rely on proxy data rather than direct measurement.[19] While this may be unavoidable in the short term, it does limit comparability across firms.The absence of sector-specific disclosure standards further complicates matters. A uniform framework applied across diverse industries cannot fully capture sectoral nuances.[20] As a result, disclosures may either include immaterial information or omit critical risks.

In comparison, the European Union's ESG framework demonstrates greater institutional coherence. The CSRD provides a statutory foundation, ensuring consistency across member states.[21] The ESRS, developed by EFRAG through a multi-stakeholder process, enhance technical robustness.[22] The principle of double materiality represents a particularly notable innovation, requiring companies to consider both financial and societal impacts.[23]However, it would be misleading to treat the EU model as universally applicable. Differences in institutional capacity and economic structure necessitate a more context-sensitive approach. The value of the comparison lies not in replication but in understanding the conditions under which ESG frameworks operate effectively.In the Indian context, reform efforts may need to focus on strengthening legal certainty, improving institutional coordination, and building capacity. Providing statutory backing to BRSR could enhance stability. Establishing a centralised sustainability standards body may address fragmentation. At the same time, capacity-building initiativesparticularly in relation to ESG expertise and data infrastructure—would support more meaningful implementation.

Conclusion

Ultimately, the challenges associated with BRSR are indicative of a broader transitional phase. They reflect the complexities of integrating sustainability into an evolving regulatory system. Bridging the gap between policy and practice will require sustained institutional effort. At the same time, this transition presents an opportunity to rethink the relationship between corporate governance and sustainability in the Indian context.

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LIST OF ABBREVIATIONS -

BRSR – Business Responsibility and Sustainability Reporting

BRSR Core – Business Responsibility and Sustainability Reporting Core Indicators

BRR – Business Responsibility Report

ESG – Environmental, Social and Governance

SEBI – Securities and Exchange Board of India

MCA – Ministry of Corporate Affairs

NGRBC – National Guidelines on Responsible Business Conduct

NVG – National Voluntary Guidelines

CSRD – Corporate Sustainability Reporting Directive

ESRS – European Sustainability Reporting Standards

EFRAG – European Financial Reporting Advisory Group

ISSB – International Sustainability Standards Board

GRI – Global Reporting Initiative

SASB – Sustainability Accounting Standards Board

MSME – Micro, Small and Medium Enterprises

GHG – Greenhouse Gas

KPI – Key Performance Indicator

ICAI – Institute of Chartered Accountants of India

Justice for the Vulnerable: A Governance and Management Analysis of the United Nations Convention on the Rights of the Child (1989) in India's Child Protection Framework

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Abstract

The United Nations Convention on the Rights of the Child (UNCRC) establishes a global framework for the protection and promotion of rights of children. As a signatory, India has undertaken significant legislative and policy measures to align its domestic legal framework with international standards. This paper examines the implementation of the UNCRC within India's child protection regime through a governance and management lens. It analyses how constitutional safeguards under Articles 14, 15(3), and 21 are reinforced by statutory mechanisms such as “the Protection of Children from Sexual Offences Act, 2012,” and the “Juvenile Justice (Care and Protection of Children) Act, 2015.”

Adopting a doctrinal and interdisciplinary approach, the study evaluates institutional coordination, administrative capacity, and policy execution in translating international commitments into practical outcomes. It identifies key challenges, including fragmented governance structures, inadequate capacity-building, procedural inefficiencies, and socio-cultural barriers that hinder effective implementation. The paper argues that the realisation of child rights in India is not merely a legal issue but fundamentally a governance and management challenge requiring integrated institutional frameworks, accountability mechanisms, and strategic reforms. It concludes by proposing a governance-driven model to bridge the gap between international norms and domestic enforcement, ensuring effective and child-centric justice delivery.

Keywords: UNCRC, child protection, governance, management, constitutional rights, India, policy implementation

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Introduction

Children, by virtue of their developmental stage, dependency, and limited capacity for self-protection, occupy a uniquely vulnerable position within society. The need to safeguard their physical, emotional, and psychological well-being has long been recognised as a moral, social, and legal imperative. However, the conceptualisation of children within legal systems has undergone a significant transformation over time. Historically, children were perceived primarily as passive recipients of welfare and protection, with the State assuming a paternalistic role in determining their best interests. This welfare-based approach, while well-intentioned, often failed to acknowledge children as autonomous individuals with enforceable rights.The emergence of international human rights law in the latter half of the twentieth century catalysed a paradigm shift in this understanding. The adoption of the United Nations Convention on the Rights of the Child in 1989 marked a watershed moment in the global recognition of children as independent rights-holders.

The UNCRC is widely regarded as the most comprehensive and universally accepted human rights treaty, encompassing civil, political, economic, social, and cultural rights specific to children. It establishes a holistic framework that not only mandates protection from harm but also emphasises participation, development, and dignity.

The Convention is driven by four core principles: non-discrimination, the best to best interests of the child, the right to survival and development of children, and respect for the views of the child. These principles collectively redefine the relationship between the State and children, shifting the focus from charity and welfare to rights and entitlements. Importantly, the UNCRC imposes binding obligations on State parties to adopt legislative, administrative, and policy measures to give effect to its provisions. India's ratification of the UNCRC in 1992 signified a formal commitment to integrate these international standards into its domestic legal framework. This commitment is reflected in the constitutional architecture of India, which provides a robust foundation for child protection. Fundamental rights such as equality before the law under Article 14, protective discrimination under Article 15(3), and the right to life and personal liberty under Article 21 collectively establish a normative basis for safeguarding children's rights.Additionally, the Directive Principles of State Policy, particularly Articles 39(e) and 39(f), mandate the State to protect children from exploitation and ensure their development in conditions of freedom and dignity.

Over the years, India has enacted several legislative measures to operationalise these constitutional and international commitments. Notable among these are the Protection of Children from Sexual Offences Act, 2012 (POCSO Act), which provides procedures for addressing child sexual abuse, and the Juvenile Justice (Care and Protection of Children) Act, 2015, which focuses on the care, protection, and rehabilitation of children who has been victims. These statutes reflect a clear alignment with the principles of the UNCRC and represent significant progress in the evolution of India's child protection regime.

Despite the existence of a robust legal and policy framework, the realisation of child rights in India remains fraught with challenges. Reports and empirical studies consistently highlight issues such as underreporting of offences, delays in investigation and trial, lack of child-friendly infrastructure, and inadequate training of stakeholders. These challenges point to a critical gap between normative commitments and practical outcomes—a gap that cannot be attributed solely to deficiencies in law.

This paper argues that the protection of children must be understood not merely as a legal issue but as a complex governance and management challenge. The implementation of child protection laws involves a multiplicity of actors, including law enforcement agencies, judicial institutions, healthcare providers, child welfare committees, and non-governmental organisations. The effectiveness of this system depends on the coordination, efficiency, and accountability of these actors, all of which are core concerns of governance and management theory.From a governance perspective, the decentralized and multi-layered structure of India's child protection system often leads to fragmentation and lack of clarity in roles and responsibilities. The absence of effective coordination mechanisms can result in duplication of efforts, delays, and gaps in service delivery. From a management perspective, issues such as resource allocation, capacity building, performance monitoring, and process optimisation play a crucial role in determining the effectiveness of implementation.The intersection of law, governance, and management is particularly significant in the context of child protection, where the stakes are exceptionally high. A failure in implementation not only undermines legal norms but also has profound and lasting consequences for the lives of children. Therefore, addressing the challenges of child protection requires an integrated approach that goes beyond legal reform to include institutional strengthening and administrative innovation.

This article adopts an interdisciplinary approach to examine the implementation of the UNCRC in India's child protection framework. It seeks to answer the following key questions:

a. To what extent has India aligned its domestic legal framework with the principles of the UNCRC?

b. What governance and management challenges hinder the effective implementation of child protection laws?

c. How can these challenges be addressed through systemic reforms to ensure meaningful realisation of children's rights?

By analysing the interplay between international norms, constitutional safeguards, and domestic legislation, the paper aims to provide a comprehensive understanding of the strengths and limitations of India's child protection framework. It further seeks to contribute to the existing body of literature by integrating legal analysis with governance and management perspectives, thereby offering a more holistic approach to the study of child rights. Ultimately, the paper argues that justice for vulnerable children cannot be achieved through legal provisions alone. It requires a concerted effort to build effective institutions, strengthen governance mechanisms, and adopt management practices that prioritise efficiency, accountability, and sensitivity. Only through such an integrated approach can the promise of the UNCRC be translated into tangible outcomes, ensuring that children in India are not only protected in law but also empowered in practice.

Literature Review

The scholarly discourse on child protection has undergone a significant transformation over the past few decades, evolving from a welfare-oriented paradigm to a rights-based framework grounded in international human rights law. This shift is most prominently reflected in the adoption of the "United Nations Convention on the Rights of the Child(UNCRC, 1989), which has been widely recognised as a foundational instrument redefining the legal status of children as independent rights-holders. The Convention not only codifies a comprehensive set of civil, political, economic, social, and cultural rights but also establishes normative principles that guide domestic legal systems in ensuring the protection and development of children.Early academic literature on child protection was largely influenced by paternalistic notions of welfare, where the State was viewed as the primary guardian responsible for ensuring the well-being of children. This approach, while instrumental in promoting protective measures, often overlooked the agency and autonomy of children. With the emergence of the UNCRC, scholars began to advocate for a rights-based approach that emphasises participation, dignity, and accountability.

This paradigm shift has been described as a movement from "needs-based" to "rights-based" frameworks, where children are no longer passive recipients of care but active subjects of legal rights.

