ISBN : 978-81-999799-1-8

INTERNATIONAL

MULTIDISCIPLINARY CONFERENCE

on

Synergizing Technology, Sustainability and Management through Intelligent, Ethical and Sustainable System

CONFERENCE PROCEEDINGS

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APRIL, 2026

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INTERNATIONAL MULTIDISCIPLINARY CONFERENCE

ON SYNERGIZING TECHNOLOGY, SUSTAINABILITY AND MANAGEMENT THROUGH INTELLIGENT, ETHICAL AND SUSTAINABLE SYSTEM

(ICSTIESS VIRTUAL-2026)

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I N S P I R A™
Reg. No. SH-481 R- 9-V P-76/2014
JAIPUR - DELHI

Published by

INSPIRA
Tonk Road, Jaipur-302018
Rajasthan, India

ISBN: 978-81-999799-1-8

Edition: April, 2026

Price: Rs. 1085/-

Printed by:
In-house-Digital
Jaipur-302018


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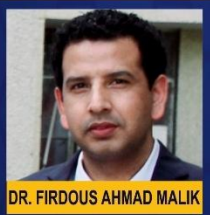

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Greeting Messages

Distinguished Guests, Colleagues, and Participants,

It is a great pleasure to welcome you to the International Multidisciplinary Conference on Synergizing Technology, Sustainability and Management through Intelligent, Ethical, and Sustainable System. This conference brings together diverse perspectives to address one of the most pressing challenges of our time: how to effectively translate technological innovation into sustainable and impactful solutions.

I believe that at the heart of this endeavour lies the entrepreneurial mindset, as it forms the base for technological innovation. In increasingly complex and uncertain environments, innovation is no longer a linear process driven solely by technological advancement. Rather, it is shaped by how individuals and organizations interpret, reframe, and act upon emerging opportunities. This is the essence of entrepreneurial thinking.

An entrepreneurial mindset enables us to move beyond predefined paths and to actively construct opportunities, while continuously learning, adjusting, and responding to dynamic contexts. It forms the foundation for transforming technological potential into viable, sustainable business models and systems. This is particularly relevant in domains where technological possibilities are abundant, yet their societal and environmental value must still be discovered and realized.

As reflected in my work, innovation should be understood not only as a technological achievement, but as a process of entrepreneurial co-creation of people. A process in which markets, stakeholders, and solutions evolve together through experimentation and engagement. This requires entrepreneurial individuals who foster adaptivity and flexibility through experimentation and engagement and who can design intelligent, ethical, and sustainable systems for the future.

I hope this conference inspires meaningful dialogue, fosters interdisciplinary collaboration, and contributes to advancing both theory and practice in this important field.

Thank you, and I wish you a fruitful and inspiring conference.

Most sincerely,

Dr. Gabi Kaffka

Key Paper

THE INTERDISCIPLINARY GLOBAL TAPESTRY: ALIGNING ETHICS, LAW, COMMERCE, MANAGEMENT AND SOCIETY FOR SUSTAINABLE DEVELOPMENT

Dr. Rupali DilipTaru

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Abstract

As we navigate the mid-2020s, the pursuit of sustainable development has transitioned from a peripheral corporate social responsibility (CSR) goal to a core systemic necessity. This paper explores the critical intersections of **ethics, law, commerce, management, and society**. It argues that true sustainability cannot be achieved through siloed efforts; rather, it requires a "Tapestryapproach" where ethical frameworks guide legal mandates, and innovative management practices drive commercial success without compromising societal well-being. This keynote outlines the challenges of integrating these five pillars and proposes a roadmap for researchers and practitioners to foster resilient, sustainable ecosystems.

Keywords: *Sustainable Development, ESG, Ethics in Technology, Circular Economy, Social Governance, ICSTIESS 2026.*

Introduction: The Multi-Dimensional Challenge

Sustainable development is often defined by the "Triple Bottom Line"—People, Planet, and Profit. However, the operationalization of these goals occurs within a complex web of human institutions. For the **ICSTIESS Conference**, we must recognize that technical sessions are not merely about "green tech," but about the **human architecture** that governs it.

The Five Pillars of Sustainable Progress

Pillar	Role in Sustainable Development	Key Conflict/Challenge
Ethics	The moral compass for emerging technologies (AI, Biotech).	Balancing universal values with cultural relativity.
Law	Creating enforceable standards and accountability.	Lagging behind the pace of digital and environmental change.
Commerce	Driving the resource allocation and scaling of solutions.	Overcoming the "short-termism" of quarterly profits.
Management	Implementing sustainable strategies within organizations.	Aligning workforce motivation with ESG (Environmental, Social, Governance) goals.
Society	The ultimate stakeholder and beneficiary of development.	Mitigating the "Digital Divide" and social inequality.

Ethical and Legal Frameworks: From Compliance to Conscience

Sustainable development is no longer just about "following the law." In a world where technology moves faster than legislation, **ethics** must fill the void.

- **Proactive Law:** We are moving toward "Regulatory Sandboxes" where legal frameworks are co-created with innovators to ensure safety without stifling growth.
- **The Ethics of AI in Sustainability:** As we use algorithms to manage energy grids or supply chains, we must ensure these systems are transparent and unbiased.

Management and Commerce: The Value of "Circular Economies"

Modern management must shift from a linear "take-make-waste" model to a **Circular Economy**. This requires a fundamental change in commercial strategy:

- **Product-as-a-Service (PaaS):** Reducing consumption by selling utility rather than ownership.
- **Supply Chain Transparency:** Using Blockchain to track the ethical footprint of every component in a product.

Society: The Human-Centric Approach

Sustainable development fails if it is not inclusive. The "Society" pillar reminds us that:

- **Social Equity** is a prerequisite for environmental stability.
- **Education and Literacy** in the 2020s must include "sustainability literacy," enabling citizens to make informed commercial and ethical choices.

Conclusion: A Call to Action

The ICSTIESS community stands at a crossroads. Our research must bridge the gap between technical feasibility and societal acceptability. To achieve the Sustainable Development Goals (SDGs), we must treat Ethics, Law, Commerce, Management and Society not as separate or only tracks, but as a single, integrated engine for progress which connect with many other important terminologies of environment.

"True sustainability is not a destination, but a continuous process of aligning human ingenuity with the finite boundaries of our planet and the infinite requirements of our collective conscience."

POLLUTION IN INDIAN RIVERS: CAUSES AND CONTROL MEASURES

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Abstract

Water pollution in Indian rivers is a pressing environmental issue with profound implications for human health, biodiversity, and socio-economic development. Rapid industrialization, urbanization, and population growth have exacerbated the contamination of river waters through the discharge of untreated sewage, industrial effluents, agricultural runoff, and religious practices. Major rivers such as the Ganga, Yamuna, and Brahmaputra are critically polluted, threatening drinking water resources, aquatic life, and sustainable livelihoods. This paper examines the key causes of river pollution in India and evaluates existing control measures, including governmental policies, technological interventions, and community-based initiatives. The study concludes that a combination of improved wastewater treatment, stricter regulation, public awareness, and collaborative governance is essential for achieving meaningful restoration and sustainable management of river systems. The paper also highlights future directions for research and policy to enhance water quality and preserve river ecosystems.

Keywords: Water Pollution, Indian Rivers, Industrial Effluents, Sewage Disposal, Agricultural Runoff, Pollution Control, Environment Policy

Introduction

Water is a fundamental resource for all terrestrial life and is vital for domestic, agricultural, and industrial activities. In India, rivers hold cultural, religious, and

economic significance, yet many of these lifelines are severely polluted. Water pollution refers to the contamination of water bodies by harmful substances that degrade water quality and render it unsafe for consumption and ecological balance. The primary sources of pollution include untreated sewage, industrial wastewater, agricultural chemicals, and solid waste disposal.

Polluted river water threatens public health by spreading water-borne diseases like cholera, dysentery, and hepatitis. It also disrupts freshwater ecosystems, leading to loss of aquatic biodiversity. As India faces increasing water scarcity, maintaining clean and sustainable river water has become a national priority. This paper explores the major causes of water pollution in key Indian rivers and assesses existing strategies to mitigate this environmental crisis.

Causes of Water Pollution in Indian Rivers

- **Industrial Discharges**

Industrialization has led to rapid economic development in India. However, many industries release untreated or inadequately treated effluents into nearby rivers. These effluents contain toxic chemicals, heavy metals, organic compounds, and suspended solids that lower oxygen levels and disrupt aquatic ecosystems. Leather tanning, textile dyeing, paper and pulp, metal processing, and chemical manufacturing are among the major polluting industries. For example, the discharge of chromium from tanneries into the Ganga and its tributaries poses severe health risks to aquatic organisms and humans alike.

- **Domestic Sewage and Wastewater**

A significant proportion of urban sewage in India remains untreated before being discharged into rivers. Cities and towns lack adequate sewer networks and wastewater treatment plants (WWTPs), leading to the direct flow of domestic waste into water bodies. Sewage contains pathogens, nutrients (nitrogen and phosphorus), and organic matter that increase biochemical oxygen demand (BOD), causing eutrophication and loss of aquatic life. The Yamuna River is one of the most affected rivers due to the enormous volume of untreated sewage from Delhi and other cities.

- **Agricultural Runoff**

Agricultural practices contribute heavily to river pollution through the runoff of fertilizers, pesticides, and animal waste. Excessive use of nitrogenous and phosphate fertilizers increases nutrient loads in river water, leading to algal blooms and subsequent depletion of dissolved oxygen. Pesticide residues are toxic to aquatic fauna and can accumulate in the food chain, posing long-term ecological and health

risks. This pollution is prominent in rivers like the Chambal and Ghaghara, where agricultural intensityis high.

- **Religious and Cultural Practices**

Rivers in India are revered and intimately linked with cultural practices. Ritual bathing, immersion of idols, disposal of religious offerings, and cremation remains contribute to polluting loads in river waters. Materials such as flowers, cloth, and plastics further degrade water quality and impede natural flow. During festivals like the Kumbh Mela, the temporary surge in religious activities leads to significant waste accumulation in riverbanks and water.

- **Solid Waste Disposal**

Improper solid waste disposal, including municipal garbage and plastic waste, ends up in river channels. Landfills located near riverbanks often leach contaminants into groundwater and river water. Floating plastic waste and debris not only pollute the river surface but also harm aquatic organisms through ingestion and physical entanglement.

Impacts of River Water Pollution

- **Public Health Risks**

Water pollution directly affects human health, especially among communities dependent on rivers for drinking, bathing, and irrigation. Contaminated water causes gastrointestinal infections, skin diseases, and liver disorders. Heavy metals like lead and mercury can cause neurological and developmental issues, particularly in children.

- **Ecological Degradation**

Ecosystems in rivers support a wide range of flora and fauna. Pollution leads to decreased biodiversity, fish kills, and disruption of food webs. Excess nutrients cause algal blooms that deplete oxygen, creating “dead zones” where aquatic life cannot survive.

- **Economic Consequences**

The economic cost of polluted rivers includes loss of fisheries, decreased agricultural productivity due to contaminated irrigation water, and increased public health expenditure. Tourism and recreational activities also suffer in polluted river stretches.

Control Measures and Management Strategies

- **National Policies and Legislation**

The Government of India has enacted several laws to prevent water pollution, including the Water (Prevention and Control of Pollution) Act, 1974, and the Environment (Protection) Act, 1986. These laws empower pollution control boards to monitor water quality, issue discharge standards, and penalize violators. Amendments and stricter enforcement have strengthened regulatory oversight.

- **Construction of Wastewater Treatment Plants**

Expanding sewage treatment infrastructure is crucial. Urban areas require adequate wastewater treatment plants (WWTPs) to ensure that domestic sewage is treated before discharge. Public-private partnerships and funding under national missions like the **Namami Gange Programme** aim to build and upgrade WWTPs along the Ganga and other polluted rivers.

- **Industrial Effluent Treatment**

Industries must install Effluent Treatment Plants (ETPs) to treat wastewater on-site. Zero liquid discharge (ZLD) technologies and cleaner production practices reduce pollutant loads. Environmental audits, continuous online monitoring, and incentives for adopting green technologies can further enhance compliance.

- **Improved Agricultural Practices**

Promoting sustainable farming practices reduces nutrient and pesticide runoff. Techniques such as integrated nutrient management, use of organic fertilizers, contour farming, and buffer strips along riverbanks help decrease pollution. Farmer education and government subsidies for eco-friendly inputs can support this transition.

- **Community Participation and Public Awareness**

Effective river conservation requires active community involvement. Public awareness campaigns, river cleaning drives, and educational programs engage citizens and local stakeholders. NGOs and community groups play a key role in monitoring river health and advocating environmental protection.

Case Study: Namami Gange Programme

Launched in 2014, the **Namami Gange Programme** is a flagship initiative to rejuvenate the River Ganga. It focuses on sewage treatment, riverfront development, afforestation, and public awareness. The programme includes funding for WWTPs, solid waste management, and bio-remediation technologies. Early results indicate improved water quality at several points, though sustained efforts and monitoring remain essential for long-term success.

Challenges and Future Directions

- **Implementation Gaps**

Despite strong policies, implementation remains uneven due to lack of coordination, inadequate funding, and bureaucratic delays. Strengthening institutional capacity and ensuring transparency through real-time data can address these challenges.

- **Climate Change and Water Quality**

Climate change exacerbates river pollution by altering flow regimes and intensifying extreme weather events, leading to higher pollutant loads from runoff. Future strategies must integrate climate resilience into river management plans.

- **Innovation and Research**

Investing in research for low-cost wastewater treatment technologies, bioremediation methods, and predictive water quality modeling will aid pollution control. Collaboration between academic institutions, industry, and government can accelerate innovation.

Conclusion

Water pollution in Indian rivers is a multifactorial problem driven by industrial effluents, untreated sewage, agricultural runoff, and socio-cultural practices. Current control measures, including legislation, wastewater treatment infrastructure, and community initiatives, have contributed to progress but require stronger implementation and sustained commitment. Achieving clean and sustainable rivers demands an integrated approach that combines technological solutions, effective governance, public participation, and environmental education. Protecting river ecosystems is not only an ecological imperative but also essential for human health, economic development, and intergenerational equity.

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SYNCHRONICITIES OF OPPRESSION: INTERROGATING THE RURAL AND NEOLIBERAL ARCHITECTURES OF CASTE IN BAMA AND YASHICA DUTT

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Abstract

This work compares Bama's Karukku (1992) and Sangati (1994) with Yashica Dutt's Coming Out as Dalit (2019) by exploring different but overlapping ways Dalit identity, defiance, and voice emerge in Indian literature. Rather than seeing Bama as old and Dutt as new, the reading treats them as parallel expressions - one shaped by bodily harm under rural hierarchy, the other haunted by emotional strain within city life governed by market rules. Using locally rooted feminist thought, insights from Guru and Rege, ideas about emotion, and Bourdieu's concepts, it shows tension between Bama's shared "We," built through many voices, versus Dutt's singular "I," formed amid urban individualism. Language plays a key role: Bama challenges power using defiant regional speech; Dutt explains her truth in accessible English, targeting wider, upper-caste audiences abroad. Though caste oppression has shifted from religious impurity to claims of merit, stories told by Dalit women still break dominant narratives and resist control. From village lanes where pain was lived daily to online spaces where hashtags speak back, Dalit feminist expression now moves flexibly across physical realities and virtual reach.

Keywords: Dalit Literature, Neoliberal Caste, Affect Theory, Dalit Feminism, Bama, Yashica Dutt, Language Politics.

Introduction

Beginning in the shadows, Dalit voices in Indian writing have challenged dominant historical narratives shaped by uppercaste perspectives. These stories which were long silenced & twistedfound new force after 1990. Spurred by renewed attention during Ambedkar's hundredth anniversary the writings by oppressed communities surged into public view. Suddenlythose called "untouchable" spoke not as passive figures studied by others but as narrators of their own lives. Yet even here women carrying both caste and gender burdens remained on the margins. At the crossroads of caste and genderthe Dalit woman faded from view overlooked by male led uprisings on one hand, pushed aside by upper-caste feminism on the other. Sharmila Rege in 1998 pointed out how struggles for Dalit identity often became

shaped by men's voices while women's movements absorbed dominant-caste norms. Her observation peeled back layers long left unexamined.

This study examines shapes of Dalit feminist awareness through comparing early writings by Bama ‘s Karukku and Sangati with Yashica Dutt’s Coming Out as Dalit. Though written almost thirty years apart these works frame a shifting phase in India: one marked by market reforms alongside growing digital connectedness.Bama's stories take shape amid rural Tamil Nadu’s rigid caste divisions during the 1990s. Karukku which is widely recognised as Tamil’s inaugural Dalit life narrativealongside Sangati confront raw experiencesenforced social isolation, hardship in farming communities and contradictions within faith-based hierarchies. Grounded in village terrain her writing captures bodily harm through lived sensation. Meanwhile Yashica Dutt’s personal accountreleased decades later in 2019 unfolds behind city facades where caste pretends not to exist. Based in New Yorkand working as a reporter she speaks from privilege educated, part of an emerging Dalit elite. Hers is a reckoning with internal wounds, the strain of hiding identity, fear threaded into daily choices, quiet rejections woven through offices and top universities.

One could assume progress moves straight ahead:out of village ignorance into city light, from old hierarchies toward marketdriven futures. Yet this work challenges that idea. Rather than stages on a timeline these conditions exist at once. What Bama writes about oppressive control is not ancient history. For most Dalits in rural areas nowit shapes daily life. At the same time, it unfolds alongside the quiet exclusion and subtle hierarchies Dutt faces in city life. One form life in village beatings another thrives in metropolitan scrutiny :both shape caste today. While one punishes the body and the other monitors behaviour, together they sustain old divisions beneath a modern surface.

This work examines texts using Intersectionality, Dalit Standpoint Theory, and Affect Theory to trace evolving forms of defiance. Though separated by style and setting, Bama and Dutt both turn personal history into a tool against caste-based erasure. Resistance moves from the cheri’s communal endurance toward connections formed online. Earlier, Dalit communities resisted caste oppression by surviving and supporting each other in shared living spaces. Today resistance also happens through digital platforms. Although the form of suffering has changed but the struggle to challenge caste and break silence continues.

Theoretical Framework

To rigorously analyse the complexities of caste and gender in these narratives it is important to move beyond Western feminist frameworks while critically engaging with them.

- **Beyond Additive Models: The Dalit Woman's Matrix**

What Kimberlé Crenshaw called intersectionality started as a way to name how Black women were overlooked in U.S. law. Stillthinkers such as Sharmila Rege in 1998 and Gopal Guru in 1995 suggest that using this idea in India means reshaping it locally. Because caste differs from race, it functions through layers of hierarchy tied to sacred texts, marriage within groups, inherited work roles, and ideas about spiritual cleanliness. Soborrowing Western frameworks without change risks missing deep cultural roots. Though usefulthe model needs grounding in South Asian realities to matter here.

A Dalit woman stands in a distinct position inside what Collins calls the "matrix of domination." In Sangati book, Bama shows how these women experience more than just broad patriarchal control. They confront a particular form of oppression rooted in Dalit communities themselves. When Dalit men suffer degradation from dominant caste landowners outside the home, they may respond by asserting authority over women indoors. Such patterns emerge alongside another force: caste-based feudalism, under which upper-caste men treat Dalit women's bodies as open territory. Though shaped differently each layer tightens the grip on their lives. As Bama writes, *"If a landlord hits our men, they can hit back... But if a landlord lays a hand on us, we have to endure it*."

What stands out in Yashica Dutt's account is how class and neoliberal values shape Dalit experience in unexpected ways. Not poverty but lack of social belonging marks her exclusion. She speaks fluent English, holds degrees, yet remains suspect. Often absent from mainstream Dalit stories her profile challenges old assumptions about who gets heard. In privileged circles, her visibility feels disruptive to some not earned, just taken. Gender compounds this, being a woman sharpens the hostility she meets. Worthiness becomes a weapon used against her presence. Merit, in practice rarely stays neutral when caste and gender enter the room. What looks neutral often hides old hierarchies. Dutt shows the claim that markets bypass caste is false. Instead,economic systems echo caste divides. Personal connections shape opportunities. So do vague ideas like personality match or ease in office settings. These become barriers. They block Dalit women quietly. Familiar patterns reappear under new labels. Inclusion slips away.

- **Dalit Standpoint and the Politics of Affect**

This research draws on Dalit Standpoint Theory by suggesting that enduring systemic injustice offers a clearer lens for seeing how power operates. According to Gopal Guru, Dalit women speak in ways shaped by their unique positions within society, not because of innate traitsbut because of where they stand in relation to hierarchy.This study brings Affect Theory into conversation with caste analysis. More than a system of hierarchy caste lives through sensation, shaped by emotion and sustained by feeling.What stands out in Bama's rural setting is a deep sense of disgust toward what is deemed impure - abjection as Kristeva describes it. Far from being symbolic this revulsion shapes how Dalit bodies are seen: discarded, contaminated and dangerous. Yet defiance takes root here tooexpressed through raw fury and biting sarcasm. Surprisingly laughter becomes part of survival.

Worry takes centre stage in Dutt's portrayal of a neoliberal reality - shame walks beside it. Fear here does not stem from bodily contact, rather from visibility. Think of the Dalit individual living as upper-caste and haunted by the dread of discovery. That tension mirrors what some call imposter syndrome. Sara Ahmed explores how emotions shape culture by showing shame ties people to societal rules. Breaking free, she suggests, resembles coming out - a move that severs emotional chains.

Architectures of Violence

A central divergence between the texts lies in the manifestation of violence. By juxtaposing Bama's portrayal of the body with Dutt's portrayal of the psyche, we can trace the metamorphosis of caste oppression.

- **Bama and the Somatic Violence of the Cheri**

In Karukku and Sangati, violence is overt, somatic (bodily), and spatially defined. The geography of the village is a geography of caste. The cheri (Dalit settlement) is separated from the oor (upper-caste village) by tangible boundaries like roads, water tanks, and fields. Crossing these boundaries involves ritualised humiliation.

Bama recounts the childhood trauma that serves as the primal scene of her consciousness: witnessing her grandmother holding a vessel of vadais "by its string" to avoid polluting the upper-caste Naicker. This image encapsulates somatic violence: the Dalit body is rendered radioactive, capable of polluting through mere touch. The grandmother a figure of love for the child is reduced to an object of contagion by the caste gaze. When Bama laughs at the sight, her brother corrects her by initiating her into the tragic knowledge of her own untouchability.

In Sangati violence is inscribed directly onto the bodies of women. Bama describes women working in the fields, their bodies aching, abused by landlords and then returning home to be beaten by husbands. The female body is a site of unremitting labour and punishment. Bama writes of women "bending double" in the fields as their physical posture dictating their social submission.

Also, the institutions in Bama's world- specifically the Catholic Church, are extensions of this somatic order. Karukku is a searing critique of the Church as a casteist institution. Bama details how Dalit Christians are forced to sit separately. They were denied the right to sing in the choir and even buried in separate cemeteries. The "sanctuary" of religion is revealed to be a replication of the cheri/oor divide. Violence here is undeniable as it leaves bruises, scars, and bent backs.

- **Yashica Dutt and the Symbolic Violence of the Neoliberal Space**

In contrast, Yashica Dutt's narrative is situated in the "casteless" spaces of the metropolis (Delhi), the university (St. Stephen's, Columbia), and the corporate office. Hereviolence undergoes a neoliberal transmogrification. Drawing on Pierre Bourdieuwe can categorise this as Symbolic Violence as a violence which is exercised upon a social agent with his or her complicity.

Dutt describes the "meritocratic" atmosphere of elite education. In these spaces physical untouchability is replaced by social exclusion. The violence is the casual conversation about "reservation students bringing down standards." It is the assumption that a Dalit surname implies incompetence. Dutt notes, "I had learnt to be invisible." This invisibility is a survival mechanism against symbolic violence.

The violence Dutt describes is the violence of erasure. It is the silence at the dinner table when colleagues mock "quota" studentsand the Dalit individual must remain silent to protect their job. It is the obsessive curation of the self by changing how one dresses, speaks, and eatsto fit the Savarna aesthetic. Dutt writes movingly about the "stifling silence" of her childhood, where her grandfather's picture (a visible marker of Dalit identity) was hidden when guests arrived.The tragedy of Rohith Vemula which serves as a catalyst for Dutt's memoirillustrates the lethality of this symbolic violence. Vemula was not physically lynched but he was institutionally erased. His suicide note describing his birth as his "fatal accident," highlights the psychological toll of inhabiting a space that denies one's humanity. In Dutt's narrative the violence shifts from the "pollution of touch" to the "pollution of identity", where revealing one's caste is seen as an act of social contamination but a breach of the "polite" secular contract of modern India.

The Politics of Subjectivity

A striking divergence between the texts is the construction of the narratorial self by reflecting different strategies of resistance suited to their respective environments.

- **Bama's Polyvocal "We"**

In Sangati, Bama radically abandons the bourgeois literary convention of the singular, heroic protagonist. The title itself Sangati, translates to "Events" or "News," implying a communal sharing of information. The narrative voice is slippery as it moves from a first-person narrator to the voices of grandmothers, mothers, and neighbours like Vellaiyamma, Pacchiyamma, and Raakkamma.

This is a profound political choice. In the agrarian context, the individual cannot be extricated from the fate of the community. Survival is collective. When a woman is abused, the women of the cheri gather to curse the abuser or mock the landlord. Bama depicts scenes of possession, where women channel goddesses to speak truth to power, a collective catharsis that allows them to voice grievances they cannot speak in their daily lives.

Bama's "We" asserts that Dalit feminist consciousness is inherently communal. Resistance is not about individual transcendence but about collective assertion. Even when Bama leaves the convent in Karukkushe does not leave to become an individual but she returns to the community to work for their upliftment. Her subjectivity is porous which is defined by her relationships with the women around her.

- **Dutt's Neoliberal "I" and the Politics of "Coming Out"**

Conversely, Dutt utilizes the memoir formcentered on the individual "I." Her framework of "Coming Out"borrowed explicitly from LGBTQ+ discourse which is an intensely individual act of reclaiming selfhood. The narrative arc follows a classic Bildungsroman trajectory- a journey from shame to self-acceptanceculminating in a public declaration of identity.

This raises a critical theoretical tension. Does the focus on the individual narrative risk aligning with neoliberal individualism, where "liberation" is framed as a personal success story rather than a structural overhaul? Dutt is after all a successful journalist in New York.Her trajectory is one of upward mobility. Is her "coming out" merely a branding exercise in the marketplace of identities?

This paper argues that Dutt's "I" is a necessary political intervention in the urban space. In the neoliberal city the Dalit is reduced to a statistic (a "quota

candidate") or a stereotype (the rural victim). By asserting a complex, cosmopolitan, English-speaking Dalit selfhood, Dutt disrupts the Savarna imagination. Her "Coming Out" is not just for herself; it creates a template for other "passing" Dalits to reclaim their history.

Her "I" challenges the Savarna monopoly on individuality. Historicallyupper-caste individuals are allowed to be complex individuals while Dalits are treated as a homogenous mass. By claiming the "I," Dutt asserts her right to a complex interiority: to love, to fail, to like fashion, to study abroad, while remaining Dalit. It is an assertion that one can be modern and Dalit, challenging the binary that equates Dalitness only with pre-modern rurality.

Language, Translation, and the Pedagogy of Resistance

The epistemological intervention of these texts is deeply linguistic. The choice of language determines the implied reader and the political objective of the text.

- **Bama: Subversive Vernacular and Internal Healing**

Bama writes Karukku and Sangati in a distinct colloquial Tamil dialect specific to the Dalit Paraiyar community. This is a subversive act of linguistic rebellion. In 1990, the Tamil literary establishment prized "Sen-Tamil" (pure/standard Tamil), which was heavily Sanskritised and associated with uppercaste aesthetics. By writing in the vernacular, Bama disrupts the linguistic purity that mirrors caste purity.Bama's language is rough, jagged, and filled with the oral cadences of the cheri. It includes curses, songs, and proverbs that have never appeared in print before. As she notes, this language is her weapon (the Karukku or saw-edged palmyra leaf). Her implied reader is primarily her own community. The text functions as an act of internal healing and mobilization. It says"Our language, our lives, and our pain are worthy of literature."

