

Trends in
Research Perspectives

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Washima Yesmin*

TRENDING INTERDISCIPLINARY RESEARCH IN 2025

JANUARY EDITION

"A roadmap to the next era of
interdisciplinary innovation."



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AGRA BOOK INTERNATIONAL

105, Grand Fort, Paschimpuri Sikandra, Agra, 282007

Trending Interdisciplinary Research in 2025 - January

Edited by : Editorial Team ABI

Published By : AGRA BOOK INTERNATIONAL

First Published: February 2025

Copyright – Author

Price - 499 /- (Rupees Four Hundred Ninty Nine only)

ISBN – 978-93-48791-23-8

PRINTED AT : AGRA BOOK INTERNATIONAL

105, Grand Fort, Paschimpuri Sikandra Agra - 282007

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EDITORIAL

The rapid advancement of knowledge across disciplines has paved the way for groundbreaking innovations and collaborative research efforts. In today's world, where traditional academic boundaries are increasingly merging, interdisciplinary research plays a crucial role in addressing complex global challenges. It is with this vision that we present the **January Edition of "Trending Interdisciplinary Research in 2025"**, a compilation of pioneering studies that bridge diverse academic fields and offer fresh insights into contemporary issues.

This book is a testament to the evolving nature of research, where science, technology, social sciences, humanities, and applied disciplines intersect to foster new discoveries. The contributions in this edition cover a wide array of topics, including advancements in artificial intelligence, sustainable development, medical innovations, digital transformation, and emerging socio-economic trends. By integrating perspectives from multiple disciplines, we aim to promote a holistic understanding of research that can drive impactful change.

We extend our sincere gratitude to the scholars, researchers, and academicians whose valuable contributions have enriched this edition. Their dedication to exploring new frontiers and commitment to academic excellence are truly commendable. We also appreciate the efforts of reviewers and editors who have meticulously refined each article to ensure high-quality content for our readers.

As research continues to evolve, we invite scholars, academicians, and industry experts to contribute their insightful articles for our upcoming editions. We welcome interdisciplinary studies that challenge conventional wisdom and offer novel solutions to contemporary problems. **If you wish to be a part of future editions, we encourage you to submit your research papers for consideration.**

We hope this book serves as an inspiration and resource for researchers, students, and professionals seeking to explore the dynamic landscape of interdisciplinary research. Let us continue to collaborate, innovate, and contribute to the ever-expanding knowledge frontier.

Editorial Team

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1

SOCIAL NETWORKS AND HUMAN BEHAVIOUR: A COMPLEX RELATIONSHIP

Debarati Ghosh

ABSTRACT

Social networks have become an integral part of modern society, influencing human behavior on multiple levels. This paper explores the impact of social networks on cognitive, emotional, and social aspects of human behavior. It examines both positive and negative consequences, including changes in communication patterns, self-perception, and social interactions. Furthermore, the study delves into the psychological mechanisms behind social media addiction, online disinhibition, and the reinforcement of social norms. The article concludes with a discussion on the ethical and societal implications of social networks and potential strategies for mitigating their negative effects.

Introduction

The rise of social networks has transformed the way individuals interact, share information, and perceive the world. Platforms like Facebook, Twitter, Instagram, and TikTok have reshaped social interactions, altering human behavior in profound ways. The ability to connect with people worldwide has facilitated new forms of communication, but it has also introduced challenges such as misinformation, cyberbullying, and social anxiety. Human behavior is deeply influenced by social networks through reinforcement mechanisms that shape attitudes, emotions, and decision-making. This paper explores the dynamic relationship between social networks and human behavior by analyzing their psychological, cognitive, and societal effects.

Social networks play a significant role in shaping cognition, attention, and emotional responses. Social media platforms are designed to maximize user engagement by employing algorithms that promote attention-capturing content. Features like infinite scrolling, notifications, and personalized recommendations contribute to cognitive overload, reducing users' ability to focus on tasks and engage in deep thinking. Studies have shown that frequent social media use is associated with reduced attention spans and difficulties in sustained concentration. Moreover, social networks provide users with curated representations of others' lives, often leading to social

comparison. Seeing idealized versions of peers' experiences can result in decreased self-esteem, anxiety, and depression, particularly among adolescents and young adults. The phenomenon of "highlight reel" culture, where individuals post only their best moments, fosters unrealistic expectations and dissatisfaction with one's own life. Additionally, engagement with social media triggers the brain's reward system, releasing dopamine—a neurotransmitter associated with pleasure and reinforcement. Features like likes, comments, and shares act as intermittent rewards, encouraging compulsive behavior and leading to social media addiction. This addiction can interfere with daily activities, relationships, and mental well-being.

Social networks influence human behavior beyond individual cognition, affecting interpersonal relationships, communication styles, and societal dynamics. The way people communicate has evolved due to social networks. Instant messaging, emojis, and multimedia content have replaced traditional face-to-face interactions in many cases. While this has facilitated long-distance communication, it has also led to a decline in deep, meaningful conversations and reduced nonverbal communication skills. Social networks provide a sense of anonymity and distance, leading to the "online disinhibition effect." This phenomenon can manifest as increased self-disclosure, where individuals share personal information more freely than they would in real-life interactions. However, it can also lead to negative behaviors such as cyberbullying, hate speech, and trolling, as users feel less accountable for their actions. Social networks influence societal norms by shaping public discourse and reinforcing group identities. Algorithms prioritize content that aligns with users' existing beliefs, creating "echo chambers" where individuals are exposed primarily to opinions similar to their own. This reinforcement can strengthen group cohesion but also contribute to polarization and misinformation.

However, despite the challenges, social networks offer significant benefits that enhance human interaction and societal progress. Social networks allow individuals to maintain relationships across geographical barriers. They provide platforms for emotional support, particularly for marginalized groups who may find online communities more accepting than their offline environments. The rapid dissemination of information through social networks has democratized access to knowledge. Social media platforms have played a crucial role in raising awareness about social issues, mobilizing political movements, and disseminating crucial information during crises. Social networks like LinkedIn and Twitter facilitate professional connections, job searches, and knowledge exchange.

They enable entrepreneurs and businesses to reach global audiences, fostering economic growth and innovation.

Due to the lack of accountability, the spread of misinformation is a critical issue on social networks. False information often spreads faster than factual content due to its sensational nature. This has serious implications for public trust, democracy, and societal decision-making. Social networks provide a platform for cyberbullying, with anonymity enabling individuals to harass others without facing immediate consequences. Victims of cyberbullying often experience psychological distress, leading to anxiety, depression, and, in extreme cases, suicidal thoughts. User data is a valuable commodity for social networks, leading to concerns about privacy and data security. Many platforms collect vast amounts of personal information, raising ethical concerns about surveillance, targeted advertising, and the manipulation of user behavior.

The influence of social networks on human behavior raises several ethical and societal questions:

How can governments and regulatory bodies ensure that social networks operate ethically while maintaining free speech? How can individuals be educated about the risks of social networks while maximizing their benefits? And finally what steps can be taken to mitigate the negative psychological effects of social media?

However, to address the challenges posed by social networks, several strategies can be implemented. For example, promoting Digital well-being and encouraging features like screen time limits, content moderation, and mindfulness in social media consumption. Enhancing algorithm transparency and making recommendation algorithms more transparent to prevent the spread of misinformation and extremist content. Implementing stronger privacy regulations and strengthening data protection laws to safeguard users' personal information. Encouraging responsible social media use and promoting awareness campaigns to educate users about online etiquette, misinformation, and mental health impacts.

Social networks have fundamentally reshaped human behavior, influencing cognition, emotions, and social interactions. While they provide numerous benefits, including enhanced connectivity and information sharing, they also pose significant risks such as addiction, misinformation, and mental health challenges. Understanding the complex relationship between social networks and human behavior is crucial for developing strategies that maximize their positive impact while mitigating their negative consequences. As society continues to navigate the digital age, responsible

usage, regulation, and awareness will be key to ensuring that social networks contribute positively to human well-being.

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2

CASHLESS MEDICAL TREATMENT DURING GOLDEN HOUR: APEX COURT'S MAMMOTHING DIRECTION TO THE CENTRAL GOVERNMENT

**Dr. Paramita Bhattacharyya, Mr. Subham Chatterjee,
Ms. Purbita Das, Dr. Sudipta Adhikary**

ABSTRACT

In a significant judicial action, the Supreme Court of India has mandated the Central Government to create a strong and systematic structure that guarantees cashless medical care within the golden hour—the crucial first sixty minutes after a traumatic incident. This directive, rooted in the constitutional right to life as per Article 21, aims to remove financial barriers that frequently postpone critical medical treatment, thereby strengthening the country's emergency healthcare system.

The golden hour is widely recognized as the most critical time for providing medical assistance, during which timely action can greatly reduce illness and death. In India, systemic inefficiencies, bureaucratic delays, and financial obstacles often hinder access to prompt treatment, with economically marginalized individuals being disproportionately affected. The Apex Court's directive seeks to eliminate these obstacles, urging the Central Government to create a smooth, cashless treatment system that ensures prompt medical care without the need for upfront payments or financial assurances.

This study thoroughly analyzes the judicial ruling, its constitutional foundations, and its possible impacts on India's medico-legal framework. It investigates global comparative models, the practicality of establishing a nationwide emergency healthcare fund, and the infrastructural adjustments needed to put such an ambitious reform into action. Moreover, it highlights the crucial importance of public-private collaborations, insurance integration, and legislative measures in guaranteeing the effective implementation of this directive.

By setting a standard for fair and non-discriminatory access to emergency medical services, the Supreme Court's ruling is set to transform India's healthcare law. It strengthens the judiciary's active involvement in promoting social justice and healthcare fairness, conforming to international best practices in emergency medical care. The responsibility now falls on the Central Government to convert this judicial

vision into a practical, life-saving reality, initiating a transformative change in India's emergency medical response system.