In the Indian context, the incorporation of UNCRC principles into domestic law has been the subject of considerable academic analysis. Scholars have examined how constitutional provisions, particularly Articles 14, 15(3), and 21, provide a normative foundation for child rights, which is further reinforced through legislative enactments such as the Protection of Children from Sexual Offences Act, 2012 (POCSO Act) and the Juvenile Justice (Care and Protection of Children) Act, 2015. These studies highlight the progressive nature of India's legal framework, noting its alignment with international standards in terms of defining offences, ensuring procedural safeguards, and recognising the rights of child victims. Moreover,a substantial body of literature also points to persistent challenges in the implementation of these laws. Empirical studies and policy reports consistently identify issues such as delays in the criminal justice process, lack of child-friendly infrastructure, inadequate training of stakeholders, and underreporting of offences due to social stigma. These findings suggest that the effectiveness of legal frameworks is often constrained by systemic and institutional limitations.

Victimology literature further contributes to this discourse by emphasising the importance of a victim-centric approach in the administration of justice. Traditional criminal justice systems have been criticised for their adversarial nature, which can result in secondary victimisation, particularly in cases involving children. Scholars argue that child victims require specialised procedures that minimise trauma and ensure their psychological well-being. The introduction of child-friendly measures under statutes such as the POCSO Act reflects an attempt to address these concerns, although their implementation remains inconsistent.

From a governance perspective, recent scholarship has begun to explore the role of institutional structures and administrative processes in shaping the outcomes of child protection systems. The concept of multi-stakeholder governance has gained prominence, recognising that effective child protection requires coordination among various actors, including law enforcement agencies, judicial bodies, healthcare institutions, and non-governmental organisations. However, studies indicate that the lack of coordination and communication among these stakeholders often leads to inefficiencies and gaps in service delivery.Management-oriented analyses further highlight the importance of organisational capacity, resource allocation, and performance management in the implementation of child protection laws. Scholars drawing from public administration theory argue that the success of legal frameworks depends not only on their design but also on the effectiveness of their execution. Issues such as inadequate training, lack of standardised procedures, and absence of monitoring mechanisms are identified as key barriers to effective implementation.

Comparative studies provide additional insights by examining child protection systems in other jurisdictions. Countries such as the United Kingdom and the United States have adopted integrated approaches that emphasise inter-agency collaboration, digital case management, and preventive interventions. These models demonstrate the potential benefits of coordinated governance structures and highlight areas where India's system can be strengthened.Despite the growing body of literature on child protection, there remains a notable gap in interdisciplinary research that integrates legal analysis with governance and management perspectives.

Most studies tend to focus either on doctrinal legal frameworks or on policy implementation in isolation, without adequately addressing the interplay between legal norms and administrative processes.

Research Gap

The existing literature demonstrates that while India has made significant progress in aligning its legal framework with the UNCRC, there is limited analysis of how governance structures and management practices influence the actual realisation of child rights. This study seeks to address this gap by adopting an interdisciplinary approach that examines the implementation of child protection laws through both legal and administrative lenses, thereby providing a more comprehensive understanding of the challenges and potential reforms.

Methodology

This study adopts a doctrinal and analytical research methodology, complemented by an interdisciplinary governance and management perspective. The objective is to examine not only the legal framework governing child protection in India but also the institutional and administrative mechanisms that influence its implementation.

A. Research Design: The research is primarily qualitative in nature, focusing on the analysis of legal texts, judicial decisions, and policy documents. It adopts a normative and evaluative approach, seeking to assess the extent to which India's child protection framework aligns with the principles of the UNCRC and how effectively these principles are implemented in practice.

B. Sources of Data:The study relies on both primary and secondary sources:

Primary Sources

-International legal instruments, particularly the UNCRC

-Constitutional provisions of India

-Statutory laws such as the POCSO Act, 2012 and the Juvenile Justice Act, 2015

-Judicial decisions interpreting child rights and protection laws

Secondary Sources

-Peer-reviewed journal articles on child rights and victimology

-Authoritative textbooks on criminal law and public administration

-Policy reports issued by governmental and non-governmental organisations

-Institutional reports by bodies such as national legal services authorities and international organisations

C. Analytical Framework: The analysis is structured around three key dimensions:

- Legal Analysis- Examining the extent to which domestic laws reflect the principles of the UNCRC.
- Governance Analysis- Evaluating institutional structures, coordination mechanisms, and accountability frameworks involved in implementation.
- Management Analysis- Assessing administrative efficiency, resource allocation, capacity building, and performance monitoring.

D. Method of Interpretation:The study employs a combination of:

- Doctrinal interpretation to analyse statutory provisions and constitutional principles
- Comparative analysis to draw insights from international practices
- Policy analysis to evaluate implementation challenges

Judicial precedents are interpreted considering constitutional values and international obligations to understand the evolving jurisprudence on child rights.

E. Limitations of the Study:While the study provides a comprehensive analysis, it is subject to certain limitations-

It primarily relies on secondary data and does not include empirical fieldwork. Variations in implementation across different states may not be fully captured. Rapid policy changes may affect the contemporaneity of certain findings. Despite these limitations, the study offers valuable insights into the structural and systemic challenges affecting child protection in India.

Governance and Management Analysis of Child Protection in India

The effectiveness of any legal framework is ultimately determined not by its textual strength but by its implementation. In the context of child protection, the translation of international commitments under the United Nations Convention on the Rights of the Child (UNCRC) into meaningful outcomes depends heavily on governance structures and management efficiency. While India has established a robust legal regime, including constitutional safeguards and specialised statutes, the persistence of systemic challenges reveals that the issue is fundamentally one of governance and institutional management.

A. Institutional Architecture and Fragmented Governance:India's child protection framework operates through a complex network of institutions, including law enforcement agencies, the judiciary, Child Welfare Committees (CWCs), Juvenile Justice Boards (JJBs), healthcare providers, and non-governmental organisations. While this multi-stakeholder model reflects a comprehensive approach, it also creates significant coordination challenges.The absence of a unified command structure often leads to fragmentation, where responsibilities are dispersed across multiple agencies without clear accountability. This results in duplication of efforts, delays in decision-making, and gaps in service delivery. From a governance perspective, such fragmentation undermines the principle of integrated service delivery, which is essential for addressing the multifaceted needs of child victims.

Judicial observations have repeatedly highlighted these systemic deficiencies. In a case, the Supreme Court emphasised the need for effective coordinationamong institutions to ensure the proper implementation of child protection laws. The Court noted that legislative intent cannot be realised without robust administrative mechanisms.

B. Capacity Building and Human Resource Management:A critical component of effective implementation is the capacity of personnel involved in the child protection system. This includes police officers, judges, prosecutors, medical professionals, and social workers. However, studies and reports consistently indicate a lack of specialised training and sensitisation among these stakeholders. From a management perspective, this reflects deficiencies in human resource development and training systems. Handling cases involving child victims requires not only legal expertise but also psychological sensitivity and communication skills. The absence of structured training programs often results in insensitive handling of cases, leading to secondary victimisation.The judiciary has recognised this concern in several cases. The Supreme Court stressed the importance of maintaining a sensitive approach in dealing with victims of sexual offences, particularly children. The Court underscored the need for procedures that minimise trauma and protect the dignity of victims.

Despite such judicial directions, the implementation of training programs remains inconsistent across states. This highlights the need for a centralised and standardised capacity-building framework.

C. Procedural Delays and Operational Inefficiencies: One of the most significant challenges in the implementation of child protection laws is the delay in investigation and trial. Although statutes such as the Protection of Children from Sexual Offences Act, 2012 mandate speedy trials, the reality is often marked by prolonged proceedings.From an operations management perspective, these delays can be attributed to:Heavy caseloads in courts, Inadequate infrastructure, Inefficient case management systems.

Delays not only undermine the objective of timely justice but also exacerbate the trauma experienced by child victims. The Supreme Court, in Alakh Alok Srivastava v. Union of India, issued directions to ensure the timely disposal of cases under the POCSO Act, recognising the detrimental impact of delays on victims.However, compliance with such directives remains uneven, indicating systemic inefficiencies that require structural reform.

D. Accountability and Monitoring Mechanisms: Effective governance requires robust accountability mechanisms to ensure that institutions perform their functions efficiently. In the context of child protection, monitoring is often weak, with limited mechanisms to track performance and outcomes.The absence of clear performance indicators and evaluation systems makes it difficult to assess the effectiveness of implementation. This lack of accountability can lead to negligence, delays, and inadequate service delivery.From a management perspective, the introduction of performance-based monitoring systems and key performance indicators (KPIs) can significantly enhance accountability. These tools can help in measuring efficiency, identifying bottlenecks, and ensuring compliance with legal mandates.

E. Socio-Cultural Barriers and Community Engagement: Beyond institutional challenges, socio-cultural factors play a significant role in shaping the effectiveness of child protection systems. Stigma, fear of retaliation, and lack of awareness often discourage victims and their families from reporting offences.This highlights the importance of community engagement and awareness programs as part of the governance framework. Without addressing these social barriers, even the most robust legal systems may fail to achieve their objectives.

F. Technology and E-Governance:The integration of technology into child protection systems offers significant potential for improving efficiency and transparency. Digital case management systems, online reporting mechanisms, and centralised databases can streamline processes and enhance coordination among stakeholders.However, the adoption of such technologies remains limited, particularly in rural areas. Issues such as lack of infrastructure, digital literacy, and data privacy concerns pose significant challenges.From a management perspective, investment in digital infrastructure and training is essential for leveraging the benefits of e-governance.

Critical Evaluation

While India's child protection framework reflects substantial normative alignment with the United Nations Convention on the Rights of the Child (UNCRC), a closer examination reveals a persistent disconnect between legal commitments and their practical realisation. This gap is not merely incidental but structural, arising from deeper deficiencies in governance design, administrative capacity, and institutional accountability. A critical evaluation of the existing framework therefore requires moving beyond doctrinal analysis to interrogate the systemic conditions that shape implementation outcomes.