For the global scholar reading Bama in English, the experience is mediated through translation. Lakshmi Holmström's translation is masterful in preserving jagged edges of the originalbut the "epistemic privilege" is slightly diluted. Reading Bama in English involves a degree of voyeurism, the global reader is looking in on a conversation meant for the community. The translation renders the text accessible but it also smooths over the radical disruption the text caused in the Tamil literary sphere.

- **Dutt: Pedagogical English and the Global Gaze**

Yashica Dutt writes in English the language of power, globalization, and the Indian elite. Unlike Bamaher implied reader is explicitly the Savarna "outsider" or the international observer. Her tone is pedagogical and explanatory. She uses footnotes

and historical digressions to explain concepts like "reservation," "Ambedkar," "Savarna," and the history of the Dalit Panthers.

Dutt inhabits English to disrupt the "casteless" narrative of the elite. She speaks the language of the oppressor to dismantle the oppressor's arguments. This shifts the standpoint from an internal dialogue (Bama) to an external project of shaming the Savarna conscience. She writes to the upper-caste liberal who claims "I don't see caste" by forcing them to confront their complicity.

Dutt's use of English is also a claim to power. In India, English is a form of cultural capital that Dalits have historically been denied (what Ambedkar called the "milk of the tigress"). By mastering this language and using it to critique the very class that claims ownership of it. Dutt performs a radical act of appropriation. However, this also highlights a gap: her book is less accessible to the non-English speaking rural Dalit population that Bama addresses. Dutt's resistance is designed for the boardrooms, universities and literary festivals of the world.

Discussion

- **From Abjection to Anxiety: The Shift in Affect**

The transition from Bama to Dutt marks a shift in the affective economy of caste. In Bama's texts, the prevailing emotion is abjection. The Dalit body is treated as waste. The resistance to this is visceral anger. Bama's characters shout, curse, and fight back physically. The emotional register is loud and defiant.

In Dutt's text, the prevailing emotion is anxiety. It is the anxiety of the "imposter." Dutt describes the exhaustion of constantly monitoring her own behaviour: checking for accent slips, hiding her knowledge of Dalit culture, fearing that a question about her surname will unmask her. This "affective labour" is the hidden tax paid by upwardly mobile Dalits.

Dutt writes about the "shame" that governed her life - shame of her background, shame of her poverty, shame of her identity. Her narrative arc is the transformation of shame into pride. This is a different kind of resistance than Bama's anger. It is a psychological decolonization. It asserts that the shame belongs to the oppressor, not the oppressed.

- **The Transnational Turn and its Frictions**

Dutt's narrative exemplifies the "transnational turn" in Dalit studies. She explicitly draws parallels with the *Black Lives Matter* (BLM) movement in the United States. She recounts how the discourse on race in New York gave her the vocabulary to understand caste in India. She adopts the framework of "Coming Out" from the

LGBTQ+ movement.This strategy makes caste legible to a global audience that understands Race but is often baffled by the complexities of Caste. It allows for global solidarity networks. But this introduces theoretical friction. Equating Caste with Race risks flattening the specific ritual, religiousand karmic dimensions of caste that Bama highlights. Caste is not just about colour or phenotype yet it is about spiritual pollution which is a concept specific to South Asian hierarchy.

Yet Dutt's strategic essentialism is pragmatically necessary in the neoliberal era. By framing caste discrimination as analogous to racism, Dutt forces global corporations and universities to recognize it as a protected category. While Bama fights the religious hypocrisy of the Church, Dutt fights the secular hypocrisy of the Global North which celebrates diversity while ignoring caste. Dutt's work demonstrates that the Dalit movement has moved from the local village square to the digital global village by utilizing hashtags like #DalitLivesMatter to bypass the gatekeepers of Indian media.

Conclusion

The comparative study of Bama's Karukku and Sangati alongside Yashica Dutt's Coming Out as Dalit reveals that the architecture of caste is not static yet it is a shapeshifter. It morphs from the feudal brutality of the village landlord to the polite exclusion of the corporate hiring manager. It adapts to modernity by finding new ways to enforce hierarchy in the "casteless" city.

To view these texts merely as a timelinefrom the "past" to the "future", is a mistake. The rural violence Bama depicts remains the reality for the majority of Dalits in India today, occurring simultaneously with the urban anxieties Dutt describes. They are synchronic modalities of oppression. The Dalit woman today might face the threat of rape in the fields of Tamil Nadu or the threat of career suicide in a corporate office in Gurugram. Both are manifestations of the same Brahminical patriarchy.However, the trajectory of resistance offers a profound insight into the resilience of Dalit feminist agency.

- **Subjectivity:** Resistance has expanded from the collective survival of the cheri to the assertion of the complex, individual Dalit "I."
- **Space:** The site of struggle has moved from the physical boundaries of the village to the digital networks of the globe.
- **Epistemology:** The critique has evolved from exposing the hypocrisy of religion to exposing the myth of meritocracy.

Ultimately, both Bama and Dutt demonstrate that the Subaltern is not silent. Whether through the sharpvernacular tongue of Bama or the articulate, globalized

English of Dutt, Dalit women are generating a counterepistemology. They are rewriting the history of India from the bottom up by asserting that true democracy cannot exist until the annihilation of caste- in the village, in the city, and in the mindis complete. Future scholarship must continue to explore the digital ecosystem as a new site of caste apartheid and resistanceand further interrogate the intersections of eco-casteism and algorithmic bias that lie on the horizon.

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Abstracts

MACHINE LEARNING-BASED PERFORMANCE AND EMISSION OPTIMISATION OF BIODIESEL-BLENDED DIESEL ENGINES: A SUSTAINABLE AND INTELLIGENT FUEL MANAGEMENT APPROACH

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Biodiesel, derived from renewable biological sources such as Jatropha, algae and waste cooking oil offers a carbon-neutral and biodegradable alternative to fossil diesel with minimal engine modification requirements. This study employs a Machine Learning framework — integrating Random Forest (RF) and Support Vector Regression (SVR) — to predict and optimise the performance and emission characteristics of a diesel engine operating on biodiesel blends (B20, B40, B60) under varying load and injection pressure conditions. Training data were sourced from peer-reviewed experimental literature and validated using k-fold cross-validation, yielding prediction accuracy exceeding 96%. Optimised biodiesel blend ratios and injection settings demonstrated a 14–19% reduction in smoke opacity, 21% decrease in CO emissions, and maintained brake power within 3% of pure diesel baseline. The study highlights the capacity of intelligent data-driven models to guide sustainable biofuel adoption strategies in existing diesel infrastructure, minimising transition costs while advancing ethical environmental management goals.

AI & ML FOR SUSTAINABILITY: CHALLENGES IMPACT AND POSSIBLE SOLUTIONS

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The merger of AI, ML, and sustainability offers an excellent solution for addressing pressing issues related to the environment and natural resources. This paper combines computational algorithms and fundamental mathematical principles to develop sustainable solutions to problems. From a computational perspective, classification, clustering, and reinforcement learning ML algorithms are applied for data mining, decision making, and automation in various industries, including energy, agriculture, and city planning. On a mathematical front, the study identifies optimization, probability theory, and statistics as the most important concepts that can help increase the accuracy, effectiveness, and reliability of AI/ML algorithms. Mathematical analysis helps us comprehend how AI/ML algorithms work, minimize errors, and generalize their results in different scenarios. It is also worth mentioning the practical implementation of AI and ML solutions, including resource management,

environmental surveillance, and predictive climate modeling. This analysis also addresses several challenges such as computational demands, data quality issues, and ethical concerns. In conclusion, this article highlights the importance of combining AI/ML techniques with mathematics to develop solutions that can meet societal needs in the future.

PSYCHOLOGICAL CAPITAL AND EMOTIONAL INTELLIGENCE AS ENABLERS OF SDG 3 AND SDG 8: A CONCEPTUAL FRAMEWORK FOR SUSTAINABLE HEALTHCARE WORKFORCE

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Healthcare institutions worldwide face growing challenges such as workforce shortages, burnout, emotional exhaustion, and declining employee well-being, threatening long-term system sustainability. This paper examines the role of Psychological Capital (PsyCap) and Emotional Intelligence (EI) as enablers of SDG 3 (Good Health and Well-being) and SDG 8 (Decent Work and Economic Growth) through a sustainable healthcare workforce. Based on secondary data and existing literature, the study proposes a conceptual framework integrating positive organizational behavior with the Sustainable Development Goals agenda. The framework suggests that PsyCap, through hope, self-efficacy, resilience, and optimism, improves employee well-being, reduces burnout, and enhances adaptability. EI, through self-awareness, emotional regulation, empathy, and social skills, strengthens communication, teamwork, engagement, and workplace relationships. Together, these capabilities support workforce retention, organizational resilience, and long-term sustainability. The paper offers theoretical and managerial implications and recommends future empirical testing across diverse healthcare settings.

THE IMPACT OF TECHNOLOGY ON MODERN MARKETING PRACTICES

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The rapid advancement of technology has significantly transformed the field of marketing, shifting it from traditional, one-directional communication to a dynamic, interactive, and data-driven process. This study aims to examine the impact of technology on modern marketing practices, analyze its influence on consumer behaviour, and explore emerging technological trends that are likely to shape the future of marketing. The research adopts a quantitative approach, utilizing primary data collected through a structured questionnaire administered to respondents with varying levels of digital exposure and experience. The study focuses on key technological elements such as digital platforms, social media, artificial intelligence, data analytics, and marketing automation, and evaluates their role in enhancing marketing effectiveness. Statistical tools including percentage analysis, mean, standard deviation, correlation, and regression analysis were employed to interpret the data and test the proposed hypotheses. The findings reveal that technology has a strong and positive impact on marketing effectiveness, particularly in terms of personalization, customer engagement, communication efficiency, and decision-making. The study also establishes that technology significantly influences consumer behaviour, with social media, personalized advertisements, and online reviews playing a crucial role in shaping purchase decisions. However, concerns related to data privacy and excessive personalization highlight the need for ethical and transparent marketing practices.

TO STUDY THE PLASTIC HABITS AND PERCEPTIONS: A HOUSEHOLD SURVEY ON CONSUMPTION, REUSE, AND ENVIRONMENTAL AWARENESS IN DAKSHINA KANNADA

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In today's world, almost every household uses plastic in one or other form like bags, bottles, containers and packaging. Even though people are aware of its harmful effect, the usage of plastic is increasing day by day. Many of them understand that

reducing plastic usage is important but its convenience and cost make it difficult to change their routine of using plastic bags. This study mainly focuses on how households in Dakshina Kannada use and think about the harmful effect of plastic. This study primarily focuses on how much plastic people use at home, how often they reuse it and whether they are trying to reduce plastic waste. The survey also checks how aware people are about the environmental impact of plastic. The research compares plastic habits among different groups based on age, gender, education, and income to see how these factor effecting the plastic habits. It also focuses whether people willing to use eco friendly alternatives. The finding of this study will provide the insights into the behaviour and attitude of the residents in Dakshina Kannada toward plastic consumption and highlight the scope for adopting more environmentally sustainable practices.

DIGITAL TRANSFORMATION AND INCLUSIVE PEDAGOGY IN HIGHER EDUCATION: A SYSTEMATIC SYNTHESIS OF FACULTY COMPETENCIES AND EDTECH INTEGRATION STRATEGIES

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The rapid shift toward digital learning in higher education has brought a significant change in how inclusion is understood and practised. Traditionally, inclusion was largely associated with physical access, such as infrastructure and basic support systems. However, with the increasing reliance on online and blended modes of teaching, the focus is gradually moving toward the inclusiveness of digital learning environments. In the Indian context, policy frameworks such as the National Education Policy (2020) and initiatives linked to Samagra Shiksha Abhiyan emphasise the need for educators who are capable of integrating technological tools with an understanding of learner diversity. The present paper examines this transition by focusing on the role of faculty in shaping inclusive digital learning spaces. It adopts a systematic review approach, drawing on recent academic literature, policy documents,

and established frameworks such as Technological Pedagogical Content Knowledge (TPACK) and Universal Design for Learning (UDL). The objective is to identify how inclusive pedagogy and digital teaching practices intersect and what competencies are required for effective implementation. The findings indicate that inclusion in digital environments is not limited to providing access to platforms or tools. Rather, it depends on how educators interpret inclusion, their willingness to adapt teaching practices, and their ability to respond to diverse learner needs. Three key areas emerge as central to inclusive digital teaching: awareness of inclusive principles, openness toward diversity, and flexibility in instructional strategies. At the same time, the review highlights a gap between technological proficiency and inclusive application, as many educators are familiar with digital tools but may lack the competency to use them in ways that support students with varied learning needs. The study therefore suggests a shift from general technology training to a more focused, competency-based approach that integrates inclusion with digital pedagogy. Such an approach can enable digital platforms to move beyond content delivery and become meaningful tools for participation, engagement, and equitable learning in higher education.

UNCERTAINTIES IN INDIAN SUMMER MONSOON PROJECTIONS ACROSS CMIP6 CLIMATE MODELS

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The ISM, or Indian Summer Monsoon, is an elaborate system in which both oceans and the atmosphere interact to create weather and climate effects worldwide. The ISM affects a population exceeding 1 billion, including hydrology, agriculture, and socioeconomic stability. Although the last phase of the Coupled Model Intercomparison Project (CMIP6) includes some of the best tools for climate modelling to date, there are still many uncertainties regarding the future behaviour of the monsoon. Using 40 different CMIP6 climate models, this study investigates how uncertain the ISM (Indian Summer Monsoon) forecasts are. This study concentrates on examining the average amount of July–September surface air temperatures and precipitation and determining the amount of uncertainty in the climate information

produced for the years 2060–2100 (SSP5-8.5) by comparing these climatological averages to the historical period of 1960–1999 using the same 40 CMIP6 climate models for both periods. The average number of models that produce the same value is used to determine the strength of climate signals and the amount of uncertainty around climate signals.. The strong and consistent warming signal across the Indian subcontinent suggests that models agree on temperature projections, while there is large spatial variability and considerable modelling differences for precipitation; in particular, the Western Ghats and Northeast India exhibit significant modelling differences in terms of precipitation projections. While using ensemble mean projections provides limited value in understanding future monsoon projections, they provide valuable insight into how to approach these projections. An example of a physical interpretation framework that can be evaluated in order to reduce uncertainty associated with future monsoon projections is the storyline approach.

OPTIMIZATION OF CONCRETE USAGE USING LEAN CONSTRUCTION PRINCIPLES

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As we know that, concrete is one of the most widely used materialsin the construction site,yet its useis often associated with significant material wastage, unnecessary spending & environmental issues.Thisproject studyhow lean construction principles can beapplied to optimize concrete usage, with the objective of enhancing resource efficiency and reducing unnecessary waste during construction process. Mainly lean construction focuses on removing useless activities and enhancing workflow reliability across all project stages. In standard construction practices, concrete waste commonly occurs from incorrect quantity estimation, lack of coordination, overproduction, rework, & improper handling and transportation. Dealing with these issues requires a systematic approach that connects planning, execution, and monitoring within a lean framework. This study follows a structured methodology that includes a review of existing literature, analysis of construction workflows & evaluation of key factors contributing to concretewaste. Lean equipments such as timely delivery, value Stream Mapping, & improved scheduling techniques are checked for their performance in optimizing material usage. Also, the role of

coordination among project member and the implementation of digital tools in supporting lean practices are considered.

RETROFITTING AN INTERNAL COMBUSTION BIKE INTO ELECTRIC VEHICLE

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The increasing environmental concerns have accelerated the shift toward sustainable transportation. Historically, IC engine vehicles have dominated due to easy fuel availability and well-established infrastructure. However, rising fuel costs, increasing pollution, and climate change have created a strong need for cleaner alternatives. The main purpose of this work is to develop an affordable and eco-friendly mobility solution by converting existing vehicles. The process involves replacing the IC engine with an electric motor, battery, and controller while ensuring proper integration, safety, and performance. This retrofit approach not only reduces harmful emissions but also extends the lifespan of conventional bikes, making it a practical and sustainable solution. From a social perspective, this system benefits common people by lowering fuel expenses and maintenance costs. It also contributes to reducing urban air pollution and improving public health. Overall, the project supports sustainable development goals such as clean energy, sustainable cities, and climate action, promoting a greener future.

COST OPTIMIZATIONIN CIVIL ENGINEERING CONSTRUCTION: AN INTERDISCIPLINARY STUDY OF TECHNICAL AND MANAGERIAL PERSPECTIVES

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This research presents an interdisciplinary study of civil engineering construction and business management, with a focus on applying project

management principles to improve efficiency and reduce cost. The study examines construction activity as an organized process that can be optimized through technical, managerial, and economic measures across nine stages: project definition, preliminary planning, human resource hiring, project design and development, procurement of materials, project construction or implementation, project completion, project commissioning, and winding up or divestment.The work identifies a gap in the existing literature, where most books and papers address only one dimension of the problem, either technical, managerial, or commercial. Civil engineering design texts often omit cost considerations, optimization studies typically focus on mathematical models without field realities, operational research emphasizes production alone, and cost engineering literature usually treats only the commercial side. This study attempts to bridge that gap by integrating technical and cost aspects of construction optimization. The study is based on secondary data gathered from books, journals, and the scholar'stwo decades of professional experience in construction practice and consultancy. Its objectives are to identify the construction factors that influence cost, present an overall picture of the construction industry in India, prepare a useful handbook for engineers, managers, and laypersons to reduce construction cost, identify common failures in construction business, and develop guidelines for maximizing profit in construction enterprises. The discussion covers the nature of the construction industry as a capital formationsector, the impact of government agencies on project execution, the importance of systematicmanagement, and the causes of construction companyfailures. It also explains the need for social cost-benefit analysis in project evaluation and includes project management software suggestions. Further chapters address the concept of cost, cost overrun control, estimation accuracy, research methodology, literature review, design and development decisions, procurement and materials management, human resource management, and maintenance and upkeep.

LABOUR LAWS AND PLATFORM WORK: WORKER PROTECTION IN ON-DEMAND FOOD DELIVERY AND TRANSPORTATION PLATFORMS

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Digital platform expansion in India has rapidly transformed the labour landscape, especially in the food delivery and transportation sectors, such as Uber, Ola, Swiggy, and Zomato. The Code on Social Security, 2020, formally classified the

status of a 'platform worker 'as an independent contractor, while simultaneously enabling digital platforms to control the conditions of workers 'employment through algorithmic control, deploying tools of task allocation and performance monitoring. The legal classification excludes platform workers from the basic labour legislations, such as the Minimum Wages Act, 1948; Payment of Wages Act, 1936; Payment of Bonus Act, 1965; Workmen's Compensation Act, 1923; and Industrial Disputes Act, 1947.The main aim of the research is to examine the existing provisions and gaps between the legal classification of platform workers and their real working conditions. This study draws upon a doctrinal study of prevailing labour laws alongside primary data procured from in-depth interviews with 50 platform workers in Delhi. The findings indicate that most platform workers in the survey relied on platform work for income, worked long hours, and lacked employment security and meaningful channels to address disputes or grievances. This finding highlights the need for new legislation that moves beyond the outdated employer-employee classification model and can provide digital platform workers with the fundamental rights of a minimum wage, algorithmic transparency, and social security and welfare legislation. It seeks to contribute towards realising the aim of 'inclusive growth 'by 2047 by aspiring to ensure that platform workers across India enjoy dignified work with fair working conditions and job security.

PRE-MONSOON WBGT TRENDS AND EXTREME HEAT PATTERNS OVER INDIA: IMPLICATIONS FOR OUTDOOR EXPOSURE

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Over the past few decades, increasing temperatures have contributed to rising heat stress across many parts of India, especially during the pre-monsoon months. In this study, the spatial and temporal behavior of Wet Bulb Globe Temperature (WBGT) is analyzed for March-May (MAM) over the period 1979-2014 using daily simulations from the CMIP6 ACCESSCM2 model. Extreme heat stress is described as exceeding a grid-specific threshold that represents 95% of the Wet Bulb Globe Temperature (WBGT) values in this study. The number of days exceeding this threshold is used as an indicator for assessing the severity of extreme heat stress. The seasonal climatological analysis indicates that WBGT is generally high over central, eastern,

and peninsular India, with an increasing trend from March to May. The spatial distribution of 95 percent WBGT also supports the fact that these regions experience high levels of heat stress. In supplementary analysis, it was found that the frequency of exceeding days has increased over recent decades, especially from 2006-2014. Moreover, grid-based trend analysis also supports the fact that mean WBGT and threshold exceedances have generally increased over India, especially over northern and central India. From the above analysis, it can be concluded that there has been an increasing trend of heat stress over India, especially during pre-monsoon seasons, which has intensified over time. These changes have implications for people who face heat stress while working outdoors, especially in terms of heat stress affecting their productivity.

FUZZY LOGIC SAFETY RISK ASSESSMENT IN CONSTRUCTION

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Globally, construction has been standing strong as the second most dangerous occupation right behind Logging. The World Risk Poll data 2024 report shows 22% of the current global workforce has personally experienced harm at work during 2023-24. The considerably high (%) of victims signify the severity of the risks faced within the occupation. The number of victims that go unnoticed are also quite significant, as a study found that for every reported accident, there were an average of 2.48 unreported accidents. For long, traditional, static and checklist-based methods have been in practice which often fail to capture uncertain situations due to their rigid and stubborn approach. Studies show 30-40% of potential risks going unchecked. This makes risk assessment methods which are much moreadvanced and dynamic with their approach, show their reliance on live data to address risks on the move, the need of the hour. In this research, critical safety factors have been identified with the help of research papers and safety manuals. Data has been collected via questionnaire surveywhich primarily focused on ‘how often’, ‘how threatening’ and ‘how long’. The responses have been collected from various engineers and students alike. These are then implemented as inputs and utilised into the development of the Fuzzy Model. The research helps in categorising different on-site activities with accordance to their varying degree of risk involved. Overall, this research proves its effectiveness for handling uncertain scenarios which more often than not arise in the

industry and calls for advanced assessment methods which are getting better day by day with their accuracy in risk evaluation.With early identification and focus on the key risks that heavily influence construction safety and further integrating this model with AI techniques, the development of tools or apps that are user-friendly and monitor key risk factors in real-time can be commenced.

EVALUATING THE IMPACT OF EMERGING TECHNOLOGIES ON ENVIRONMENTAL SUSTAINABILITY: INSIGHTS FROM CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

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The construction sector significantly influences environmental sustainability due to the large volume of construction and demolition (C&D) waste it generates. This study examines how emerging and innovative technologies can reduce the environmental footprint, with particular emphasis on the sustainable handling of demolition debris. The research focuses on the adoption of modern solutions such as digital technologies, automation, and advanced construction materials within waste management practices. A case study-based approach is used to assess the practical performance of these technologies in real-world conditions. The study evaluates their role in improving material recovery, enhancing recycling efficiency, and promoting optimal utilization of available resources. It further investigates how these technological interventions support sustainable development goals by reducing waste generation and minimizing environmental impacts. The results demonstrate that the integration of innovative technologies can substantially improve waste management outcomes by increasing recovery rates and lowering dependence on landfills. However, factors such as economic constraints, technological complexity, and limited regulatory support may affect their large-scale implementation. Overall, the study highlights the potential of technology-driven approaches to transform conventional construction practices into more sustainable systems. The findings provide meaningful insights for policymakers, construction professionals, and researchers working towards environmentally responsible and resource-efficient waste management strategies.

ASSESSING THE INFLUENCE OF FOMO ON COMPULSIVE CONSUMER BEHAVIOUR: A STUDY OF SELF-REGULATION AS A PSYCHOLOGICAL MODERATOR

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The expansion of internet access and digital platforms has brought substantial changes to consumer purchasing patterns. Among the psychological factors shaping these behaviors, compulsive buying and the Fear of Missing Out (FOMO) have gained increasing attention. This research investigates the influence of these factors on contemporary consumer decision-making and assesses the degree to which individuals are affected by them. Data were gathered from 109 participants through structured questionnaires and analyzed using both qualitative and quantitative approaches. The results indicate a growing reliance on the internet in everyday life, significantly impacting how consumers make purchasing decisions. The study also examines the level of awareness regarding mindfulness and conscious shopping habits, as well as individuals' readiness to minimize the adverse effects linked to impulsive, compulsive, and FOMO-driven consumption. FOMO is defined as the anxiety experienced when individuals perceive that others are enjoying rewarding experiences in their absence. This feeling is often fueled by social comparison, regret, or guilt, prompting individuals to engage in similar activities to avoid exclusion. With the rise of social media and digital connectivity, such experiences have become increasingly widespread. Marketers have actively leveraged FOMO in their promotional strategies by employing techniques that evoke urgency, anticipation, and social influence. These approaches include limited-time offers, exclusive deals, and restricted availability, all designed to accelerate consumer decision-making. Digital platforms frequently incorporate features such as flash sales, countdown timers, and real-time availability updates to intensify this effect. Similarly, fashion and e-commerce brands utilize large-scale promotional campaigns with time-bound discounts and stock limitations to encourage immediate purchases. Overall, these strategies significantly contribute to impulsive buying behaviors by creating a heightened sense of urgency and perceived scarcity.

CORPORATE SOCIAL RESPONSIBILITY PRACTICES IN THE HOSPITAL INDUSTRY IN INDIA: AN EMPIRICAL STUDY BASED ON BENEFICIARY PERSPECTIVES

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Corporate Social Responsibility (CSR) has become an important approach for improving healthcare access and supporting inclusive development in the hospital industry in India. Hospitals are increasingly engaging in CSR initiatives such as free medical camps, subsidized diagnostic services, maternal healthcare programs, preventive health awareness campaigns, and rural outreach services, with a strong focus on serving vulnerable and underserved populations.This study examines the effectiveness of these CSR initiatives from the perspective of beneficiaries. The research is based on primary data collected from 200 respondents across different regions of India who have directly benefited from hospital CSR services. A structured questionnaire was used to assess their awareness of CSR programs, accessibility of services, level of satisfaction, and perceived improvements in health outcomes. The data were analysed using percentage analysis and Chi-square tests to explore relationships among key variables.The findings indicate that beneficiaries generally demonstrate a good level of awareness regarding CSR healthcare services and express a positive level of satisfaction with the support received. Many respondents reported that CSR initiatives are accessible, particularly through medical camps and subsidized treatment programs. The study also highlights the strong outreach of CSR programs in rural areas, where a considerable number of beneficiaries have accessed these services. Preventive healthcare initiatives have encouraged early diagnosis and timely treatment-seeking behaviour, while maternal healthcare and diagnostic support programs have contributed to noticeable improvements in health outcomes. However, certain challenges remain, especially in remote rural regions, where limitations in infrastructure and gaps in awareness continue to affect service accessibility.Overall, the research concludes that beneficiary-oriented CSR practices significantly enhance healthcare accessibility, foster community trust, and reinforce the social responsibility of hospitals in India.

CORPORATE SOCIAL RESPONSIBILITY AND RURAL TRANSFORMATION: EVIDENCE FROM FMCG FIRMS IN TIRUCHIRAPPALLI DISTRICT, TAMIL NADU

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This study investigates the role of Corporate Social Responsibility (CSR) initiatives undertaken by Fast-Moving Consumer Goods (FMCG) firms in fostering rural development in Tiruchirappalli District, Tamil Nadu. Drawing on stakeholder theory and shared value perspective, the study examines how CSR activities influence rural development outcomes and consumer perception.Primary data were collected from 384 rural respondents using a structured questionnaire. The study employs correlation and regression analysis to test the proposed hypotheses. The findings indicate that CSR initiatives significantly enhance rural development indicators such as income generation, health awareness and educational access. Furthermore, CSR activities positively influence consumer perception and trust towards FMCG brands.The study contributes to the CSR literature by providing micro-level empirical evidence from rural Tamil Nadu and offers managerial implications for designing effective CSR strategies aligned with sustainable development goals.