Keywords: Life, Health, Treatment, Judicial Activism, Golden Hour

INTRODUCTION

The Supreme Court of India's decision in the case of *S. Rajasekaran v. Union of India & Ors*¹, a landmark verdict decided in January, 2025 marks a pivotal moment in the protection of human life through legal intervention. The judgment addresses the critical issue of providing cashless treatment to victims of road accidents during the "golden hour," as defined under Section 2(12-A)² of the Act. The concept of the golden hour emphasizes the one-hour window following a traumatic injury, during which prompt medical care can save lives. By mandating the creation of a scheme under Section 162³ of the MV Act and instituting a Motor Vehicle Accident Fund under Section 164-B⁴, the Court has reinforced the fundamental right to life enshrined in Article 21⁵ of the Constitution enshrined in the case of *Paramananda Katara v. Union of India*⁶'s judgment. This article critically examines the judgment, its provisions, and its implications, while offering insights into the challenges and responsibilities it places on the government.

Section 162⁷ of the MV Act mandates the Central Government to establish a scheme for cashless treatment of road accident victims during the golden hour. It is further supported by Section 164-B, which creates a Motor Vehicle Accident Fund to finance this initiative. The fund is credited with various sources, including government grants, payments notified by the government, and balances from previous schemes. The Act specifies that this fund will provide compulsory insurance cover for all road users and finance medical treatment and compensation for accident victims.

The judgment identifies a glaring gap in the legislative implementation—while the statutory provisions came into effect on April 1, 2022, the Central Government had yet to formulate a scheme under Section 162. This failure prompted the Court to direct the government

¹(Writ Petition (C) No. 295 of 2012)

²Motor Vehicles Act, 1988

³Motor Vehicles Act, 1988

⁴*Ibid.*

⁵The Indian Constitution Act, 1950.

⁶AIR 1989

⁷Motor Vehicles Act, 1988

⁸The Indian Constitution Act, 1950.

to expedite the process and submit the finalized scheme by March 14, 2025.

A detailed analysis of the ruling highlights the following factors:

a) *Golden Hour and the Right to Life:*The Court's emphasis on the golden hour aligns with the constitutional mandate of Article 21⁸, which guarantees the right to life and personal liberty. In its 1989 judgment in *Parmanand Katara v. Union of India*, the Court had already recognized the obligation of medical institutions to provide immediate treatment to preserve life. Section 162 codifies this obligation, making it a statutory right for accident victims. However, the absence of an operational scheme undermines the efficacy of this provision.

b) *Motor Vehicle Accident Fund:*Section 164-B creates an extensive financial system to back the golden hour initiative. The fund covers treatment expenses, compensation for hit-and-run incidents, and various other designated costs. Although the framework is strong, the judgment points out practical issues, including delays in processing claims and shortcomings in the documents submitted. These challenges require administrative changes and technological solutions to guarantee the fund's efficient use.

Draft Concept Note by Union Government's Concerns

The preliminary concept notes developed by the Ministry of Road Transport and Highways highlighted two major issues: a ceiling of ¹ 1,50,000 on treatment expenses and a restriction of seven days for cashless treatment. Both limitations fall short in tackling the realities of serious injuries and prolonged hospitalizations. The Court's instruction to reassess these restrictions highlights the necessity for a plan that values preserving lives more than financial limitations.

Court's Observations and Directions

The ruling demonstrates the Court's active stance in protecting public interests. The Court voiced disappointment over the government's postponement in creating the scheme, given the significant time elapsed since the provisions were enacted. It stressed that delaying action would lead to avoidable fatalities. The Court examined information showing that 1,662 claimants were compensated under the hit-and-run program from April to August 2024, with 1,026 claims still awaiting resolution. The elevated level of pendency underscores systemic inefficiencies that require immediate attention. The GIC's role in managing the fund and handling claims was acknowledged favorably. Nevertheless, the Court instructed the GIC to improve its claim processing system, tackle document shortcomings proactively, and accelerate the creation of an online platform

for smooth interaction with claimants. The Court established a definitive deadline for the Central Government to complete and present the scheme by March 14, 2025. It also required the addition of measures to tackle the issues brought up regarding treatment expenses and length of time.

Guidelines for the Government

To guarantee the successful execution of the golden hour initiative, the government needs to follow these guidelines:

a) Inclusive Scheme Design: The plan should address the varied medical requirements of accident survivors, including individuals needing extended hospital stays and specialized treatment. Random limits on treatment expenses and length should be avoided.

b) Effective Fund Management: Clear and responsible systems for distributing funds are essential. The government ought to create a central agency to manage the Motor Vehicle Accident Fund and guarantee adherence to the established regulations.

c) Efficient Claim Processing: The government ought to work with the GIC to ease claim processes, lessen documentation needs, and utilize technology to cut down on delays. Prioritizing the creation of an accessible online portal for users is essential.

d) Public Awareness Initiatives: Educating the public about the golden hour program is vital for its effectiveness. The government ought to initiate nationwide efforts to inform citizens, healthcare professionals, and law enforcement about the advantages and processes of the scheme.

e) Regular Monitoring and Assessment: Ongoing audits and evaluations must be performed to evaluate the scheme's efficiency. Input from stakeholders, such as healthcare providers and accident victims, should guide changes in policy.

Impact of the Judgment

The ruling by the Supreme Court is anticipated to significantly impact road safety, healthcare, and legal responsibility in India. The ruling highlights the importance of immediate medical care within the "golden hour" — the vital time frame right after a traumatic injury, when quick medical action can greatly enhance chances of survival and recovery results. By guaranteeing the implementation of programs aimed at providing prompt medical assistance for accident victims, the ruling could significantly lower the number of deaths resulting from road accidents. This emphasis on the golden hour may result in the creation of improved emergency response systems, such as properly equipped ambulances, trauma care facilities, and skilled staff. Moreover, this initiative may

encourage a cultural change that emphasizes road safety and medical readiness, thus promoting a safer atmosphere for all drivers and pedestrians. A key aspect of the judgment is its emphasis on the government's responsibility to meet its legal duties. By holding the government accountable to its promises, the Supreme Court highlights the principle of good governance, which demands the successful execution of policies designed to safeguard public health and safety. This ruling also sets an important judicial precedent for stepping in when legislative actions have not been sufficiently implemented. It emphasizes the judiciary's function as a protector of the public good, guaranteeing that constitutional and statutory requirements are not just lofty ideals but are transformed into actual results that serve the citizens. The establishment and implementation of the Motor Vehicle Accident Fund are essential elements of this ruling.

This fund offers financial support to at-risk road users, such as pedestrians and cyclists, who frequently cannot afford the steep expenses of medical care after accidents. By lessening the financial strain on families impacted by road accidents, the ruling fosters fair access to healthcare. This mechanism also guarantees that even those who are economically disadvantaged can receive prompt and quality medical care, thereby closing gaps in the healthcare system. Eventually, this financial safety net may also encourage improved adherence to traffic laws, as motorists become increasingly conscious of the legal and financial consequences of accidents. Aside from the direct areas of road safety and accident management, the judgment's effects reach into the wider fields of public health and governance. By emphasizing the well-being of citizens and tackling systemic inefficiencies, the ruling establishes a standard for future policy development. It also emphasizes the importance of collaboration across sectors, engaging stakeholders from healthcare, transportation, law enforcement, and civil society, to develop a comprehensive strategy for road safety and accident management.

Conclusion

The Supreme Court's judgment in *S. Rajasekaran v. Union of India & Ors.* represents a landmark step toward realizing the constitutional promise of the right to life. By directing the government to implement a robust scheme for cashless treatment during the golden hour, the Court has prioritized human lives over bureaucratic inertia. However, the realization of this vision requires concerted efforts from all stakeholders. The government must act with urgency and dedication to ensure that the

golden hour scheme becomes a beacon of hope for accident victims and a testament to India's commitment to protecting life and dignity.

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3

THE ROLE OF INTERNATIONAL ARBITRATION IN CROSS-BORDER DISPUTES

Dr. Paramita Bhattacharyya, Dr. Sudipta Adhikary,
Ms. Purbita Das, Mr. Subham Chatterjee

ABSTRACT

In a time of rising globalization, cross-border conflicts have emerged as a major obstacle for international trade, investment, and business. The intricate interaction of diverse legal frameworks, cultural distinctions, and jurisdictional disputes frequently renders conventional litigation a cumbersome and adversarial procedure. International arbitration has become a favored method for settling such conflicts, providing a neutral, adaptable, and enforceable option compared to court litigation.

This article examines the essential function of international arbitration in resolving transnational conflicts, evaluating its benefits, drawbacks, and influence on promoting worldwide economic collaboration. It explores essential aspects of arbitration, including the freedom of parties to choose arbitrators, procedures, and applicable laws, which promote fairness and flexibility. Moreover, it underscores the significance of confidentiality and impartiality in fostering trust between conflicting parties, especially in politically delicate or commercially crucial disputes.

The enforceability of arbitral awards as per the New York Convention of 1958 is fundamental to arbitration's efficacy, offering parties the guarantee of worldwide acknowledgment and implementation. The article also explores new trends, such as digitalization, virtual hearings, and sustainability issues, that are transforming the arbitration environment.

Even with its advantages, international arbitration encounters criticism, including elevated expenses, delays in procedures, and worries regarding transparency. This paper highlights the necessity for reforms to tackle these issues, enhancing the accessibility and fairness of arbitration.

Keywords: Cross-Border, Arbitration, Investment, Trade, Disputes, Justice

CROSS-BORDER DISPUTES: WHAT IT IS?