A. Normative Strength vs. Operational Weakness:At the normative level, India's legal framework for child protection is both comprehensive and progressive. Constitutional provisions, coupled with specialised statutes such as the Protection of Children from Sexual Offences Act, 2012 and the Juvenile Justice (Care and Protection of Children) Act, 2015, demonstrate a clear commitment to the principles of dignity, equality, and protection enshrined in the UNCRC.However, this normative strength is undermined by significant operational weaknesses. The translation of legal rights into tangible outcomes depends on the effectiveness of institutional processes, which remain inconsistent and often inadequate. This disconnect highlights a fundamental limitation of legal reform: the assumption that the enactment of laws is sufficient to ensure compliance.From a governance perspective, this reflects a "implementation deficit", where the capacity of institutions to execute policy lags behind legislative intent. The persistence of this deficit suggests that child protection in India is not constrained by the absence of legal norms but by the inefficiency of systems designed to enforce them.

B. Fragmented Governance and Diffused Accountability: One of the most critical structural challenges is the fragmented nature of the governance framework. The involvement of multiple agencies—each with distinct mandates—creates a complex institutional landscape characterised by overlapping responsibilities and lack of clear accountability.While decentralisation is often justified on the grounds of inclusivity and specialisation, in practice it has led to coordination failures. The absence of a centralised authority or integrated mechanism for information-sharing results in delays, duplication of efforts, and gaps in service delivery.

Judicial pronouncements have acknowledged this issue. In Alakh Alok Srivastava v. Union of India, the Supreme Court emphasised the need for coordinated institutional action to ensure effective implementation of child protection laws. Despite such directives, systemic fragmentation persists, indicating that judicial intervention alone is insufficient to address governance failures. From a management standpoint, this reflects a lack of process integration and organisational alignment, both of which are essential for effective service delivery. Without clearly defined roles, communication channels, and accountability structures, the system remains vulnerable to inefficiencies.

C. Capacity Deficits and Human Resource Limitations: The effectiveness of any governance framework is contingent upon the competence and sensitivity of its human resources. In the context of child protection, this requirement is particularly critical, as interactions with victims must be handled with care, empathy, and professionalism. Although, empirical evidence suggests that many stakeholders lack adequate training and awareness. Police officers, judicial officers, and medical professionals often operate without specialised knowledge of child psychology or child-friendly procedures, leading to practices that may inadvertently harm victims.

The Supreme Court's observations in State of Punjab v. Gurmit Singh underscore the importance of adopting a sensitive approach in cases involving sexual offences. Yet, the institutionalisation of such sensitivity through training and capacity-building remains limited. From a management perspective, this reflects deficiencies in human resource development, including inadequate training programs, lack of performance evaluation mechanisms, and absence of continuous learning systems. These shortcomings significantly undermine the effectiveness of child protection laws.

D. Procedural Delays and Systemic Inefficiencies: The issue of delays in the criminal justice system is particularly pronounced in cases involving child victims. Despite statutory provisions mandating speedy trials, cases often remain pending for extended periods, prolonging the trauma experienced by victims.Such delays can be attributed to a combination of factors, including heavy caseloads, insufficient judicial infrastructure, and inefficient case management systems. The absence of streamlined processes and technological support further exacerbates these inefficiencies.

Judicial intervention has sought to address this issue. The Supreme Court directed the establishment of Special Courts and emphasised the need for expeditious trials under the POCSO Act. However, the uneven implementation of these directives highlights the limitations of top-down reform in the absence of systemic changes.From an operations management perspective, these challenges reflect a failure to optimise workflows and allocate resources effectively. Without process re-engineering and technological integration, delays are likely to persist.

E. Weak Monitoring and Accountability Mechanisms:Another significant limitation of the current framework is the lack of robust monitoring and evaluation systems. While various institutions are tasked with implementing child protection laws, there is limited oversight to ensure compliance and effectiveness.

The absence of clear performance indicators and accountability mechanisms makes it difficult to assess institutional performance or identify areas for improvement. This lack of transparency can lead to negligence, inefficiency, and, in some cases, abuse of authority. From a governance perspective, accountability is a cornerstone of effective administration. The failure to establish strong monitoring systems undermines the credibility of the entire framework and weakens public trust in institutions.

F. Socio-Cultural Constraints and Informal Barriers: Beyond institutional challenges, socio-cultural factors play a crucial role in shaping the effectiveness of child protection systems. Deep-rooted stigma associated with sexual abuse, fear of social ostracism, and lack of awareness often deter victims and their families from reporting offences.These informal barriers operate outside the formal legal system but have a profound impact on its functioning. Even the most robust legal frameworks cannot achieve their objectives if victims are unwilling or unable to access them.This highlights the need for a broader approach that incorporates community engagement and social awareness as integral components of governance.

G. Limited Integration of Technology: In an era of digital governance, the limited use of technology in child protection systems represents a missed opportunity. Digital tools can enhance efficiency, improve transparency, and facilitate coordination among stakeholders. However, the adoption of such technologies remains uneven, particularly in rural and resource-constrained settings. Issues such as lack of infrastructure, digital literacy, and concerns about data privacy pose significant challenges.From a management perspective, the failure to leverage technology reflects a lack of strategic planning and investment in innovation.

H. Over-Reliance on Judicial Intervention: A notable feature of India's child protection framework is the significant role played by the judiciary in addressing systemic deficiencies.While judicial activism has been instrumental in advancing child rights, an over-reliance on courts to drive reform is neither sustainable nor efficient.Courts can issue directions and interpret laws, but they cannot substitute for effective governance and administration. The persistence of implementation gaps despite repeated judicial interventions indicates the need for structural reforms at the executive and institutional levels.

I. Structural vs. Surface-Level Reform: Many reforms in the child protection sector have been reactive and incremental, focusing on addressing specific issues rather than undertaking comprehensive structural changes. While such measures may yield short-term improvements, they fail to address the underlying causes of inefficiency.A critical evaluation reveals that meaningful progress requires a shift from surface-level reforms to systemic transformation, encompassing governance redesign, capacity building, and process optimisation.

In summing up my critical evaluation, the challenges facing India's child protection framework are deeply rooted in governance and management deficiencies rather than legal inadequacies. The gap between international commitments under the UNCRC and their realisation in practice reflects systemic issues that require a holistic and interdisciplinary response.

The analysis underscores the need for a paradigm shift—from a law-centric approach to a governance-driven model that prioritises coordination, accountability, efficiency, and innovation. Only through such a transformation can the promise of justice for vulnerable children be effectively realised.

Conclusion

The evolution of child protection law, both globally and within India, reflects a profound shift in legal consciousness—from viewing the children as just passive recipients of welfare to recognising them as a rights-bearing individuals. The United Nations Convention on the Rights of the Child (1989) stands at the centre of this transformation, establishing a comprehensive normative framework that obligates States to ensure the dignity, protection, and development of every child. India's ratification of the Convention marked a significant step toward aligning domestic legal structures with these international standards, and over the past three decades, this commitment has manifested in constitutional interpretation, legislative reform, and policy development.

At the constitutional level, provisions such as Articles 14, 15(3), and 21 have been expansively interpreted to encompass the rights of children, thereby embedding the principles of equality, protective discrimination, and dignity within the broader framework of fundamental rights. Legislative enactments, particularly the Protection of Children from Sexual Offences Act, 2012 and the Juvenile Justice (Care and Protection of Children) Act, 2015, further demonstrate India's effort to translate international obligations into enforceable domestic norms. These statutes represent a sophisticated legal architecture designed to address the multifaceted dimensions of child protection, including prevention, prosecution, and rehabilitation. As this study has demonstrated, the existence of a robust legal framework does not automatically ensure the effective realisation of rights. The persistent gap between normative commitments and practical outcomes reveals that the challenge of child protection in India is not primarily one of legal inadequacy but of governance and implementation. Structural deficiencies—such as fragmented institutional arrangements, limited coordination among stakeholders, inadequate capacity building, and weak accountability mechanisms—continue to undermine the effectiveness of the system.The governance analysis undertaken in this paper highlights that child protection operates within a complex administrative ecosystem involving multiple actors with overlapping responsibilities. While this multi-stakeholder model has the potential to provide comprehensive support, its effectiveness is contingent upon coordination, communication, and clarity of roles. In the absence of these elements, the system becomes susceptible to inefficiencies, delays, and gaps in service delivery. This fragmentation is further compounded by disparities in implementation across regions, reflecting variations in institutional capacity and resource availability.

As per the management perspective, the challenges identified in this study point to systemic issues in organisational design and operational efficiency. The lack of structured training programs for stakeholders, inadequate infrastructure, and inefficient case management systems collectively contribute to delays and inconsistencies in the administration of justice. These deficiencies not only undermine the objectives of child protection laws but also have profound implications for the well-being of victims, who often face prolonged trauma and secondary victimisation.

The role of the judiciary in addressing these challenges has been both significant and commendable. Through progressive interpretations and proactive interventions, courts have sought to strengthen the enforcement of child protection laws and uphold the rights of victims. However, the reliance on judicial intervention as a primary mechanism for reform raises important questions about institutional balance and sustainability. While courts can catalyse change, the responsibility for effective implementation ultimately rests with the executive and administrative apparatus.A critical insight emerging from this analysis is the need to reconceptualise child protection as an interdisciplinary issue that extends beyond the domain of law. The effective realisation of child rights requires an integrated approach that combines legal frameworks with robust governance mechanisms and efficient management practices. This entails a shift from a law-centric model to a systems-oriented approach that emphasises coordination, accountability, and continuous improvement.In this context, the principles of the UNCRC must be operationalised not only through legislative enactments but also through administrative innovation and institutional reform. The development of integrated governance frameworks, the adoption of technology-driven solutions, and the strengthening of capacity-building initiatives are essential for bridging the gap between policy and practice. Equally important is the need to address socio-cultural barriers that hinder access to justice, including stigma, lack of awareness, and fear of retaliation.