AN EMPIRICAL ASSESSMENT OF THE IMPACT OF TRANSFORMATIONAL LEADERSHIP ON ORGANIZATIONAL PERFORMANCE IN INDIA

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The present study investigates the impact of transformational leadership on organizational performance within Indian organizations. Primary data were collected through a structured questionnaire administered to 195 subordinates, of which 145 responses were received; after excluding incomplete questionnaires, 133 valid responses were retained for analysis. The findings reveal a statistically significant and

positive relationship between transformational leadership and organizational performance ($r = 0.781$, $p < 0.01$), with regression results indicating that transformational leadership explains a substantial proportion of variance in organizational performance ($R^2 = 0.610$). Furthermore, all dimensions of transformational leadership—idealized influence (attributed and behavioral), inspirational motivation, intellectual stimulation, and individualized consideration—demonstrate significant positive correlations with organizational performance. These results suggest that transformational leadership is a critical determinant of organizational effectiveness. The study highlights the importance of fostering leadership practices that inspire and motivate employees, enhance their capabilities, and encourage creativity and commitment. It is recommended that managers develop a clear and compelling vision, strengthen employees' self-efficacy, and implement training and coaching interventions to improve employee well-being and overall organizational performance.

A STUDY ON IMPACT OF GOOGLE ADS ON CUSTOMER SATISFACTION IN ONLINE BUSINESS WITH SPECIAL REFERENCE TO TRICHIRAPPALLI DISTRICT

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In the rapidly evolving digital landscape, online businesses increasingly rely on digital advertising to attract and retain customers. Among various platforms, Google Ads has emerged as a powerful tool for enhancing brand visibility, driving website traffic, and influencing customer behavior. The primary objective of the study is to analyze how Google Ads influence customer satisfaction, awareness, and purchase decisions. The study is based on primary data using a structured questionnaire. Convenience sampling technique was adopted for data collection. The collected data were analyzed using statistical tools such as percentage analysis, Chi-square test, and ranking method. The findings reveal that a majority of respondents are frequently exposed to Google Ads, with many encountering them multiple times a day. Factors such as attractive headlines, discounts, and brand reputation significantly influence users to click on advertisements. The Chi-square analysis indicates a significant

relationship between exposure to Google Ads and customer satisfaction, suggesting that effective advertising strategies positively impact consumer perception and engagement. It highlights the importance of targeted advertising, creative content, and continuous optimization to maximize effectiveness. The research provides valuable insights for marketers and business owners to enhance their digital advertising strategies and improve overall customer experience.

ROLE OF TEACHERS IN AN AI-SUPPORTED LEARNING ECOSYSTEM

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The rapid integration of Artificial Intelligence (AI) into education is reshaping the traditional roles of teachers, transforming them from primary knowledge transmitters into facilitators, mentors, and designers of meaningful learning experiences. This paper examines the evolving role of teachers within an AI-supported learning ecosystem, where technology complements human instruction to enhance educational outcomes. AI-powered tools such as adaptive learning platforms, automated assessment systems, and data analytics enable personalized learning pathways, allowing teachers to better understand individual student needs and learning patterns. In this context, teachers play a crucial role in interpreting AI-generated insights, ensuring ethical use of technology, and fostering critical thinking, creativity, and emotional intelligence—skills that cannot be replaced by machines. The study highlights how educators act as mediators between technology and learners, guiding students in the responsible and effective use of AI tools while maintaining a human-centered approach to education. Furthermore, it addresses the challenges teachers face, including the need for digital literacy, continuous professional development, and adaptation to changing pedagogical practices. The paper concludes that while AI enhances efficiency and personalization in education, the role of teachers remains indispensable in creating inclusive, empathetic, and value-driven learning environments. It emphasizes the importance of empowering educators through training and institutional support to effectively integrate AI into teaching practices, ensuring a balanced and holistic educational ecosystem.

DIGITAL AGILITY: ASSESSING THE NECESSITY OF DATA LITERACY AND CYBERSECURITY TRAINING ACROSS NON-TECH SECTORS

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The tech industry's rapid evolution has stressed the critical need for digital literacy and cybersecurity awareness, particularly among the workforce of non-tech sectors like healthcare, manufacturing and government. Digital agility can be defined as the ability of an organisation to adapt itself to the changing technological environment. Employees of the non-tech sector often face lack of data literacy, which hinder their ability to navigate the increasingly digital workplace securely and effectively. This study assesses the critical requirement of digital literacy and cybersecurity awareness to empower individuals, enabling them to thrive in their workspace. The study focuses on three core areas: digital literacy, cybersecurity education, and mentorship and community support. The study focuses on digital literacy which equips employees with essential data literacy skills, AI skills, Machine learning, internet navigation, and understanding digital tools. Simultaneously the paper evaluates the role of cybersecurity education in mitigating risk related to AI driven and data driven threats among highly vulnerable non tech workforce. The study determines how mentorship and community support with a collaborative learning environment can encourage workforces to build confidence and address unique challenges. The study also highlights the broader impact of empowering the workforce of the non-tech sectors including enhanced diversity, innovation, and equity. This research contributes to the fields of digital inclusion and cybersecurity by providing a deep analysis of replicable and scalable approaches to address systemic inequities. By equipping employees with the tools and knowledge to excel in the digital age, this study aligns with the broader goals of fostering workforce diversity and creating a more secure and inclusive tech ecosystem. This paper analyses how leveraging partnerships with tech companies, educational institutions, and community organizations and integrating accessible training programs, free resources, and hands-on workshops can bridge the digital divide.

ASSESSING THE FINANCIAL SUSTAINABILITY OF NON BANKING FINANCIAL COMPANIES WITH SPECIAL REFERENCE TO TRICHY TOWN

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The banking and financial services sector in India has grown rapidly, with Non-Banking Financial Companies (NBFCs) emerging as key providers of credit to underserved segments such as MSMEs, rural households, and small entrepreneurs. This study analyzes the financial performance and sustainability of NBFCs in Tiruchirappalli, Tamil Nadu, using indicators such as profitability, liquidity, asset quality, and capital adequacy. Based on secondary data and analytical tools, the study finds that profitability, asset quality, and capital adequacy significantly influence sustainability, while liquidity has a moderate impact. The results emphasize that effective risk management, regulatory compliance, and technological adoption are essential for ensuring the long-term sustainability of NBFCs.

DIGITAL PAYMENTS AND FINANCIAL INCLUSION: A SUSTAINABLE PATH FOR INDIA'S ECONOMY

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Digital payment systems have transformed financial transactions in India by improving accessibility, efficiency, and transparency. The rapid growth of Unified Payments Interface (UPI), mobile wallets, and Aadhaar-enabled services has significantly expanded the reach of formal financial systems. This paper examines the role of digital payments in advancing financial inclusion and promoting sustainable economic development in India. Using secondary data from policy reports, government publications, and academic literature, the study analyzes the benefits, challenges, and future potential of digital financial systems. The findings indicate that digital payments enhance economic participation, reduce transaction costs, and

strengthen the delivery of financial services. However, issues such as digital illiteracy, cybersecurity risks, and infrastructural gaps continue to hinder inclusive growth. The study concludes that with appropriate policy interventions, digital payments can serve as a key driver of an inclusive and sustainable economy.

CARBON TRADING AND ENVIRONMENTAL ECONOMICS: A MARKET-BASED APPROACH TO CLIMATE CHANGE MITIGATION

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Climate change has emerged as a critical global concern due to rising greenhouse gas emissions, particularly carbon dioxide (CO_2), driven by industrial and economic activities. Traditional regulatory approaches have often failed to ensure efficient pollution control due to their rigidity and high compliance costs. In this context, carbon trading, grounded in environmental economics, offers a market-based mechanism by assigning a price to carbon emissions and promoting cost-effective reduction strategies. This article examines the theoretical foundation, mechanisms, and global practices of carbon trading systems, while also evaluating their effectiveness in controlling emissions. It further highlights key challenges such as measurement issues, market volatility, and equity concerns, and explores the relevance of carbon trading in developing economies, particularly India. The study concludes that although carbon trading provides an efficient tool for emission reduction, its success depends on strong institutional frameworks, transparent governance, and effective monitoring systems. Special emphasis is placed on the applicability and potential of carbon trading in developing economies, particularly India, where the need to balance economic growth with environmental sustainability is paramount. The study concludes that while carbon trading offers a flexible and cost-efficient approach to mitigating climate change, its success is contingent upon robust institutional frameworks, transparent governance, accurate monitoring systems, and sustained international cooperation.

A STUDY ON DIGITAL MARKETING AND ITS IMPACT ON CONSUMER BUYING BEHAVIOUR

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Digital marketing's explosive expansion has drastically changed how the customerengage with a brands and make judgments about buying. Due to the widespread use of devices of mobile and the social media platform, and internet, methods of digital marketing become essential tools for a company looks to change clientbehavior. This studies examines how different aspects of a digital markets, including marketing of social media, marketing of emailand the search engine optimization (SEO), and marketing of content affect customers decisions for buyingthis study of attempts for shed light on well digital marketing methods influences the consumer decisions by the analyzing relationship between these strategies and a consumer behavior studies these conclusions emphasize the of internet adsand growing role for target marketing, and the effect of social media evaluations on the consumer buying habits. The ramifications for a company looking to maximize the digital marketing initiatives for enhancingconsumer engagements and the increase of sales are additionallycovered in these study.

AI-DRIVEN E-WASTE MANAGEMENT SYSTEM

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The swift growing of e-waste, driven by short product life cycles and increasing consumption of electronics items, create a vital environmental threat. Traditional recycling methods struggle to keep leading to pollution and resource depletion. This research explored the potential of AI to reduce e-waste through proactive interventions. Machine learning enhances product design for disassembly computer vision optimizes recycling sorting and predictive analytics enable condition-based maintenance and remanufacturing.AI-driven recommendation systems promote repair, resale, and accountable disposal. Despite challenges like data standardization

and implementation costs, AI integration can transition the electronics industry from linear to circular economy, supporting sustainable development goals and reducing hazardous waste.

PERFORMANCE EVALUATION OF LIQUID MICROSILICA IN HIGH STRENGTH & DURABLE CONCRETE BLENDED WITH GGBS (GROUND GRANULATED BLAST FURNACE SLAG) & BIPOLAR

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Concrete is vital used in construction Industry. It is the backbone of modern civilization. Cement production for the current fiscal year (**FY 2025–26**) is estimated to be approximately **470 to 480 million metric tons** & Global cement production is estimated to be approximately **4.57 billion metric tons** per year. But manufacturing of cement in huge amount causes environmental problems like release of greenhouse gases (CO2) and depletion of natural resources. Viewing this the construction industry has shifted from viewing industrial waste as a liability to treating it as a high-value resource. Utilizing these by-products is essential for achieving **Net Zero** carbon goals and enhancing the mechanical properties of concrete. Therefore, it is necessary to use industrial by products like Fly ash, GGBS, Micro silica, Rice husk etc. without changing engineering properties of concrete. Nowadays, most concrete mixture contains supplementary cementations materials which form part of the cementations component. These materials are majority by-products from other processes. In design we have considered. Since we are focusing on Liquid Micro silica (LMS), GGBS, and Bipolar inhibitors. Developing countries like India is witnessing massive construction activities in infrastructure sectors. Transport sector in particular has seen significant construction of highways, roads, ports, railways, and airports over the last decade. The vast amount of civil infrastructure in the world includes an extensive stretch of road networks. Recent research done on High Strength concrete using various admixtures in different proportions to enhance physical and mechanical properties is presented with the objective of designing high Strength concrete which may be utilized in Construction. This investigation deals the mechanical and rheological properties of high strength concrete with the replacement of cement with industrial by-products. The addition of GGBS (Ground Granulated Blast Furnace Slag, Micro silica & Bipolar (Corrosion Inhibiting Admixture) (2Kg/ Cum) is helpful in gaining strength

properties and made the concrete environmental friendly without much effect on the cost. In Concrete Cement content is obtained by blending fixed proportion of Cement (56%), GGBS (39%), Micro silica (5%) and different proportions of Chemical Admixture/ Super plasticizer (0.53% of total Cementitious Content) at water-cement ratio of 0.31. added to increase the flow and to reduce water demand.

INDUSTRIAL EFFLUENTS AND THEIR INFLUENCE ON AGRICULTURAL SYSTEMS AND ENVIRONMENTAL SUSTAINABILITY

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Industrial growth has inadvertently accelerated effluent production, jeopardizing both agricultural systems and ecological stability. This research analyzes the pathways and impacts of industrial waste on soil quality, water resources, and crop productivity. Often laden with heavy metals and toxic organic compounds, these discharges accumulate in the environment, triggering long-term soil and water degradation. Untreated effluent infiltration actively degrades soil health by altering its physicochemical makeup and suppressing the microbial activity necessary for nutrient cycling. The resulting decline in crop yield and quality poses a direct threat to food security, driven by the bioaccumulation of toxins in the food chain. In water-stressed areas, the use of contaminated irrigation water intensifies this crisis. These pollutants also ravage surface and groundwater resources, triggering biodiversity loss and ecosystem instability. Aquatic life remains the most vulnerable, suffering from collapsed species diversity. Consequently, farming communities face severe socio-economic repercussions, ranging from economic instability to increased disease prevalence. To mitigate these challenges, this paper emphasizes stringent regulatory frameworks, advanced wastewater treatment, and sustainable industrial practices. It advocates for continuous monitoring, increased public awareness, and the adoption of eco-friendly alternatives. By integrating scientific assessment with policy measures, the study underscores the necessity of a balanced industrial approach that safeguards agricultural productivity and environmental integrity for future generations.

BRIDGING THE CURRICULUM GAP: A COMPARATIVE CASE STUDY OF PUBLIC EDUCATION EXPENDITURE AND FINANCIAL COMPETENCE ACROSS OECD NATIONS

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Financial inclusion in the contemporary global economy is increasingly predicated on the possession of robust financial knowledge, which serves as a critical mechanism for individuals to optimize economic performance across the life cycle. This study investigates the determinants of financial literacy, knowledge, and behaviour within a cross-section of twenty OECD member states using the 2023 international datasets. Utilizing an econometric framework corrected for heteroscedasticity (White's Robust Standard Errors), the research evaluates how individual educational attainment interacts with systemic institutional factors—specifically the Human Development Index (HDI), the Human Inequality Coefficient (HIC), and Household Debt (HD). The empirical results demonstrate that while tertiary education is a fundamental and statistically significant driver of financial competence ($p < 0.01$), public expenditure on education (PSE) lacks a corresponding impact on literacy outcomes ($p = 0.812$). Furthermore, the study identifies that high levels of household debt and systemic inequality serve as significant anchors, dragging down the financial health of populations. We provide a detailed diagnostic analysis, including the Jarque-Bera test for normality, to validate the model's reliability. These findings suggest a critical "curriculum gap" in OECD nations, necessitating a strategic transition toward targeted financial capability frameworks rather than generalized educational funding.

WATER POLLUTION IN INDIAN RIVERS: CAUSES AND CONTROL MEASURES

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Water pollution in Indian rivers is a pressing environmental issue with profound implications for human health, biodiversity, and socio-economic development. Rapid

industrialization, urbanization, and population growth have exacerbated the contamination of river waters through the discharge of untreated sewage, industrial effluents, agricultural runoff, and religious practices. Major rivers such as the Ganga, Yamuna, and Brahmaputra are critically polluted, threatening drinking water resources, aquatic life, and sustainable livelihoods. This paper examines the key causes of river pollution in India and evaluates existing control measures, including governmental policies, technological interventions, and community-based initiatives. The study concludes that a combination of improved wastewater treatment, stricter regulation, public awareness, and collaborative governance is essential for achieving meaningful restoration and sustainable management of river systems. The paper also highlights future directions for research and policy to enhance water quality and preserve river ecosystems.

ETHICALAND SUSTAINABLE ARTIFICIAL INTELLIGENCE: CHALLENGES, FRAMEWORKS, AND FUTURE DIRECTIONS

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Artificial Intelligence (AI) has become a central driver of technological innovation, transforming industries and reshaping human interaction with digital systems. However, alongside its rapid growth, concerns regarding ethical implications and environmental sustainability have emerged as critical challenges. This research paper explores the integration of ethical principles and sustainability considerations in AI development and deployment. It examines how issues such as bias, transparency, accountability, and privacy intersect with environmental concerns including energy consumption, carbon emissions, and resource utilization. Furthermore, the study presents a comparative analysis of ethical and sustainable AI, highlighting their interdependence. Real-world applications across sectors demonstrate both the benefits and risks associated with AI systems. The paper argues that a holistic

approach combining ethical frameworks and sustainability strategies is essential to ensure responsible AI that aligns with long-term societal and environmental goals.

HYBRID WORK MODEL AND ITS IMPACT ON EMPLOYEE PRODUCTIVITY AND JOB SATISFACTION

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The hybrid work model has become one of the new forms of work arrangements that integrate remote work and office work. The hybrid model of work has been embraced by a number of organizations because companies need to offer employees flexibility in their work and ensure that the productivity and cooperation of the organization do not suffer. Hybrid work model has gained momentum following the COVID-19 pandemic because organizations have discovered the advantages of flexible working practices. The hybrid work model enables employees to work at home and in the office, and this contributes to enhancing work-life balance, job satisfaction, and productivity of employees. The hybrid work model, however, presents some communication, coordination, and performance monitoring issues. The current research paper investigates the hybrid method of work and its effectiveness in terms of staff productivity and job satisfaction. It is a primary data-based study, which aims to gather data by using primary data comprising of employees in companies that have implemented the hybrid work model. A structured questionnaire was the method of collecting the data, which were analyzed with the help of statistical tools like percentage analysis and chi-square test. The paper examines the employee perceptions on productivity, job satisfaction, work-life balance, communication, and issues associated with the hybrid work model. The study found that the hybrid work model improves employee productivity, job satisfaction, and work-life balance. The reason why employees like the hybrid work model is that it allows them to have flexibility, saves on time travelling to work and enhances the work-life balance. Nevertheless, the research also established that the hybrid work model also poses certain challenges including communication problems, coordination problems and problems in working together within a team. The paper concludes that hybrid work model is a good form of work organization in the present-day organization, although the organization must have relevant policies, communication systems and performance management systems in order to successfully introduce hybrid work models.

ROAD SAFETY IN INDIA-A CHALLENGE

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The economic development of a country depends on the transportation facilities of the country.There are three types of transportation – air, water and road. Among these types of transports, road transportation is used mostly.This includes heavy motor vehicles, light motor vehicles and two-wheelers which include buses, trucks, cars, scooters-motorcycles etc.Along with increasing road transport means, road accidents are also increasing.There are many reasons for road accidents, among which, not following traffic rules is a major reason.News related to road accidents are published every day in newspapers of small towns, distresses the society.In Rajasthan, about 10-15 people are dying every day in road accidents, which is a serious concern to the administration.Road accidents not only cause human loss but also cause loss of valuable economic resources of the country. Thus, Government is making efforts to reduce road accidents.Traffic Police organizes Road Safety Weeks for the awareness of public.

CO-CREATION UNDER CONSTRAINTS: A SYSTEM DYNAMICS MODEL OF SYNTEGRATION®, INNOVATION, AND STARTUP SURVIVAL IN DIGITAL ECOSYSTEMS

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This study develops a system dynamics model to examine how co-creation influences innovation, survival, and scaling in digital startup ecosystems. Extending prior work on open innovation, it reconceptualizes co-creation as a nonlinear and constrained process rather than a uniformly beneficial driver. The model captures key feedback loops linking partnerships, co-creation, innovation output, and intellectual property (IP), while incorporating balancing dynamics such as coordination costs, knowledge leakage, and resource constraints. A key contribution is the integration of Syntegration® as a structural mechanism that enhances cocreation efficiency by improving communication and accelerating consensus formation. Co-creation effectiveness is modelled using an S-shaped convergence function to reflect the dynamics of shared understanding over time. The model is calibrated using data from Indian startups and unicorns and validated against observed patterns, including high early-stage failure rates and nonlinear scaling. Results show that unstructured co-

creation can generate diminishing returns and increase failure risk, while structured interaction improves innovation outcomes and survival. The study highlights the dual role of co-creation and the importance of coordination mechanisms in digital ecosystems.

A STUDY ON IMPACT OF E-COMMERCE IN CONSUMER BUYING BEHAVIOUR WITH SPECIAL REFERENCE TO TRICHY DISTRICT

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The rapid growth of digital technology has significantly transformed consumer purchasing behaviour, particularly in the field of e-commerce. This study aims to analyse the **preference and satisfaction towards e-commerce among consumers in Tiruchirappalli district**. A sample of 175 respondents was selected using a structured questionnaire to collect primary data. The study examines demographic characteristics, usage patterns, preferred platforms, influencing factors, and satisfaction levels related to online shopping. The findings reveal that a majority of respondents are young, educated, and urban-based consumers who actively engage in e-commerce activities. Platforms such as Amazon and Meesho are widely preferred due to their convenience, product variety, and attractive discounts. Digital payment methods, especially Google Pay and PhonePe, are commonly used, indicating a shift towards cashless transactions. The study also identifies key influencing factors such as discounts, convenience, and product availability, which significantly impact consumer decisions. Despite high levels of satisfaction among respondents, certain challenges such as concerns over product authenticity, wrong information, and data security persist. Overall, the study concludes that e-commerce has become an integral part of consumer lifestyle, with increasing acceptance and positive perception among users. The research suggests that improving trust, transparency, and security measures can further enhance consumer satisfaction and promote sustained growth in the e-commerce sector.

THE IMPACT OF DIGITAL LEADERSHIP COMPETENCIES ON ORGANISATIONAL CHANGE MANAGEMENT

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The modern digital world offers organizations a continuous state of change due to the technological revolution, globalization, and changing customer demands. Digital leadership and change management have become a key success factor in organizations. This paper examines the relationship between digital leadership competencies and change management practices in bringing about transformation in organizations. It looks at how leaders can use digital tools, create innovation and how they can deal with resistance to change in an effective way. The study utilizes a descriptive research design using secondary sources of data to examine leadership behaviors and change outcomes. Results show that digital leadership contributes to greater adaptability, the culture of lifelong learning, and employee engagement in the process of transition. Moreover, proper change management plans decrease the uncertainty and enhance the success rates of implementation. The paper finds that digital leadership and systematic change management systems are key to sustainable organizational development during the era of digital.

AN EMPIRICAL STUDY ON CASH–UPI PAYMENT DYNAMICS USING MACHINE LEARNING ALGORITHMS

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The rapid adoption of digital payment systems has transformed transaction behavior, particularly in economies where cash has traditionally dominated. Unified Payments Interface (UPI) has emerged as a widely used real-time payment mechanism, offering convenience, speed, and interoperability. However, despiteitsgrowth, cash continue store main relevant due to factors such as trust, transaction value, and network reliability. This paper presents a comparative machine learning–based analysis of user payment preferences between UPI and cash. Multiple classification algorithms, including Logistic Regression, Decision Tree, Random Forest, Support Vector Machine, and Extreme Gradient Boosting, are employed tomodel and analyze the influence of demographic characteristics, behavioral factors, transaction patterns, and infrastructural constraints on payment choice. By leveraging survey-based data and supervised learning techniques, the study aims to provide a

structured understanding of the key determinants affecting digital payment adoption. The findings of this research contribute to a deeper behavioral and technological perspective on payment system usage and offer insights relevant to policymakers, financial institutions, and digital payment service providers.

FACTORS INFLUENCING MENSTRUATION TABOOS AMONG THE GIRL STUDENTS OF THE RURAL AREAS OF CHIPLUN TALUKA

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Menstruation, an integral component of the female reproductive system, continues to be surrounded by secrecy and cultural silence in many rural communities. This study investigates the battle factors influencing menstrual taboos among adolescent girl students in the rural areas of Chiplun Taluka, Maharashtra, India. Using a quantitative method, the data is being collected through questionnaire composed of relevant questions. When it comes to opt between logical scientific reasoning and non-verified religious and social beliefs about menstruation, even educated modern society chooses the later one. To find out the practicality and reality of the dependent and independent variables, regression analysis is done. Finally, the findings talk about the facts that the psychological factor coefficient 0.28 and p- value 0.001 indicates a conspicuous effect on the traditional menstruation taboos and fear of religious violation prevails a lot in the rural areas of Chiplun Taluka, Maharashtra, India. The accuracy of collected data has been verified through the standard error value, 0.32. Psychological conditioning shapes our social and religious self prominently. The study concluded that strengthening of menstruation education, enhancing open communication, emphasizing on supportive school environment will definitely reduce social- religious stigma and enhancing the mental health and autonomy of rural adolescent. Health sector with “Happy Five Days” concept can put such issues in the win -win situation.

A LITERATURE REVIEW ON THE INFLUENCE OF SOCIAL MEDIA INFLUENCERS ON CONSUMER PURCHASE INTENTION AND BRAND PERCEPTION

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The proliferation of social media platforms has fundamentally transformed marketing communication strategies, establishing social media influencers as pivotal intermediaries between brands and consumers. The digital ecosystem has created unprecedented opportunities for influencers to shape consumer attitudes, preferences, and purchasing behaviours through authentic content creation and parasocial relationships with their audiences. This review systematically analyses how influencer characteristics—including credibility, authenticity, expertise, and relatability—affect consumer decision-making processes and brand evaluations. The study explores theoretical frameworks underpinning influencer marketing effectiveness, including the Source Credibility Model, Parasocial Interaction Theory, and the Elaboration Likelihood Model, demonstrating their applicability in understanding consumer responses to influencer endorsements. Contemporary research reveals that influencer marketing effectiveness depends on multiple factors: perceived authenticity of sponsored content, congruence between influencer persona and brand values, engagement quality rather than mere follower quantity, and the trust established through consistent content delivery. The review highlights how Generation Z and Millennial consumers particularly respond to micro-influencers and nano-influencers who demonstrate genuine product experiences rather than overtly commercial messaging. Furthermore, this review addresses the evolving landscape of influencer marketing across platforms including Instagram, TikTok, YouTube, and emerging social media channels, examining platform-specific consumer behaviours and engagement patterns. The synthesis reveals that purchase intention is significantly influenced by perceived influencer trustworthiness, content relevance, and the emotional connection fostered through regular interaction. Brand perception, meanwhile, is shaped by the alignment between influencer values and brand positioning, with incongruent partnerships potentially damaging brand equity. The findings indicate that strategic influencer selection, authentic content co-creation, and transparent disclosure practices are essential for maximizing marketing effectiveness while maintaining consumer trust. This comprehensive review provides valuable insights for marketing practitioners and researchers seeking to understand the complex dynamics of influencer-driven consumer behaviour in the contemporary digital marketplace.

DESIGN AND DEVELOPMENT OF A REAL-TIME CARBON CREDIT MEASURING DEVICE FOR INDUSTRIAL AND AGRICULTURAL APPLICATIONS

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Carbon credits represent the reduction, avoidance of greenhouse gas (GHG) emissionscommonly measured in metric tons of CO_2equivalentthat can be sold or traded. Environmental monitoring and regulatory compliance have become vital in the global effort to mitigate climate change. This paper presents the design and development of a cost-effective, real-time carbon credit measuring device. The system integrates gas-sensitive sensors, microcontrollers, and renewable energy components to estimate CO_2 emissions and translate them into carbon credit values.IoT devices and networks allow the collect accurate, continuous data about their fields. A solar-powered battery system controlled by a charge controller is utilized for operation this carbon credit device. The experimental results indicate that the system provides a practical and accessible demonstration of carbon trading metrics. It offering a scalable solution for organizations seeking to align with international sustainability standards and government carbon regulations to earn credits by adopting practices that reduce emissions and enhance carbon credit.