Cross-border disputes present significant challenges to jurisdictional coherence and authority, as conflicts arise between nations with differing

legal systems, leading to complexities in resolving international conflicts. Key issues at the heart of these disputes often involve trade, investment, and intellectual property rights, areas where legal frameworks can vary widely across jurisdictions. Procedural inconsistencies in national systems can obstruct the effective enforcement of transnational legal awards, which undermines the reliability of international dispute resolution. While arbitration serves as a vital mechanism to bridge these gaps, it requires stronger global legal alignment to ensure consistency and fairness. The tension between state sovereignty and the push for international legal harmonization often complicates the process, as countries seek to protect their domestic interests. Therefore, strategic foresight is essential when developing equitable dispute resolution frameworks, ensuring that they are adaptable, fair, and effective in addressing the multifaceted challenges presented by cross-border disputes.

INTERNATIONAL ARBITRATION AT A GLANCE

International arbitration serves as a pivotal mechanism for resolving disputes outside traditional court systems, especially in cross-border contexts where jurisdictional boundaries often complicate matters. Its core advantage is party autonomy, allowing the involved parties to design the arbitration process according to their specific needs, including choosing procedural rules and selecting arbitrators with the required expertise. This customization ensures a more efficient and relevant resolution. Another significant advantage is neutrality, which ensures that no party is biased by the laws of a particular jurisdiction, a critical factor in international disputes. Additionally, the confidentiality inherent in arbitration protects sensitive information, which is especially crucial in high-stakes matters involving proprietary data or trade secrets.

Arbitration's global reach is reinforced by the New York Convention, which enables the recognition and enforcement of arbitration awards across jurisdictions. However, despite these benefits, several challenges remain. High costs, lengthy procedures, and jurisdictional complexities continue to impede the efficiency of the system. Disparities in national laws and inconsistent enforcement practices can also create ambiguities, making the arbitration process more cumbersome. These ongoing issues highlight the need for continuous refinement in international arbitration practices, ensuring that this method of dispute resolution remains effective, equitable, and accessible in an increasingly interconnected world.

LEGAL FRAMEWORKS FOR CROSS-BORDER DISPUTES

The legal frameworks governing cross-border disputes rely heavily on international conventions, bilateral and multilateral agreements, and national legal systems to ensure resolution mechanisms are effective,

consistent, and enforceable. The **New York Convention (1958)** plays a crucial role by mandating the global enforcement of arbitration awards, while the **Hague Conventions** provide guidelines for jurisdiction, recognition, and enforcement of civil matters across borders. The **ICSID Convention** facilitates the resolution of investor-state disputes arising under Bilateral Investment Treaties (BITs), protecting foreign investments in international contexts. Additionally, **Regional Trade Agreements** such as those under NAFTA, EU, and ASEAN provide tailored rules for trade disputes, while the **WTO Dispute Settlement Body** handles global trade-related conflicts. National legal frameworks, including domestic laws that align with international standards such as **UNCITRAL**, also plays a pivotal role, particularly in areas like cross-border insolvency. Key institutions, like the **International Chamber of Commerce (ICC)** and the **Permanent Court of Arbitration (PCA)**, provide specialized arbitration and dispute resolution services, ensuring global coherence and fairness in complex cross-border matters.

CHALLENGES IN RESOLVING CROSS-BORDER DISPUTES

Resolving cross-border disputes presents multifaceted challenges that undermine the coherence and effectiveness of legal adjudication on an international scale. Jurisdictional conflicts often create significant barriers, complicating the determination of applicable laws and procedures across different legal systems. The lack of uniformity in legal frameworks exacerbates this issue, resulting in inconsistent application of justice and complicating the enforcement of foreign judgments, which often encounter procedural roadblocks in non-signatory jurisdictions. Cultural and procedural disparities further complicate negotiations, impeding the ability to find common ground in resolving conflicts. Additionally, the high costs associated with arbitration serve as a deterrent, particularly for smaller entities, limiting access to this crucial dispute resolution tool. Moreover, sovereignty concerns frequently clash with the imperative for international legal harmonization, as nations seek to protect their domestic interests and legal autonomy. As global commerce becomes increasingly dynamic and interconnected, there is a pressing need for adaptive and robust dispute resolution mechanisms that can effectively address these challenges while ensuring fairness and efficiency in a rapidly evolving international legal landscape.

RESOLVING CROSS-BORDER DISPUTES IN CROSS-BORDER DISPUTES

Resolving cross-border disputes involves intricate challenges that often undermine the coherence and efficiency of international legal frameworks. Jurisdictional conflicts present significant hurdles,

complicating the identification of applicable laws and procedures across diverse legal systems, while a lack of uniformity exacerbates inconsistencies in the application of justice. Enforcement of foreign judgments remains problematic, particularly in non-signatory jurisdictions, further hindering cross-border dispute resolution. Cultural and procedural disparities between jurisdictions add complexity to negotiations, making it difficult to reach consensus. The high costs of arbitration deter smaller entities, restricting access to this essential dispute resolution mechanism. Moreover, sovereignty concerns frequently collide with the push for international legal harmonization, as nations prioritize domestic interests over global cooperation. As international commerce continues to evolve rapidly, there is an urgent need for adaptable, robust dispute resolution mechanisms that can navigate these challenges and maintain fairness and efficiency in the increasingly interconnected global legal and economic environment.

LANDMARK CASES THAT HAVE SHAPED CROSS-BORDER DISPUTES

In *Re: Interplay between Arbitration Agreements under the Arbitration and Conciliation Act 1996 and the Indian Stamp Act 1899 (AIR 2023)* overruling its previous 5 judges Bench and held that unstamped agreements are valid and enforceable. Whether a policy circular amounts to an arbitration agreement if it contemplates further consent of the parties was decided in the case of *Dhansar Engineering Company Pvt Ltd v. Eastern Coalfields Ltd (AIR 2024)*, the Calcutta High Court held that a policy circular issued by a parent company contemplating arbitration would not amount to an arbitration agreement if it required fresh consent of the contractor to refer the dispute to arbitration. In the case of *Apex Buldsys Limited v. IRCON International Ltd (AIR 2024)*, The Delhi High Court ruled that limiting the panel for arbitrator appointment to just three names would undermine the principle of broad representation. Additionally, allowing one party to appoint two-thirds of the tribunal members would contravene principles of neutrality and balance. The Delhi High Court in the case of *Allied-Dynamic JV v. Ircon International Ltd (2024)* ruled that if a party did not raise objections regarding the bias of the arbitrator during the arbitral proceedings, they cannot later challenge the arbitral award on those grounds under Section 34 of the Arbitration and Conciliation Act.

FUTURE TRENDS IN RESOLVING CROSS-BORDER DISPUTES

The future of resolving cross-border disputes is poised for transformative change driven by technological advancements and the

evolving demands of global commerce. Digital platforms are set to redefine arbitration, enabling faster, more accessible, and cost-effective dispute resolution processes across jurisdictions. Blockchain technology holds the potential to streamline these processes by ensuring transparent, tamper-proof records, facilitating greater efficiency and trust in cross-border legal proceedings. A growing reliance on hybrid dispute resolution mechanisms, combining elements of traditional litigation with arbitration and mediation, is emerging as a flexible solution to address the complexities of international conflicts. Artificial intelligence is anticipated to play a significant role in predicting legal outcomes, enhancing decision-making processes and reducing uncertainties. With environmental and sustainability-related issues gaining prominence, the frequency of such disputes will rise, necessitating new frameworks for resolution. As global interconnectivity continues to expand, the harmonization of international legal standards will become increasingly inevitable, allowing stronger collaboration among jurisdictions and ensuring smoother, more effective resolutions.

CONCLUSION

Disputes across borders have grown more prevalent in the contemporary global economy, as trade, investment, and business activities surpass national limits. In this scenario, international arbitration arises as an essential method for settling these conflicts, providing parties with an effective, impartial, and enforceable resolution. Its importance is rooted in tackling the issues created by jurisdictional disputes, varying legal frameworks, and the necessity for equitable resolution methods that build trust among participants.

One of the most significant benefits of international arbitration is its impartiality. In contrast to litigation, which could engage the courts of one party's nation, arbitration offers an equal platform. Parties can select arbitrators from a pool of qualified professionals. Additionally, arbitration eliminates the possible bias that could occur in foreign courts, where local interests may sway judgments.

One more important advantage of international arbitration is its adaptability. Parties may customize procedures to meet their unique requirements, establishing rules, language, location, and applicable law. This adaptability not only accelerates arbitration compared to conventional court procedures but also aligns it with the practical demands of global trade. Confidentiality is an additional aspect that attracts businesses since arbitration processes are private, protecting sensitive data and maintaining business relationships.

The implementation of arbitral awards according to the New York Convention of 1958 is arguably the most important benefit of international

arbitration. This convention, with more than 170 signatory nations, guarantees that arbitral awards are acknowledged and enforceable worldwide, offering parties the assurance that their disputes will lead to binding resolutions. This enforceability is especially essential in international disputes, where parties are frequently located in different jurisdictions that have diverse legal frameworks.

Nonetheless, international arbitration faces several challenges. Elevated expenses, particularly in intricate situations, may discourage smaller entities. Moreover, there is the possibility of delays resulting from procedural intricacies or trivial disputes concerning arbitral awards. Critics contend that arbitration can occasionally lack transparency due to its secretive nature, potentially reinforcing power disparities between parties.

Notwithstanding these obstacles, international arbitration continues to be a vital mechanism for addressing cross-border conflicts, especially in sectors like trade, investment, and intellectual property. Its capacity to integrate various legal systems, deliver impartial and enforceable results, and adjust to the specific needs of international trade positions it as the favored option for global corporations and investors.

To enhance the efficacy of international arbitration, ongoing initiatives are required to tackle its shortcomings. Improved cost-effectiveness, increased procedural clarity, and stronger systems to deter unnecessary challenges are key areas that need focus. Additionally, capacity-building programs, especially in developing nations, can contribute to establishing a more inclusive and fair arbitration environment.