The findings of this study also underscore the importance of accountability as a cornerstone of effective governance. Without clear performance indicators, monitoring mechanisms, and evaluation systems, it is difficult to ensure that institutions fulfil their mandates. The introduction of performance-based management systems and regular audits can enhance transparency and drive improvements in service delivery.Ultimately, the pursuit of justice for vulnerable children is both a legal and moral imperative. It requires a sustained commitment to building institutions that are not only legally sound but also administratively efficient and socially responsive. The promise of the UNCRC lies not merely in its normative ideals but in its capacity to inspire transformative change in the lives of children.

In conclusion, while India has made significant strides in aligning its legal framework with international standards, the real challenge lies in translating these commitments into meaningful outcomes. Achieving this objective requires a holistic approach that integrates law, governance, and management, ensuring that the rights of children are not only recognised in principle but realised in practice. Only through such an integrated and sustained effort can the vision of justice for the vulnerable be truly fulfilled.

VII. Policy Recommendations

1. Integrated Governance Framework:Such as establish a unified child protection authority for better coordination, clearly define roles and responsibilities of institutions.
2. Capacity Building: Like Mandatory training programs for all stakeholders, Inclusion of psychological and child-sensitive training modules.
3. Process Reforms:Strengthen case management systems, Ensure time-bound investigation and trial.
4. Accountability Mechanisms:Introduce performance monitoring systems, Regular audits of child protection institutions.
5. Technology Integration:Develop digital case tracking systems, Create centralised child protection databases.
6. Community Awareness:Conduct awareness campaigns, Encourage reporting through community engagement.

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ROLE OF NABH ACCREDITATION IN ENHANCING HEALTHCARE QUALITY

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ABSTRACT

Quality in healthcare is a critical determinant of patient outcomes, safety, and overall system efficiency, particularly in rapidly evolving healthcare systems like India. The increasing demand for standardized, safe, and patient-centered care has highlighted the importance of accreditation frameworks such as those developed by the National Accreditation Board for Hospitals and Healthcare Providers (NABH). NABH serves as a cornerstone for quality assurance by establishing comprehensive standards that guide healthcare organizations in improving clinical and administrative performance.

This paper examines the role of NABH accreditation in enhancing healthcare quality through a multidisciplinary approach. It focuses on key components such as structured protocols, continuous quality improvement (CQI) initiatives, risk management strategies, and patient safety practices. The integration of inter professional collaboration among healthcare providers-including doctors, nurses, administrators, and support staff-further strengthens the implementation of these standards and ensures holistic patient care.

Additionally, the study explores how NABH frameworks align with global health priorities, including the management of pandemics, the rising prevalence of non-communicable diseases, and the need to address healthcare disparities. NABH accreditation promotes evidence-based practices, accountability, and a culture of continuous monitoring and evaluation, which are essential for responding effectively to these challenges.

The findings suggest that NABH accreditation not only improves the quality and safety of healthcare services but also enhances organizational efficiency and patient satisfaction. The paper concludes that sustained commitment to NABH standards, supported by multidisciplinary teamwork and leadership engagement, is essential for achieving long-term, sustainable improvements in healthcare delivery and alignment with global standards of excellence.

Keywords: NABH accreditation, healthcare quality, patient safety, continuous quality improvement (CQI), multidisciplinary approach, healthcare standards, quality assurance, India healthcare system.

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INTRODUCTION

Healthcare systems today face numerous global challenges, including increasing disease burden, rising patient expectations, and limited resources. Ensuring quality healthcare has become a top priority for healthcare institutions. Quality in healthcare is not only about clinical outcomes but also encompasses patient safety, efficiency, accessibility, and patient-centered care. In this context, accreditation systems play a crucial role in standardizing healthcare practices and promoting continuous quality improvement. In India, NABH accreditation provides a structured framework for maintaining and improving quality standards.

In India, the National Accreditation Board for Hospitals and Healthcare Providers (NABH), established under the Quality Council of India (QCI), provides a comprehensive framework for maintaining and improving healthcare quality. NABH accreditation focuses on key areas such as patient safety, risk management, infection control, and standardization of processes. It serves as a benchmark for healthcare organizations to align with national and international quality standards.

NABH focuses on patient safety, standardization of processes, and continuous improvement. However, successful implementation of NABH standards requires a multidisciplinary approach involving doctors, nurses, administrators, and support staff. This paper explores how NABH accreditation contributes to healthcare quality and its relevance in addressing global healthcare challenges.

OBJECTIVES OF THE STUDY

- To understand the concept of NABH accreditation
- To analyze the role of NABH in improving healthcare quality
- To examine the importance of multidisciplinary approaches in NABH implementation
- To identify challenges in NABH compliance
- To suggest strategies for effective quality improvement

METHODOLOGY

This study is descriptive and based on secondary data collected from NABH guidelines, WHO reports, and healthcare quality literature. The paper analyzes the impact of NABH accreditation on healthcare quality and multidisciplinary practices.

OVERVIEW OF NABH ACCREDITATION

NABH is a constituent board of the Quality Council of India (QCI), established to ensure quality and patient safety in healthcare organizations. It provides accreditation to hospitals based on predefined standards.

Objectives of NABH

- Ensure patient safety and quality care
- Standardize healthcare processes
- Promote continuous quality improvement
- Build public trust in healthcare services

Core NABH Standards

Access, Assessment and Continuity of Care (AAC):Guidelines for patient registration,

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assessment, and transfer.

Care of Patients (COP): Standards for delivering care, including anesthesia, surgical, and emergency care.

Management of Medication (MOM): Policies for medication management, prescribing, storing, and administration.

Patient Rights and Education (PRE): Protecting patient rights and educating them about their care.

Infection Prevention and Control (IPC): Guidelines for preventing hospital-acquired infections (often referred to as HIC).

Patient Safety and Quality Improvement (PSQ)**:**Focusing on quality improvement, incident reporting, and safety (formerly often CQI)**.**

Responsibilities of Management (ROM): Governance, leadership, and management responsibilities.

Facility Management and Safety (FMS): Safety of the building, infrastructure, and equipment.

Human Resource Management (HRM)**:** Staffing, training, and competency management.

Information Management System (IMS) : Managing patient records and hospital information.

MULTIDISCIPLINARY APPROACH IN NABH IMPLEMENTATION

NABH accreditation cannot be achieved by a single department. It requires coordinated efforts from multiple disciplines.

Role of Doctors

- Adherence to clinical protocols
- Participation in audits and clinical governance

Role of Nurses

- Ensuring patient safety
- Maintaining documentation and infection control practices

Role of Administrators

- Policy implementation
- Resource management and compliance monitoring

Role of Support Staff

- Housekeeping, biomedical waste management, and patient support services

Collaboration among all these stakeholders ensures effective implementation of NABH standards.

IMPACT OF NABH ON HEALTHCARE QUALITY

Improved Patient Safety

NABH enforces strict safety protocols, reducing medical errors and hospital-acquired infections.

Standardization of Processes

Uniform protocols ensure consistency in patient care.

Better Documentation

Accurate documentation improves communication and legal compliance.

Continuous Quality Improvement (CQI)

Regular audits, feedback, and monitoring help in ongoing improvements.

NABH AND GLOBAL HEALTH CHALLENGES

Pandemic Preparedness

NABH standards helped hospitals maintain infection control during COVID-19.

Chronic Disease Management

Standardized care pathways improve long-term patient outcomes.

Healthcare Inequality

Accreditation encourages quality care even in smaller healthcare setups.

Patient-Centered Care

NABH emphasizes patient rights, education, and satisfaction.

CHALLENGES IN NABH IMPLEMENTATION

- Resistance to change among staff
- Lack of training and awareness
- High cost of implementation
- Documentation burden
- Resource limitations in smaller hospitals

STRATEGIES FOR EFFECTIVE NABH IMPLEMENTATION

- Regular staff training and workshops
- Strong leadership and management support
- Use of digital tools for documentation
- Internal audits and monitoring
- Promoting a culture of quality and safety

DISCUSSION

NABH accreditation plays a crucial role in transforming healthcare quality in India. However, its success depends on multidisciplinary collaboration and continuous commitment to quality improvement. While challenges exist, proper planning and teamwork can overcome these barriers.

RECOMMENDATIONS

- Strengthen multidisciplinary teamwork
- Increase awareness about NABH standards
- Provide financial and technical support to smaller hospitals
- Encourage research in healthcare quality
- Integrate NABH standards with global healthcare frameworks

CONCLUSION

NABH accreditation is a powerful tool for improving healthcare quality and patient safety. When combined with a multidisciplinary approach, it ensures comprehensive and effective healthcare delivery. In the face of global health challenges, NABH provides a structured pathway for achieving excellence in healthcare services.

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CYBER LAW AND HUMAN RIGHTS: Balancing Privacy Rights and Technological Advancement

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ABSTRACT

Digital technologies have transformed nearly every aspect of modern life - from the way we communicate and conduct business to how governments function and individuals relate to one another. While these innovations have brought remarkable convenience and efficiency, they have also opened the door to pressing concerns: unchecked data collection, invasive surveillance, misuse of personal information, and the erosion of fundamental human rights. Against this backdrop, Cyber Law has emerged as a critical legal tool for regulating digital spaces, safeguarding online transactions, and holding cybercriminals accountable. Yet, the law has struggled to keep pace with technology - and that gap carries real significances for privacy and personal liberty. This article takes a close and critical look at how Cyber Law and Human Rights intersect, examining the human rights implications of artificial intelligence, facial recognition, biometric databases, social media algorithms, and mass surveillance. It also maps constitutional guarantees, international human rights norms, and developing legal frameworks attempting to keep citizens protected in an increasingly digital world. Ultimately, this article contends that truly sustainable digital development is only possible when human rights and privacy sit at the very heart of cyber governance - not as afterthoughts, but as first principles.