A STUDY ON CHALLENGES AND OPPORTUNITIES OF CIRCULAR ECONOMY IN INDIA

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India, as one of the world's fastest-growing economies, faces significant challenges related to resource depletion, waste generation, and environmental degradation. The traditional linear economic model of “take–make–dispose” is no

longer sustainable in the context of an increasing population and rapid industrialization. This highlights the urgent need for a transition towards a circular economy, which emphasizes resource efficiency, waste minimization, reuse, recycling, and sustainable production and consumption. A circular economy offers a transformative pathway for India to achieve long-term sustainability while maintaining economic growth. Promoting closed-loop systems, eco-friendly innovations, and responsible consumption patterns can reduce environmental pressure, conserve natural resources, and generate new employment opportunities. Key sectors such as agriculture, manufacturing, energy, and urban development can significantly benefit from circular practices. Furthermore, government initiatives like Swachh Bharat Mission, Make in India, and policies supporting renewable energy and waste management provide a strong foundation for this transition. However, challenges such as a lack of awareness, technological limitations, and policy gaps must be addressed through coordinated efforts among the government, industries, and society. This paper explores the importance of adopting a circular economy in India and its potential to drive sustainable development. It also examines key opportunities, challenges, and strategies required to accelerate this transition, ultimately contributing to environmental protection, economic resilience, and social well-being.

NON-LINEAR SETTLEMENT ANALYSIS OF NON-HOMOGENEOUS FLOATING ANDEND-BEARING GRANULAR PILES IN HOMOGENEOUS AND NON-HOMOGENEOUSSOILS

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Ground Improvement using granular piles has emerged as a cost-effective altemative to concrete piles for enhancing the load-carrying capacity and reducing settlements of foundations constructed on weak and soft subsoils. The increasmg scarcity of sites with competent foundation strata has necessitated innovative ground reinforcement techniques, particularly for extremely weak soil conditions. Granular piles create composite ground systems with lower compressibility and higher shear strength than native soils through a combination of soil replacement, confinement-mduced stiffness, and densification effects. This research develops an elastic continuum approach to analyze the settlement response of Single non-homogeneous floating and end-beanng granular piles embedded in both homogeneous and non

homogeneous soil media. Unlike previous studies that often neglected soil-pile interaction or pile non-homogeneity, the present analysis incorporates linear and non-linear variations of deformation modulus with depth for both granular pile material (E_gp(z)) and surrounding soil (E s(z)), provldmg a more realistic representation of In-situ behavior where confimng stresses mcrease pile stiffness progressively from top to tip. The granular pile is discretized into finite cylindrical elements subjected to interface shear stresses and uniform base pressure, Mindlin's elastic solutions form the basis for computing soil displacements, ensurmg compatibility between pile and soil deformations at the interface. Formulations are validated against classical solutions by Poulos (1969) and Mattes & Poulos (1969) for homogeneous cases, demonstrating excellent agreement. Key findings reveal significant settlement reductions of 10-15% for floatmg non-homogeneous granular piles and 20-40% for end-bearing piles compared to homogeneous counterparts, depending on relative stiffness (K gp), pile slenderness (L/d), bearing stratum stiffness (E b/E s), and nonhomogeneity parameters (u, ß). Interface shear stresses redistribute with reduced values in upper compressible regions and increased values in lower stiffer regions. Design charts are presented correlating settlement influence factor (I sp) with governing non-dimensional parameters, facilitating rational granular pile design for practical geotechnical applications.lJ]

IMPACT OF INFLUENCER MARKETING ON CONSUMER TRUST AND PURCHASE INTENTION

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The rapid pace of digital marketing has changed the nature of brand-consumer communication, and influencer marketing is a significant strategy. It is not based on a traditional advertisement but rather uses people who are viewed as credible and relatable, which influence consumers' attitudes and behaviour. Nevertheless, there is still a knowledge gap regarding the translation of influencer marketing into real consumer behaviour, i.e., in terms of trust. This paper discusses how influencer marketing can affect consumer trust and the effect of this trust on purchase intention. The quantitative method was employed, with primary data gathered in a structured questionnaire of 139 active social media users on social media platforms like Instagram and YouTube. The critical variables were the credibility of the influencer, consumer trust and purchase intention. The use of statistical methods like percentage analysis, mean, standard deviation and correlationanalysis was done to test the

hypothesis and relationships. The results show that influencer marketing has a significant effect on consumer trust, which confirms the first hypothesis. Credibility of the influencer, particularly authenticity and expertise are also important in the development of trust. The second hypothesis was also confirmed as a strong and statistically significant relationship was observed between trust and purchase intention. The findings indicate that trust is an important predictor of purchase intention. The paper points out that influencer marketing is not a direct driver of purchases: trust mediates the effectiveness thereof. Influencers generate awareness, but ultimate decisions will be made based on other factors such as price and brand reputation. Micro-influencers were also discovered to be more credible compared to macro-influencers. On balance, the research adds empirical data on the situation in India, highlighting the idea that the development of consumer trust is the key to the successfulness of influencer marketing.

UNDERSTANDING SUSTAINABLE ENTREPRENEURSHIP AMONG GENERATION Z: A CONCEPTUAL MODEL OF MOTIVATION, RISK PERCEPTION, AND RESPONSIBLE INNOVATION

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The increasing prominence of sustainability, responsible innovation, and the global agenda of the United Nations Sustainable Development Goals (SDGs) has significantly reshaped entrepreneurial aspirations, particularly among Generation Z. As a cohort characterized by heightened environmental awareness, ethical sensitivity, and purpose-driven career orientation, Generation Z demonstrates a growing inclination toward sustainable entrepreneurship. However, existing literature largely examines entrepreneurial intention through fragmented lenses, often overlooking the integrated role of psychological drivers, risk perception, and responsible innovation in shaping sustainable career choices. This conceptual paper addresses this gap by developing a comprehensive framework that explains how motivation and risk perception interact with responsible innovation to influence sustainable entrepreneurial intentions among Generation Z. Drawing on Self-Determination Theory and Risk Perception Theory, the study proposes that intrinsic and extrinsic

motivations, along with sustainability-oriented values, act as key psychological antecedents of entrepreneurial decision-making. These drivers are mediated by individuals' perception of risk and further shaped by their orientation toward responsible innovation, encompassing ethical awareness, social responsibility, and environmental consciousness. The framework positions responsible innovation as a critical mechanism that transforms entrepreneurial intention into sustainability-oriented career choices, thereby contributing to the achievement of SDGs related to economic growth, innovation, and responsible production. The proposed model contributes to the literature by integrating motivational and cognitive perspectives into a unified framework, offering a nuanced understanding of sustainable entrepreneurship in the context of Generation Z. The study also provides practical implications for policymakers, educators, and entrepreneurial ecosystems aiming to foster responsible and sustainable ventures aligned with global sustainability and SDG priorities. Finally, directions for future empirical validation and cross-contextual research are discussed.

EFFECTIVE AND ETHICAL ML APPROACH FOR BREAST CANCER DETECTION: ENABLING SUSTAINABILITY IN HEALTHCARE

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Breast cancer is recognized as one of the leading causes of cancer-related mortality today, and early identification of this condition is essential, since delayed detection markedly reduces patient survival rates and increases healthcare expenditures. It is imperative to have a precise and sensitive methodology for the early detection of breast cancer. Recently, machine learning (ML) has achieved significant success in computer vision, generating substantial interest in its applications within clinical cancer, particularly in improving early detection methods for breast cancer and potentially enhancing patient outcomes. It corresponds with the overarching concept of intelligent, ethical, and sustainable healthcare systems. ML and its applications in clinical oncology have generated numerous opportunities to tackle challenges such as class imbalances in clinical datasets, misdiagnosis, inappropriate treatment, and, in some cases, patient fatalities by offering more precise predictive models. In this study, the Synthetic Minority Over-sampling Technique (SMOTE) was used to address the class imbalances. Following this, an ML-based ensemble approach comprising Support Vector Machines, Random Forests, and

Gradient Boosting was employed to enhance the classification of breast cancer into benign and malignant. The suggested methodology was evaluated on the Wisconsin Breast Cancer Dataset (WBCD) and achieved scores over 97% across all critical performance measures, including accuracy, precision, recall, AUC, confusion matrix, and ROC. Along with accuracy, interpretability and explainability, they are essential for implementing AI ethically in healthcare. As a result, an analysis of feature relevance was conducted to uncover the most clinically significant diagnostic characteristics. The primary benefit of this ML-based automated detection method is its integration of sophisticated technology, ethical AI governance, and sustainable health systems, while enhancing accuracy by minimizing manual errors.

CLIMATE, COMMUNITY, AND RESISTANCE: ECOLOGICAL IMAGINATION IN ALICE WALKER'S FICTION

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This paper examines the ecological imagination in the fiction of Alice Walker through the interrelated lenses of climate, community, and resistance. Focusing on *The Color Purple* and *Meridian*, the study argues that Walker articulates an environmental consciousness that anticipates contemporary debates on climate justice. Rather than treating nature as a passive backdrop, her narratives construct the environment as a living, relational space that shapes identity, healing, and resistance. Drawing on ecofeminist and Black feminist frameworks, the paper demonstrates how the exploitation of land parallels the oppression of Black women, revealing intersecting structures of domination. At the same time, Walker envisions alternative modes of being grounded in care, reciprocity, and communal survival. The analysis highlights how ecological awareness emerges through everyday practices, emotional bonds, and collective resilience, offering a critique of extractive and patriarchal systems. By linking literary representation with current concerns about environmental inequality, the paper positions Walker's fiction as a vital resource for rethinking sustainable futures. Ultimately, it argues that her work foregrounds an ethics of care that redefines human–nature relationships and contributes to broader discourses on climate, justice, and identity.

THE INFLUENCE OF PERSONALIZED DIGITAL ADS ON CONSUMER ENGAGEMENT IN THE BEAUTY AND PERSONAL CARE MARKET

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This study examines the effect of personalized digital advertisements on consumer engagement within the Indian beauty and personal care industry. With the rapid growth of digital platforms and data-driven marketing, personalization has become a key strategy for brands to connect with consumers. The research aims to analyze how personalized advertisements influence consumer engagement and how perceived relevance and trust act as mediating factors, ultimately affecting purchase intention. The study is based on the Stimulus–Organism–Response (S-O-R) framework, where personalized digital advertisements are considered the stimulus, perceived relevance and trust represent the organism, and consumer engagement and purchase intention form the response. A quantitative research design was adopted, and primary data was collected through a structured questionnaire from 151 respondents using a non-probability convenience sampling method. Statistical tools such as descriptive analysis, correlation, and regression were used to analyze the data.The findings indicate that personalized digital advertisements have a significant positive impact on consumer engagement. Perceived relevance and trust were found to play a crucial mediating role, enhancing the effectiveness of personalized advertisements. Furthermore, higher consumer engagement leads to increased purchase intention in the beauty and personal care sector. The study also highlights the importance of platforms like Instagram in influencing consumer behavior and emphasizes the growing role of influencer marketing. The research concludes that while personalization improves engagement and marketing effectiveness, brands must ensure transparency and build trust to avoid privacy concerns. The study provides valuable insights for marketers to design more effective personalized advertising strategies and contributes to the existing literature by focusing on the Indian context.

BUILDING TRUST IN AI CHAT SUPPORT: HOW PRIVACY AND QUERY HANDLING SHAPE CONSUMER CONFIDENCE

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This study examines the impact of privacy and query handling on consumer trust in AI-based chat support systems. With the rapid adoption of artificial intelligence in customer service, chatbots have become essential tools for providing instant, cost-effective, and 24/7 assistance. However, despite their efficiency, concerns regarding data privacy and the quality of query handling continue to influence user trust. The research focuses on analyzing how privacy protection practices and query handling efficiency affect consumers' willingness to engage with AI chat systems. A descriptive and analytical research design was used, supported by primary data collected through structured questionnaires. Statistical tools were applied to evaluate the relationship between variables such as privacy perception, response accuracy, and consumer trust. The findings indicate that strong data privacy measures and accurate, responsive query handling significantly enhance consumer trust, while privacy concerns and poor responses negatively impact user confidence. The study also highlights the importance of human-like interaction and transparency in improving user experience. The research concludes that organizations must prioritize secure data handling, efficient query resolution, and user-centric design to build sustainable trust in AI-driven customer support systems.

INDUSTRIAL AUTOMATION

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Industrial automation has emerged as a fundamental component of modern electrical engineering, enabling increased productivity, efficiency, and precision in manufacturing and industrial processes. This study explores the role of automation technologies such as Programmable Logic Controllers (PLCs), Supervisory Control and Data Acquisition (SCADA) systems, sensors, and actuators in optimizing industrial operations. The integration of these systems facilitates real-time monitoring,

control, and data acquisition, thereby reducing human intervention and minimizing operational errors. The abstract further examines the impact of automation on energy efficiency, safety, and cost-effectiveness within industrial environments. Advanced automation techniques, including the use of robotics and intelligent control systems, contribute to enhanced system reliability and consistent product quality. Additionally, the study highlights the challenges associated with implementation, such as high initial investment, cybersecurity concerns, and the need for skilled personnel. In conclusion, industrial automation represents a significant advancement in electrical engineering, driving innovation and competitiveness across various industries. Future developments are expected to focus on the integration of artificial intelligence and the Industrial Internet of Things (IIoT) to achieve smarter and more adaptive automation systems.

BRIDGING THE EMPLOYABILITY GAP: A COMPARATIVE ANALYSIS OF TRADITIONAL VS. SKILL-BASED EDUCATION MODELS FOR THE EMERGING WORKFORCE IN GOA

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This study examines the comparative effectiveness of traditional and skill-based education models in addressing the employability gap within the emerging workforce in Goa. By evaluating perceptions of job readiness and the prevalence of skill gaps among a diverse demographic, the research highlights a significant disparity between academic preparation and market requirements. The findings indicate that while there is a slight preference for skill-based instruction, neither model independently provides sufficient preparation for the professional environment, with a majority of participants feeling only partially prepared or unready for employment. The analysis suggests that current specialized training lacks a significant correlation with increased job readiness, pointing toward a need for better alignment with industry standards. Ultimately, the study advocates for the implementation of a hybrid pedagogical framework that integrates the theoretical depth of traditional education with the practical applications of skill-based learning to better equip the Goan youth for the evolving labour market.

SMART SHOP: AN INTELLIGENT MULTI-SEGMENT MARKETPLACE FOR PRODUCT LIFECYCLE MANAGEMENT

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Rapid urbanization, industrial growth, and changing consumer lifestyles have led to a significant increase in waste generation worldwide. Many reusable materials, such as old electronics, kitchen utensils, mobile phones, glass products, plastic items, furniture, and household goods, are thrown away daily, despite having functional and resale value. Improper disposal of waste causes environmental pollution, overflowing landfills, wasted resources, and health issues. Often, people discard unwanted products simply because they lack a proper way to sell or recycle them. To address this issue, there is a growing need for sustainable, tech-driven waste management systems that can reduce waste and create economic opportunities.This paper presents Smart Shop, an innovative digital platform designed to encourage recycling, refurbishment, and resale of waste materials efficiently and profitably. Smart Shop enables users to sell any type of waste or unused product through a website rather than throwing it away. These products can include damaged electronics, old household goods, unused appliances, scrap items, and other reusable waste materials. By selling these products on the Smart Shop platform, users can earn money, turning waste into income. This feature motivates people to dispose of waste responsibly and raises awareness of the value in discarded items.Once collected, trained workers and technicians carefully inspect, sort, repair, and refurbish the waste products. Items that can be restored are made reusable and listed for resale at affordable prices. This process benefits both sellers and buyers: sellers earn money for unused products, buyers receive refurbished items at lower costs, and the platform profits from resale. In this way, Smart Shop creates a sustainable business model where all participants benefit financially while also supporting the environment.The Smart Shop model is based on the concept of the circular economy, where products are reused for as long as possible instead of discarded after a single use. Unlike the

traditional “buy-use-dispose” model, Smart Shop extends the life cycle of products, decreases waste generation, and conserves natural resources. This reduces the need for manufacturing new products, therefore lowering energy consumption and raw material usage. The platform also fosters social development by creating jobs for waste collectors, refurbishment staff, delivery personnel, and small vendors involved in the recycling chain. Technologically, Smart Shop features a user-friendly website interface, a secure transaction system, product tracking, inventory management, and waste categorization modules to ensure smooth operations and transparency. The platform showcases how digital technology can promote environmental sustainability while generating profit. Smart Shop is not only a waste management solution but also a socially responsible and economically beneficial innovation. It represents a practical step toward cleaner cities, better resource use, and a greener future through sustainable recycling and refurbishment practices.

IMPACT OF EMPLOYER BRANDING ON JOB-SEEKING BEHAVIOR OF MBA STUDENTS: A STUDY WITH RESPECT TO SIGNALING THEORY

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In the present competitive job market, organizations need to attract talented and skilled employees to achieve long-term success. MBA students are considered an important group of potential employees because they possess managerial knowledge, analytical ability, and leadership skills. Therefore, many organizations focus on developing a strong employer brand to attract such candidates. Employer branding refers to the way an organization presents itself as an attractive workplace by highlighting its culture, reputation, work environment, and career opportunities. However, job seekers often have limited information about an organization before joining it. As a result, they rely on signals such as company reputation, social media presence, employee reviews, and career development opportunities while evaluating employers. This concept can be understood through Signaling Theory, which explains how organizations send signals to influence job seekers’ perceptions. This study examines the impact of employer branding on the job-seeking behavior of MBA

students. Primary data were collected from 100 MBA students using a structured questionnaire. The data were analyzed using descriptive statistics, correlation analysis, and regression analysis. The findings indicate that employer branding has a positive influence on students' job application intentions. Factors such as company reputation, career growth opportunities, and work–life balance significantly influence MBA students' perceptions of employers.

GST REFORMS AND CONSUMER WELFARE: EVIDENCE FROM INDIA'S DIGITAL ECONOMY

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The Goods and Services Tax (GST) in India in 2017 has been supplemented by digitalisation to enhance consumer welfare in the country. This research study has relied on secondary data gathered from the Reserve Bank of India, Ministry of Finance, and Economic Survey publications. It is found that the GST collection increased from ₹7.40 lakh crore in 2017-18 to ₹22.08 lakh crore in 2024-25, suggesting higher tax compliances.Similar trends have also been observed for the registration of GSTs, which increased from 110 lakhs to 165 lakhs. Moreover, the increase in the number of e-way bills suggests the enhanced efficiency of the supply chain network. Digital Economy: In terms of the development of the digital economy, it is found that there is an increase in the number of UPI transactions from 5.3 billion to 117.6 billion. At the same time, the number of digital transactions increased from ₹2070 trillion in 2018 to ₹12,735 trillion in 2023. Moreover, e-invoicing has increased from 37 crore to 145 crore**.**These findings show that GST and digitalization have brought about a lessening of cascading effect of taxes, better price transparency, greater product availability, and greater financial inclusion. Despite the digital divide and threats to cybersecurity, the overall consumer welfare is positively affected. The paper concludes that through further reforms and digitalization, there will be greater consumer benefit and help in achieving the goal of inclusive growth as envisioned in Viksit Bharat 2047.

OBJECT-ORIENTED SIMULATION FRAMEWORK FOR EFFICIENT IRRIGATION CANAL OPERATION AND MANAGEMENT

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This study presents the development of an **object-oriented simulationmodel** for analyzing and managing irrigation canal operations under steady and unsteady flow conditions. Efficient water distribution in canal systems is a major challenge due to variations in demand, flow conditions, and operational constraints. Traditional models lack flexibility, scalability, and user-friendliness. The proposed model integrates **hydraulic flow principles (Saint-Venant equations)** with **object-oriented programming concepts**, enabling modular, reusable, and extensible system design. The model simulates canal networks consisting of reaches, junctions, regulators, weirs, and outlets, incorporating real-world hydraulic behavior. A **numerical solution based on Preissmann's implicit finite difference scheme** is used to solve unsteady flow equations, ensuring stability and accuracy. The system is supported by a structured database and graphical interface for user interaction. Validation with real canal data demonstrates the model's capability to predict flow behavior and assist in decision-making for canal operation. The study concludes that object-oriented simulation provides a powerful, flexible, and efficient tool for irrigation management and future smart water systems.

DESIGN AND ECONOMIC EVALUATION OF AN IOT BASED PRECISION AGRICULTURE SYSTEM IN KHANDESH REGION OF MAHARASHTRA.

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Even though there has been a development of sophisticated technologies and procedures in other sectors, agriculture still remains the driving force behind the rural economy in countries such as India. In rural areas such as Jalgaon in Maharashtra, there are a number of individuals whose sole means of livelihood is agriculture. Nevertheless, there are several challenges they face in this venture, which include a lack of water availability, erratic rainfall, ineffective irrigation systems, and increased production costs among others. The conventional method of irrigation has been

characterized by both over-irrigation and under-irrigation due to its heavy dependence on preset programs and subjective judgment. It is possible here to make use of modern technologies such as Internet of Things in order to boost the efficiency of farming practices. IoT will help us to track the environmental and soil parameters in real-time and make automatic decisions about irrigation of water. This research paper will focus on designing a system of Internet of Things for irrigation and then analyze its economics. Such sensors, along with microcontrollers like ESP32, are used to collect continuous information on soil moisture, humidity, and temperature on the farm. The collected data is processed on a cloud-based server to obtain the required amount of water needed for the growth of the crops based on their requirements. Based on the set threshold levels, this system has the ability to irrigate the land using actuators such as relay modules and water pumps. The performance of this IoT-based system will be analyzed through a case study approach. Information will be collected during one harvesting season and compared with traditional methods of irrigation. From the analysis performed, it can be concluded that using this IoT-based system results in saving up to 30-40% water used in the farm and also increases the yield of crops by 10-15%. From the economic point of view, despite the relatively high cost involved in setting up the IoT system, it can generate greater returns in the long run. Lower water usage, lesser power utilization, reduced manpower requirements, and enhanced efficiency lead to a favorable return on investment in the short run.

A STUDY ON CHALLENGES IN HUMAN RESOURCE MANAGEMENT

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Human Resource Management (HRM) is the term used to describe formal systems devised for the management of people within an organization. The responsibilities of a human resource manager fall into three major areas: staffing, employee compensation and benefits, and defining/designing work. Essentially, the purpose of HRM is to maximize the productivity of an organization by optimizing the effectiveness of its employees. This mandate is unlikely to change in any fundamental way, despite theever-increasing pace of change in the business world. As Edward L. Gubman observed in the*Journal of Business Strategy*, "the basic mission of human resourceswill alwaysbe to acquire, develop, and retain talent; align the workforce with the business; and be an excellent contributor to the business. Those three challenges will never change." Human Resource Management can be a challenge for small business especially, which typically don't have an HR department to rely on. They

may be limited to one HR person, or this responsibility may still belong to the CEO. Regardless, small business owners need to understand the challenges in order to face them so that they are prepared to tackle HR issues as their company, and workforce, grows. This paper aims at studying the challenges in HRM, to suggest measures to overcome the challenges and highlight the emerging challenges in HRM.

DESIGN AND ECONOMIC EVALUATION OF AN IOT-ENABLED PRECISION AGRICULTURE SYSTEM: AN IN-DEPTH ANALYTICAL CASE STUDY OF SUSTAINABLE IRRIGATION AND YIELD OPTIMIZATION IN RURAL JALGAON DISTRICT, INDIA

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Even though there has been a development of sophisticated technologies and procedures in other sectors, agriculture still remains the driving force behind the rural economy in countries such as India. In rural areas such as Jalgaon in Maharashtra, there are a number of individuals whose sole means of livelihood is agriculture. Nevertheless, there are several challenges they face in this venture, which include a lack of water availability, erratic rainfall, ineffective irrigation systems, and increased production costs among others. The conventional method of irrigation has been characterized by both over-irrigation and under-irrigation due to its heavy dependence on preset programs and subjective judgment. It is possible here to make use of modern technologies such as Internet of Things in order to boost the efficiency of farming practices. IoT will help us to track the environmental and soil parameters in real-time and make automatic decisions about irrigation of water. This research paper will focus on designing a system of Internet of Things for irrigation and then analyze its economics. Such sensors, along with microcontrollers like ESP32, are used to collect continuous information on soil moisture, humidity, and temperature on the farm. The collected data is processed on a cloud-based server to obtain the required amount of water needed for the growth of the crops based on their requirements. Based on the set threshold levels, this system has the ability to irrigate the land using actuators such as relay modules and water pumps. The performance of this IoT-based system will be analyzed through a case study approach. Information will be collected during one harvesting season and compared with traditional methods of irrigation. From the analysis performed, it can be concluded that using this IoT-based system results in saving up to 30-40% water used in the farm and also increases the

yield of crops by 10-15%. From the economic point of view, despite the relatively high cost involved in setting up the IoT system, it can generate greater returns in the long run. Lower water usage, lesser power utilization, reduced manpower requirements, and enhanced efficiency lead to a favorable return on investment in the short run.

DIGITAL-AI SYNERGIES TRANSFORMING ORGANIZATIONAL AGILITY AND GROWTH TRAJECTORIES

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Organizations have always played an important role in helping to foster progress within society. These industries and organizations have achieved great success through innovation in areas such as education, computer software development, and engineering since the days when technological advances were being made right up to this modern age. The onset of the digital age or digitalization began around the early 2000s, which resulted in a swift growth in industries. From technological advances to advanced technologies like Artificial Intelligence and Machine Learning, firms underwent complete change, incorporating digital means into the evolution of their operations. In today's world, digital technologies and Artificial Intelligence are critical to organizational development and improvement. Digital technologies facilitate agility, foster innovation, and give companies a competitive advantage. Firms use AI to conduct data analysis and make predictions to inform business decisions, use machine learning to automate various tasks, and integrate intelligent systems to increase efficiency and scale. For example, educational institutions adopt AI to customize learning experiences for individual students; software companies use AI to speed up software writing and bug testing; manufacturing firms rely on AI to improve logistics and predict equipment failure. Furthermore, cloud computing and edge computing expand these capabilities by facilitating real-time data analysis and seamlessly incorporating IoT devices. This paper provides an overview of the key motivators for integrating digital technology and AI into organizations to build resilience, providing sector-specific examples that drive sustainable growth. In a nutshell, advanced digital technologies, including AI and machine learning, serve as fundamental components in fast development and

globalization. The synergy between these technologies and concepts, including sustainable development, creates endless possibilities, especially when pursuing the VIKSHIT BHARAT @ 2047 initiative.

A STUDY ON AUTOMATED ROAD ACCIDENT DETECTION ON HIGHWAYS: AN EDGE-BASED SYSTEM AND METHOD FOR REAL-TIME DETECTION AND REPORTING OF HIGHWAY ROAD ACCIDENTS

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Highway accidents remain a significant safety concern due to high travel speeds and delays in emergency response. Fast and dependable detection is essential to reduce injuries and prevent additional damage. This work presents a real-time accident monitoring approach that performs analysis directly on embedded edge devices. By processing data locally rather than relying on continuous cloud connectivity, the system achieves quicker response and reliable operation under varying network conditions. The method integrates deep learning–based visual analysis with motion evaluation across successive video frames to identify potential collision events. To improve reliability and minimize false alerts, detections are confirmed across multiple frames before final classification. Once verified, the system automatically sends an alert containing location details, time information, and relevant context through a 4G communication link to support prompt emergency response. Testing on embedded platforms shows that the system maintains an effective balance

between computational efficiency and detection performance. Overall, the design provides a scalable and cost-efficient solution for enhancing highway safety through continuous real-time monitoring.