Thus, international arbitration is essential in promoting global economic collaboration by offering a dependable and effective means to address cross-border conflicts. Although it has its flaws, its benefits significantly surpass its drawbacks. As worldwide trade keeps expanding, the importance of international arbitration will escalate, necessitating continuous innovation and cooperation among participants to guarantee it stays a just, efficient, and reachable option for resolving disputes.

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4

ECONOMIC INEQUALITY AND ITS IMPACT ON POLITICAL PARTICIPATION

Debajit Boruah

ABSTRACT

The study analyses the intricate relationship between economic inequality and political participation, arguing that socioeconomic disparities hinder democratic engagement of marginalized groups. Marginalized communities face systemic barriers, including logistical challenges, voter suppression tactics and psychological disempowerment, which inhibit their political agency. The study identifies structural barriers, psychological factors and systemic inequalities as key mediators. By bridging empirical evidence with theoretical frameworks, the study illuminates how economic stratification perpetuates political disengagement and offers policy recommendations to foster inclusive democratic practices. The study also explores these dimensions and provides a comprehensive understanding of how economic inequality undermines the democratic ethos of inclusivity.

Keywords: economic inequality, political participation, marginalization and representation

Introduction

Economic inequality refers to the unequal distribution of wealth, income and resources among individuals or groups within a society. This disparity often affects individuals' ability to access opportunities, basic needs and social mobility, creating significant gaps between socioeconomic classes. Political participation, encompasses activities such as voting, protesting and advocacy, which serves as a means for citizens to influence governance and decision-making. However, economic inequality can undermine political participation by marginalizing underprivileged groups, limiting their ability to engage in political processes due to lack of resources, education, or time (Piketty, 2014). As a result, policies may disproportionately favour the affluent, perpetuating cycles of inequality (Dahl, 1998).

Bridging the gap between economic inequality and political participation requires targeted interventions that empower marginalized groups and promote inclusivity. Technology, particularly in the form of bots and digital platforms, plays a vital role in this regard. Bots can facilitate access to information, simplify voter registration and amplify

underrepresented voices through social media campaigns (Verba et al., 1995). They can also combat misinformation and mobilize grassroots movements by engaging citizens in civic discussions and encouraging political awareness. However, technology is not a standalone solution, it complements broader efforts to create equitable platforms for political participation, fostering a more inclusive democratic process (Piketty, 2014).

Economic Inequality and Its Impact on Political Participation

Economic inequality and political participation are fundamental dimensions of societal structure that shape democratic governance. While democracies advocate for equal representation, the reality is often skewed by systemic economic disparities. Economic inequality constrains political participation by marginalizing lower-income groups, perpetuating a vicious cycle of underrepresentation and exclusion. Socioeconomic disparities create structural barriers, reduce psychological empowerment and limit representation in governance. Economic inequality often translates into structural obstacles that disproportionately affect low-income individuals. These include logistical constraints, such as limited access to transportation, polling stations or online voting platforms; financial barriers, such as the costs associated with political involvement, like campaign donations or time off work; and educational disparities, which lead to lower levels of political literacy and awareness among economically disadvantaged groups. Economic inequality also erodes the psychological foundations of political participation. Feelings of alienation, helplessness and distrust in institutions are prevalent among individuals in lower socioeconomic strata, which often lead to apathy and withdrawal from political engagement. In India, for instance, economic disparities intersect with caste and regional inequalities, exacerbating political disengagement among marginalized communities. Despite being the world's largest democracy, voter turnout in economically deprived regions remains disproportionately low, reflecting a lack of trust in governance structures.

Economic inequality significantly impacts political participation by creating multiple layers of exclusion and marginalization. When individuals from lower socioeconomic backgrounds struggle with basic needs like food, shelter and healthcare, engaging in political processes becomes a secondary concern. The financial strain experienced by these groups makes it difficult for them to contribute to political campaigns, attend political events or even dedicate time to voting. Additionally, the lack of financial resources limits their ability to access political information, which often requires internet connectivity, technology, or transportation to political hubs. This results in a lack of political literacy, where economically

disadvantaged individuals may not fully understand their rights, the policies that affect them or how to effectively participate in the democratic process. Moreover, economic inequality fosters a sense of disillusionment and distrust towards political institutions. When people see that the system disproportionately benefits the wealthy, it can lead to political apathy and a lack of engagement. In this way, economic inequality perpetuates a cycle of exclusion, where the marginalized are further pushed out of political participation, limiting the diversity of voices and undermining the democratic process.

Strategies to Mitigate the Impact of Economic Inequality on Political Participation

Addressing the adverse effects of economic inequality on political participation requires a comprehensive strategy that tackles both systemic barriers and individual limitations. Policy interventions play a critical role in narrowing economic disparities, as measures like progressive taxation ensure that wealthier individuals contribute more to public welfare, while social welfare programs provide essential support to underprivileged communities. These efforts not only improve economic equity but also empower marginalized groups to participate more actively in political processes.

Simplifying voting mechanisms is another vital step. Initiatives such as mail-in ballots, early voting and digital voting platforms can significantly enhance accessibility, particularly for those who face logistical or financial constraints in attending polling stations. Similarly, civic education programs are essential to equip economically disadvantaged populations with the knowledge and skills needed to navigate democratic institutions, fostering political awareness and rebuilding trust in governance.

Additionally, institutional reforms are necessary to create a more inclusive political landscape. Strengthening campaign finance regulations helps curb the disproportionate influence of wealth in politics, ensuring a level playing field. Introducing quotas or affirmative action mechanisms can further guarantee diverse representation, providing underrepresented groups with a stronger voice in decision-making processes. These combined efforts not only address the structural barriers caused by economic inequality but also create a more equitable and participatory democracy for all citizens.

Conclusion

Economic inequality poses a significant threat to democratic participation by systematically excluding marginalized groups. These disparities erode the inclusivity and responsiveness of democratic institutions, compromising their legitimacy and effectiveness. To resolve

this challenge, there is need of a multifaceted approach that includes inclusive policies, institutional reforms and the empowerment of marginalized communities. By fostering equitable access to resources, promoting civic education and ensuring proportional representation, societies can bridge the gap between economic inequality and political participation. A democracy that fails to reflect the voices and interests of all its citizens risks losing its integrity and becoming a tool for perpetuating inequality rather than dismantling it. As such, the pursuit of inclusivity is not just a policy goal but a moral imperative for democratic societies.

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5

IMPACT OF SOCIAL MEDIA ON COLLEGE STUDENTS : WITH SPECIAL REFERENCE TO THE STUDENTS OF YAMUNA NAGAR DISTRICT OF HARAYANA

Mr. Gourav Kamboj

ABSTRACT

Social media is playing an important role in every sphere of life now days. Computers and internet has contributed a lot in this field. Smart phones have put the entire world on a common platform. We can connect with anybody throughout the world with the help of social media. There are many social media networks to choose for the people. In this study I have selected Facebook, WhatsApp, Instagram, Snapchat and other platforms as the popularity of these social media networks is more among Indian youth. Other social media networks were also taken in this study. To find out the impact of media on students we have look in to both negative and positive impacts, because everything have positive and negative aspects. This empirical paper aims to investigate the impact of social media on college students in Yamuna Nagar district of Haryana. A sample of more than 100 respondents was selected having smartphone with them. To conduct this study a well-structured google form was developed. The collected data was analyzed on percentage and average bases. The study found that there was both positive and negative impact of social media on social life of Students.

Keywords: Social Media, Yamuna Nagar, College Students, Positive Effects, Negative Effects, Haryana

Introduction: The major goal of this research is to see how social media affects college students' academic performances. Students frequently use social media networking sites and applications. They spend a significant amount of time on these sites on a daily basis. According to studies, university and college students are the most active users of social networking sites among students of various ages. In education, social networking sites are extremely significant. students in fact have a variety of options to better their learning and have access to the most up to date knowledge by interacting with learning groups and other educational systems. Students can also share information by forming connections with diverse people. This has the potential to improve student learning results. Students mental Health, which refers to their emotional,

psychological and social well being is also affected by university and college social media. Students at universities and colleges spend a significant amount of time on social media throughout the day and at night and it can be argued that technology plays a significant role in their everyday life. Despite their enormous contribution to knowledge acquisition, it is necessary to identify whether such technologies are being used to gain knowledge or for other reasons that may result in adverse technology abuse affects. Many students spend numerous hours on social media sites such as Facebook, WhatsApp, Instagram and Snapchat everyday. This may appear to be a waste of time at first look, but it also assists kids in developing important knowledge and becoming engaged citizens who create and share content. We believe that technology is an important aspect of students Success as social media sites rise in popularity.

The district of Yamuna Nagar in Haryana, India, serves as an interesting case study for examining the impact of social media among college students. With a diverse population comprising students from various educational institutions, Yamuna Nagar presents a microcosm of the broader trends in social media usage and its impact among young adults in India.

Objectives of the Study:

1. To identify the influence of social media on the academic performance of the students life.
2. To know the awareness of social media.
3. To understand the pros and cons of social media on the students.
4. To find the purpose for which social media platforms are used and the percentage of students who use social media.
5. To examine college students' attitudes towards social media in Yamuna Nagar District of Haryana.
6. To analyze the ways in which social media usage can influence the mental wellbeing of students.

Review of Literature:**1. Elantheraiyan.P&S.Shankarkumar (2019)**

This study investigates the impact of social media on college students in Chennai district, India. The study uses a survey to collect data from 200 college Students and identifies four main themes: social media usage patterns, impact on academic performance, impact on mental health, and impact on Interpersonal relationships. The findings suggest that social media use is prevalent among college students in Chennai and can have both positive and negative impacts on their academic performance, mental health, and interpersonal relationships. The study provides valuable insights into the impact of social media on college students in Chennai and highlights

the need for further research and interventions to promote healthy social media use.