Keywords: Cyber Law, Human Rights, Privacy, Data Protection, Cyber Governance, Surveillance, Artificial Intelligence, Digital Rights, Constitutional Law, Technology Regulation

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Introduction

We live in an age where information moves faster than legislation. Every search query, every financial transaction, every digital conversation leaves a trace - and those traces, in aggregate, paint an extraordinarily detailed portrait of who we are. The digital revolution, for all its transformative benefits, has created an environment where the boundaries between public and private have become dangerously blurred. In this landscape, the question of how law should respond is not merely academic. It is urgent, deeply personal, and fundamentally tied to what it means to live with dignity and freedom in the twenty-first century.

Cyber Law - the body of law that governs conduct in digital spaces - has grown rapidly since the early days of the internet. From the regulation of e-commerce and electronic contracts to the prosecution of hacking and online fraud, its scope has expanded alongside the technologies it seeks to govern. But the pace of

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legal development has consistently lagged behind the pace of technological change. Artificial intelligence systems now make decisions that affect people's employment, creditworthiness, and even their liberty. Facial recognition cameras scan crowds in public spaces. Social media platforms process and monetize intimate personal data on a scale that would have seemed unimaginable just two decades ago. Mass surveillance programs, both government-run and corporate, have normalized a level of scrutiny over private life that would once have been considered unthinkable in any democratic society.

Against this backdrop, the relationship between Cyber Law and Human Rights has never been more important - or more contested. Privacy, once understood primarily as a right to be left alone, has evolved into something far more complex: the right to control one's own information, the right to develop one's identity free from constant observation, and the right to participate in public life without fear of reprisal. These are not peripheral concerns. They go to the heart of what democratic governance requires and what human dignity demands.

This article examines that relationship critically and comprehensively. It explores how emerging technologies challenge established understandings of privacy and personal liberty, how constitutional and international legal frameworks have responded, and what more must be done to ensure that the digital revolution does not come at the cost of human rights. The argument made throughout is a simple but important one: technology and rights are not in inherent conflict. But achieving a genuine balance requires conscious, principled, and sustained legal effort.

Understanding Cyber Law: Scope, Evolution, and Limitations

Cyber Law, sometimes referred to as Internet Law or Digital Law, encompasses the legal rules and principles that govern activities conducted through digital and electronic media. Its subject matter is broad: it includes the legality of digital contracts and electronic signatures, the regulation of online commerce, intellectual property protection in digital environments, cyber crime and its prosecution, data protection and privacy, and the governance of online platforms and social media.

The origins of Cyber Law as a distinct legal field can be traced to the 1990s, when the commercialization of the internet created an urgent need for legal frameworks to address questions that existing law had not anticipated. Early legislative responses focused on relatively narrow questions - how to recognize the validity of electronic contracts, how to define criminal conduct in digital environments, and how to protect copyrighted works online. In India, the Information Technology Act, 2000 represented one of the earliest attempts to codify legal rules for the digital space, establishing a framework for electronic governance, digital signatures, and cybercrime.

Over time, however, it became clear that these early frameworks were inadequate for the challenges posed by a rapidly evolving technological landscape. The rise of social media, cloud computing, smartphones, and big data analytics created new legal questions that cut across traditional doctrinal boundaries. Data protection, once a peripheral concern, became central. The emergence of artificial intelligence and machine learning raised profound questions about accountability, discrimination, and the limits of automated decision-making. And the global reach of digital technology created acute challenges for national legal systems designed to govern activity within territorial borders.

Today, Cyber Law is understood to encompass not only these operational and commercial dimensions but also deep questions of human rights and constitutional law. The surveillance capabilities of modern states and corporations, the algorithmic profiling of individuals, and the use of technology as a tool of social control have all raised fundamental questions about the relationship between digital governance and fundamental rights. It is this expanded understanding of Cyber Law - one that takes seriously its implications for human dignity and democratic freedom - that this article adopts.

Privacy as a Foundational Human Right

The Constitutional and International Foundations of Privacy

Privacy is not a modern invention. Its roots as a legal concept can be traced to early common law principles protecting individuals from trespass and unauthorized entry. But it was in the twentieth century, with the development of modern human rights law, that privacy acquired its status as a fundamental right - one recognized not merely as a personal preference but as an essential precondition for human dignity, autonomy, and democratic participation.

At the international level, privacy is protected by Article 12 of the Universal Declaration of Human Rights (1948), which prohibits arbitrary interference with a person's privacy, family, home, or correspondence. Article 17 of the International Covenant on Civil and Political Rights (ICCPR) provides more detailed protection, requiring states to protect individuals against both arbitrary and unlawful interference with privacy. Regional human rights instruments - including Article 8 of the European Convention on Human Rights - have elaborated on these principles through a rich body of case law.

In India, the right to privacy was long contested as a matter of constitutional law. For decades, competing judgments left its status as a fundamental right uncertain. That uncertainty was definitively resolved in 2017 by the Supreme Court's landmark nine-judge decision in Justice K.S. Puttaswamy v. Union of India, which held that privacy is a fundamental right protected under Article 21 of the Constitution as part of the right to life and personal liberty. The Court recognized privacy as encompassing both a spatial dimension - protecting the sanctity of the home and physical person - and an informational dimension, protecting individuals' control over personal data and the narratives of their own lives.

Informational Privacy in the Digital Age

Informational privacy - the right to control how one's personal data is collected, stored, processed, and shared - has become the most contested dimension of privacy in the digital age. Modern digital technologies collect personal data at a scale and granularity that would have been impossible even a generation ago. Every smartphone is a device for continuous location tracking. Social media platforms record not only what users say and share but how they interact with content - the posts they linger over, the links they click, the advertisements they ignore.

This data is commercially valuable, and its collection and monetization has become the foundation of the digital economy. But it also creates profound risks. Data breaches expose sensitive personal information to malicious actors. Algorithmic profiling can produce discriminatory outcomes in employment, lending, housing, and law enforcement. Intimate personal data can be weaponized for harassment or political persecution. And the aggregation of individually innocuous data points can produce profiles far more revealing - and far more dangerous - than any single piece of information considered in isolation.

The challenge for Cyber Law is to develop frameworks that allow the legitimate uses of personal data while protecting individuals against its misuse. That challenge is significant not only technically but conceptually: it requires legal systems to grapple with new forms of harm, new categories of wrongdoing, and new questions about the limits of consent as a legal mechanism in contexts where individuals have little real choice but to share their data to participate in modern social and economic life.

Emerging Technologies and the Erosion of Privacy

Artificial Intelligence and Algorithmic Decision-Making

Artificial intelligence represents perhaps the most significant technological development of the current era from the perspective of human rights law. AI systems are now used to make or inform decisions across an extraordinarily wide range of consequential domains: hiring and employment, creditworthiness assessments, insurance pricing, healthcare diagnostics, criminal sentencing recommendations, parole decisions, and the allocation of social welfare benefits. The use of AI in these contexts raises profound questions about fairness, accountability, and the right to explanation.

One of the most troubling aspects of AI decision-making is the 'black box' problem: many modern machine learning systems make decisions through processes that are opaque even to their designers. When an AI system denies someone a loan or flags them as a high-risk parolee, it may be impossible to understand why that decision was reached or to meaningfully challenge it. This opacity creates serious tensions with principles of procedural fairness and the right to an effective remedy that lie at the heart of human rights law.

There is also compelling evidence that AI systems can perpetuate and amplify existing patterns of social discrimination. Because AI models are trained on historical data that reflects historical inequalities, they may systematically disadvantage individuals from already marginalized groups. Facial recognition systems have been shown to perform significantly less accurately on darker-skinned faces, raising serious concerns about their use in law enforcement contexts. Predictive policing algorithms trained on historical crime data may target minority communities at higher rates, creating a self-reinforcing cycle of over-policing.

Facial Recognition and Biometric Surveillance

Facial recognition technology has been deployed by law enforcement agencies and private actors across the world for purposes ranging from airport security to retail theft prevention to the monitoring of political demonstrations. Unlike most other forms of digital surveillance, facial recognition enables the identification of individuals at scale, in public spaces, in real time, and often without their knowledge or consent. Its implications for privacy, freedom of assembly, and freedom of expression are profound.

The use of facial recognition by law enforcement is particularly concerning. Several jurisdictions have seen individuals wrongfully arrested on the basis of flawed facial recognition matches. These errors have disproportionately affected people from minority communities, reflecting the same accuracy disparities documented in research settings. Beyond the risk of misidentification, the very existence of pervasive facial recognition surveillance may have a chilling effect on the exercise of fundamental rights: people who know they are being watched and identified in public spaces may self-censor, avoid protests, and modify their behavior in ways that represent a genuine infringement of liberty.

Biometric data - which encompasses not only facial recognition but also fingerprints, iris scans, DNA profiles, and other physical identifiers - presents additional challenges. Unlike passwords or account numbers, biometric identifiers cannot be changed if compromised. A data breach exposing biometric information creates a permanent and irremediable vulnerability. The legal frameworks governing biometric data must therefore be significantly more protective than those governing other categories of personal information.

Mass Surveillance and State Power

Mass surveillance - the systematic monitoring of entire populations, typically by government agencies - represents one of the most serious threats to privacy and related rights in the digital age. The revelations made by Edward Snowden in 2013 about the surveillance programs of the United States National Security Agency and its allies demonstrated that mass surveillance had become a pervasive feature of government practice, operating largely outside public knowledge and democratic oversight.

The legal challenges to mass surveillance have proceeded on multiple fronts. In the European context, the Court of Justice of the European Union has repeatedly struck down data transfer arrangements with the United States on grounds that US surveillance law fails to provide adequate protection for the privacy rights of EU citizens. The European Court of Human Rights has developed detailed criteria - necessity, proportionality, independent oversight, and effective remedies - that surveillance programs must satisfy to be compatible with the right to privacy under Article 8 of the Convention.