SUSTAINABILITY OF COMMON PROPERTY RESOURCES UNDER CLIMATE CHANGE: A SOCIO-ECOLOGICAL STUDY OF BHINMAL REGION, RAJASTHAN

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This study examines the sustainability of Common Property Resources (CPRs) in the Bhinmal region of Rajasthan over the period 2022–2025 within a socio-ecological systems framework. CPRs—such as grazing lands, village ponds, community forests, and wastelands—are central to rural livelihoods in arid landscapes. During the study period, increasing climate variability, reflected in erratic rainfall, rising temperatures, and recurrent droughts, has intensified stress on these resources. Concurrently, socio-economic changes, including land-use shifts, population pressure, and the weakening of traditional institutions, have altered patterns of access, use, and management. The study adopts an interdisciplinary methodology combining household surveys, participatory rural appraisal (PRA), and field observations with geospatial analysis using GIS to assess changes in land use, vegetation cover, and water availability between 2022 and 2025. These are complemented by secondary data on climate trends and policy frameworks. The findings indicate a measurable decline in the ecological health and productivity of CPRs, alongside the erosion of customary governance practices such as rotational grazing and collective water management. However, localized adaptive responses, including community-led restoration efforts and the continued relevance of indigenous knowledge systems, suggest potential pathways for resilience. Based on the findings, the study proposes policy measures focused on strengthening decentralized and participatory governance through the empowerment of local institutions such as Gram Panchayats and user groups. It highlights the need for legal recognition and protection of CPRs to prevent encroachment and privatization, alongside the integration of traditional ecological knowledge into formal climate adaptation strategies. Further, the study recommends targeted investment in ecological restoration, improved water harvesting infrastructure, and the use of GIS-based monitoring systems for informed decision-making. Linking CPR management with rural livelihood programs and climate resilience schemes is also essential for long-term sustainability. The study concludes

that sustaining CPRs under climate stress requires a holistic approach that integrates ecological restoration, institutional strengthening, and inclusive policy support, offering insights for similar arid regions.

IOT-BASED AUTOMATIC SMART PARKING SYSTEM

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The rapid increase in urbanization and the growing number of vehicles in metropolitan areas have created severe parking-related challenges, including traffic congestion, fuel wastage, and significant loss of time for drivers. Traditional parking systems lack real-time awareness and efficient space management, making them inadequate to address these modern-day demands. This project proposes an IoT-Based Automatic Smart Parking System that leverages Internet of Things (IoT) technology to intelligently monitor, manage, and allocate parking spaces in real time. The proposed system integrates ultrasonic or infrared sensors installed at individual parking slots to detect vehicle presence and occupancy status. These sensors are connected to a microcontroller (such as Arduino or NodeMCU/ESP8266) that processes the sensor data and transmits it over a Wi-Fi or GSM network to a centralized cloud server. The cloud platform aggregates the data and updates a real-time dashboard accessible via a web application or mobile app, enabling drivers to view available parking slots before arriving at the parking facility. Key features of the system include automated slot detection, real-time availability updates, remote monitoring, an LED/display indicator board at the entrance showing free and occupied slots, and an optional automated entry/exit gate control mechanism using servo motors. The system is further enhanced with a slot reservation module that allows users to pre-book a parking space through the mobile application, reducing search time and improving the overall parking experience. The system architecture follows a three-tier model comprising the sensing layer (hardware sensors and microcontrollers), the network layer (Wi-Fi/GSM communication modules), and the application layer (cloud backend and user interface). Firebase or a similar real-time database is employed to ensure low-latency data synchronization between the hardware and the user-facing application. The system is designed to be scalable and cost-effective, making it suitable for both small private parking lots and large multi-storey parking facilities. The implementation of this smart parking solution is expected to significantly reduce vehicle idle time, lower carbon emissions, optimize parking space utilization, and improve the overall traffic flow in urban environments. This

project demonstrates the practical application of IoT in solving real-world infrastructure problems and contributes to the vision of smarter, more sustainable cities.

ROLE OF EDUCATIONAL TECHNOLOGY IN PROMOTING SUSTAINABLE MUSIC PEDAGOGY: A CONCEPTUAL FRAMEWORK

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The integration of educational technology into music education has significantly transformed traditional pedagogical practices, offering new opportunities for sustainable learning. This study aims to examine the role of educational technology in promoting sustainable music pedagogy through a systematic review of recent literature (2020–2026) and to propose a comprehensive conceptual framework. Sustainable learning in music education extends beyond skill acquisition to include long-term engagement, cultural preservation, emotional well-being, and lifelong learning. The study adopts a systematic literature review methodology based on the PRISMA framework to ensure rigor and transparency. The findings reveal that technologies such as artificial intelligence (AI), mobile learning applications, and digital platforms enhance accessibility, personalization, and learner engagement. However, existing research predominantly focuses on performance outcomes, often neglecting emotional, cultural, and sustainability dimensions. The study proposes a conceptual framework comprising four key dimensions: technological integration, pedagogical innovation, learner engagement, and sustainable outcomes. The framework emphasizes that effective integration of technology with pedagogy leads to meaningful and long-lasting learning experiences.The study concludes that while educational technology holds immense potential to transform music pedagogy, its success depends on balanced implementation aligned with pedagogical and cultural contexts. The findings provide a foundation for future research and practical application in sustainable music education.

IMPACT OF GST 2.0 ON BUSINESS ENTERPRISES AND EASE OF DOING BUSINESS

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The introduction of Goods and Services Tax (GST) in India was a major step towards the establishment of a unified system of indirect tax and the development of

GST 2.0 is a move towards the use of technology in compliance. This research paper investigates the effects of GST 2.0 on business ventures especially compliance burden, and ease of doing business. The research method is quantitative in nature and is anchored on primary data; 100 Micro, Small and Medium Enterprises (MSMEs) were selected and a structured questionnaire was used to gather the data. The data have been interpreted using the statistical tools of percentage analysis, mean, standard deviation and correlation analysis. The results indicate that GST 2.0 has increased the transparency, tax reporting accuracy, and minimized manual errors by employing tools like e-invoicing, automatic generation of returns, and real-time input tax credit matching. Nevertheless, the research also states that these technological achievements have not led to the compliance burden being alleviated. Rather, they have moved it to the realm of greater reliance on digital systems, increased compliance costs, and reliance on external professionals. The findings also reveal that, although GST 2.0 helps to create predictability and regulatory uniformity, other issues like ITC addiction and unremitting compliance have posed operational challenges to businesses. The research concludes that GST 2.0 can be described as a systemic change in the tax system as it enhances efficiency in the system at the same time introducing new technological and operational pressure to businesses. It has an intermediate and uneven effect on the ease of doing business, thus, it is mostly based on the digital preparedness and flexibility of businesses.

ESG AND FINANCIAL PERFORMANCE: A COMPARATIVE STUDY OF PUBLIC AND PRIVATE SECTOR BANKS IN INDIA

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Environmental, Social, and Governance (ESG) practices have become very relevant in recent years as predictors of sustainable corporate performance in the banking industry. This research paper seeks to compare and contrast the effects of ESG practices on the financial performance of both the public and private sector banks in India. It is based on a systematic literature review (SLR) methodology that is based on secondary data and is based on a PRISMA framework to select and analyse relevant studies. All the selected articles underwent a review to comprehend the association between the ESG variables and the financial performance outcomes like Return on Assets (ROA), Return on Equity (ROE), and profitability. The results indicate that the overall effect of ESG practices on financial performance is positive, although, private sector banks show better results because of effective governance,

increased transparency, and strategic integration of ESG. On the other hand, the performance of the public sector banks is more socially oriented with quite average financial results. The paper highlights the significance of adopting ESG in order to attain sustainable growth and competitive edge.

A STUDY ON AUTONOMOUS HIGHWAY SURVEILLANCE CAR

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As India is a rising country and the roads in India are developing rapidly one of the major challenges is to keep the reads safe and in proper condition. The objective of this study is to design and implementation of an “Autonomous Highway Surveillance Car” to operate without human intervention while continuously monitoring highway conditions in real time. The techniques like Robotics, embedded systems, machine learning, and Internet of Things (IoT) communication are integrated in this system to create an efficient road inspection solution. The vehicle is carrying an ultra-wide-angle camera that will capture road images continuously during movement. Then these images are processed using image processing techniques and trained machine learning models and identify road abnormalities such as potholes, surface damage, obstacles, and edge misalignment. As soon as the problem is detected, the system acquires its exact geographical location using a GPS module and then it sends the information to the concerned authorities through an IoT-based communication system for timely response and prompt action. Autonomous navigation is performed through multiple sensors, obstacle detection mechanisms, and basic path- planning algorithms, helping the vehicle to move safely along the highway without manual control. This system will drastically reduce the dependency on manual monitoring methods and improves response time for maintenance activities while reducing the error. Overall, the model demonstrates a practical, cost- effective, and scalable approach for intelligent highway surveillance and preventive road management.

DESIGN AND DEVELOPMENT OF A SOLAR-ASSISTED MICRO ELECTRIC VEHICLE WITH INTELLIGENT ENERGY MANAGEMENT AND COST-EFFICIENT DESIGN

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The growing demand for sustainable urban mobility solutions has accelerated the development of energy-efficient electric vehicles, particularly in the micro-mobility segment. This study presents the design and development of a low-cost solar-assisted micro electric vehicle integrated with an intelligent energy management system. The proposed system combines a photovoltaic panel, battery storage, and electric drivetrain to enhance energy utilization and extend vehicle range. An adaptive, rule-based energy management strategy is implemented to dynamically allocate power between the solar source and battery based on real-time operating conditions such as solar availability, load demand, and battery state of charge. The system operates in multiple modes, including solar-priority, hybrid-assist, battery-protection, and idle-charging modes, to optimize performance and improve battery lifespan. Emphasis is placed on cost-efficient design through lightweight structural considerations and the use of readily available components, making the solution viable for urban and low-income mobility applications. Preliminary analysis indicates improved energy efficiency and reduced dependency on grid charging. The proposed approach demonstrates a practical integration of renewable energy, intelligent control, and sustainable design principles for next-generation micro electric vehicles.

REFRAMING SDGS IN THE AGE OF INTELLIGENT SYSTEMS: A SOCIOLOGICAL ANALYSIS OF ETHICAL DIGITAL TRANSFORMATION AND POST-PANDEMIC PATHWAYS TO INCLUSIVE DEVELOPMENT

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This paper critically examines the transformation of Sustainable Development Goals (SDGs) within the evolving landscape of intelligent systems, situating the analysis within a sociological framework that interrogates the intersections of technology, ethics, and post-pandemic development trajectories. It argues that the accelerated digitalization witnessed during and after the COVID-19 pandemic—where global internet penetration rose from approximately 53.60% in 2019 to nearly 66.20% in 2023—has significantly reconfigured pathways toward inclusive development, while

simultaneously intensifying structural inequalities. Drawing upon empirical trends, the study highlights that nearly 38.50% of the global population in low-income regions remains digitally excluded, thereby constraining equitable access to SDG-linked resources such as education, healthcare, and financial inclusion. The paper employs a multidisciplinary sociological lens to analyze how artificial intelligence-driven governance and digital platforms have improved service delivery efficiency by approximately 27.40%, yet raise ethical concerns related to surveillance, algorithmic bias, and data privacy, affecting nearly 21.30% of vulnerable populations disproportionately. Furthermore, the study explores post-pandemic organizational strategies, noting that over 62.70% of enterprises have adopted hybrid or digitally integrated models, reshaping labor dynamics and social relations. By integrating insights from social theory, policy analysis, and real-world case patterns, the research emphasizes the need for ethically grounded, inclusive, and sustainable digital ecosystems that align with SDG targets. It concludes that achieving SDGs in the age of intelligent systems requires not merely technological adoption but a reorientation of governance, institutional accountability, and participatory frameworks to ensure that the benefits of digital transformation are equitably distributed across diverse socio-economic contexts.

SECURITY AND PRIVACY CHALLENGES IN IOT NETWORKS: THREATS AND COUNTERMEASURES

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Now a day the rapid growth of the Internet of Things (IoT) has made everyday devices like smart homes, wearable gadgets, and connected vehicles more useful and efficient. However, this connectivity also brings serious security and privacy challenges. This research paper explores the common threats faced by IoT networks and discusses possible ways to reduce these risks. IoT devices often have limited processing power and weak security features, making them easy targets for cyberattacks. Common threats include unauthorized access, data theft, malware attacks, and denial-of-service (DoS) attacks, where systems are overloaded and stop working. In many cases, sensitive user data such as personal information, location,

and daily habits can be exposed if proper protection is not in place. Another major concern is privacy. Since IoT devices constantly collect and share data, users may lose control over how their information is used. Weak authentication methods and lack of encryption can allow attackers to intercept or misuse this data. To address these issues, the paper suggests several countermeasures. Strong authentication methods, such as multi-factor authentication, can help ensure that only authorized users access devices. Data encryption is essential to protect information during transmission. Regular software updates and security patches can fix known vulnerabilities. Network monitoring and intrusion detection systems can help identify suspicious activities early. Additionally, designing IoT systems with security in mind from the beginning—known as “security by design”—is crucial. Educating users about safe practices, such as using strong passwords and updating devices, also plays an important role. In conclusion, while IoT networks offer many benefits, they also introduce new risks. By understanding these threats and applying proper security measures, it is possible to build safer and more reliable IoT systems.

DESIGN AND ECONOMIC EVALUATION OF AN IOT-ENABLED PRECISION AGRICULTURE SYSTEM: AN IN-DEPTH ANALYTICAL CASE STUDY OF SUSTAINABLE IRRIGATION AND YIELD OPTIMIZATION IN RURAL JALGAON DISTRICT, INDIA

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Even though there has been a development of sophisticated technologies and procedures in other sectors, agriculture still remains the driving force behind the rural economy in countries such as India. In rural areas such as Jalgaon in Maharashtra, there are a number of individuals whose sole means of livelihood is agriculture. Nevertheless, there are several challenges they face in this venture, which include a lack of water availability, erratic rainfall, ineffective irrigation systems, and increased production costs among others. The conventional method of irrigation has been characterized by both over-irrigation and under-irrigation due to its heavy dependence on preset programs and subjective judgment. It is possible here to make use of modern technologies such as Internet of Things in order to boost the efficiency of farming practices. IoT will help us to track the environmental and soil parameters in real-time and make automatic decisions about irrigation of water. This research paper will focus on designing a system of Internet of Things for irrigation and then analyze

its economics. Such sensors, along with microcontrollers like ESP32, are used to collect continuous information on soil moisture, humidity, and temperature on the farm. The collected data is processed on a cloud-based server to obtain the required amount of water needed for the growth of the crops based on their requirements. Based on the set threshold levels, this system has the ability to irrigate the land using actuators such as relay modules and water pumps. The performance of this IoT-based system will be analyzed through a case study approach. Information will be collected during one harvesting season and compared with traditional methods of irrigation. From the analysis performed, it can be concluded that using this IoT-based system results in saving up to 30-40% water used in the farm and also increases the yield of crops by 10-15%. From the economic point of view, despite the relatively high cost involved in setting up the IoT system, it can generate greater returns in the long run. Lower water usage, lesser power utilization, reduced manpower requirements, and enhanced efficiency lead to a favorable return on investment in the short run.

EXPLORING THE RELATIONSHIP BETWEEN EDUCATION AND INCOME OF INDIVIDUALS WITH PROBABLE VOTING BEHAVIOR: A CASE STUDY OF THE KATKARIS IN ALIBAUG

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Today education plays a very important role in our life and society as a whole. Education has led to change, development and progress in every society in this world. There is a remarkable difference in outlook and attitude of a person who is educated as compared to one who isn't. Moreover, occupation too plays a very important role in the life of an individual. Occupation gives one a status symbol to adhere to, and gives a person a characteristic that distinguishes one from another. In a democracy, education and occupation have mixed roles to play in the political participation of citizens. Interesting analyses have been done time and again to understand how people vote. In this study, which has been done in Alibaug Taluka of Raigad District, 35 individuals (Katkari tribals who are a Particularly Vulnerable Tribal Group) were surveyed to understand their levels of education and their occupation. However, as

elections are round the corner, questions related to elections couldn't be included in the questionnaire. Nevertheless, analysis has been made and probability has been drawn as to what the respondents may possibly do in comparison with their education and occupation.

SYNERGISING EMPLOYER BRANDING WITH SUSTAINABLE LEADERSHIP AND EMPLOYEE PERFORMANCE IN THE DIGITAL ERA

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In the contemporary digital era, organisations are increasingly challenged to attract, retain, and motivate talent while simultaneously embedding sustainability into their leadership practices. This research explores the synergy between employer branding, sustainable leadership, and employee performance within digitally transforming workplaces. Employer branding has emerged as a strategic tool to position organisations as employers of choice, while sustainable leadership emphasises long-term value creation, ethical responsibility, and stakeholder well-being. Together, these constructs influence employee engagement, productivity, and overall performance. Using a descriptive and analytical research design, this study integrates secondary data from peer-reviewed journals and conceptual models to examine how digital tools, social media platforms, and remote work environments reshape these interrelationships. A conceptual model—the *Synergistic EB–SL–EP Model in the Digital Era*—is proposed to illustrate the combined impact of employer branding and sustainable leadership on employee performance, moderated by digital transformation and mediated by engagement and trust. The findings suggest that organisations which align authentic employer branding with sustainable leadership principles experience higher employee commitment, enhanced performance, and stronger employer reputation. The study concludes that the integration of these three dimensions is essential for building resilient, future-ready organisations in the digital age.

SUSTAINABILITY AND INFORMATION SYSTEMS IN THE CONTEXT OF SMART BUSINESS

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In recent years, calls have increased for adherence to standards that ensure sustainability, including the global initiative presented by the United Nations with 17 Sustainable Development Goals (SDGs) to ensure a more sustainable future. Achieving these goals is extremely important, as institutions have sought to integrate technology, especially business intelligence, into their operations to ensure their achievement. This study aims to provide a systematic literature review of the intersection of information systems and sustainability in business intelligence. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology was utilized to select high-quality studies from various databases, including ScienceDirect, IEEE Xplore, and Scopus, to be included in this review. The methodology resulted in 32 studies taxonomized into four main categories covering different aspects of the intersection of information systems and sustainability. This study discusses integrating information systems and sustainability in various sectors, such as tourism, health, urban, and other sectors, with different technologies, such as Blockchain, IoT, Industry 4.0, and other innovations. Moreover, the information system types implemented to support sustainability practices in different domains are highlighted.

A STUDY ON CONSUMER BRAND ENGAGEMENT IN THE ERA OF SOCIAL MEDIA INFLUENCERS

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The concept of consumer brand engagement has developed as an important point in the field of contemporary marketing specifically all-round the changing space of the modern social media. With the fastest absorbing of the social media platforms, the quickest large dominance of the influencer marketing has taken a very noticeable fast changes and transformation leading to the search of new consumer brand dimensions, its new drivers, their results and outcome connected the engaging concepts and the modern world. This is to bring to notice that the factors affected are already putting their results in shaping the consumer brand engagement in a very innovative and creative way to the word with the help of social media influencers. The study highlights the main multi-dimensional constructs having the cognitive,

behavioral, emotional components that shows how the consumer is having experience with the brand. The role of social media influencers is of huge importance as they connect with the credible, persuasive intermediaries, relatable points between the brands and the consumers. On a good note, their perceived value, expertise, trustworthiness, attractive and the connectivity with the engaging audience make the process of interacting very much enhancive. The role of social media marketing also includes the quality of the content, interactivity, e- word of mouthed for engaging the brand community's presence and the audience. The digital world also helps to strengthen the emotional bond between the brands and the consumers. The effective result-oriented outcomes include the brand loyalty, its awareness, purchase intention from the strong customers. the paper gives more ways to develop the study of empirical research in the meaning of developing economies and digital changing world. The findings show a path to support marketers, researchers, and the audience who are associated in designing more creative engagement strategies in the competitive digital world.

VANSWASTHYA NETWORK: AI-POWERED TRIBAL HEALTH, NUTRITION & ECO-SURVEILLANCE FOR ONE HEALTH INDIA

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India's tribal communities possess extensive indigenous knowledge systems related to medicinal plants, forest-basednutrition, and ecological balance. However, much of this knowledge remains undocumented and vulnerable to erosion due to socio-economic transitions, environmental degradation, and limited integration with formal healthcare systems. Concurrently, tribalregions face increasing health risks, including zoonotic disease outbreaks, nutritional deficiencies, and climate-sensitive illnesses. These interconnected challenges necessitate an integrated and technology-enabled health framework. This study proposes theVanSwasthya Network, a conceptual AI-enabled digital ecosystem designed to preserve tribal medicinal knowledge, strengthennutrition security, and establish decentralized eco-health surveillance under the One Health paradigm. The proposed modelintegrates Artificial Intelligence for data analytics and outbreak prediction, Natural Language Processing for knowledgedocumentation, block chain for secure and transparent intellectual property governance, and community-based participatory datacollection mechanisms. The research adopts a conceptual and descriptive methodology using secondary policy reports, digital traditional knowledgerepositories, and comparative analysis of

conventional and digital health models. Findings suggest strong community acceptance ofdigital preservation initiatives when accompanied by ownership protection mechanisms. The integration of AI-driven analyticsdemonstrates potential to enhance early disease detection and environmental risk monitoring in forest-based regions.

VISION 2020 TOWARDS VIKSIT BHARAT THROUGH TECHNOLOGICAL DEVELOPMENT OF THE UNORGANIZED SECTOR

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The vision of Viksit Bharat under the framework of Vision 2020emphasizes inclusive and sustainable economic growth by integratingall sectors of the economy, particularly the unorganized sector. Thissector, which constitutes a significant portion of India's workforce,is often characterized by low productivity, limited access to finance,lack of formalization, and minimal technological adoption. The presentstudy explores the role of technological development as a catalyst fortransforming the unorganized sector into a more efficient,competitive, and resilient component of the economy. The paper highlights significant digital tools, fintech solutions,e-commerce platforms, and mobile-based technologies that can enhanceproductivity, improve market access, and ensure financial inclusionfor small and informal enterprises. It also examines governmentinitiatives such as Digital India, Skill India, and financialinclusion programs that support this transformation. Furthermore, thestudy identifies key challenges including digital illiteracy,inadequate infrastructure, and resistance to change, which hindertechnological adoption. The research concludes that strategic policy interventions, capacitybuilding, and increased investment in digital infrastructure areessential to empower the unorganized sector. By leveraging technology,India can bridge the gap between formal and informal economies,thereby accelerating progress towards the goal of a Viksit Bharat.

FEMALE CONTRIBUTION IN STOCK MARKET

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At this era, we had seen that the participation of women has gained in the stock market. Females are growing their attention in stock market in recent years due to its impact on economic growth and financial inclusion. Traditionally, financial

markets were male-dominated, but socio-economic changes, digitalization, war circumstances and financial awareness have encouraged women to invest. This paper explores the role, contribution, challenges, and emerging trends of female investors in the stock market, particularly in India. The study highlights that although women are still underrepresented, their participation is steadily increasing and positively influencing investment behaviours and market stability. The research highlights that women are gradually shifting from traditional saving methods to modern financial investments, contributing to economic growth and financial inclusion. Despite progress, barriers such as lack of financial literacy, risk aversion, and socio-cultural constraints still limit their full participation.

GROWTH OF FINTECH IN INDIA AND CYBERSECURITY CHALLENGES

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India has seen rapid growth in the Financial Technology (FinTech) sector in recent years. Digital payments, mobile banking, and online financial services have changed the way people handle money. The advent of the Unified Payments Interface (UPI) has made transactions fast, simple, and accessible to a large section of the population. This growth has supported financial inclusion by driving more people into the formal financial system. At the same time, the expansion of FinTech has increased cybersecurity risks. Challenges such as phishing, identity theft, data breaches, fake loan applications, and online payment fraud have become more common. Many users are still unaware of these risks, which makes them easy targets. This paper examines the growth of FinTech in India and identifies key cybersecurity challenges. It also discusses real examples of fraud and highlights gaps in awareness and regulation. The study suggests practical measures such as stronger security systems, better regulations, and user education to reduce these risks. The paper concludes that FinTech can support economic growth, but strong cybersecurity is necessary to build trust and ensure long-term sustainability.

HOME AUTOMATION & SECURITY USING AIML

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The rise of Internet of Things (IoT) technologies has opened new possibilities for building smart homes with autonomous capabilities for decision-making, hazard detection, and energy-saving operations. This paper describes the development of an AI/ML-driven smart home automation and security system based on the Raspberry Pi Pico W microcontroller, providing a unified, cost-effective and scalable platform for contemporary smart home technologies. The system design includes a sensor network, including an MQ-series LPG sensor for detecting combustible gases, an ACS712 Hall-effect current sensor for monitoring power consumption, and a magnetic reed-switch window sensor for detecting intrusions. Relay switches are used to automate the control of appliances such as lights and fans in response to sensor data and machine learning predictions. A DC buck converter converts 12V to 5V to supply power to the electronic components. Sensor readings are continually collected, processed, and sent over Wi-Fi to a cloud-based IoT dashboard using HTTP/MQTT communication protocols written in Micro Python using the Thonny IDE. The dashboard offers real-time monitoring of sensor data, appliance status, and historical data, allowing remote access and manual override via any internet-enabled device. Time-stamped, structured sensor data sets are used to train machine learning models for predictive analytics, such as power consumption prediction and anomaly detection of appliance operation. Experimental tests showed successful operation under various hazard scenarios. In response to gas leakage, automatic appliance turn-off and immediate dashboard warnings were generated in reasonable time. Intrusions through open windows produced instant alarms, and the current sensor successfully detected abnormal load variations which may correspond to possible electrical faults. The AI/ML component identified usage patterns and classified anomalies with acceptable accuracy, thereby facilitating safety measures. Findings prove that the integration of embedded IoT devices and machine learning-based analytics results in a safe, energy-efficient and reliable household management system.

THE ROLE OF 6G NETWORKS IN TRANSFORMING SMART CITY INFRASTRUCTURE

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Wireless communication has continuously shaped how cities grow and function. In recent years, the concept of smart cities has emerged as a way to improve urban living through connected technologies. While 5G has already enhanced connectivity, the upcoming 6G networks are expected to take this transformation much further. With extremely high data speeds, near-instant communication, and intelligent network capabilities, 6G can significantly improve how city systems operate.This paper examines how 6G can support smart city development in areas such as transportation, healthcare, energy management, and public safety. It also highlights key challenges, including security concerns, high deployment costs, and technical limitations, while suggesting possible future research directions.

GEOSPATIAL TECHNOLOGY FOR RURAL DEVELOPMENT: A SPATIAL ANALYSIS OF SOCIOECONOMIC TRANSFORMATION, AGRICULTURAL MODERNIZATION, AND INFRASTRUCTURE ACCESSIBILITY IN RURAL INDIA

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Geospatial technology has emerged as a transformative tool in analyzing and addressing rural development challenges. This study examines the role of Geographic

Information Systems (GIS), Remote Sensing (RS), and spatial analytics in understanding socioeconomic transformation, agricultural modernization, and infrastructure accessibility in rural India. By integrating spatial datasets with socio-economic indicators, the study highlights regional disparities and identifies development gaps. The research adopts a mixed-method approach combining spatial analysis, secondary data, and case-based interpretation. Results indicate that geospatial tools significantly enhance planning efficiency, resource allocation, and policy formulation. The study emphasizes the integration of geospatial intelligence into rural development strategies for sustainable and inclusive growth.