2. S.Vanithamani et al. (2021)

This study examines the impact of social media among college students in Suler, Coimbatore, India. The study uses a survey to collect data from 100 college students and identifies four main themes: social media usage patterns, impact on academic performance, impact on mental health, and impact on Interpersonal relationships. The study reveals that social media use is prevalent among college students in Suler, Coimbatore, and can have both positive and negative impacts on their academic performance, mental health, and interpersonal relationships. The study provides valuable insights into the impact of social media on college students in this region of India and highlights the need for further research and interventions to promote healthy social media use.

3. Qingya Wang et al. (2011)

This paper discusses the impact of social media on college students' academic performance. The study aims to explore the relationship between social media use and study efficiency. Results show that social media is popular among college students, with facebook being the most used platform. The majority of participants spent 6-8 hours per day on social media, with 68% using laptops to access the sites. While 20% used their cell phones, only 12% preferred desktop computers. In terms of social media use during school hours, 64% of participants reported using social media during school hours, with 80% using it while completing homework. The study found that social media use is affecting college students' academic performance, as 45% of participants admitted to spending too much time on social media. The authors recommend that college students should strive for a better balance between social media use and academics.

4. AgwiUche Celestine and Ogwueleka Francisca Nonyelum (2018)

The study gives us insight into how the internet has allowed for information sharing and collaborative interaction across borders, and social media has become an omnipresent platform for creating and sharing content, networking, and entertainment. Social media's ease of use, speed, and global reach has led to its widespread use by young people. However, the increased use of social media sites by undergraduate students has raised concerns about its impact on their academic performance. The use of social media has become so prevalent that students spend a significant amount of time engaging in social media activities, which could negatively affect their academic activities. This study was conducted at Samuel Adegboyega University. The results showed that spending too much time

on social media can have a detrimental effect on academic activities. Therefore, the study suggests that students should minimize the time spent on social media activities to improve their academic performance.

5. Kaushik Bhakta (2017)

The study aimed to determine the nature of social media use among college students, its impact on their academic performance, and its overall effect on them. The survey research method was used, and a self-made questionnaire was administered to 100 second-year undergraduate students pursuing a BA Degree in English in Howrah and Kolkata districts. The results indicated that students primarily used WhatsApp for entertainment purposes and that a negative relationship existed between social media usage duration and academic achievement. Social media had both positive and negative impacts on

college students. While it allowed them to participate in different groups and social activities, overuse of social media could also hinder their academic performance. Therefore, it is crucial for parents, teachers, and the government to create guidelines to monitor social media use among students.

6. AnupAdhikari (2020)

This study discusses the impact of social media on Navoditcollege students. While social media is a modern communication tool, it can have both positive and negative effects on students. The excessive use of social media can have long-lasting effects on students' mental and physical health and negatively impact their academic performance. The study reports that students use social media mainly to remain updated on trends and make learning technology easier. However, the research also highlights concerns such as privacy issues, parental control, and peer pressure to join social media. Therefore, the study suggests that students have their own perception of the impact of social media, and it is important to be aware of both the positive and negative effects it can have.

Research Methodology:

The data was collected from primary as well as secondary resources. The primary data was collected with the help of well-structured questionnaire. This study employs a mixed-methods approach to investigate the impact of social media on college students in Yamuna Nagar district of Haryana. The secondary data was collected from the previous studies, internet, different libraries, etc. A questionnaire was designed and data was collected from sample size of more than 100 Students.

How Social Media has affected Students?

Social media has profoundly impacted students' lives, influencing their academic performance, mental health, and social interactions. On

the one hand, social media has enabled students to connect with peers, access educational resources, and express themselves creatively. Platforms like Instagram, WhatsApp, and Facebook have become essential tools for learning, self-expression, and community-building. However, excessive social media use has led to significant concerns. Students' constant exposure to curated and manipulated content has fostered unhealthy comparisons, lowered self-esteem, and increased anxiety. Cyber bullying, online harassment and fear of missing out (FOMO) have become pervasive issues, affecting students' emotional well-being and academic focus. Moreover, social media's constant distractions have decreased attention spans, reduced face-to-face interaction skills, and compromised critical thinking abilities. The blurring of boundaries between personal and online lives has also led to sleep deprivation, decreased physical activity, and compromised mental health. Furthermore, social media's algorithms and echo chambers have contributed to the spread of misinformation, biased perspectives, and decreased empathy. Educators and parents must recognize these challenges and promote responsible social media use, digital literacy, and media literacy to ensure students navigate the online world effectively and maintain a healthy balance between their online and offline lives.

How Social Media is Changing Education?

Social media permeates today's society with millions of us engrossed, some would argue to the point of unhealthy addiction, in the latest happenings via apps such as Facebook, Instagram and WhatsApp. According to the previous survey conducted, 85% of all adults aged 16+ have a profile on at least one social networking site, and though the report doesn't break down these figures by age group, it's reasonable to assume that among those of university age, that percentage could potentially be much higher.

Education is very essential part of any individual's life. For every teenager, education is more important than anything. Today teenager shows very much interest for using social networks but unfortunately social networks affect education badly. Previous research done has already calculated that more than 90% of college students use social networks. Technology Has shown a fast development by producing small communication devices but these small communication devices can be used for accessing social networks any time anywhere, these devices include pocket computers, laptops, ipads and even simple mobile phones (which support internet) etc. Technology is step towards betterment, no doubt but any technology which can provide ease of social networks can be dangerous for social network addicts.

Implications for Future Study:

Further research could look at why WhatsApp and Facebook have become so popular in comparison to other social media platforms. Because both social networking sites have large utilisation rates, it would be interesting to learn why people use them so frequently. It would be a worthwhile issue to investigate as these websites become more popular. Finally, additional study on gender and social networking websites usage is needed to better understand the effects of males and females using these sites.

Conclusion and Suggestions:

Social media has now become an important part of life for the people. People are assessing social media for number of reasons. Students specially use social media for number of purpose. This study shows that majority of students using social media platforms and they spent their 2 to 3 hours each day on social media. In this study, most of the students were under graduate students who are using social media most of the time. Most of the students are using social media for more than 3 years. They mostly use social media for sharing information and learning technology. Most of the students take help of social media during completion of assignments because it aware about innovations previously done researches which help students complete their assignments more accurately. As per this research, most of the students were agreed that social media is useful in studies because it provide most of the information on a single click without any delay. Social media poses positive effect on studies because it is helpful in providing many information and previously done researches and about upcoming technology and with social media it is very easy to share any information to anyone who connected to the person through social media. Everyone started sharing their personal information and various data on social media, these information s are used by hackers and unwanted persons for their personal benefits and their personal benefit causes big harm to the authentic users so there is privacy issues related to social media. There are many drawbacks of social media but in many ways social media is useful for students because it provide education, connectivity with others, provide many information s and aware with various updates, innovations and other things In present world social media poses positive effect on life therefore social media is essential for modern world.

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6

ROLE OF ARTIFICIAL INTELLIGENCE IN CLIMATE ADAPTATION

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ABSTRACT

Artificial Intelligence (AI) offers transformative potential for climate adaptation, enabling advanced data analysis, forecasting, and decision-making to mitigate climate risks. AI improves disaster preparedness by predicting extreme weather events and optimizes agriculture through precision farming. It also supports urban planning with climate-resilient designs and aids biodiversity conservation by monitoring ecosystems and detecting environmental changes. However, equitable access, data challenges, and ethical concerns must be addressed to ensure AI benefits are shared globally. This Chapter underscores AI's pivotal role in driving sustainable and inclusive strategies for a resilient future.

Keywords: Artificial Intelligence, Climate Adaptation, Internet of Things

Introduction

Climate change is a pressing global challenge, threatening ecosystems, economies, and livelihoods worldwide. The intensification of extreme weather events, rising sea levels, and shifting climatic patterns necessitates innovative solutions to mitigate its impacts and adapt to its challenges. Among the emerging tools, Artificial Intelligence (AI) stands out as a transformative technology for climate adaptation. AI can analyze vast datasets, generate real-time insights, and provide tailored strategies for addressing climate risks. By enabling better forecasting, resource optimization, and resilience planning, AI offers immense potential across sectors such as agriculture, urban development, biodiversity conservation, and renewable energy management. However, challenges like data accessibility, equity, and ethical considerations must be addressed to ensure inclusive, effective, and equitable use of AI. This paper explores the multifaceted role of AI in promoting sustainability and building resilience to climate change.

AI-Driven Climate Risk Assessment and Forecasting

AI plays a pivotal role in enhancing climate risk assessment by improving the accuracy of predictions for extreme weather events and long-term climate trends. Machine learning (ML) models process large datasets from satellite imagery, meteorological records, and historical climate data to predict events like hurricanes, floods, and heatwaves.

These insights are critical for developing early warning systems, enabling proactive disaster preparedness, and reducing economic losses. For instance, AI-powered tools provide timely alerts for cyclones or floods, giving governments and communities time to mobilize resources and mitigate damages. Moreover, AI can simulate long-term climate scenarios, helping policymakers develop adaptive strategies and allocate resources effectively.

AI for Climate-Resilient Agriculture

In agriculture, AI offers solutions for adapting to climate change by optimizing resource use, improving crop yields, and managing risks. Precision agriculture, powered by AI, ensures the efficient use of water, fertilizers, and pesticides, reducing environmental impacts while maintaining productivity. AI models predict crop performance under changing conditions and detect early signs of pests or diseases. For example, AI tools provide farmers with localized climate-smart advisories, such as planting schedules and irrigation recommendations, helping them adapt to extreme weather patterns and increase resilience. By improving agricultural efficiency, AI also contributes to global food security in the face of climate change.

Sustainable Urban Planning

AI enhances urban planning by enabling the development of climate-resilient infrastructure and efficient resource management. AI models simulate potential climate risks, such as flooding or heatwaves, and guide urban planners in creating sustainable designs. For example, AI-driven tools help optimize the integration of green spaces, renewable energy, and smart transportation systems in urban areas. Additionally, AI improves energy efficiency in buildings by monitoring usage patterns and identifying inefficiencies. Real-time water management systems powered by AI detect leaks and optimize water distribution, reducing waste and ensuring sustainability. These innovations contribute to the creation of resilient, eco-friendly cities equipped to withstand climate challenges.