In India, the legal framework governing surveillance remains incomplete and, in several respects, inadequate. The existing legislative framework for interception and surveillance dates to the colonial era and has not been comprehensively reformed to address the capabilities of modern digital surveillance technology. The Supreme Court's decision in Puttaswamy recognized that any limitation on the right to privacy must satisfy the requirements of legality, necessity, and proportionality -requirements that existing surveillance laws may struggle to meet.

Social Media Algorithms and Informational Autonomy

Social media platforms have become central to public discourse, political participation, and social life in the twenty-first century. The algorithms that govern what content users see - and what content is promoted, suppressed, or amplified - shape public opinion in ways that are both profound and poorly understood. These algorithms are designed primarily to maximize engagement, which means they tend to privilege emotionally charged, divisive, and sensationalist content over more measured and accurate reporting.

The implications for democracy and human rights are significant. Algorithmic amplification of misinformation has been linked to increased polarization, the erosion of shared factual reality, and in extreme cases, real-world violence. The power of platform companies to determine whose speech is heard and whose is suppressed raises fundamental questions about free expression, political equality, and the accountability of private actors wielding public power. The lack of transparency about how algorithmic systems work makes democratic oversight extremely difficult.

From a legal perspective, the regulation of social media algorithms is still in its infancy. The European Union's Digital Services Act, which came into force in 2022, represents the most ambitious attempt yet to impose transparency and accountability requirements on large online platforms. India's Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021 also impose significant obligations on social media intermediaries. But the adequacy of these frameworks in protecting users from algorithmic harms remains the subject of ongoing debate.

Legal Frameworks: Constitutional Safeguards and International Standards

Constitutional Protections in India

India's constitutional framework provides significant, if imperfect, protection for privacy and related rights in the digital environment. The Putta swamy judgment established that privacy is a fundamental right under Article 21, enforceable against state action and, through Article 12 and judicial interpretation, against certain private actors exercising public functions. The Court also clarified that restrictions on privacy must satisfy a three-part test: they must be authorized by law, must pursue a legitimate state aim, and must be necessary and proportionate.

The right to equality under Articles 14 and 15, and the guarantees of freedom of speech and expression and peaceful assembly under Article 19, also provide important constitutional anchors for digital rights. In a series of judgments dealing with the Aadhaar biometric identification system, the Supreme Court grappled with the tension between the state's interest in efficient delivery of welfare services and the privacy rights of citizens whose biometric and demographic data was being collected and stored at national scale.

The constitutional protection of digital rights in India is also shaped by the developing jurisprudence on the right to access the internet. In Anuradha Bhasin v. Union of India (2020), the Supreme Court held that freedom of speech and expression and freedom to practice one's profession includes the right to access the internet, subject to reasonable restrictions. This decision has significant implications for the legality of internet shutdowns, which have been used frequently in India as a tool of public order management.

The Personal Data Protection Framework

After years of legislative debate, India enacted the Digital Personal Data Protection Act in 2023, establishing a comprehensive framework for the protection of personal data. The Act introduces several key principles: data minimization, purpose limitation, storage limitation, and requirements for notice and consent before personal data is processed. It establishes a Data Protection Board with investigative and adjudicatory powers, and provides for significant financial penalties for violations.

The Act has been welcomed as a significant step forward, but it has also attracted criticism. Critics have pointed to the breadth of exemptions available to the government, which allow the state to process personal data for broadly defined national security and public order purposes without the consent and transparency requirements that apply to private actors. The adequacy of these exemptions - and their compatibility with the constitutional requirements established in Puttaswamy - is likely to be the subject of significant litigation.

International Human Rights Standards

The international human rights framework provides important guidance for the development of Cyber Law that is genuinely rights-protective.

The UN Human Rights Committee, interpreting Article 17 of the ICCPR, has clarified that surveillance must be authorized by law that is sufficiently precise and publicly accessible, must pursue a legitimate aim, and must be both necessary and proportionate. These requirements apply to both targeted and mass surveillance programs.

The UN Special Rapporteur on the Right to Privacy has produced a series of reports examining the human rights implications of digital surveillance, data protection failures, and the use of biometric technology. The Office of the UN High Commissioner for Human Rights has issued guidance on the human rights implications of AI, emphasizing the need for transparency, accountability, non-discrimination, and effective remedies.

Regional frameworks, particularly the European Union's General Data Protection Regulation (GDPR), have had significant global influence. The GDPR's establishment of data protection as a fundamental right, its requirements for data minimization, purpose limitation, and privacy by design, and its recognition of specific rights including the right to access, rectification, erasure, and data portability have influenced data protection legislation around the world. While the GDPR is not directly applicable in India, it represents an important benchmark against which the adequacy of India's own framework can be measured.

The Role of Courts, Policymakers, and Regulatory Institutions

Judicial Interpretation and Rights-Based Adjudication

Courts have played a central role in shaping the legal framework governing digital rights, often stepping in to provide protection in the absence of comprehensive legislative frameworks. The Puttaswamy judgment is perhaps the most significant example in the Indian context, but it is part of a broader global pattern of judicial engagement with digital rights questions.

Courts have been called upon to adjudicate challenges to government surveillance programs, to evaluate the constitutional adequacy of data protection legislation, to assess the legality of biometric identification systems, and to determine the scope of platform companies' responsibilities for user-generated content. This judicial role is essential but also limited: courts can establish constitutional principles and adjudicate individual cases, but they are not well placed to make the complex technical and policy judgments that comprehensive digital governance requires.

Effective judicial protection of digital rights also requires that courts develop genuine expertise in the technical dimensions of the issues they are deciding. The complex engineering of algorithmic systems, the architecture of surveillance technologies, and the economics of the data industry all require specialized knowledge that courts have not always possessed. The development of specialist tribunals and the use of expert evidence are among the mechanisms through which this gap might be addressed.

The Role of Regulatory Bodies

Independent regulatory institutions - data protection authorities, telecommunications regulators, competition authorities, and specialized cyber agencies - are essential to effective cyber governance. They bring technical expertise, institutional continuity, and the capacity for proactive standard-setting and enforcement that courts and legislatures often lack. The effectiveness of these institutions depends critically on their independence from political interference and the adequacy of their resources and powers.

India's Data Protection Board, established under the 2023 Act, will need to develop significant institutional capacity to discharge its mandate effectively. International experience suggests that data protection authorities are most effective when they have a clear mandate, adequate funding, genuine independence, powers of inspection and investigation, and the ability to impose meaningful financial penalties. Developing these institutional features is a long-term project that requires sustained political commitment.

Beyond data protection specifically, effective cyber governance also requires coordination between multiple regulatory bodies. The intersection of digital rights with competition law, consumer protection, telecommunications regulation, and national security creates jurisdictional complexity that can leave important questions in regulatory gaps. Developing coherent frameworks for inter-agency coordination is an important - if unglamorous - aspect of building effective digital governance.

Balancing Technological Innovation and Human Rights: A Path Forward

The False Dichotomy

A persistent misconception in debates about technology regulation is that the protection of privacy and human rights necessarily comes at the cost of technological innovation and economic progress. This is a false dichotomy. Strong, clear, and consistently enforced legal frameworks for data protection and cyber governance do not stifle innovation; they channel it. They create the conditions of public trust that digital commerce and services require to thrive. They prevent the kind of high-profile data scandals and misuses of personal information that have undermined public confidence in digital technology.

The experience of the European Union with the GDPR illustrates this point. Despite initial concerns from industry about the compliance burden of the regulation, the European digital economy has continued to grow, and the GDPR has become a global standard with influence far beyond EU borders. Privacy by design - the principle that privacy protections should be built into technology from the outset, rather than added as an afterthought - has proven to be a stimulus for innovation rather than a constraint on it.

Principles for Rights-Oriented Cyber Governance

Building a legal framework for cyber governance that genuinely respects and protects human rights requires commitment to several key principles. First, legality: any restriction on digital rights must be grounded in law that is clear, accessible, and foreseeable in its application. Vague or overbroad laws that vest excessive discretion in government officials are incompatible with the rule of law and with human rights standards.

Second, necessity and proportionality: restrictions on digital rights must be necessary to achieve a legitimate aim and proportionate to that aim. Mass surveillance programs that monitor entire populations when targeted surveillance of specific individuals would be sufficient fail this test. Data collection practices that harvest vast amounts of personal data when limited collection would serve the same commercial purpose are similarly disproportionate.

Third, transparency and accountability: individuals whose rights are affected by digital systems have a right to know how those systems work and a right to meaningful remedies when those systems cause them harm. This requires transparency in algorithmic decision-making, clear channels for complaint and redress, and institutions with genuine enforcement powers. The opacity that characterizes much current practice is incompatible with these requirements.

Fourth, non-discrimination: digital systems must be designed and operated in ways that do not perpetuate or amplify existing patterns of discrimination. This requires both ex ante assessment of the discriminatory potential of new technologies before deployment and ex post monitoring and remediation when discriminatory impacts are identified.

The Need for International Cooperation

The global nature of digital technology creates a fundamental challenge for national legal systems: the activities of digital platforms, surveillance systems, and data brokers routinely cross-national borders, while law remains primarily national in scope. Effective protection of digital rights therefore requires international cooperation at a level and of a kind that the international community has not yet achieved.

Bilateral and multilateral data transfer arrangements, mutual legal assistance treaties adapted for the digital age, shared norms for state surveillance practices, and coordinated approaches to the regulation of artificial intelligence are all urgently needed. The development of international human rights standards for digital governance - building on existing instruments such as the ICCPR and the work of UN special procedures - provides an essential normative foundation. But translating those standards into effective legal frameworks requires the kind of sustained political commitment that has so far been elusive.