THE ROLE OF ARTIFICIAL INTELLIGENCE IN CORPORATE GOVERNANCE AND RISK MANAGEMENT

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Artificial Intelligence (AI) systems have established significant potential for upgrading across various domains, including autonomous vehicles, intelligent personal assistants, and advanced robotics. Up to date developments in creative AI have further emphasized this potential, particularly for knowledge-intensive responsibility. However, developing public awareness of AI-mixed risks and the need to align AI systems with human and social values has led to the growing of ethical frameworks and regulatory measures. ToaddressAI-corporate governance challenges and promote transparency, fairness, andprivacy, new governance tools and processes are required. Consequently, use of an increasing demand for empirical research on AI corporate governance value within organizations deploying AI systems. While information technology(IT)anddatagovernancearelaunched are as of informationsystems(IS) research, AI governance is yet an emerging field. The aim sets out to explore and elaborate on the impact of artificial intelligence (AI) and blockchain adoption in corporate governance from ethical interpretation. In total, this research collects an abundance of data: 13 Linked in Posts with Comments; 3 Webinars; 7 YouTube Videos; and 6 semi-structured interview videos. This study innovative develop a data analysis framework that constitutes the corporate governance transformation data analysis with the risk management use of AI and

blockchain technology. This data understanding of why corporate governance needs to change, especially with the emergence of data analysis and AI technologies, what modification will corporate governance encounter. Effective data value to priories creativity, speed, and accountability, to replace the old business model, to foster agile or collaborative governance to deal with uncertainty and cooperation in the digital world faster transaction, to foster a network and platform strategies to drive success. Corporate governance is one of the key tools to counter the effects of current economic changes and information technology development, the global financial crisis, as well as to sound corporate governance practices. the study was conducted within certain theoretical, methodological, empirical, and pragmatic conditions, the identifies seven contingency factors: volume of AI systems, industry sector, regulation, customer expectations, cultureandvalues, strategicpriorities, and technology and process maturity.

AN ANALYSIS OF SUSTAINABILITY OF ARTIFICIAL INTELLIGENCE AND ITS IMPACT ON ENVIRONMENT

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While AI is radically altering our economic and societal systems, its impact on the environment is becoming more prominent. In this paper, we will explore the latest findings regarding both direct environmental effects – such as energy use in AI training and inference, emissions from data centers, and hardware manufacturing/waste disposal – and indirect effects related to AI-driven technologies that can either mitigate or relocate emissions. According to our study, training the model requires a considerable amount of power consumption and production of many

pollutants. As was the case in the era of large-scale models and data centers when there were huge demands for materials and waste production. Artificial intelligence-based applications could contribute positively depending on how they are designed and utilized. In particular, artificial intelligence could increase transportation, agricultural, and industrial processes' energy efficiency. Moreover, artificial intelligence-based systems could be used to monitor environmental compliance by individuals. Therefore, artificial intelligence's effect on the environment may not necessarily be negative. Its impact is dependent on design and system implementations and policies. We think a three part framework is a way to look at and improve AI sustainability.

USE OF SMART TECHNOLOGIES FOR IMPROVING ENVIRONMENTAL SUSTAINABILITY INBUSINESS

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Smart technologies such as the Internet of Things (IoT), artificial intelligence (AI), big-data analytics, automation, and blockchain are fast becoming key tools for businesses committed to environmental sustainability. This paper explores how firms use these tools to cut energy use, reduce waste, lower carbon emissions, and improves resource efficiency while still meeting their financial goals. The study adopts a mixed-method approach, combining a review of existing cases and empirical studies with a small-scale hypothetical dataset to illustrate the relationship between technology adoption and environmental performance. Findings show that when smart technologies are integrated purposefully into operations, supply chains, and buildings, they can significantly improve both environmental outcomes and business sustainability. The paper concludes with practical suggestions for managers and policymakers to scale up smart-tech-driven green initiatives.[1][2][3][4]

AI IN ACCOUNTING EDUCATION: A STUDY FROM STUDENT'S PERSPECTIVE

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With the introduction of digital tools and machine learning systems, artificial intelligence (AI) is having a growing impact on accounting education. This research was designed to analyse the role of AI in accounting education from the perspective of students, with a particular emphasis on their awareness, usage, and understanding of AI tools in academic learning. This study focused on primary data collected through an organised questionnaire administered to students pursuing B.Com, B.Com (Hons), and other commerce-related studies. A convenient sampling technique was used. The questionnaire collected responses regarding the use of AI tools in financial accounting, auditing, taxation, and management accounting. The collected data was analysed using statistical techniques such as descriptive statistics and correlation analysis to test the hypotheses proposed in the research. This study concludes that students were familiar with AI tools, and their responses correlated with actual usage patterns. Based on these conclusions, it was concluded that if AI tools are widely adopted by students, they are likely to improve conceptual understanding, increase efficiency in solving accounting problems, and boost academic performance. Furthermore, integrating AI into educational practices may result in more interactive and beneficial learning environments. Thus, the study concludes that Artificial Intelligence has the potential to greatly influence accounting education, depending on its easy access and effective implementation.

ANALYZING THE EFFECTIVENESS OF EMPLOYEE ENGAGEMENT STRATEGIES IN THE SERVICE INDUSTRY: A STUDY OF AMRAVATI REGION

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Employee engagement has become a crucial determinant of organizational performance, particularly in service-oriented industries where human interaction directly influences service quality and customer satisfaction. This study examines the effectiveness of employee engagement practices in the service sector of the Amravati region, Maharashtra, which includes industries such as banking, healthcare, IT

services, and education. The research aims to assess the current level of employee engagement, identify key influencing factors, and analyze its impact on organizational productivity and employee retention. A descriptive analytical research design has been adopted, with primary data collected through structured questionnaires and semi-structured interviews from approximately 100 respondents, including employees and managers across selected service sectors. The study focuses on key engagement drivers such as leadership support, work environment, recognition and rewards, career development opportunities, organizational culture, and training and development. The findings are expected to reveal that higher levels of employee engagement positively influence job satisfaction, productivity, and employee retention, while challenges such as workload pressure, limited growth opportunities, and lack of recognition may hinder engagement levels. The study also highlights the importance of effective human resource practices and supportive leadership in fostering a motivated and committed workforce. This research contributes to existing literature by providing region-specific insights into employee engagement in a developing service economy and offers practical recommendations for organizations and HR professionals to enhance engagement strategies. Ultimately, improving employee engagement can lead to better service delivery, increased organizational performance, and sustainable growth in the Amravati region.

THE ROLE OF GOVERNMENT IN WOMEN EMPOWERMENT

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Women's empowerment has emerged as a central pillar in India's socio-economic development agenda reflecting the country's commitment to gender equality, inclusive growth and social justice. Over the decades the Government of India has implemented a wide range of legislative, policy and programmatic interventions aimed at dismantling structural barriers that restrict women's access to education, employment, healthcare and political participation. This paper analyzes the evolving role of the government in fostering women's empowerment using key national datasets.

PERCEPTIONS OF SKILL DEVELOPMENT INITIATIVES AMONG COMMERCE STUDENTS: A QUALITATIVE STUDY ON CAREER READINESS AND INCLUSIVE DEVELOPMENT

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Skills development initiatives have been widely recognized as being vitally important in terms of enhancing employability potential and promoting sustainable economic growth, particularly with respect to developing economies. As it relates to higher education & the promotion of skills development initiatives, the focus of students pursuing a degree in Commerce has been on establishing a pathway that will lead to a bridge between academia and industry. The human behaviour research study is an effort to gain a better understanding of what students think about skills development initiatives from within the framework of qualitative research. The study uses a qualitative research design, and includes interviews with students enrolled in Commerce. The research will demonstrate the possibility for the concept of inclusion to be promoted as an outcome of the study, while emphasizing that skills development initiatives are a critical component to enhancing economic growth opportunities for the purposes of both sustained and expanded growth and development of the economy, while being consistent with the concept of inclusion.

LEADERSHIP AND MOTIVATION OF UNPAID AND REMOTE INTERNS IN STARTUPS: A DESCRIPTIVE STUDY

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The organisational structures and workforce dynamics have been radically redefined by the swift development of remote work that has been accelerated by the digital transformation and the COVID-19 pandemic. Out of these changes, the introduction of remote unpaid internships, especially in startups, has also posed new problems of how to manage and maintain the motivation of interns. Without monetary rewards and physical contact in the workplace, leadership behaviour becomes an important factor in determining the engagement and performance of interns. This

research paper discusses how various leadership styles, including transactional, laissez-faire, and supportive/participative leadership, influence the motivation of remote unpaid interns in startups. The study takes a quantitative research design, where a structured questionnaire was administered to 110 respondents with experience in remote unpaid internships. The data analysis is based on descriptive statistics, correlation analysis, and regression analysis to verify the correlation between leadership styles and intern motivation. The results indicate that supportive/participative leadership will exert the most positive effect on intern motivation, and then transformational leadership. These styles of leadership can be applied successfully to increase the intrinsic motivation form of motivation since they offer recognition, communication, mentorship, and personal development opportunities. The moderate positive effect is reflected by transactional leadership, which is mainly based on orderly communication and task clearance, and laissez-faire leadership, which is negatively impacted and results in a lack of engagement and motivation. The research also notes that motivation in remote unpaid internship environments is largely driven by non-financial aspects like learning opportunities, recognition, autonomy and engagement. Leadership behaviour, thus, serves as an alternative to monetary reward, and it is crucial to underline active and supportive leadership practices in startups. The study fills the gap in the literature by covering one of the most important areas of leadership, remote work, and unpaid internships, especially in the context of small-scale organisations.

AN EMPIRICAL STUDY ON FINANCIAL WELL-BEING AND DIGITAL INVESTMENT BEHAVIOUR AMONG GENERATION Z

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In recent years, digital financial service platforms have transformed how individuals invest, particularly among Generation Z. This research explores the connection between financial well-being, financial literacy, and digital investment behaviour among Gen Z. Although easy access to online investment tools allows more participants to enter financial markets, there remain concerns about the quality of decision-making and its effects on financial well-being. The research design uses a quantitative approach, with primary data gathered through a structured questionnaire.

Gen Z responses were collected and evaluated on a five-point Likert scale. The constructs identified were digital investment behaviour, financial literacy, financial well-being, and behavioural biases. The data was analysed using statistical techniques, such as descriptive analysis, reliability test, and correlation, to test the hypotheses proposed in the research. The findings suggest that there is a strong positive impact of financial literacy on financial well-being, which implies that people with more financial education are more likely to attain financial stability and confidence. Digital investment behaviour has a dual effect on financial well-being, as it is easy to get involved in investments, but it can lead to quick and less informed choices. Furthermore, behavioural biases such as fear of missing out and overconfidence have an adverse effect. This study emphasizes the importance of improved financial education and responsible digital investment practices among Gen Z. It adds to the existing body of knowledge by combining behavioural factors, financial literacy, and digital investment behaviour into one framework and providing effective implications for policymakers, educators, and fintech platforms.

DEVELOPMENT AND ANALYTICAL, NUMERICAL, AND EXPERIMENTALINVESTIGATION OF REPLACEABLE FUSE LINK BEAM-TO-COLUMNCONNECTIONS IN STEEL MOMENT-RESISTING FRAMES

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Steel moment-resisting frames (MRFs) are extensively employed as lateral load-resisting systems in seismic regions owing to their superior ductility and energy dissipation characteristics. However, conventional rigid beam-to-column connections are susceptible to brittle failure and significant damage during strong seismic events, resulting in costly and time-consuming repair and rehabilitation. To address these limitations, the present study proposes a novel fuse link beam-to-column connection that integrates replaceable ductile elements within the connection region to enhance seismic resilience. The proposed connection consists of bolted replaceable fuse links designed to act as structural fuses, wherein inelastic deformation is intentionally confined to the fuse elements through axial yielding and controlled buckling mechanisms, while ensuring elastic behaviour of primary structural members such as beams and columns. A comprehensive semi-analytical model is developed to predict the load-deformation response and moment-rotation behaviour of the connection,

incorporating key parameters such as geometry, stiffness, and material properties. Subsequently, detailed finite element-based numerical analyses are carried out to validate the analytical model and to investigate the nonlinear behaviour of the connection under monotonic and cyclic loading conditions. Further, experimental investigations on full-scale beam-column sub-assemblages are conducted to assess the strength, stiffness, ductility, and energy dissipation capacity of the proposed system. The performance of steel MRFs incorporating the developed connection is evaluated through nonlinear static (pushover) analysis of multi-storey frames to examine global response characteristics such as lateral stiffness, strength, drift capacity, and failure mechanisms. The results indicate that the proposed fuse link connection provides adequate rotational stiffness, significant ductility, and stable hysteretic behaviour, while effectively localizing damage within replaceable components. The study demonstrates that the developed connection offers a cost-effective, repairable, and resilient alternative to conventional rigid connections, thereby contributing to the advancement of performance-based seismic design and sustainable structural systems.

INTERNATIONAL ENVIRONMENTAL POLICIES

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International environmental policies, in the contemporary global context, are not merely formal agreements but represent a collective commitment to safeguarding human existence and maintaining ecological balance. The growing challenges of climate change, rapid loss of biodiversity, air and water pollution, and the unsustainable exploitation of natural resources have made it evident that environmental issues transcend national boundaries. Consequently, their resolution requires coordinated international efforts and well-structured policy frameworks that bring nations together on a common platform. At the core of these policies lies the principle of sustainable development, which emphasizes meeting present needs without compromising the ability of future generations to meet their own. A key guiding concept within this framework is that of “common but differentiated responsibilities,” which ensures a balanced distribution of obligations among developed and developing countries, taking into account their varying economic capacities and technological advancements. Additionally, mechanisms such as financial assistance, technology transfer, and capacity-building initiatives play a crucial role in facilitating the effective implementation of these policies. Despite their significance, international environmental policies face several practical challenges. Conflicts between national

interests and global environmental goals, lack of political will, and disparities in resources and responsibilities between nations often hinder their successful execution. Moreover, issues related to compliance, monitoring, and accountability further complicate their effectiveness. However, these challenges can be addressed through strengthened multilateral cooperation, enhanced transparency, and a more inclusive approach to global governance. This paper aims to provide a comprehensive analysis of the evolution, principles, implementation mechanisms, and challenges associated with international environmental policies. It also highlights the importance of public participation, local-level awareness, and inclusive policy-making in enhancing their effectiveness. Ultimately, international environmental policies are not just diplomatic instruments but a reflection of shared global responsibility, guiding humanity towards a more sustainable, balanced, and secure future.

OPTIMIZATION OF PROCESS PARAMETERS IN ROLL FORMING PROCESS: A CASE STUDY AT M/S CHAITANYA STEEL SHAPE PVT. LTD., JALGAON (MS), INDIA

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The roll forming process involves feeding sheet metal through a sequence of rollers, each of which imparts a specific shape to the metal. These rollers collaborate to produce the desired cross-section. Due to its consistency and ease of repetition, roll forming is an excellent method for accurately producing large quantities of metal components. Rollforming enables the production of long components with intricate cross-sections from sheet materials that exhibit high strength.This paper aims to develop a fundamental understanding of the effect of control factors such as roll load at entry and exit, roll speed roller diameter, temperature of rollers, bending pressure, percentage reduction in thickness of roll sheet on final shape in the roll formed parts by using Taguchi's method of process optimization. This study aimed at enhancing the quality characteristic of roll forming process, by optimizing some roll forming process parameters using the Taguchi method. Also, the effect of process parameters in roll forming of mild steel has been investigated. To analyze how roll forming process parameters affect final shape of the roll formed sheet, anorthogonal array(OA),main effect analysis, signal-to-noise (S/N) ratio are employed. The results

indicate that the optimal conditions forminimizingshape geometryofroll formed sheet includean entryand exit load, roll speed, no. of pass and such others. Additionally, the Taguchi method for Design of experiments (DOE) is used to explore significant effects, including interactions among roll forming process.

BRIDGING THE GAP IN YOUTH PSYCHOLOGICAL WELL-BEING: A CONCEPTUAL FRAMEWORK FOR INTEGRATING DIGITAL INTERVENTIONS AND COMMUNITY HEALTH WORKERS IN LMICS

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The Unprecedented rise of Mental health disorders among the Youth are contributing to a public health crisis, where most conditions emerge before 25. In Low and Middle Income Countries (LMICs) especially India, workforce shortage of healthcare professionals, limited access to services and stigma tends to broaden the treatment gap. Digital Mental Health Interventions have demonstrated small to moderate effects in reducing the symptoms of Anxiety and Depression, hence have emerged as scalable tools to enhance psychological support. However, lower sustained engagement and higher drop outs pose as a challenge in the unguided format of the intervention. The current paper employed narrative review approach to synthesize evidences from youth psychology, digital mental health and task-sharing literature. Key findings suggest that guided and blended interventions outperforms self-directed tools due to improved engagement and adherence. Likewise, Community Health workers – based task-sharing models have demonstrated effectiveness in extending mental health services in LMICs. Despite these advancements, there is a lack of integrated framework which can combine digital tools with Community Health Workers. The findings enabled the development of conceptual Hybrid Digital – CHW Model for scalable youth mental health care in LMICs. This model is based on a stepped care system, which integrates digital tools for screening, psychoeducation and self-management along with CHW led monitoring and referral pathways. The proposed framework is aimed at accessibility and scalability, providing a sustainable approach in a low resource setting for the Youth's well-being.

PERFORMANCE-ORIENTED PROBABILISTIC ANALYSIS OF SEISMIC VULNERABILITY IN EXISTING RC FRAMED BUILDINGS

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A probabilistic methodology based on Incremental Dynamic Analysis (IDA) is presented for the seismic performance assessment of typical non-seismic reinforced concrete (RC) framed buildings representative of a large inventory of existing structures. The study aims to evaluate structural performance, damage states, fragility, and hazard-survival probability. For the IDA, a suite of 20 recorded Indian earthquake ground motions was selected through a detailed statistical evaluation of key ground motion parameters, including peak ground acceleration, peak ground velocity, peak ground displacement, RMS acceleration, RMS velocity, RMS displacement, Arias intensity, characteristic intensity, spectral acceleration, acceleration spectrum intensity, and significant duration. This record set effectively captures the variability in structural response due to the randomness of earthquake input motions. Median spectral acceleration over the period range relevant to the considered building population is proposed as an efficient intensity measure. The seismic response of the sample building is quantified in terms of yield and collapse capacities using IDA curves. Yield capacity is defined as the intensity level at which the IDA curve departs from linear behavior, while collapse capacity is identified as the intensity level at which the curve becomes horizontal. The results obtained from the 20 ground motions are used to assess record-to-record variability in response. Fragility curves are then developed to express the probability of exceeding yield and collapse damage states at different intensity levels. Finally, hazard-survival curves are generated by converting the intensity axis of the fragility curves into annual probability of exceedance using a log-log linear ground motion hazard model. The proposed framework provides a clear probabilistic measure of the likelihood of yielding and collapse under varying earthquake intensities.

ADOPTION OF SOLAR IRRIGATION SYSTEMS AND IT'S IMPACT ON RURAL DEVELOPMENT-A STUDY

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The study titled *"Adoption of Solar Irrigation Systems and it's Impact on Rural Development-A study"* examines the role of solar-powered irrigation in enhancing agricultural productivity and promoting sustainable rural development in India, with a specific focus on Maharashtra and the Vidarbha region. Agriculture in rural India heavily depends on reliable irrigation; however, traditional methods powered by electricity and diesel face challenges such as high operational costs, energy insecurity, and environmental degradation. Solar irrigation systems have emerged as a viable and eco-friendly alternative to address these issues. The primary objective of this research is to analyse the adoption level of solar irrigation among farmers, identify the key factors influencing its adoption, and evaluate its economic, social, and environmental impacts. The study adopts a descriptive and analytical research design, using both primary and secondary data. Primary data were collected through structured questionnaires and interviews with 100 farmers, while secondary data were sourced from government reports, research articles, and institutional publications. The findings reveal that solar irrigation significantly reduces dependence on conventional energy sources, lowers irrigation costs, and ensures reliable water supply, leading to increased cropping intensity and improved farm income. Additionally, the technology contributes to rural development by generating employment opportunities, empowering farmers (including women), and reducing seasonal migration. However, the study also identifies key challenges such as high initial investment, lack of technical awareness, limited access to financing, and concerns related to groundwater over-extraction. The research concludes that while solar irrigation systems hold immense potential for sustainable agricultural growth and rural development, their widespread adoption requires stronger policy support, enhanced awareness programs, improved financial accessibility, and effective water management practices. The study provides valuable insights for policymakers, researchers, and stakeholders to promote renewable energy-based irrigation solutions in rural areas.

GREEN CHEMISTRY-DRIVEN SYNTHESIS OF METAL NANOPARTICLES FOR SUSTAINABLE ENVIRONMENTAL APPLICATIONS

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Increasing environmental pollution and the harmful effects of conventional chemical synthesis methods have created a strong need for sustainable and eco-friendly alternatives. Green chemistry provides an efficient approach for synthesizing metal nanoparticles by reducing the use of toxic chemicals and promoting renewable biological resources. In the present study, plant-based extracts were employed as natural reducing and stabilizing agents to synthesize metal nanoparticles through a simple, cost-effective, and environmentally benign process. The prepared nanoparticles were characterized using spectroscopic and microscopic techniques to determine their size, morphology, and stability. Their potential application in environmental remediation was further explored, particularly for the degradation of organic pollutants in wastewater. The results indicate that these biosynthesized nanoparticles exhibit excellent catalytic activity and effectively break down harmful contaminants under mild conditions. This green synthesis approach minimizes hazardous waste generation and supports sustainable development while maintaining efficiency. Additionally, the method is scalable and economically viable, making it suitable for practical applications. The combination of green chemistry principles with nanotechnology offers a promising solution for addressing environmental challenges. Future work may focus on optimizing synthesis conditions and utilizing diverse plant sources to further enhance nanoparticle performance and expand their environmental applications.

PERFORMANCE EVALUATION OF SOLAR-DRIVEN ALKALINE ELECTROLYZER-FED PEM FUEL CELL HYBRID MICROGRIDS

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The increasing demand for sustainable and low-carbon energy systems has accelerated research on renewable energy technologies and alternative energy storage solutions. Solar photovoltaic (PV) systems are widely considered a promising renewable energy source; however, their intermittent nature creates challenges in

maintaining reliable and continuous power supply, particularly in off-grid and remote applications. Hydrogen-based energy storage systems offer a potential solution by enabling the storage of surplus renewable energy in the form of hydrogen and converting it back into electricity using fuel cell technology. This research proposes the design and performance evaluation of a solar-driven hydrogen hybrid microgrid integrating a photovoltaic system, an alkaline electrolyzer, hydrogen storage, and a proton exchange membrane (PEM) fuel cell for sustainable off-grid power generation. In the proposed system, excess solar electricity is utilized for hydrogen production through water electrolysis using an alkaline electrolyzer. The produced hydrogen is stored and later supplied to a PEM fuel cell to generate electricity when solar power generation is insufficient or when load demand increases. The proposal aims to experimentally develop and validate the integrated hybrid system to analyze system performance, operational stability, and energy conversion efficiency under varying solar irradiance and dynamic load conditions. The research will also investigate energy management strategies to optimize system operation and improve round-trip energy efficiency. The outcomes of this study are expected to contribute to the development of efficient hydrogen-based renewable energy systems and demonstrate the feasibility of solar-driven hybrid microgrids for reliable and sustainable off-grid power applications.

ROLE OF GRAPHENE OXIDE IN GREEN NANOTECHNOLOGY: A MULTIFUNCTIONAL MATERIAL FOR ENVIRONMENTAL MONITORING ANDREMEDIATION

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Graphene oxide (GO) has emerged as a promising material in green nanotechnology, offering versatile solutions for environmental monitoring and remediation. Its unique structural and chemical features, including a high surface area and reactive functional groups, enable efficient interaction with a wide range of environmental contaminants. This study highlights the dual functionality of GO as both a sensing material and a remediation agent within sustainable environmental systems. In monitoring applications, GO-based platforms provide high sensitivity and selectivity for detecting trace pollutants, supporting accurate and rapid environmental assessment. Simultaneously, GO plays a significant role in remediation by adsorbing

and transforming hazardous substances through various physicochemical mechanisms. The use of environmentally friendly synthesis methods further enhances its sustainability by reducing the reliance on toxic chemicals and energy-intensive processes. Additionally, the incorporation of GO into composite materials improves its stability, reusability, and performance under complex environmental conditions. Integrated systems combining detection and removal functions demonstrate the potential for more efficient and adaptive environmental technologies. Despite these advantages, evaluating the ecological safety and long-term effects of GO remains essential. Overall, this work emphasizes the importance of combining green chemistry principles with nanotechnology to develop effective, sustainable strategies for environmental protection and pollution control.

UTILIZATION OF SISAL LEAF EXTRACT AS A PARTIAL REPLACEMENT OF WATER IN CONCRETE FOR IMPROVED MECHANICAL AND DURABILITY PERFORMANCE

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Sisal (*Agave sisalana*) is an important natural fiber crop, and a large quantity of sisal leafextract isgeneratedasaby-product during fiber extraction.Thisextract isgenerally discarded, creating environmental concerns despiteits potential for useful applications. Althoughsisalleafextract hasbeen investigated inother fields, itsuse inconcretehas received limited attention. At the same time, the construction industry consumes a substantial amount of fresh water, making water conservation an important issue. This study examines the suitability of sisal leaf extract (SLE) as a partial replacement for mixing water in concrete. The quantity, physical properties, and chemical composition of SLE were evaluated, and GC-MS analysis was performed to identifyits constituent compounds. The influence ofSLE on cement properties, workability, and the mechanical performance of concrete was investigated for M20, M25, and M30 grades. The study also assessed compressive strength, flexural strength, split tensile strength, stress-strain behavior, elastic modulus, ultrasonic pulse velocity, and durability-related properties such as so rptivity, water absorption, loss of weight on drying, permeability, rapid chloride penetration, and sulphate resistance. The results indicate that SLE-modified concrete showed

improved compressive strength at optimum replacement levels. At 28 days, the maximum strength was observedat 2.5%replacement forM20,5%forM25,and5%for M30concrete.Itwas also foundthat watercanbereplaced withSLEupto 2.5% forM20,5%forM25,and 7.5% for M30 without reducing compressive strength below that of the reference concrete. The durability performance of SLE concrete was comparable to that of conventionalconcrete. Overall, the findings suggest that sisal leaf extract canbe used as a promising eco-friendly partial replacement for water in concrete.

GREEN SYNTHESIS OF INDOLE DERIVATIVES FOR ENVIRONMENTAL APPLICATIONS

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The rising environmental concerns associated with traditional chemical processes have encouraged the advancement of sustainable and environmentally friendly synthetic approaches. Indole derivatives, recognized for their versatile heterocyclic framework and broad structural diversity, have gained importance in green and environmental chemistry. This study emphasizes the design and preparation of indole-based compounds using eco-conscious methods, including renewable raw materials, green solvents such as water and ethanol, and energy-saving techniques like microwave irradiation, ultrasound assistance, and catalyst-free reactions. These approaches focus on improving atom efficiency, decreasing hazardous waste generation, and lowering energy requirements, in accordance with the core principles of green chemistry. The resulting indole derivatives demonstrate considerable potential in environmental applications, such as pollutant conversion, corrosion control, and the formulation of sustainable agrochemicals. Their lower toxicity, structural flexibility, and enhanced biodegradability make them suitable for environmentally safe applications. Furthermore, this work highlights the connection between molecular architecture and environmental performance, emphasizing the need to design compounds that achieve both effectiveness and ecological compatibility. Overall, combining green synthetic strategies with indole chemistry provides a promising route toward cleaner production technologies and supports the development of sustainable solutions in environmental chemistry.