Biodiversity Conservation and Ecosystem Management

AI has proven valuable in biodiversity conservation and ecosystem management by monitoring environmental changes and detecting threats. Tools powered by AI analyze satellite imagery to detect deforestation, habitat destruction, and illegal activities such as poaching. Additionally, AI tracks endangered species, providing data on migration patterns and population dynamics. By integrating Internet of Things (IoT) devices, AI systems enable real-time monitoring of ecosystems, offering early warnings of adverse changes. These capabilities are crucial for designing

effective conservation strategies, restoring ecosystems, and maintaining biodiversity in the face of climate impacts.

AI and Renewable Energy Optimization

AI supports the transition to renewable energy by optimizing the efficiency of solar and wind systems, predicting energy demand, and managing storage solutions. By coordinating multiple energy sources, AI ensures a stable power supply while reducing grid instability. Predictive maintenance powered by AI minimizes downtime and enhances the lifespan of renewable energy systems. Moreover, AI facilitates the integration of renewables into smart grids, improving energy distribution and management. These advancements are essential for accelerating the shift toward sustainable energy systems, reducing greenhouse gas emissions, and supporting global climate goals.

Ethical and Policy Considerations in AI for Climate Adaptation

The deployment of AI in climate adaptation raises ethical and policy challenges, particularly regarding equitable access, data privacy, and transparency. Marginalized and low-income communities often lack the infrastructure to benefit from AI technologies, exacerbating the digital divide. Bridging this gap requires investments in digital literacy, affordable technology, and localized capacity-building programs. Data privacy is another critical concern, as AI systems rely on vast amounts of sensitive information. Implementing data protection standards and anonymizing personal data are essential to safeguard privacy. Additionally, addressing algorithmic biases ensures fairness in AI-driven outcomes. Policymakers must establish clear regulations and promote international collaboration to guide the ethical use of AI for climate resilience.

Challenges and Future Prospects of AI in Climate Adaptation

Despite its potential, AI faces significant challenges in scaling and implementation. Many regions, particularly in developing countries, lack comprehensive climate data necessary for building accurate AI models. Global data-sharing platforms and standardized datasets are essential to address these gaps. Infrastructure limitations, such as unreliable internet and insufficient computing resources, hinder the deployment of AI in vulnerable regions. Overcoming these barriers requires investments in infrastructure, partnerships, and financial support. Additionally, adapting AI solutions to diverse local contexts is critical for their effectiveness. Collaborative efforts between governments, academic institutions, and private organizations are vital for advancing AI research and ensuring its global accessibility.

Conclusion

AI represents a powerful tool for addressing the multifaceted challenges posed by climate change. Its applications in forecasting, agriculture, urban planning, conservation, and energy optimization provide innovative solutions to enhance resilience and sustainability. However, realizing AI's full potential requires addressing ethical, equity, and data-related challenges. By fostering global collaboration, building local capacities, and ensuring inclusive access, AI can drive transformative climate adaptation strategies and support a resilient, sustainable future.

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7

GLOBAL PERSPECTIVES ON SMART CITY INITIATIVES

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ABSTRACT:

Smart city initiatives are transforming urban environments by integrating advanced technologies, sustainability, and citizen-focused solutions to address global challenges such as urbanization and climate change. This chapter explores various regional approaches, highlighting successful case studies, failures, and best practices from cities like Barcelona, Singapore, and New York. It examines the role of innovation, inclusivity and collaboration in shaping smart cities, emphasizing the importance of knowledge-sharing, policy harmonization, and international funding. The goal is to provide insights into how cities can adopt interconnected, sustainable strategies to create resilient urban spaces that contribute to global sustainability objectives.

Keywords: Smart Cities, Urban Innovation, Sustainability, Technology Integration, Citizen Engagement

Introduction

Smart city initiatives have become transformative solutions to address challenges such as rapid urbanization, climate change, and resource management. By integrating advanced technologies like IoT, AI, and big data, cities are enhancing infrastructure, improving governance, and fostering sustainability. However, the strategies and outcomes vary significantly due to regional priorities, economic capacities, and cultural contexts. These initiatives involve combining technological innovation, sustainable solutions, and citizen-centric approaches to tackle urbanization and climate-related issues. Studying global smart city models is essential for understanding diverse strategies and innovations, enabling cities to share knowledge and adopt best practices. This chapter explores these varied approaches, offering insights into creating smarter, more inclusive, and resilient urban environments worldwide.

Evolution of Smart Cities Globally

- **Early Smart City Concepts**

The early concept of smart cities emerged from the need to integrate technology into urban planning, focusing on improving efficiency, connectivity, and sustainability. Initial efforts emphasized infrastructure automation, such as intelligent traffic systems and energy grids, laying the foundation for today's technologically advanced and citizen-focused smart urban developments.

- **Regional Adoption Patterns**

Smart city adoption patterns differ globally, shaped by regional priorities, resources, and challenges. Developed nations prioritize technology integration and innovation ecosystems, while developing regions focus on addressing basic urban needs like infrastructure, energy, and water management. These variations highlight the diverse approaches to achieving smart, sustainable, and inclusive cities worldwide.

- **Common Themes and Challenges**

- **Technological Innovations**

IoT, AI, and Big Data are revolutionizing smart cities by enhancing real-time data collection, predictive analytics, and automated urban management systems. These innovations drive efficiency, improve resource allocation, and enable smarter decision-making for cities worldwide.

- **Sustainability Efforts**

Smart cities are increasingly focusing on green energy solutions, waste management, and water conservation to create more sustainable environments. These efforts aim to reduce urban carbon footprints and ensure the long-term resilience of cities against environmental challenges.

- **Citizen Engagement**

Citizen engagement in smart city initiatives varies widely, with some cities prioritizing community participation through digital platforms, while others face challenges in ensuring broad inclusivity. Effective engagement fosters transparency, trust, and co-creation of solutions for urban issues.

- **Challenges**

Data privacy and cybersecurity concerns arise as cities collect vast amounts of personal data, requiring strong safeguards.

Financing and economic disparities often hinder the development of smart cities, particularly in lower-income regions.

Interoperability of technologies and infrastructure is another challenge, as diverse systems need to communicate seamlessly for efficient urban management.

- **Lessons Learned from Global Case Studies**

Case Study: Barcelona, Spain - A Smart City Success Story
Barcelona stands as a global leader in smart city initiatives, excelling in sustainability, urban mobility, and citizen engagement through IoT-driven services like smart parking and waste management. However, challenges such as gentrification and displacement emerged during the "21@" district project, highlighting the need for social inclusivity. Best practices from Barcelona include prioritizing citizen involvement, leveraging open data, fostering public-private partnerships, and integrating green technologies to balance innovation with sustainability. These strategies provide valuable lessons for other cities aiming to develop sustainable, inclusive, and technology-driven urban environments that improve quality of life for all residents.

Role of International Collaboration

- **Knowledge Sharing**

Global forums, partnerships, and alliances foster collaboration, allowing cities to share insights, innovations, and best practices for urban development.

- **Policy Harmonization**

Developing global standards for smart city technologies ensures interoperability, facilitates cross-border innovation, and aligns urban strategies across different regions.

- **Funding and Support**

International organizations like the UN and World Bank provide financial resources, technical assistance, and policy guidance to support smart city projects globally.

Future of Smart City Initiatives Worldwide

- **Emerging Trends**

The future of smart cities lies in the integration of cutting-edge technologies such as AI, blockchain, and renewable energy systems to optimize urban management and sustainability. Concepts like digital twins and the metaverse are reshaping urban planning by creating virtual city models, enabling real-time simulations and innovative citizen experiences.

- **Opportunities for Global Collaboration**

Global collaboration presents opportunities to build interconnected networks of smart cities, enabling the sharing of knowledge, resources, and technologies. International partnerships can drive standardization, foster innovation, and accelerate urban transformation, ensuring that cities across the globe can address shared challenges while leveraging collective advancements for sustainable development.

- **Addressing Global Challenges**

Smart city initiatives must tackle pressing global issues such as climate change, urban inequality, and demographic shifts. By adopting green technologies, enhancing accessibility, and planning for aging populations, smart cities can promote resilience, inclusivity, and sustainability, ensuring equitable urban environments that cater to diverse populations and changing global conditions.

Conclusion

In conclusion, global smart city initiatives demonstrate diverse strategies, innovative technologies, and valuable lessons in addressing urban challenges. From leveraging AI and IoT to promoting sustainability and

inclusivity, these efforts highlight the potential of smart cities to transform urban living. Cities worldwide must adopt holistic, citizen-focused approaches to foster equity and resilience. The vision for the future lies in creating interconnected urban hubs that prioritize sustainability, innovation, and collaboration for a thriving global community.

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8

FROM CLASSROOM TO CAREER : ROLE OF EDUCATION IN REDUCING POVERTY

Pinki Sarmah

Abstract:

Education is a cornerstone for personal and societal growth. Its transformative role in breaking the poverty cycle has been widely acknowledged across the globe. This paper explores how education fosters economic mobility, reduces intergenerational poverty, and creates opportunities for sustainable livelihoods. By examining barriers to educational access and showcasing successful interventions, this study highlights the indispensable role of education in driving upward mobility. Recommendations for policy improvements are provided to bridge the gaps in access and quality.

Key words: Education, poverty cycle, global Initiatives, policy intervention.