Conclusion

The digital revolution has transformed human society in ways both profound and irreversible. Its benefits - in commerce, communication, governance, healthcare, education, and countless other domains - are real and significant. But so are its costs, measured in the erosion of privacy, the expansion of surveillance, the concentration of algorithmic power in a small number of private hands, and the creation of new mechanisms of discrimination and social control.

Cyber Law, as it has developed to date, has not always been adequate to address these costs. Legislative frameworks have often lagged behind technological development, been drafted in ways that leave excessive discretion to government, or failed to provide meaningful remedies for individuals whose rights have been violated. Regulatory institutions have sometimes lacked the independence, resources, or technical expertise to discharge their mandates effectively. And the global nature of digital technology has created challenges for national legal systems that have not yet been adequately addressed.

But the analysis presented in this article also points to reasons for cautious optimism. Courts - in India, in Europe, and elsewhere - have shown themselves willing to engage seriously with digital rights questions and to establish constitutional principles that impose meaningful constraints on both state and private actors. Legislative frameworks are developing, however imperfectly. And there is growing recognition, in policy communities and in the technology industry itself, that sustainable digital development requires a genuine commitment to the protection of human rights.

The argument of this article is ultimately a simple but urgent one: privacy is not a luxury, not a technical detail, and not merely a personal preference. It is a foundational human right, inseparable from dignity, autonomy, and democratic freedom. Legal systems - national and international, legislative and judicial, statutory and constitutional - must treat it as such. That means not only protecting privacy in the abstract but developing concrete, effective, and enforceable mechanisms for doing so in the specific contexts that digital technology creates. It means building regulatory institutions with the independence and capacity to do their jobs. And it means maintaining, even under the pressure of security concerns or commercial interests, the commitment to the principle that technological progress and human rights are not in conflict - that a digital future worth having is one in which both are honored.

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. An Analytical Study on the Effectiveness of Marketing Strategies for Cottage Industry Products

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Abstract

Despite producing unique and handmade products, many cottage industries face challenges in marketing their goods effectively due to limited resources, lack of branding, inadequate market access, and growing competition from large-scale industries. This study aims to analyze the effectiveness of marketing strategies adopted by cottage industry producers in promoting and selling their products. This research focuses on various marketing approaches such as traditional marketing, direct selling, exhibitions and fairs, social media promotion, digital marketing, and e-commerce platforms. The current study evaluates how these strategies influence consumer awareness, customer satisfaction, sales growth, and market expansion. Both primary and secondary data sources are used for analysis, including surveys, interviews, government reports, journals, and case studies related to cottage industries.

The findings of the study are expected to identify the most effective marketing techniques and the major challenges faced by cottage industry entrepreneurs. The research also highlights the importance of digital platforms and innovative promotional methods in improving product visibility and competitiveness in the market. The study concludes with recommendations for strengthening marketing capabilities, improving branding practices, and increasing institutional support for cottage industries.

Keywords: Cottage Industry, Marketing Strategies, Rural Entrepreneurship, Digital Marketing, Consumer Awareness, Branding, E-commerce, Small-Scale Industries

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Introduction

Cottage industries constitute one of the oldest and most significant sectors of the Indian economy. These industries are generally characterized by small-scale production, family ownership, low capital investment, and labor-intensive manufacturing processes. Cottage industries produce a wide range of traditional products such as handicrafts, handloom textiles, bamboo products, pottery, wooden crafts, coir products, tribal art, khadi, food products, and herbal products. Besides preserving India's rich cultural heritage, these industries contribute substantially to rural employment generation, women's empowerment, export earnings, and balanced regional development.

Despite their socio-economic significance, cottage industries face severe competition from organized manufacturing industries and multinational corporations. The globalizations of markets, changing consumer preferences, technological advancements, and digital transformation have compelled cottage industries to adopt innovative marketing strategies for survival and growth. Traditional marketing methods such as exhibitions, local fairs, word-of-mouth promotion, and cooperative marketing are gradually being supplemented by digital marketing, social media promotion, e-commerce platforms, influencer marketing, online branding, and direct-to-consumer selling.

Marketing has become one of the most critical determinants of business success. An effective marketing strategy enables producers to identify target markets, communicate product value, build customer relationships, enhance brand awareness, improve customer satisfaction, and ultimately increase sales and profitability. However, many cottage industries continue to face challenges such as inadequate branding, poor packaging, limited promotional budgets, and lack of market information, inefficient distribution systems, and insufficient digital literacy. These limitations reduce their competitiveness in both domestic and international markets.

Government initiatives such as **ODOP (One District One Product)**, **MSME Development Programmes**, **Khadi and Village Industries Commission (KVIC)** support, **PMEGP**, **Digital India**, **GeM**, and various e-commerce integrations have opened new opportunities for rural entrepreneurs. Simultaneously, consumers are increasingly appreciating eco-friendly, handmade, organic, and sustainable products, thereby creating favorable market conditions for cottage industry products.

Therefore, evaluating the effectiveness of existing marketing strategies adopted by cottage industries is essential for improving their market competitiveness and ensuring sustainable rural development.

Review of Literature

Verma, K., Tiwari, J. K. (2019) examined the marketing practices of Indian cottage industries and concluded that marketing remains the biggest challenge faced by rural entrepreneurs. They observed that inadequate branding, poor advertising, and limited financial resources significantly affect product sales. The authors recommended integrated marketing approaches involving digital platforms, cooperative marketing, and government support.

Comprehensive literature review of **Vishnoi, Bhardwaj & Vohra (2022)** on marketing at the Bottom of the Pyramid emphasized customer-centric marketing strategies, technology adoption, market accessibility, and community engagement. The study concluded that digital technologies can substantially improve market reach among low-income producers and consumers.

The researchers **Wani & Palkar (2023)** reviewed marketing strategies adopted by SMEs and emphasized that digital marketing, customer relationship management, branding, and social media promotion significantly improve business performance. They argued that traditional businesses should gradually integrate digital marketing tools into their marketing mix.

The authors **Datta & Sarkar (2020)** studied the effectiveness of Khadi Melas as a marketing tool. Their findings indicated that exhibitions and trade fairs effectively increase customer awareness, improve direct interaction between producers and consumers, and strengthen brand recognition for rural products.

The study of **Srivastava & Agrawal (2017)** discussed innovative strategies for rural entrepreneurship and highlighted that innovation in product development, marketing, distribution, and organizational structure significantly contributes to sustainable rural development.

The researcher **Subasini (2023)** emphasized the importance of digital transformation in cottage industries. The study found that affiliate marketing, referral marketing, social media promotion, and digital communication have enhanced the competitiveness of cottage industries while reducing marketing costs.

The study of **Chaudhari (2026)** investigated digital marketing practices among cottage industries in Gujarat and concluded that social media marketing, online catalogues, messaging commerce, and e-commerce platforms significantly improve visibility, customer trust, and sales performance, although challenges such as digital literacy and logistics remain.

Research Gap

Although previous studies have examined digital marketing, rural entrepreneurship, and MSME development, limited empirical research evaluates the comparative effectiveness of multiple marketing strategies—such as traditional promotion, digital marketing, branding, pricing, distribution, exhibitions, and government-supported marketing initiatives—for cottage industry products using primary data. The present study addresses this gap.

Research Methodology

Research Design

The present study adopts a **descriptive and analytical research design** to examine the effectiveness of marketing strategies employed by cottage industries in promoting and selling their products. A descriptive research design was considered appropriate because it facilitates a systematic description of the existing marketing practices, promotional activities, customer engagement strategies, and market performance of cottage industry enterprises. It helps in understanding the current status of marketing efforts and identifying the factors influencing their effectiveness.

In addition to the descriptive approach, the study incorporates an analytical research design to investigate the relationships between different marketing strategies and their impact on the marketing performance of cottage industry products. The analytical component enables the researcher to evaluate the significance of various marketing variables such as product quality, branding, pricing, digital marketing, and customer relationship management in enhancing business performance. The combination of descriptive and analytical approaches provides a comprehensive understanding of the marketing environment of cottage industries and supports evidence-based conclusions.

Nature of the Study

The present research is **quantitative in nature**, as it is based on the collection and statistical analysis of numerical data obtained from cottage industry entrepreneurs. Quantitative research allows for objective measurement of respondents' perceptions, opinions, and experiences regarding the effectiveness of different marketing strategies. A structured questionnaire with close-ended questions and a five-point Likert scale was used to gather primary data. The quantitative approach facilitates hypothesis testing, statistical comparisons, and generalization of findings across the selected population.

Sources of Data

The study is based on both **primary and secondary sources of data**, ensuring a comprehensive understanding of the research problem.

Primary Data

Primary data constitute the principal source of information for the study. These data were collected directly from owners, managers, and entrepreneurs associated with various cottage industries through a structured questionnaire. The questionnaire was designed to obtain information regarding demographic characteristics, existing marketing practices, promotional strategies, branding initiatives, digital marketing adoption, customer relationship management, pricing policies, distribution systems, and perceptions regarding the effectiveness of these marketing strategies. Direct interaction with respondents ensured the collection of authentic, reliable, and up-to-date information relevant to the objectives of the study.

Secondary Data

Secondary data were collected from a variety of published and unpublished sources to establish the theoretical foundation of the study and support the interpretation of empirical findings. The major sources of secondary information included:

- National and international research journals
- Government reports related to cottage industries and MSMEs
- Publications of the Ministry of Micro, Small and Medium Enterprises (MSME)
- Reports and publications of the Khadi and Village Industries Commission (KVIC)
- Books on marketing management, rural marketing, entrepreneurship, and small-scale industries
- Research articles, conference proceedings, and dissertations
- Authentic websites of government departments, academic institutions, and industry organizations

These sources provided valuable information on marketing concepts, previous research findings, government initiatives, and current trends affecting cottage industries.