INCORPORATING WASTE POLYETHYLENE IN ASPHALT PAVEMENT MIXTURES: A SUSTAINABLE APPROACH

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Bituminous mixtures are extensively used in flexible pavement construction, consisting of asphalt or bitumen as a binder combined with mineral aggregates, which are mixed, laid in layers, and compacted. While well-designed bituminous pavements generally perform satisfactorily, they often face performance issues due to increasing traffic loads, temperature variations, and moisture-induced conditions. To enhance durability, extensive research has focused on incorporating additives and modifying bitumen. Studies have demonstrated that adding polymers to asphalt binders improves the adhesion between aggregate and binder, leading to enhanced pavement performance. However, the chosen additive must be both structurally effective and economically viable. Plastic waste, particularly in developing countries like India, presents a major environmental challenge due to its non-biodegradable nature. Among various plastics, Low-Density Polyethylene (LDPE) has been identified as an effective bitumen modifier, even when derived from reclaimed waste materials. This study investigates the feasibility of using reclaimed polyethylene from OMFED milk packets as a stabilizer in Stone Mastic Asphalt (SMA), Bituminous Concrete (BC), and Dense Bituminous Macadam (DBM) mixes. The Marshall Procedure was used to determine the Optimum Binder Content (OBC), which was found to be 4% for SMA and 4.5% for both BC and DBM when using stone dust as a filler. When fine aggregate was partially replaced with granulated blast furnace slag and fly ash, the OBC increased to 5% for SMA and 4% for BC and DBM. The Optimum Polyethylene Content (OPC) was determined to be 2% for SMA and DBM and 1.5% for BC with stone dust as a filler. However, when slag and fly ash were incorporated, the OPC was consistently found to be 1.5% across all mix types. To assess the impact of polyethylene as a stabilizer, performance evaluations were conducted, including the Drain Down Test, Static Indirect Tensile Strength Test, and Static Creep Test. The results indicate that incorporating OMFED polyethylene significantly enhances key mix properties, such as Marshall Stability, drain-down resistance, and indirect tensile strength. These findings highlight the potential of using reclaimed polyethylene as a sustainable and effective modifier for improving the performance and longevity of bituminous pavement mixtures. Keywords: Bituminous Concrete (BC), Stone Mastic

Asphalt (SMA), Dense Bituminous Macadam (DBM), OMFED Polyethylene, Marshall Properties, Static Indirect Tensile Strength, Static Creep Test.

BEHAVIOURAL ANALYSIS OF RETAINING STRUCTURES USING BACKFILL CONSISTING OF SOIL–CONSTRUCTION DEBRIS BLENDS

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Accelerated urbanization and continuous expansion of infrastructure networks have resulted in a rapid increase in construction activities, which periodically undergo renovation, retrofitting, and redevelopment. These processes, along with damage caused by natural disasters such as earthquakes, generate significant quantities of construction and demolition waste (CDW). Globally, approximately **45 million tonnes of CDW** are produced annually, yet only **12.3 million tonnes** are currently recycled, leading to increased air pollution and severe constraints on landfill availability. Environmental impacts (EI) associated with CDW landfilling are projected to increase by **20.2%**. However, recycling **50%** of CDW instead of landfilling can reduce EI by **33%**, while complete recycling has the potential to further reduce EI by **46%**. In India, urban local bodies are estimated to generate **500–700 million tonnes of CDW annually**, requiring nearly **1750 acres of additional land every year** for disposal. Studies have shown that approximately **20% of CDW** can be reused in building construction, while **100%** of the material is suitable for reuse in flyovers, significantly reducing the need for landfilling. A major fraction of CDW comprises building-derived materials (BDM), which can be processed into coarse aggregate-sized particles and utilized as an alternative geomaterial for subgrade and fill applications. The management and reuse of such waste materials remain a critical challenge, particularly in developing nations. Concurrently, the extraction of conventional backfill materials such as natural sand has been increasingly restricted due to environmental considerations, encouraging the exploration of sustainable alternatives. Despite this, limited research has been carried out on the combined use of BDM and natural soil as backfill material for retaining structures. The present study aims to evaluate the geotechnical performance of locally available soils partially replaced with BDM for application in earth-retaining systems. In this investigation, locally sourced sand and red soil were individually blended with **0–30% BDM by dry mass** to examine the feasibility of BDM as a partial backfill replacement. Laboratory experiments were

conducted to determine the index properties, strength characteristics, and volumetric behaviour of the individual materials and their mixtures. The results indicate that BDM can function effectively as a lightweight backfill material at an optimum replacement level of **20%**. Consolidated undrained triaxial tests demonstrated an increase in shear strength parameters with the inclusion of BDM up to this optimum content.

INFLUENCE OF PLASTIC HINGE FORMATION SEQUENCE ON PUSHOVER ANALYSIS OF 3D FRAMES

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Pushover analysis is widely used to assess the seismic performance of structures, yet discrepancies often remain between analytically predicted and experimentally observed displacements. While much of the earlier improvement effort has focused on geometric and material modeling, the sequence of plastic hinge formation and its effect on displacement response deserves greater attention. This study examines that issue and proposes practical strategies to reduce the computational effort required to account for plastic hinge formation sequence in performance evaluation. In Strategy 1, 15% of the potential plastic hinge locations are treated as uncertain and allowed to vary, leading to different hinge formation sequences. Two sub-strategies are considered by distributing the uncertain hinge locations either in horizontal planes or in vertical planes. When the uncertain hinges are restricted to horizontal planes, the base sheardiffers from the experimental results byonly1.4%to 1.7%, although displacements are about 10% lower. When the uncertain hinges are restricted to vertical planes, the differences increase to about 7% for base shear and 15% for displacement, indicatingthat horizontal plane assignment yields better agreement. Strategy2 randomizes the uncertain plastic hinge locations throughout the 3D frame. The results show that this approach performs better than Strategy 1 and produces analytical responses that closely match the experimental observations. Strategy 1 is useful when defects or deficiencies are known in advance, whereas Strategy 2 is suitable for general applications.

ANALYSIS SWITCHING PULSE OF DC LEVEL SHIFTING MODULATING TECHNIQUE IN MULTILEVEL INVERTER

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Multilevel Inverters (MLI) is contemplating in an attempt to optimize the ripple content and voltage stress across power semiconductor devices. This breakthrough is an essential aspect for a high power and medium voltage applications. In this work, Modulating technique is analyzed and designed to synthesize maximum level at the output. The proposed DC level switching technique is used on cascaded topology is designed to reduce total harmonic distortions in output AC waveform. The detailed analysis is done on 9-level (line-line) with continuous AC sinusoidal waveform. This 9-level is achieved by cascading two basic cells in series. The topology used can be extended for N level by using (3N-3)/2 switches and (N- 1)/4 dc sources. DC level shifting technique consists of reference sinusoidal wave and carrier DC levels. The Number of DC carrier levels depends on the number of levels generated. When sinusoidal wave is greater than dc level a pulse is generated at the output .This techniques is beneficial as compared with other modulating technique as it does not require high frequency carrier waveform. The analysis of switches is evaluated with software results. The software results are validated using MATLAB/SIMULINK. The total harmonic distortion (THD) using modulating DC Level shifting technique is found to be 10.41 %.

EXPLORING THE ROLE OF FOOD, SERVICE, AND ATMOSPHERE IN FINE DINING CUSTOMER SATISFACTION IN INDIA

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India's burgeoning fine dining scene is a sensory spectacle, a meticulously crafted symphony of flavours, attentive service, and an atmosphere that elevates the dining experience to an art form. However, in this competitive arena, understanding the elusive concept of customer satisfaction is crucial for restaurants to thrive. This study embarks on a captivating exploration, delving beyond generic restaurant satisfaction research to unveil the unique drivers that truly resonate with discerning Indian fine dining patrons.Imagine a tapestry woven with the vibrant threads of

impeccable service, meticulously plated delicacies, and an ambiance that whispers luxury. This tapestry represents India's burgeoning fine dining scene, a landscape where discerning diners seek experiences that transcend mere sustenance. Yet, in this realm of heightened competition, a crucial question arises: what truly satiates the sophisticated palate of the Indian fine diner? Existing research offers a broad canvas, but this study delves deeper, focusing on the finer details that differentiate satisfaction in the world of fine dining.Gone are the days of one-size-fits-all approaches. This study recognizes the distinct character of Indian fine dining, where personalized service, curated menus that tantalize the taste buds, and an atmosphere that exudes a touch of grandeur play a pivotal role.By bridging the knowledge gap, this study empowers restaurants with the insights needed to craft targeted strategies, refine service quality, carve a competitive niche, and anticipate future trends in customer expectations. This translates to a roadmap for creating exceptional dining experiences that leave a lasting impression, transforming customers into loyal patrons and propelling restaurants to new heights of success.Through this captivating exploration, the study unveils the secrets of customer satisfaction in Indian fine dining, a realm where every element of the experience plays a part in creating a culinary symphony that resonates deeply with discerning diners.

PERFORMANCE ENHANCEMENT OF EXPANSIVE SUBGRADE SOIL USING FLY ASH AND BITUMEN-COATED MESH REINFORCEMENT

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The performance of flexible pavements is highly governed by the engineering characteristics of the subgrade, which serves as the primary load-supporting layer of the pavement system. Expansive soils, typically characterized by high silt and clay content, exhibit undesirable volume change behaviour and low shear strength, necessitating stabilization prior to pavement construction. In this study, fly ash was utilized as a partial replacement of the natural subgrade soil to improve its geotechnical properties. Fly ash, being an industrial by-product, offers a sustainable alternative for subgrade improvement and waste utilization. To enhance the strength and bearing capacity of the treated soil, bitumen-coated chicken mesh and bamboo mesh were incorporated in multiple layers within the CBR mould. The specimens were prepared at their optimum moisture content and maximum dry density, and laboratory

investigations were carried out to determine the California Bearing Ratio and Unconfined Compressive Strength for different replacement percentages and reinforcement configurations. The results indicated that 15% fly ash replacement combined with four layers of bitumen coated chicken mesh produced the maximum CBR value, demonstrating a significant improvement in load-bearing performance. In addition, plastic waste was introduced as a partial replacement material to address moisture related issues and improve the stability of the subgrade. Comparative evaluation of UCS, CBR, MDD, and OMC showed that the modified soil outperformed the untreated soil. The findings suggest that the combined use of fly ash, plastic waste, and mesh reinforcement can provide an effective and sustainable solution for the stabilization of expansive subgrade soils in flexible pavement applications.

THE TRANSFORMING BUILDING INFORMATION MODELING BIM THROUGH ARTIFICIAL INTELLIGENCE: CURRENT STATE ANDFUTURE TRENDS

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The article explores the role of artificial intelligence (AI) in the transformation of the Building Information Modeling (BIM) environment. It focuses on current trends and developments in the field of AI, its applications in BIM, and future perspectives. AI introduces process automation, design optimization, and efficient management of construction projects into the BIM framework. Among its many benefits is the ability to quickly retrieve information, identify and describe problematic areas, and suggest alternative solutions during the design phase. In the construction phase, AI can enable more efficient and faster responses to project changes and construction challenges. When transferring data to the operation and maintenance phase, AI can sort large volumes of information and present it in a clear and actionable format for facility managers. This article analyzes both theoretical and practical aspects of AI integration into BIM and evaluates its potential benefits for the construction industry. There's no doubt that Building Information Modeling has transformed how projects are designed, coordinated, and delivered. It's moved us from disconnected drawings to a collaborative, data-driven process that cuts errors and reduces rework. Now AI is entering the conversation. In construction as a whole, AI is being explored for everything from scheduling to safety monitoring. Within BIM, it's showing real potential to speed up processes, improve decision-making, and make project data more

valuable. For architects, contractors, developers, and facility owners, AI in construction isn't just a tech headline anymore. The real test is simple- can AI in BIM help you finish projects faster, keep costs in check, and hand over a better-performing building? AI is stepping into the mix, promising to make BIM faster, smarter, and more insightful. The question is, where does the promise end and the real, usable value begin?

EVALUATION AND OPTIMIZATION OF QUALITY MANAGEMENT SYSTEMS INCONSTRUCTION PROJECTS USING TQM PRINCIPLES

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The construction industry plays a crucial role in economic development, yet it frequently faces challenges related to quality, cost overruns, and schedule delays. Ensuring consistent quality across all phases of construction projects requires the effective implementation of structured Quality Management Systems (QMS). This study focuses on evaluating the effectiveness of quality management practices in construction projects and identifying the key factors that influence project quality performance. The research adopts the principles of Total Quality Management (TQM), integrating quality planning, quality control, and continuous improvement strategies. A systematic approach has been followed to analyze the relationship between project processes, organizational practices, and quality outcomes. Data has been collected through structured questionnaires targeting professionals such as project engineers, quality engineers, and site managers to capture realtime challenges and industry practices. Statistical tools and regression analysis have been utilized to determine the most significant factors affecting quality performance. The study highlights the impact of management commitment, workforce training, process standardization, and effective communication on achieving desired quality levels. Furthermore, the research proposes a practical implementation framework that integrates TQM concepts with construction project workflows to enhance efficiency and reduce defects. The findings of this study aim to support construction organizations in improving quality performance, minimizing rework, and enhancing customer satisfaction. The proposed recommendations provide a strategic roadmap for implementing robust quality management systems, thereby contributing to sustainable and cost-effective project delivery in the construction sector.

ANALYSIS OF TRAPEZOIDALLY CORRUGATED WEB STEEL GIRDERS WITH WEB OPENINGS

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Recent studies on corrugated web steel girders have gained significant attention due to their improved structural efficiency and reduced material usage. Most existing research focuses on the shear buckling behaviour of trapezoidally corrugated web steel girders (TCWSGs) without considering web openings. However, in practical applications, openings are often provided in the web to accommodate services such as pipelines, ventilation ducts, and electrical systems. The presence of such openings alters the stress distribution and buckling behaviour of the girders, necessitating detailed investigation. The present study focuses on evaluating the influence of web openings on the shear buckling behaviour of TCWSGs. The primary objective is to investigate the shear strength and failure characteristics of girders with cutouts under shear loading. A comprehensive parametric study is carried out considering variations in web height, web thickness, opening size, shape, and location. The research methodology includes experimental, numerical, and analytical investigations. In the experimental phase, seven girder specimens with and without cutouts were tested under simply supported conditions with mid-span loading to induce shear-dominated behaviour. Appropriate stiffeners were provided to prevent lateral torsional buckling. The results were analysed in terms of load deformation and load-strain behaviour. Three types of shear buckling modes local, global, and interactive were observed. While girders without openings predominantly failed by global buckling, girders with openings exhibited both global and interactive buckling modes. All specimens demonstrated post-buckling strength due to tension field action. In the numerical phase, finite element analysis was performed using ABAQUS. A total of 246 models were analysed, incorporating geometric and material nonlinearities. The numerical results showed good agreement with experimental findings, with a variation within 6%. A detailed parametric study was conducted to assess the effect of various geometric parameters on shear capacity. In the analytical phase, existing design models and Eurocode 3 provisions were evaluated. For girders with openings, existing models were found to be inadequate in accounting for the effect of cutout location. Therefore, a simplified design equation was proposed to estimate the shear capacity of TCWSGs with web openings. The proposed equation showed good agreement with

experimental and numerical results and can be effectively used along with existing design provisions. Overall, the study provides a comprehensive understanding of the behaviour of corrugated web steel girders with openings and offers practical design recommendations for their safe and efficient application.

STUDY THE OCCURRENCE OF LIGHTNING AND THUNDERSTORM DURING FEBRUARY TO MAY, WITH ALL ENVIRONMENTAL INFLUENCING FACTORS BY NEURAL NETWORK AND MACHINE LEARNING TECHNIQUE

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This paper is based on the study of the occurrence of lightning and or thunderstorm, the weather phenomena ,during February to May, analysis on google collaborator platform. The environmental parameters used were 'convective available potential energy(CAPE)', 'convective inhibition (CIN)' , 'convective precipitation (CP)', '2 meter dew point temperature, (d2m), 'mean sea level pressure (MSL)', 'relative humidity at 500 HPA pressure level ', 'relative humidity at 850 HPA pressure level ' , 'earth's surface skin layer temperature (skin)', 'earth surface pressure (sp)', 'sea surface temperature (sst)', 'air temperature (t at 500 HPA)' , 'air temperature (t at 850 HPA)' , 'air temperature measured at 2 meters above the surface (t2m)', ' total cloud cover (tcc)', ' total precipitation (tp)', 'u ,horizontal wind at 500 HPA pressure level', 'u, horizontal wind at 800 HPA pressure level', 'v, vertical wind at 500 HPA pressure level', 'v ,vertical wind at 800 HPA pressure level', ' w ,speed of air movement at 500 HPA pressure level', 'w, speed of air movement at 800 HPA pressure level', data source was 'Copernicus Climate Data Store (ERA5 dataset)' with sub region of data adequate for Alipore. Date wise 'Copernicus Hub' daily data merged with date wise daily surface data of Alipore to have insights of occurrence of lightning or thunderstorm during February to May as well as trend for near future . The multivariate analysis, with historical large data from 1969 to 2026, with associated variables, factors influencing lightning and thunderstorm, i.e. predictors from ERA5 data set, along with target data, i,e. surface data set of Alipore with actual data of lightning or thunderstorm occurrence, was subjected to parallel study with LSTM neural network and machine learning to study the occurrence of such phenomena, during the scheduled months.

DEVELOPMENT OF HIGH-PERFORMANCE CEMENT-BASED MATERIALS USING CRUSHED BRICK AND MORTAR WASTE

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This study investigates the potential use of crushed brick materials as a sustainable alternative in cement-based composites. With the growing demand for environmentally responsible construction practices, the reuse of construction and demolition waste has gained significant importance. In this context, crushed bricks, obtained from waste masonry, are explored as a partial replacement material in mortar and high-performance cementitious systems. The research focuses on evaluating the influence of crushed brick particles on the fresh, mechanical, anddurability propertiesofcement-based materials. Various experimentalanalyses were carriedout, including particle size distribution, workability assessment, and strengthe valuation under different curing conditions. In addition, advanced investigations such as rheological behavior and microstructural characteristics were considered to understand the interaction between crushed brick particles and the cement matrix. The results indicate that the incorporation of crushed brick material affects both fresh and hardened properties of the mix. While a slight reduction in workability is observed due to the porous nature of brick particles, improvements in certain durability aspects and long-term performance are noted. The study also highlights that optimized particle size distribution and appropriate replacement levels can enhance the overall performance of the composite material. Based on the findings, the use of crushed brick as a supplementary material presents a viable solution for sustainable construction. It not only contributes to waste reduction but also supports the development of eco-friendly cementitious products without significantly compromising structural performance. This research provides valuable insights for the practical application of recycled materials in modern construction practices.

MODELING AND SIMULATION OF HETEROGENEOUS TRAFFIC FLOW USING CELLULAR AUTOMATA APPROACH

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Traffic congestion is a major issue in developing countries due to rapid urbanization and increase in vehicle population. Unlike developed countries, traffic conditions in India are heterogeneous in nature, consisting of various vehicle types such as cars, two-wheelers, buses, and trucks operating without strict lane discipline. This makes traffic analysis and modelling more complex. This project focuses on the analysis and modelling of heterogeneous traffic using both microscopic and macroscopic approaches. A Cellular Automata (CA) based simulation model is adopted due to its efficiency in handling complex vehicle interactions. The study emphasizes important traffic characteristics such as flow, speed, density, occupancy, and introduces area occupancy as a better parameter for mixed traffic conditions. Traffic data is collected using video graphic techniques, and parameters are analysed for model development. The model is validated using real traffic data and shows good agreement with observed conditions. The results indicate that the CA model effectively represents heterogeneous traffic behaviour and can be used for traffic planning and management. This study helps in understanding traffic dynamics and provides a foundation for improving traffic systems in developing countries.

ETHICAL IMPLICATIONS OF EMERGING TECHNOLOGIES

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Emerging technologies such as artificial intelligence, blockchain, biotechnology, and the Internet of Things are rapidly transforming modern society, offering unprecedented opportunities for innovation and development. However, these advancements also raise significant ethical concerns that require careful examination. This paper explores the ethical implications associated with the adoption and integration of emerging technologies across various sectors, including education, healthcare, governance, and industry. The study highlights key ethical challenges such as data privacy, security risks, algorithmic bias, digital inequality, and the potential misuse of technology. It also examines issues related to accountability,

transparency, and the impact of automation on employment and human agency. As technologies become more autonomous and data-driven, ensuring ethical standards in their design and implementation becomes increasingly critical. Furthermore, the paper emphasizes the importance of developing robust ethical frameworks, regulatory policies, and interdisciplinary approaches to guide responsible innovation. It advocates for collaboration among policymakers, technologists, educators, and society to promote fairness, inclusivity, and sustainability in technological development. The findings suggest that while emerging technologies have the potential to drive progress and improve quality of life, their ethical implications must be proactively addressed to prevent harm and ensure equitable benefits. The paper concludes by recommending the integration of ethical considerations into technological design and decision-making processes to build a more responsible and human-centered digital future.

CONSUMER PERCEPTION OF AI-GENERATED VS. HUMAN-CREATED ADVERTISEMENTS: A STUDY ON TRUST AND PURCHASE INTENTION

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This study examineshow consumers' perceptions of advertising trust impact their purchase intention, using the context of advertisement created by human creators and artificial intelligencePrevious studies show variousapproaches on consumer acceptance of AI-generated advertisement, however, demographic and behavioral componentsas moderators in the relationship between trust and purchase intention remain underexplored in literature. In this study, primary data was collected through a questionnaire from 107 people of different age, occupational and social media usage levels. The study employed regression analysis to analyze the impact of advertising trust on purchase intention. The results show that advertising trust positively and significantlyinfluences purchase intention in all models. On the other hand, the control variables used in this study turned out to be statistically insignificant. This would imply that demographic and behavioral factors may not be necessarily key drivers impacting the relationship between trust and purchase intention. The results also show that the influence of advertising trust on consumer purchase intention is unaffected by age gender occupation, and level of digital engagement. This study supports the emerging body of literature on use of artificial intelligence in marketing by showing that trust in advertising contentwhether created

by a human or AI-generateserves as a major determinant in consumer decision-making. The results suggest that prioritizing credibility and authenticity in advertisements could provide better outcomes than relying on demographic segmentation strategies alone.

EVALUATING ROLE OF NANOTECHNOLOGY IN THE BEVERAGE INDUSTRY

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The process of manipulating matter at the nanoscale and using these particles to create new materials and products is involved in nanotechnology. There are many uses for nanotechnology in the industrial sector. It has been demonstrated that nanotechnology can enhance the sensory, nutritional, and quality aspects of beverages. Furthermore, different bioactive ingredients in functional beverages can be delivered using nanocapsules. In the beverage processing industry, nanoengineered membranes have been used. Additionally, another prospective use of nanoparticles in the beverage sector is in nanopackaging. Altering the particle size at the nanoscale can also enhance physical characteristics of the beverages as well. This article summarises the applications of nanotechnology in the beverage industry sector.

DEVELOPMENT OF BEAUTY PRODUCT E-COMMERCE PLATFORM “DIM-GLOWING"

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E-commerce platforms have significantly transformed the way consumers purchase products, especially in the beauty and skincare industry. This research paper presents the development of DIM-GLOWING, a web-basede-commerce platform designed for beauty products. The system allows users to browse skincare products, view product details, and create personal accounts for purchasing items online. The platform is developed using modern web technologies including HTML, CSS, JavaScript, Node.js, Express.js, and MongoDB. The proposed system aims to

provide a user-friendly interface and efficient product management for online beauty shopping. Although the system is currently under development, it demonstrates the fundamental features required for a functional e-commerce platform.

AN ANALYTICAL STUDY OF CONSUMER BEHAVIOUR TOWARDS OF E-SERVICES OF TOURISM WITH SPECIAL REFERENCE TO UTTAR PRADESH

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Tourism industry has undergone a significant transformation with the rapid growth of digital technologies and e-services. The emergence of online platforms, mobile applications, and digital payment systems has reshaped consumer behaviour in the tourism sector. This study aims to analyze consumer behaviour towards e-services of tourism with special reference to Uttar Pradesh, a state rich in cultural, historical, and religious tourism destinations. The primary objective of this research is to examine the factors influencing the adoption and usage of e-tourism services such as online booking platforms, digital travel guides, and virtual tour services. The study also evaluates consumer satisfaction, trust, convenience, and perceived risks associated with these e-services. A descriptive and analytical research design has been used, based on both primary and secondary data. Primary data is collected through structured questionnaires from tourists using e-services, while secondary data is gathered from journals, reports, and government publications. The findings of the study indicate that convenience, time-saving, ease of access, and availability of information are the major factors driving consumers towards e-tourism services. However, issues such as lack of digital literacy, security concerns, and trust deficits still act as barriers, especially in semi-urban and rural areas of Uttar Pradesh. The study highlights that younger consumers are more inclined towards digital platforms, whereas older consumers show comparatively less adoption. The research concludes that although e-services have enhanced the tourism experience, there is a need for improving digital infrastructure, ensuring data security, and creating awareness among consumers. The study provides useful insights for policymakers, tourism departments, and service providers to develop more user-friendly and secure e-tourism platforms, thereby promoting sustainable tourism growth in Uttar Pradesh.

PERFORMANCE – BASED MIX DESIGN FOR IN PLANT RECYCLED ASPHALT USING THREE CONSTITUENTS PROPORTIONING METHOD

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The growing emphasis on sustainable pavement construction has increased the use of reclaimed asphalt pavement material (RAPM) in asphalt recycling. However, conventional mix design methods are often inadequate in addressing the complexity arising from multiple interacting constituents and the variability associated with recycled materials. This study presents a systematic approach for improving the mix design of in-plant recycled asphalt by incorporating a three-constituent proportioning framework consisting of RAPM, virgin binder, and recycling agent (RA). The proposed methodology focuses on rational estimation of constituent proportions by considering the interaction between aged RAPM binder, virgin binder, and RA, including the effects of partial blending. Modifications to conventional proportioning procedures are introduced to reduce the number of trial mixes and improve the efficiency of the design process. Laboratory evaluation of trial mixes is carried out to assess volumetric, strength, and performance-related properties such as fatigue resistance, rutting susceptibility, and cracking behavior, ensuring that the recycled mix achieves performance comparable to that of conventional asphalt mixtures. In addition, the study incorporates the influence of material and process variability, particularly associated with RAPM, on pavement performance through simulation-based analysis. The results indicate that variability significantly affects fatigue and rutting life, highlighting the need for proper RAPM management and controlled mixing conditions. The developed approach enables quicker estimation of optimal proportions while maintaining desired performance criteria, thereby reducing laboratory effort and improving reliability in mix design. Overall, this research provides a practical and performance-oriented framework for in-plant asphalt recycling, facilitating improved decision-making in material selection, proportioning, and pavement design. The proposed methodology contributes toward achieving durable, cost-effective, and sustainable pavement systems.

DETAILED STUDY ON PRE-ENGINEERED BUILDINGS (PEB) AND PPVC CONSTRUCTION

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This study examines the application and effectiveness of Pre-Engineered Buildings (PEB) and Prefabricated, Pre-finished Volumetric Construction (PPVC) as advanced construction methodologies aimed at addressing the increasing demand for rapid and efficient infrastructure development, particularly within the Indian context. The research seeks to evaluate how these modern construction techniques can overcome the limitations associated with conventional building practices. The study incorporates a comprehensive review of existing literature, encompassing both global and domestic perspectives, to analyze the structural, economic, and operational advantages of PEB and PPVC systems. These methods, characterized by off-site fabrication and on-site assembly, contribute to enhanced construction speed, improved quality control, cost optimization, and reduced environmental impact. Furthermore, the research integrates findings from various case studies and previously published works to assess practical aspects such as design considerations, fabrication processes, transportation logistics, erection procedures, and maintenance requirements. The study also critically evaluates the challenges hindering widespread adoption in India, including insufficient standardization, limited skilled workforce, and lack of awareness among stakeholders. The results indicate that PEB and PPVC technologies offer significant potential in improving construction efficiency and sustainability. The study concludes by recommending strategic initiatives such as policy support, technological integration, and capacity building to facilitate broader implementation of these innovative construction approaches.

SPATIO-TEMPORAL ANALYSIS OF RAINFALL INTENSITY CLASS TRENDS OVER THE WESTERN HIMALAYAS

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Understanding long-term rainfall variability in the Himalayan region is crucial due to its strong influence on floods, water resources, agriculture, and climate-

sensitive ecosystems. This study investigates both seasonal (JJAS) and monthly rainfall trends across three Himalayan states of India—Jammu Kashmir, Himachal Pradesh, and Uttarakhand—using station-level rainfall data. Rainfall trends were analysed for different rainfall intensity categories using the non-parametric Mann–Kendall test. Spatial visualization was performed using GIS-based mapping to identify regional patterns of increasing, decreasing, and stable rainfall behaviour. Seasonal analysis provides an integrated view of monsoon variability, while month-wise analysis helps identify the contribution of individual months to overall monsoon trends. The results reveal strong spatial heterogeneity in rainfall behaviour, emphasizing the importance of station-level and category-wise analysis for Himalayan hydroclimatic studies.