Introduction:

Poverty is the greatest threat to peace and stability in the world today, rather than terrorism and other well publicized struggle. According to Global multidimensional poverty index(2024) out of 6.3 billion people across 112 countries, 1.1 billion (18.3%) live in severe multidimensional poverty. From the World Bank's record(2024) almost 8.4% of the global population lives in extreme poverty as they lived on less than \$2.15 a day. Education, as known, is the great equalizer and could go a long way in solving this issue. It empowers people with the skills and knowledge needed to access better employment opportunities, improve income levels, and contribute to societal progress. This paper explores the transformative power of education in breaking the poverty cycle and enabling economic mobility, especially in low-income communities.

Role of education in breaking poverty cycle:

Education is key to breaking the cycle of poverty, as it helps individuals gain skills to compete in the job market and earn better incomes. Quality education reduces poverty and boosts economic growth.

Globally, education significantly impacts poverty. UNESCO reports that 420 million people could escape poverty if every household had at least one adult who completed secondary school, cutting global poverty by over half. However, in developing countries, 60% of 10-year-olds struggle with basic reading and comprehension skills. In the U.S., education

and poverty are closely linked. In 2023, only 4% of people with a bachelor's degree lived in poverty, while the poverty rate for high school dropouts was 25.1%. Children in families with at least one parent holding a bachelor's degree have a poverty rate as low as 4%.

India shows how education reduces poverty. The extreme poverty rate fell from 53.86% in 1983 to 21.23% in 2011, partly due to improved primary education. Yet, challenges remain, with 27% of children still living in poverty in 2019.

Education also helps stop poverty from passing from one generation to the next. In the U.S., 6.4% of children born into poverty remain poor throughout their lives. Higher education levels increase job opportunities, income, and economic mobility, breaking the poverty cycle.

Berries to educational access:

Access to education faces numerous challenges in developing countries. Poverty is a major barrier, as families often cannot afford school-related costs, even when education is free. According to UNESCO, children from the poorest households are far more likely to miss out on schooling than their wealthier peers.

Gender inequality also limits access, with cultural norms and practices like early marriage preventing many girls, especially in Afghanistan, from attending school. Rural areas face additional hurdles, including long distances, poor infrastructure, and the impacts of conflict, which destroy schools and displace families.

Discrimination further excludes children with disabilities and those from ethnic or linguistic minorities, who face social stigma and lack adequate support. Weak governance, corruption, and underfunding worsen these issues, while limited access to technology widens the digital divide, as seen during the COVID-19 pandemic. Parental illiteracy and child labour also prevent many children from getting an education.

Addressing these issues requires collaborative efforts from governments, NGO's and communities.

Scheme recommendations:

Education is crucial for reducing poverty by equipping individuals with skills and knowledge for better job opportunities. Global initiatives like Education for All (EFA) and Sustainable Development Goal 4 (SDG 4) aim to ensure inclusive, quality education for everyone. Since 2002, the Global Partnership for Education (GPE) has raised over \$11 billion to improve education systems in low-income countries. In Bangladesh, the Reaching Out-of-School Children (ROSC) project has helped over 700,000 rural children return to school since 2004.

India has introduced several programs to reduce poverty through education. The Sarva Shiksha Abhiyan (SSA), launched in 2001, focused on universal primary education and later expanded to secondary education under the Samagra Shiksha Abhiyan in 2018. The Mid-Day Meal Scheme, started in 1995, combats child malnutrition while boosting school enrolment. The Right to Education (RTE) Act of 2009 guarantees free education for children aged 6–14. For higher education, the National Scholarship Portal (2015) provides financial aid to disadvantaged students. The National Education Policy (NEP) 2020 emphasizes vocational training, aims to reduce dropout rates, and targets a 50% higher education enrolment rate by 2035. It also promotes digital education through initiatives like DIKSHA and the National Digital Education Architecture (NDEAR).

Conclusion:

Education remains one of the most powerful tools for breaking the poverty cycle. By equipping individuals with knowledge, skills, and opportunities, it empowers them to escape poverty and achieve economic independence. While significant progress has been made, barriers to education persist, particularly in low-income regions. Addressing these challenges requires a concerted effort from governments, communities, and international organizations. With sustained investment and innovative policies, education can unlock the potential of millions and pave the way for a more equitable and prosperous future.

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9

EFFECTS OF SUSTAINABILITY, CLIMATE CHANGE AND ENVIRONMENTAL DIPLOMACY

Babuli Chandra Nayak

ABSTRACT

India plays a significant role in climate diplomacy due to its growing economy, high greenhouse gas emissions, and vulnerability to climate change impacts. This essay focuses on India's efforts in climate diplomacy, highlighting its: (1) negotiation tactics in global climate meetings like the UNFCCC and Paris Agreement (2) climate policies like the National Action Plan on Climate Change and the International Solar Alliance (3) partnerships with countries like the EU on climate and energy issues (4) advancements in climate technology and sharing knowledge with other nations (5) promises to cut greenhouse gas emissions and shift towards a cleaner economy. However, the rapid growth of industries all over the world is causing a lot of damage to forests and is throwing off the balance of nature. This is leading to problems like acid rain and global warming. Leaders worldwide now understand the seriousness of climate change and are trying to find ways to save the environment. However, they are struggling because they need to balance protecting nature with continuing to develop industries quickly. So, they are using climate diplomacy to look after the environment based on their own country's needs. India, with its eco-friendly policies and low pollution levels, is playing a role in this. India is working on global climate governance problems and trying to find a way to keep the environment safe while still growing economically through its climate diplomacy efforts. However, this essay looks at the good and bad points of India's climate diplomacy, as well as how working together more could help lead the fight against the world's climate crisis.

Keywords: India, climate diplomacy, UNFCCC, Paris Agreement, climate policy, sustainable development.

Introduction:

The real climate problem started during the Industrial Revolution in Europe. People at that time were more focused on using the environment for their benefit, which led to the destruction of resources and habitats. Rachel Carson, one of the earliest ecologists, brought attention to the misuse of science through her book "The Silent Spring."¹ The outcomes of using natural resources carelessly were very bad. Garret Harden called

it the “Tragedy of the commons.”² It would be a mistake to think that people only started caring about the environment during the Industrial Revolution. Aristotle, an ancient Greek philosopher, believed in living a good life by taking care of the natural world and helping it grow.³

Rousseau and Burke kind of supported the environment while talking badly about Locke’s view of people being selfish and separated. Rousseau warned against using nature wrongly when criticizing modern times and human thinking. He told society to watch out for being tricked and to remember that everyone can use what nature gives us, but nobody can claim the earth as their own.⁴ Burke believes in working together across generations to think about the future and understand how our actions today can impact future generations. Ecologists like J.S. Mill have updated utilitarianism to focus on finding a balance between taking care of the environment and dealing with the serious problem of climate change. Climate change is a big issue right now, with things like desertification, loss of biodiversity, rising sea levels, and extreme weather events like wildfires and droughts happening more often.

Environmental Indian Policies:

The main reason behind this problem is the large-scale industrialization that started in the mid-1800s. Due to this, the ozone layer has been damaged and temperatures have gone up. To protect the environment and their interests, world leaders have come together to use climate diplomacy. This rule is also valid for India.

In the late 1970s, things took a turn for the worse. Policymakers had to acknowledge that natural resources were running out. This led to the Oil Crisis in 1973, accidents like the Bhopal Gas tragedy in 1984 the “Chernobyl disaster in 1986”⁵ due to misuse of science and technology, and the rise of acid rain because of industry’s careless behaviour. Keneth Boulding believed that people in a new society don’t just try to show off

¹ Carson, R. (1962), *The Silent spring*, Boston, MA: Houghton Mifflin.

² Hardin, G. (1968), *The Tragedy of the Commons*, Science, pp162

³ Jha, Anjana, ‘Recent Trends in Political Science’ the Indian Journal of Political Science, Meerut: Vol. LXXV, no. 1, Jan-March, pp 8.

⁴ Mukherjee, Subrata and Ramaswamy, Sushila, (1999), *A History of Political Thought*, New Delhi: Prentice Hall of India, pp 221

⁵ The Chornobyl nuclear reactor accident happened on 26 April 1986 and was the worst accident in the history of nuclear power. The reactor was destroyed, and a lot of radioactive material was let out into the environment. About 30 workers died within a few weeks, and over a hundred others got hurt from radiation. As a result, the officials moved around 115,000 people away from the reactor in 1986. They also later relocated approximately 220,000 people from Belarus, the Russian Federation, and Ukraine after 1986.

how rich they are. He said that Earth is like a spaceship that needs constant help from others to stay in good shape.⁶ This new realization added a moral aspect to ecology. James Love came up with the Gaia theory as a different way to study the environment that doesn't focus only on humans. It talks about "deep ecology," which cares more about the world's health than just one person's needs.⁷ Climate change became a big deal in 1987 when the Brunt Land Commission Report came out, talking about "sustainable development." People started worrying about the "greenhouse effect" caused by too many chlorofluorocarbons (CFCs) being let out, especially by rich countries. Groups like Friends of the Earth and Green Peace started telling everyone about global warming. Then in 1992, the UN Conference on Environment and Development (UNCED) happened in Rio for the first time. Many people called it the "Earth Summit."⁸ It established the United Nations Framework Convention on Climate Change (UNFCCC) to manage the yearly Conference of Parties (COP) meetings of global leaders. The 1997 Kyoto Conference was one of these important meetings. It was important because it made people realize how serious climate change is. Also, it introduced a method called Common, However, differentiated Responsibility, or CBDR, to help use carbon space effectively. Countries like the United States, Canada, and the European Union, which have a history of emitting a lot of CO₂, were told to keep their emissions below 1990 levels. However, to preserve the environment, developing countries that are not members of the Annex were urged to adopt green technologies. The "carbon trading" option was created to assist developing countries in offsetting their CO₂ emissions by acquiring credits for the reduction of greenhouse gas emissions by funding environmentally friendly initiatives, especially those that developed nations.⁹ Emission trading, Joint Implementation, and the Clean Development Mechanism are three ways the Kyoto Protocol uses to help countries reduce their greenhouse gas emissions. The Clean Development

⁶ Boulding, Kenneth, (1966), 'The Economics of the Coming Spaceship Earth' in H. Jarret (ed.) *Environmental Quality in a Growing Economy*, Baltimore: Johns Hopkins Press

⁷ Heywood, Andrew. (2014) *Global Politics*, New York: Palgrave Macmillan pp. 399

⁸ The Earth Summit, also called the United Nations Conference on Environment and Development (UNCED), took place in Rio de Janeiro, Brazil from June 3 to June 14, 1992. Representatives from more than 178 governments attended the event.