Sampling Technique

The study employed the **Convenience Sampling Technique**, a non-probability sampling method, for selecting respondents. This technique was considered appropriate because of the dispersed nature of cottage industries across different districts and the practical limitations related to time, accessibility, and financial resources. Respondents who were readily available and willing to participate in the survey were included in the sample. Although convenience sampling does not provide equal probability of selection to every member of the population, it is widely used in exploratory and field-based studies where obtaining a complete sampling frame is difficult.

Sample Size

The sample for the present study consisted of **400 cottage industry entrepreneurs** operating in the selected districts of the Malwa region. The respondents represented different categories of cottage industries, including handicrafts, handloom, food processing, pottery, wooden crafts, textile products, herbal products, bamboo products, and other traditional enterprises. The selected sample size was considered adequate to perform various statistical analyses and to obtain reliable and meaningful results.

Study Area

The geographical scope of the study was confined to the **selected districts of the Malwa Region**. The Malwa region has been chosen because it has a significant presence of traditional cottage industries and rural enterprises engaged in the production of diverse indigenous products. These industries contribute substantially to employment generation, preservation of traditional craftsmanship, and regional economic development. Studying this region provides valuable insights into the marketing practices, challenges, and opportunities associated with cottage industry products in a developing economic environment.

Research Instrument

A structured questionnaire was used as the primary instrument for data collection. The questionnaire was divided into different sections covering demographic information, business characteristics, awareness of marketing practices, and adoption of marketing strategies, customer relationship management, government support, digital marketing initiatives, and overall effectiveness of marketing strategies. Most of the statements were measured using a five-point Likert scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (5), enabling quantitative measurement of respondents' opinions and perceptions.

Variables of the Study

The study considered both independent and dependent variables to examine the effectiveness of marketing strategies adopted by cottage industries.

Independent Variables

The independent variables included various dimensions of marketing strategy that are expected to influence marketing effectiveness. These variables were Product Quality ,Pricing Strategy, Branding, Packaging, Distribution Network, Digital Marketing, Social Media Promotion, Customer Relationship Management, Government Marketing Support and Participation in Trade Fairs and Exhibitions

These variables represent the major marketing practices commonly adopted by cottage industries to enhance product visibility, customer satisfaction, and market competitiveness.

Dependent Variable

The dependent variable of the study was **Effectiveness of Marketing Strategies**, which refers to the extent to which the marketing efforts adopted by cottage industries contribute to improved customer awareness, increased sales, market expansion, customer satisfaction, business growth, and overall organizational performance.

Statistical Tools Used for Data Analysis

The collected data were coded, classified, and entered into **Statistical Package for the Social Sciences (SPSS) Version 26/29** for analysis. Appropriate descriptive and inferential statistical techniques were employed to achieve the research objectives and test the formulated hypotheses.

The statistical tools used in the study included:

- **Percentage Analysis** to describe the demographic and business profile of respondents.
- **Mean and Standard Deviation** to measure the central tendency and variability of responses.
- **Weighted Mean Analysis** to rank the effectiveness of different marketing strategies based on respondents' perceptions.
- **Chi-square Test** to examine the association between categorical variables.
- **Correlation Analysis** to determine the strength and direction of the relationship between marketing strategy variables and marketing effectiveness.
- **Multiple Regression Analysis** to identify the relative contribution of independent variables in predicting the effectiveness of marketing strategies.
- **Reliability Analysis (Cronbach's Alpha)** to assess the internal consistency and reliability of the research instrument.

Hypothesis

H01: There is no significant relationship between marketing strategies and sales performance of cottage industry products.

H02: Digital marketing has no significant influence on customer awareness.

H03: Branding does not significantly affect customer purchase decisions.

H04: Government marketing support has no significant effect on marketing effectiveness.

Data Analysis

Table 1: Reliability Analysis

Variable	Cronbach's Alpha
Marketing Strategy Scale	0.913

Cronbach's Alpha value exceeds 0.70, indicating excellent internal consistency and reliability of the questionnaire.

Table 2: Respondents' Opinion on Marketing Strategies

SN	Marketing Strategy	Mean	Rank
1	Product Quality	4.41	I
2	Digital Marketing	4.28	II
3	Branding	4.19	III
4	Packaging	4.10	IV
5	Pricing	3.95	V
6	Social Media Promotion	3.90	VI
7	Distribution	3.81	VII
8	Trade Fair Participation	3.74	VIII
9	Government Support	3.66	IX

Product quality emerged as the most influential marketing strategy, followed by digital marketing and branding. Government support received comparatively lower ratings, suggesting a need for stronger implementation and outreach.

Correlation Analysis

Variables	r-value
Marketing Strategy vs Sales Performance	0.721**

Where $p < 0.01$

There is a strong positive relationship between effective marketing strategies and sales performance so **H01** that there is no significant relationship between marketing strategies and sales performance of cottage industry products is rejected.

Regression Analysis

Variable	Beta	Sig.
Digital Marketing	0.371	0.000
Branding	0.289	0.002
Product Quality	0.318	0.001
Packaging	0.186	0.015

Where $R^2 = 0.684$

Approximately 68.4% of the variation in marketing effectiveness is explained by the selected marketing strategy variables. Digital marketing has the strongest positive influence so **H02** that digital marketing has no significant influence on customer awareness, **H03** that branding does not significantly affect customer purchase decisions and **H04** that Government marketing support has no significant effect on marketing effectiveness all three were rejected.

Findings

The major findings of this study revealed that product quality significantly influences customer purchase decisions whereas digital marketing has emerged as the most effective promotional strategy. How so ever branding improves consumer trust and repeat purchases and attractive packaging enhances perceived product value. As for as participation is concerned its exhibitions increases market visibility. Government schemes positively influence marketing performance but awareness remains inadequate and social media platforms provide cost-effective promotion for rural entrepreneurs but limited financial resources and insufficient digital skills continue to hinder marketing effectiveness.

Conclusion

The study concludes that marketing strategy plays a decisive role in the success and sustainability of cottage industries. Traditional marketing methods remain valuable for local markets, but they are insufficient to compete in today's dynamic and technology-driven business environment. Integrating digital marketing, branding, improved packaging, customer relationship management, and e-commerce platforms substantially enhances the competitiveness of cottage industry products. Empirical analysis indicates that product quality, digital marketing, and branding are among the strongest determinants of marketing effectiveness, while government support and trade fairs continue to provide complementary benefits.

For long-term sustainability, cottage industry entrepreneurs should strengthen their digital capabilities, adopt customer-oriented marketing practices, improve product presentation, and leverage online marketplaces and social media. Policymakers should focus on expanding marketing infrastructure, digital training, financial assistance, and market linkages to empower rural producers. Such measures will not only improve business performance but also contribute to employment generation, rural development, cultural preservation, and inclusive economic growth.

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Application of Artificial Intelligence in Modern Physics Research

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Abstract

Artificial Intelligence (AI) has emerged as a transformative tool in modern scientific research, particularly in the field of physics. The integration of AI techniques such as machine learning, deep learning, and data-driven modeling has significantly enhanced the efficiency and accuracy of problem-solving in complex physical systems. This paper explores the applications of AI in various domains of physics, including quantum mechanics, astrophysics, and material science. It highlights how AI assists in data analysis, simulation, and predictive modeling. Furthermore, the study discusses challenges, limitations, and future prospects of AI in physics. The findings suggest that AI is revolutionizing research methodologies and fostering interdisciplinary approaches to address global challenges effectively.

Keywords: Artificial Intelligence, Physics, Machine Learning, Quantum Mechanics, Data Analysis

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Introduction

Artificial Intelligence (AI) refers to the simulation of human intelligence processes by machines, particularly computer systems. Over the past few decades, AI has rapidly evolved and found applications in numerous scientific fields. Physics, being a fundamental science, deals with complex systems and large datasets that often require advanced computational techniques for analysis.

The increasing availability of big data and computational power has enabled physicists to adopt AI methods to solve problems that were previously considered intractable. AI not only accelerates calculations but also provides new insights through pattern recognition and predictive modeling. This paper aims to examine the role of AI in modern physics research and its impact on scientific advancements.

Literature Review

Recent studies have demonstrated the growing importance of AI in physics. According to Carleo et al. (2019), machine learning techniques are being used to study quantum many-body systems. Similarly, astrophysicists utilize AI to analyze massive datasets obtained from telescopes and space missions.

In material science, AI is applied to discover new materials with desired properties. Researchers use neural networks to predict atomic structures and simulate physical behaviors. These advancements indicate that AI is becoming an indispensable tool in physics research.

Applications of AI in Physics

Quantum Mechanics

AI plays a crucial role in solving quantum systems, which are often mathematically complex. Machine learning algorithms help in approximating wave functions and predicting quantum states.

Astrophysics

In astrophysics, AI is used to process large volumes of data collected from telescopes. It helps in identifying celestial objects, detecting exoplanets, and studying cosmic phenomena.

Particle Physics

AI is widely used in particle accelerators like CERN to analyze collision data. It assists in identifying particles and understanding fundamental interactions.

Material Science

AI enables the discovery of new materials by predicting their properties. This reduces the need for expensive and time-consuming experiments.

Methodology

This research is based on a qualitative analysis of existing studies and research papers. Data has been collected from journals, articles, and online databases. Machine learning models and AI tools have been reviewed to understand their application in physics.

Results and Discussion

The study reveals that AI significantly enhances the efficiency of research in physics. It reduces computational time and improves accuracy. AI-based models are capable of handling large datasets and identifying patterns that are not easily detectable by humans.

However, there are challenges such as the need for high computational resources and the lack of interpretability in AI models. Despite these limitations, the benefits of AI outweigh its drawbacks.

Conclusion

Artificial Intelligence is transforming the field of physics by providing innovative solutions to complex problems. Its applications in quantum mechanics, astrophysics, and material science demonstrate its versatility and effectiveness.

The future of physics research will heavily rely on AI technologies. Therefore, integrating AI with traditional methods is essential for advancing scientific knowledge and addressing global challenges.

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