SUSTAINABLE CONCRETE WITH PVC WASTE POWDER: EXPERIMENTAL PERFORMANCE, MICROSTRUCTURE & LIFE CYCLE ASSESSMENT IN CONVENTIONAL, FIBER-REINFORCED & SELF COMPACTING CONCRETE

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This study investigates the feasibility of using polyvinyl chloride (PVC) waste powder (PWP) as a partial replacement for cement in conventional concrete, fiber-reinforced concrete, and self-compacting concrete. In addition to experimental evaluation, the study examines the environmental implications of PWP-based concrete through life cycle assessment, addressing a common gap in waste-utilization research that often emphasizes strength while overlooking environmental performance [1]. Concrete mixes were prepared with 0% to 30% PWP by weight of cement. Conventional concrete was studied for M30, M40, and M50 grades, fiber-reinforced concrete for M50 grade, and self-compacting concrete for M60 grade, following IS 10262:2019 for mix design [1]. The research evaluated fresh, mechanical, and durability properties, along with microstructural behaviour using field emission scanning electron microscopy. Environmental impact assessment was conducted in SimaPro using the Ecoinvent database for selected M50 conventional concrete and M60 self-compacting concrete mixes [1]. Results show that PWP can be effectively used up to 15% in conventional concrete and up to 20% in self-compacting concrete when combined with supplementary cementitious materials such as ground granulated blast furnace slag and silica fume, with only marginal reductions in fresh properties beyond these levels

[1]. Mechanical test results indicate that the optimum PWP content generally lies between 15% and 20%, while the inclusion of 0.5% engineered fibers improves tensile performance by reducing void formation [1]. Durability tests also suggest that concrete with up to 20% PWP performs satisfactorily without significant compromise [1]. Microstructural analysis indicates improved densification, reduced voids, and dense C-S-H gel formation in mixes containing up to 15% PWP, whereas gel separation becomes noticeable at higher replacement levels [1]. Life cycle assessment further reveals that replacing part of the cement with PWP in combination with supplementary cementitious materials substantially lowers environmental impacts across multiple categories. Overall, the study demonstrates that PWP is a viable and sustainable cement replacement material that can reduce cement consumption, lower environmental burden and cost, and maintain acceptable performance in different concrete systems [1].

SUSTAINABLE WASTE MANAGEMENT FOR FUTURISTIC INDIA

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Sustainable waste management is critical for India's future, given the rapid urbanization, population growth, and economic development. Landfilling and open dumping, two of the most common traditional waste disposal options, are insufficient and dangerous to both the environment and human health. The pros and cons of switching to more environmentally friendly methods of garbage disposal in India are discussed in this chapter. Key challenges include inadequate infrastructure, lack of public awareness, inefficient waste segregation, and limited recycling capabilities. Innovative solutions such as waste-to-energy technologies, decentralized waste processing, and the integration of the informal sector are essential for improving waste management. The adoption of smart technologies, such as IoT- enabled smart bins and advanced data analytics, can optimize waste collection and processing. Public-private partnerships and community engagement are crucial for fostering a culture of sustainability. By embracing a circular economy approach, which emphasizes reducing, reusing, and recycling waste, India can mitigate environmental degradation and promote sustainable development. The findings underscore the need

for comprehensive policy reforms, technological innovations, and active participation from all stakeholders to achieve a sustainable waste management system in India.

GEOTECHNICAL PERFORMANCE EVALUATION OF SAND–BENTONITE BUFFER MATERIALS UNDER LONG-TERM REPOSITORY CONDITIONS

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The safe disposal of high-level radioactive waste remains a critical challenge in the advancement of nuclear energy systems. Deep geological repositories (DGRs) are widely considered a reliable long-term solution, where engineered barrier systems play a vital role in isolating hazardous materials from the environment. Among these, sand-bentonite mixtures are extensively used as buffer materials due to their low permeability, swelling capacity, and contaminant retardation characteristics. This study investigates the long-term performance of sand-bentonite buffer materials under coupled thermo-hydro-mechanical and chemical influences typically present in deep geological environments. Laboratory experiments were conducted to evaluate the physical, thermal, hydraulic, and transport properties of selected geomaterials. Special emphasis was placed on understanding the interaction between heat generation, moisture migration, and contaminant transport behavior. The influence of temperature variation on sorption, diffusion, and permeability characteristics was also examined. Further, an experimental setup was developed to quantify heat and moisture migration under controlled thermal gradients. The results were integrated with numerical modeling tools to simulate long-term behavior and assess the durability and effectiveness of buffer materials over extended periods. The study highlights the importance of coupled processes in determining the overall performance of engineered barriers. The findings provide a comprehensive understanding of the behavior of sand-bentonite mixtures and contribute to the development of design methodologies for efficient radioactive waste containment systems. This research supports the safe implementation of DGRs by improving material selection and performance prediction under realistic environmental conditions.

EXPERIMENTAL INVESTIGATION ON STRENGTH, FLEXURAL BEHAVIOR, AND DURABILITY OF TYRE RUBBER AGGREGATE CONCRETE (TRAC) AND RUBBER-REINFORCED CONCRETE (TRRC)

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This study presents an experimental evaluation of the mechanical and durability characteristics of an innovative and sustainable material known as Tyre Rubber Aggregate Concrete (TRAC). TRAC is developed by partially replacing natural aggregates with waste tyre rubber particles obtained through mechanical processing. A series of tests on both fresh and hardened concrete were conducted using weigh batching to examine workability, compressive strength, split tensile strength, and flexural strength. The results indicated a reduction in compressive strength with increasing rubber content, while workability remained largely unaffected. An optimum replacement level of 6% rubber aggregate was identified for achieving balanced mechanical performance. Further, flexural testing of TRAC beams with 6% replacement showed failure predominantly in the pure bending region, with deflection behavior comparable to conventional concrete and improved ductility. Impact resistance studies also revealed enhanced ductility and superior energy absorption characteristics at the same replacement level. Durability assessments under aggressive environmental conditions, including acid, sulphate, and chloride exposure, demonstrated improved resistance to degradation and reduced permeability due to the pore-filling effect of fine rubber particles. Additionally, rubber-based hollow blocks incorporating rubber crumbs and chips satisfied IS specifications, highlighting their potential for lightweight applications. The study was further extended to investigate Rubber-Reinforced Concrete (TRRC), where tyre rubber strips were used as tensile reinforcement in under-reinforced beams. Experimental results confirmed that TRRC exhibits improved ductility with slightly lower ultimate load capacity compared to conventional reinforced concrete. Analytical models developed for service load and deflection of TRAC and TRRC showed good agreement with experimental results. Therefore, TRAC and TRRC are recommended for structural components such as lintels, floor slabs, and ribs where durability and ductility are prioritized over high load-carrying capacity.

ACADEMIC-INDUSTRY COLLABORATIONS

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Collaboration between academia and industry has emerged as a key catalyst for organizational innovation, acting as a link between theoretical developments and practical implementations. This research explores the mechanisms, advantages, and obstacles of these partnerships, emphasizing their importance in promoting innovation. As companies confront the challenges of swiftly changing markets and technological upheavals, partnerships with academic institutions provide exceptional chances to leverage advanced research, tap into a skilled workforce, and create innovative solutions designed for industrial issues. On the other hand, academic institutions gain from these collaborations by encountering real-world challenges, obtaining funding for their research, and maintaining the significance of their scholarly activities. Utilizing a mixed-method research strategy that incorporates case studies, surveys, and interviews, this study explores essential elements that lead to effective academic-industry collaborations. Innovation forms the foundation of competitiveness and expansion for organizations in the fast-changing global markets of today. In a time marked by digital evolution and technological progress, organizations must consistently innovate to tackle intricate challenges, capture new opportunities, and maintain enduring competitiveness. Collaboration between academia and industry has become a vital facilitator of organizational innovation, connecting theoretical insight with real-world application. The importance brand new academic-industry Collaboration educational-industry partnerships are rooted within the complementary strengths state-of-the-art party. Academia contributes towards theoretical and a professional talent pool, and get entry to develop research centres. Conversely, enterprise provides resources, practical know-how and a market-pushed perspective to guide research state-of-the-art commercialization. As an example, industries today's leverage instructional expertise to decorate R&D efficiency and increase innovative products and services. The manner fosters a -manner exchange latest understanding and understanding that drives sustainable innovation.

STUDY ON PILE RAFT FOUNDATION SUBJECTED TO BLAST LOAD

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Pile raft foundations are widely used in critical structures due to their efficient load transfer capability. However, these foundations are vulnerable to extreme loading conditions such as nearby blasts, which can cause significant damage to both the superstructure and the foundation system. This study investigates the behaviour of pile raft foundations subjected to blast loading using the CONWEP model in Abaqus finite element software. The foundation system considered consists of a raft (15 m × 15 m × 1 m) supported by piles of 0.6 m diameter and 20 m depth embedded in sandy soil. The analysis focuses on evaluating the response of the foundation under blast-induced forces by examining lateral displacement, vertical displacement, and maximum stresses developed in the pile and raft. A detailed parametric study is carried out to assess the influence of various factors, including soil properties (density of sand), blast characteristics (intensity, distance, and orientation), and pile raft configuration (number of piles and spacing). The results indicate that these parameters significantly affect displacement behaviour and stress distribution in the foundation system. The study provides valuable insights for the design and optimization of pile raft foundations to improve their resistance against blast loading and ensure structural safety and performance in challenging conditions.

SIMPLIFIED ANALYTICAL AND FINITE ELEMENT APPROACHES FOR THE DESIGN AND BEHAVIOR ASSESSMENT OF PILE FOUNDATIONS

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Pile foundations are widely used to support buildings, bridges, and industrial structures constructed on soft or weak soils. A pile foundation consists mainly of piles and pile caps, which together transfer structural loads from the superstructure to the underlying soil strata. Since pile foundations are employed in important structures, their analysis and design must be accurate, safe, and reliable. The present study aims to develop a simplified and appropriate approach for the analysis of pile foundations.

The investigation focuses on four important aspects of pile foundation behavior: comparison of design moments in pile caps, evaluation of clear edge distance for pile caps, determination of fixity depth in piles, and assessment of pile cap rigidity For the study of pile cap moments, results obtained from the finite element method were compared with those from the truss analogy and conventional methods. Although the maximum moments obtained from the truss analogy and conventional approach were nearly similar, the reinforcement distribution differed considerably. The finite element method produced significantly different maximum moments and also considered the effect of cap rigidity, which is neglected in the other two methods. The study further examined the adequacy of the clear edge distance in pile caps subjected to axial load and moment. Finite element analysis showed that stress concentration occurs near the edges of the pile cap, and the results suggested that the clear edge distance should be equal to half of the pile diameter to safely accommodate the developed stresses For pile fixity depth, the study observed that accurate values can be obtained through finite element analysis or the LPILE program. In addition, coefficients proposed for different soil conditions were found to give results in close agreement with both finite element analysis and LPILE The rigidity of the pile cap was also examined in relation to the rivet theory used for load distribution among piles. As current design guidelines do not clearly define the rigidity requirement of pile caps.

INFLUENCE OF SOIL-STRUCTURE INTERACTION ON SEISMIC BEHAVIOR OF HIGH-RISE BUILDINGS

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It is widely believed that soil-structure interaction can improve a building's ability to withstand earthquakes. However, recent earthquakes and studies have highlighted the disastrous consequences of ignoring SSI effects, causing conflicting opinions on its impact on the seismic behaviour. As a result, some contemporary design codes choose to ignore SSI or only consider its beneficial effects. Moreover, previous research has mainly focused on low or mid-rise moment frames, and impacts of SSI on commonly used structural systems of high-rise buildings have received little attention. In this study, a soil-foundation-structure model based on finite element software was employed to examine SSI effects on high-rise buildings. The validity of the model was confirmed through shaking table tests. The study explores a range of

superstructure and substructure parameters to compare the seismic response of rigidly and flexibly supported structures. Moreover, beneficial and detrimental scenarios concerning SSI were identified, and code-based procedures that offer a secure and cost-effective structural design approach were developed. This study examines the influence of soil-structure interaction (SSI) on the seismic behavior of high-rise buildings. It highlights how soil flexibility affects structural response parameters such as displacement, base shear, and natural time period during earthquakes.

CYCLIC AND FATIGUE BEHAVIOUR OF GEOPOLYMER REINFORCED CONCRETE BEAMS UNDER UNIAXIAL COMPRESSIVE LOADING

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Geopolymer concrete is an innovative material with the potential to replace ordinary Portland cement in structural applications. While its behaviour under monotonic loading is well documented, real structures are often subjected to repeated cyclic loads. In this study, the behaviour of geopolymer concrete under uniaxial cyclic compressive loading was investigated. The flexural response of geopolymer reinforced concrete beams was also examined under cyclic loading and low-cycle fatigue loading. An experimental program was conducted on 20 cylinder specimens to develop stress- strain envelope curves, common point curves, and stability point curves under cyclic loading. The stability point curves were used to determine the permissible stress level. The non-dimensional plastic deflection at the end of unloading was plotted against the envelope point, common point, and stability point deflections. Based on the test results, mathematical expressions were proposed for the cyclic stress-strain relationship. The program was extended to study the flexural behaviour of geopolymer reinforced concrete beams and conventional reinforced concrete beams under cyclic loading. A two-point loading test was carried out on thirteen geopolymer reinforced concrete beams and seven conventional reinforced concrete beams to obtain envelope points, common points, and stability points. The structural response and failure modes of the beams were observed at different stages of loading history, including first cracking, yield, maximum, and ultimate load stages. Analytical expressions for plastic deflection curves were also developed. The behaviour of

conventional and geopolymer reinforced concrete beams was compared in terms of load-carrying capacity, stiffness, ductility, and energy dissipation. The study further included testing of beams under slow-cycle fatigue loading to investigate their flexural performance under repeated loading conditions and to confirm the permissible load level beyond which strain accumulation does not occur. The loading cycles were repeated until the stability point was reached. Envelope curves and stability point curves obtained from fatigue tests were plotted and compared with those from cyclic loading tests. The load-carrying capacity of the beams and the effect of slow-cycle fatigue loading were also examined. The behaviour of conventional and geopolymer reinforced concrete beams was compared under fatigue loading as well. The results showed that both types of beams exhibited similar behaviour under monotonic loading, but their response differed under cyclic loading.

ANALYSIS OF SUSTAINABLE ARCHITECTURE PRACTICES IN INDIA WITH REFERENCE TO CONSTRUCTABILITY IN DESIGN AND CONSTRUCTION

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Constructability is an important construction management approach that focuses on the effective use of construction knowledge and experience during planning, design, procurement, and execution to achieve project objectives. The construction industry, being the second largest sector in India, is also a major contributor to CO_2 emissions and environmental degradation. Therefore, adopting sustainable architectural practices has become essential for minimizing the negative impacts of construction activities. This study examines the relationship between constructability and sustainable architecture in the Indian context. Although both concepts have been widely studied independently, their analytical relationship is not clearly established. The present research identifies a strong and positive relationship between constructability and sustainability, highlighting the potential of constructability as a tool for promoting sustainable development. The research focuses on identifying key design and construction (D&C) activities related to constructability, analyzing their interdependencies, and assessing their priorities. It also evaluates the awareness level of architects and professionals regarding constructability practices in India. The methodology is divided into five stages, incorporating both qualitative and quantitative approaches. Initially, five categories of sustainable architecture and fifteen

constructability parameters were identified through literature review. The relationship between the two concepts was analyzed using case studies and a decision matrix. Thirty D&C activities were then identified across three stages conceptual planning, design development, and field operations—and validated through pilot study and content analysis. Further analysis using Dependency Matrix and Design Structure Matrix (DSM) helped in understanding the sequencing and interrelationships of activities. A point-based evaluation system was developed using the Analytic Hierarchy Process (AHP), and an online survey was conducted to assess awareness levels among professionals. The findings indicate that the application of DSM simplifies activity networks and improves project coordination. It was observed that Design-Build approaches enhance coordination and construction quality, although their practical adoption is limited. The study also identifies several important D&C activities that are not widely practiced, such as early contractor involvement, material recycling, efficient site planning, waste and wastewater management, and documentation of lessons learned. The research proposes three project management models for different stages—decision, design, and execution to facilitate the implementation of constructability principles. Recommendations and checklists are also provided to support sustainable architectural practices. In conclusion, this study establishes a strong link between constructability and sustainable architecture and provides practical guidelines for integrating both concepts to achieve sustainable development in the construction industry.

लौकिक शास्त्रीय दृष्टि से मानव जीवन का अध्ययन

Dr. Mithilesh Kumar
Sanskrit, Patna, Bihar

लौकिकशास्त्र (Secular/Practical Knowledge Tradition) मानव जीवन के व्यावहारिक, सामाजिक एवं सांस्कृतिक पक्षों का अध्ययन करने वाला महत्वपूर्ण क्षेत्र है। यह शास्त्र धार्मिक या आध्यात्मिक मान्यताओं से परे जाकर मनुष्य के दैनिक जीवन, व्यवहार, संबंधों, कर्तव्यों एवं सामाजिक संरचनाओं का यथार्थवादी विश्लेषण प्रस्तुत करता है। प्रस्तुत शोध का उद्देश्य लौकिकशास्त्रीय दृष्टिकोण से मानव जीवन के विभिन्न आयामोंकृजैसे परिवार, समाज, अर्थव्यवस्था, नैतिकता तथा व्यवहारकृका सम्यक् अध्ययन करना है। इस अध्ययन में यह स्पष्ट किया गया है कि मानव जीवन केवल आध्यात्मिक या धार्मिक नियमों से संचालित नहीं होता, बल्कि उसके निर्णय, आचरण एवं सामाजिक संबंधों पर लौकिक तत्वों का गहरा प्रभाव पड़ता है। लौकिकशास्त्र मानव के जीवन को तर्क, अनुभव और सामाजिक यथार्थ के आधार पर समझने का प्रयास करता है। इसमें मनुष्य के व्यक्तिगत हित, सामाजिक उत्तरदायित्व, आर्थिक क्रियाकलाप तथा सांस्कृतिक परंपराएँ प्रमुख भूमिका निभाती हैं।

धार जिले के कृषि आधारित लघु एवं मध्यम उद्यमों के प्रदर्शन पर ई–कॉमर्स अपनाने का प्रभाव का विश्लेषणात्मक अध्ययन

डॉ. भारतसिंह गोयल

प्राध्यापक एवं शोध निर्देशक, वाणिज्य विभाग, शासकीय कन्या महाविद्यालय देवास, मध्य प्रदेश

नरसिंह भिडे

शोधार्थी, वाणिज्य अध्ययनशाला, सम्राट् विक्रमादित्य विश्वविद्यालय, उज्जैन मध्य प्रदेश

यह अध्ययन मध्य प्रदेश के धार जिले में संचालित कृषि आधारित लघु एवं मध्यम उद्यमों के प्रदर्शन पर ई–कॉमर्स अपनाने के प्रभाव का विश्लेषण करता है। वर्तमान डिजिटल युग में ई–कॉमर्स प्लेटफॉर्म व्यवसायों को व्यापक बाजार, बेहतर मूल्य खोज, तथा ग्राहकों तक सीधी पहुँच प्रदान कर रहे हैं। इस शोध का मुख्य उद्देश्य यह जांचना है कि ई–कॉमर्स अपनाने से इन उद्यमों की बिक्री, लाभप्रदता, बाजार विस्तार एवं प्रतिस्पर्धात्मक क्षमता में किस प्रकार परिवर्तन आया है। ई–कॉमर्स अपनाने वाले उद्यमों में बिक्री वृद्धि, ग्राहक आधार विस्तार तथा उत्पादों की बेहतर ब्रांडिंग देखने को मिली है। साथ ही, डिजिटल भुगतान एवं ऑनलाइन विपणन के कारण संचालन में पारदर्शिता और दक्षता भी बढ़ी है। हालाँकि, तकनीकी ज्ञान की कमी, इंटरनेट कनेक्टिविटी की समस्या तथा लॉजिस्टिक्स से जुड़ी चुनौतियाँ प्रमुख बाधाएँ बनी हुई हैं। ई–कॉमर्स कृषि आधारित लघु एवं मध्यम उद्यमों के प्रदर्शन को सकारात्मक रूप से प्रभावित करता है, बशर्ते आवश्यक डिजिटल अवसंरचना एवं प्रशिक्षण उपलब्ध हो।

किशोर न्याय में न्यायालय की अवधारणा

Ms. Bhumika Chapiya

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किशोर न्याय में न्यायालय की अवधारणा का उद्देश्य यह सुनिश्चित करना है कि बच्चों को एक ऐसे न्यायिक प्रक्रिया के माध्यम से सहायता मिले जो उनकी मानसिक, भावनात्मक और सामाजिक स्थिति को समझते हुए संवेदनशीलता और समावेशी दृष्टिकोण से काम करे। किशोर न्यायालय एक विशेष प्रकार की न्यायिक संस्था है जो केवल उन मामलों की सुनवाई करती है जो बच्चों या किशोरों से संबंधित होते हैं। यह न्यायालय न केवल अपराधों के मामलों में बल्कि बच्चों की सुरक्षा, देखभाल, पुनर्वास, और संरक्षण से जुड़े मामलों में भी कार्य करता है। किशोर न्यायालय का मुख्य उद्देश्य बच्चों को सुधारने और पुनर्वास की प्रक्रिया से जोड़ना है, न कि उन्हें दंडित करना। इसका कार्य किशोर अपराधियों को समाज में फिर से आत्मनिर्भर और रचनात्मक नागरिक बनाने के लिए आवश्यक मार्गदर्शन प्रदान करना है। इस प्रकार का न्यायालय मानता है कि बच्चों के अपराधों का कारण अक्सर सामाजिक, आर्थिक और पारिवारिक समस्याएँ होती हैं, और उन्हें सुधारने के लिए एक सहानुभूतिपूर्ण दृष्टिकोण अपनाने की आवश्यकता होती है। भारत में किशोर न्याय (बालकों की देखरेख और संरक्षण) अधिनियम, 2015 के तहत किशोर न्यायालयों की स्थापना की गई है। इस अधिनियम के अनुसार, 18 वर्ष से कम

उम्र के बच्चों के सभी मामलों को किशोर न्यायालय में लाया जाना चाहिए, जहाँ उनके अधिकारों की रक्षा और उनकी स्थिति के अनुसार न्याय सुनिश्चित किया जाता है। किशोर न्यायालय यह सुनिश्चित करता है कि बच्चों को उचित देखभाल, संरक्षण, और विकास का अवसर मिले, ताकि वे भविष्य में समाज के स्वस्थ और आत्मनिर्भर नागरिक बन सकें। किशोर न्यायालय का दृष्टिकोण सुधारात्मक होता है, जिसमें किशोर अपराधियों के मानसिक और भावनात्मक विकास पर ध्यान दिया जाता है। यह न्यायालय बच्चों को शिक्षा, स्वास्थ्य सेवाएं, और व्यावसायिक प्रशिक्षण प्रदान करने में भी सहयोग करता है, ताकि वे समाज में पुनः स्थापित हो सकें, किशोर न्यायालय की अवधारणा का उद्देश्य बच्चों को अपराध की दुनिया से बाहर निकालकर एक सकारात्मक और सशक्त जीवन की ओर ले जाना है, जिसमें बच्चों के अधिकारों, संरक्षण, और समुचित विकास को प्राथमिकता दी जाती है।

उज्जैन जिले में महिलाओं के आर्थिक सशक्तिकरण में माइक्रो फाइनेंस संस्थाओं की भूमिका का विश्लेषणात्मक अध्ययन

डॉ. नितिशा तोषनीवाल

सहायक प्राध्यापक, लोकमान्य तिलक विज्ञान एवं वाणिज्य महाविद्यालय, उज्जैन मध्य प्रदेश

अर्जुन राठौर

शोधार्थी, वाणिज्य अध्ययनशाला, सम्राट् विक्रमादित्य विश्वविद्यालय, उज्जैन मध्य प्रदेश

यह शोध पत्र उज्जैन जिला में महिलाओं के आर्थिक सशक्तिकरण में माइक्रो फाइनेंस संस्थाओं की भूमिका का विश्लेषणात्मक अध्ययन प्रस्तुत करता है। अध्ययन माइक्रो फाइनेंस सेवाएँकृजैसे सूक्ष्म ऋण, बचत योजनाएँ एवं वित्तीय साक्षरताकृमहिलाओं की आय, रोजगार सृजन, और आत्मनिर्भरता पर किस प्रकार प्रभाव डालती हैं। माइक्रो फाइनेंस संस्थाओं की सहायता से महिलाओं की आय में वृद्धि हुई है, उनके उद्यमशील कौशल का विकास हुआ है तथा वे पारिवारिक एवं सामाजिक निर्णयों में अधिक सक्रिय भागीदारी निभाने लगी हैं। हालांकि, उच्च ब्याज दर, सीमित ऋण राशि, तथा वित्तीय जागरूकता की कमी जैसी चुनौतियाँ अभी भी मौजूद हैं, जो सशक्तिकरण की प्रक्रिया को आंशिक रूप से प्रभावित करती हैं। माइक्रो फाइनेंस संस्थाएँ महिलाओं के आर्थिक सशक्तिकरण का एक प्रभावी माध्यम हैं, किन्तु इनके अधिक प्रभावी क्रियान्वयन हेतु नीतिगत सुधार, वित्तीय शिक्षा का विस्तार तथा संस्थागत पारदर्शिता आवश्यक है।

झुंझुनूं जिले में खरीफ फसलों के उत्पादन पर ग्रीष्मकालीन वर्षा का प्रभाव

शुभलता यादव

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जलवायु में परिवर्तन स्वाभाविक परिघटना है, किंतु वर्तमान में मानवजनित कारणों से भूमंडलीय तापन एवं वर्षा की प्रवृत्ति में परिवर्तन देखने को मिल रहा है। अध्ययन क्षेत्र झुंझुनूं जिला राजस्थान के अर्द्धशुष्क जलवायु प्रदेश में स्थित कृषि प्रधान क्षेत्र है, जहाँ औसत वार्षिक तापमान 25 सेल्सियस एवं औसत वार्षिक वर्षा 405.1 मिमी है। कृषि, जलवायु से प्रत्यक्षतः प्रभावित मानवीय गतिविधि है। कृषि प्रधान ग्रामीण अर्थव्यवस्था वाले झुंझुनूं जिले में कम वर्षा और जल संसाधन की कम उपलब्धता कृषि के समक्ष मुख्य चुनौती है। इन दशाओं में वर्षा की बदलती प्रवृत्ति कृषि की दृष्टि से महत्त्व रखती है। जिले की वार्षिक वर्षा की प्रवृत्ति में हाल ही के वर्षों में धनात्मक वृद्धि हुई है एवं वार्षिक वर्षा सामान्य वर्षा से अधिक ही रही है। जिले की अधिकांश वर्षा ग्रीष्मकालीन मानसून के द्वारा होती है। ग्रीष्मकालीन वर्षा का खरीफ फसलों के उत्पादन पर सकारात्मक प्रभाव पड़ने की संभावना है। इस अध्ययन में झुंझुनूं जिले में ग्रीष्मकालीन वर्षा की परिवर्तनशीलता एवं उसका खरीफ फसलों के उत्पादन के साथ संबंधों का विश्लेषण किया गया है।

₹1085/-

ISBN : 978-81-999799-1-8

Published by:
INSPIRA
Jaipur - 302018 (Raj.)
Mobile No.: 9829321067, 9828571010
Email: inspirairajaipur@gmail.com

Website : inspirajournals.com