⁹ Mohamed Abdel Fattah Omar & Omar El-Baroudy, *Climate Change Impact on Arctic Region*, International Journal of Mechanical Engineering (IJME), Volume 5, Issue 1, December-January 2016, pp. 123-130

Mechanism helps rich countries pay for pollution-reducing projects in poorer countries, while Joint Implementation helps developed countries get credit for reducing emissions by funding projects in other developed countries. ET is recommending countries with high emission levels to buy extra emission allowances from other countries. This way, the Kyoto Resolution provides a detailed and adaptable structure.

India has always been a key player in all these changes. Its cultural vibe is famous for encouraging a strong bond between nature and people. During the early Vedic Period, the belief in worshipping nature with the phrase “Vasudeva kutumbakam”¹⁰ became well-known. In his book “Arthashastra, Kautilya” said that rulers can place a tax to protect the environment and animals. During the “Ashoka period”, people believed it was wrong to burn the leftover plant material after harvesting. Ancient Buddhists in India thought deeply about nature and believed that becoming enlightened meant going beyond oneself and feeling connected to everything in the world.¹¹

Articles 48(A) and 51A (g) of the Indian constitution talk about how much Indians care about protecting the environment. India also signed the Stockholm Declaration, which is very important for the environment. The Indian government was formed soon after gaining independence. The “Vanamahotshava” campaign is all about making people more aware of why it’s important to protect our natural resources. Back in the 3rd and 4th Five Year Plans, a program called social forestry was started to get more trees planted through volunteer efforts.

The World Bank helped with setting up the Joint Forest Management Program to keep forests sustainable. In 2008, India started the Green India Mission to tackle climate change, focusing on involving local communities and tribes in conservation efforts. The goal of the mission is to bring together forest producers and traditional communities who

¹⁰ From Jawaharlal Nehru to Narendra Modi, leaders in India have frequently used the phrase “vasudhaiva kutumbakam” (the world is one family) to explain the country’s global perspective. Although this term is commonly used in India’s diplomacy, its meaning is not always clear and is not often explained.

¹¹ See ‘Kyoto Protocol’ URL: <http://en.wikipedia.org/wiki/kyoto>

¹² Heywood, Andrew. (2007) Political Ideologies, New York: Palgrave Macmillan pp. 282

¹³ See National Mission for a Green India, Draft submitted to Prime Minister’s Council on Climate Change, MoEF, Government of India, URL: moef.nic.in/downloads/public_inofrmation/GIM-report-pmecc.pdf.

¹⁴ Andersen, I. (2022). “India is key to the success of Stockholm+50, as it was in 1972”. Digital Bimonthly newsletter, DownToEarth, 18 May, India. <https://www.downtoearth.org.in/blog/climate-change/india-is-key-to-the-success-of-stockholm-50-as-it-was-in-1972-82900>

¹⁵ *Ibid*

provide various resources like fuel, food, and wood. They also aim to enhance habitat and restore different types of ecosystems, not just plantations. The main focus is on fighting climate change by making forests and other ecosystems better at capturing carbon, helping species and ecosystems cope with changes, and helping local communities that rely on forests.¹² Its efforts to involve the Joint Forest Management Committee at the local level and the Forest Development Agencies at the state and district levels greatly contributed to its success. Some people criticize this approach for favouring commercial forestation, but it cannot be denied that India has made progress as a result.¹³ No longer considered a major source of pollution in history, it is now focused on expanding industrialization by using water more efficiently and relying on renewable energy sources that do not produce carbon emissions. In 2007, the Bali Summit made a big impact by changing the REDD method into the REDP+ program. This new program included more rules like protecting forests, sustainably managing forests, and growing more carbon in forests. The United States is becoming less of an economic powerhouse, while China is now the top manufacturing country. The South Block of Nations is getting stronger in negotiations. People are starting to see that globalization isn't all it's cracked up to be. Ultra-nationalism is on the rise as countries focus on protecting their interests. This shift is pushing world leaders to focus on "climate diplomacy," which could put the environment at risk. The future doesn't look good for the second phase of the Kyoto Plan, which started in 2012 and is supposed to finish by 2020.

The Stockholm Conference:

The very first meeting to talk about environmental issues was held in Sweden in 1972, known as the Stockholm Conference. It played a big role in starting the environmental movement we have today. The only leader from another country at the meeting was "Indira Gandhi", who was the prime minister of India back then. She talked about reducing poverty, which is a key part of the Sustainable Development Goals (SDGs). Her comments at the conference were seen as a big step forward in this area. In her speech, she said, "We need to show most people in the world that taking care of the environment and protecting wildlife will not only help them but also make their lives better".¹⁴ Different opinions have caused a standstill and impacted global environmental decisions. India can play a bigger role in resolving the issue. The United States and India have grown closer due to their big market, cultural influence, and shared concern about terrorism. The new "Act East" plan has been effective in limiting China's power. India's history of protecting the environment has

also given them the courage to lead in climate diplomacy and convince others to help protect the climate. According to “Jairam Ramesh”, a past Environment Minister and Congress leader, she highlighted unfairness and inequality by mentioning that countries with a small number of people used most of the world’s natural resources. This led to a big rise in environmental harm compared to how countries like India use resources.¹⁵ When wealthy nations started focusing on environmental protection, developing countries in the Global South were already prioritizing poverty reduction and development. The fourth paragraph of a declaration agreed upon at the Stockholm Conference on June 16 heavily borrowed from a speech given by “Indira Gandhi.”

Indira Gandhi’s Speech at the Stockholm Conference, 1972:

In under-developed countries, many environmental issues happen because of not having enough resources. Lots of people there don’t have the basic things they need to live a good life, like enough food, clothes, a safe place to live, education, healthcare, and clean water. So, these countries should focus on getting better and making sure they take care of the environment while doing so. To achieve this goal, developed nations must work on narrowing the differences with developing countries. Environmental issues in developed countries are mostly connected to their industries and technology advancements. The fourth paragraph of the Stockholm Declaration on the Human Environment comes from a speech by “Indira Gandhi” at the 1972 Stockholm Conference. You can read it in the UN Document A/RES/2994(XXVII) 1972, which is the report of the UN Conference on the Human Environment.

Conclusion:

Taking out Russia Canada, and the United States not following the plan during the Trump administration, has made it less strong. Also, China, which was not included in the Kyoto Plan, is now one of the big polluters. Because of these changes, the idea of CBDR “Common Binding Differential Responsibility” is no longer possible. The rule focuses a lot on “intergenerational fairness” by asking for more sharing of responsibilities among the past polluters. Developed countries are taking on the responsibility because China is becoming one of the biggest polluters. On the other hand, developing countries are arguing about emissions per person.

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10

CLIMATE CHANGE AND SOCIAL INEQUALITY : VIEW FROM SOCIOLOGY OF EXCLUSION AND INCLUSION

Dr. Joydeb Patra

Introduction:

Climate change is one of the most defining challenges of the 21st century, affecting ecosystems, economies, and societies at an unprecedented scale. That said, the burden of climate change is shared unequally, with most of the burden being faced by the marginalized communities; hence deepening social and economic inequalities. It is from rising sea levels threatening coastal low-income populations to extreme weather events wiping off the livelihoods of small-scale farmers that climate change almost furthers historical patterns of exclusion in practice. The sociology of exclusion and inclusion, accordingly, provides a very useful lens to analyse how climate change affects certain groups in a rather disproportionate manner while granting privileges and resilience to others.

Inequality-both social and environmental-is an important factor that influences and is influenced by climate change. Generally, communities that are poor have little or no means to resist climate-influenced shocks, while affluent communities can adapt through migration, insurance, or new technology. Marginalized groups-frequently women, indigenous populations, or ethnic minorities-are systematically excluded from participating in decision-making processes, especially those related to climate governance. This exclusion increases their vulnerability to environmental change, even as their voices in the policy forum are muted at best.

Exclusion refers to denied access based on structural factors accounting for social groups in terms of rights, services, and participation-by socioeconomic status, ethnicity, gender, or location-across the board. In contrast, inclusion refers to the effort to bring certain marginal groups into the social, economic, and political sphere. When considering climate change, exclusion may be exercised when marginalized persons have restricted access to climate adaptation resources and services. Sometimes, it may express itself through forced displacement from their homes or loss of means of livelihood. Inclusionary efforts, on the other hand, include

community resilience programs, equitable policymaking, and so forth, which aim to counteract these aspects.

This edition investigates the complex interrelation of climate-change inequities through the sociology of exclusion and inclusion. The intention is to cover some of the dimensions through which climate change is experienced unequally among vulnerable sections, the socio-political structures that sustain these inequalities, and potential pathways toward inclusive climate governance. The framing will address syntagms including economic inequities in climate adaptation, political exclusion in climate governance, the gendered and racialized impacts of climate change, and the social exclusion effects of climate-induced displacement.

Understanding Exclusion and Inclusion in the Context of Climate Change

Within this course of study, the sociology of exclusion and inclusion investigates the manner in which some groups are poignantly kept away from mainstream society while others gain access to resources, opportunities, and decision-making processes. Climate change becomes a magnifying glass explaining such imbalances, as systemic inequalities determine exposure, vulnerability, and adaptive capacity.

1. Economic Exclusion and Climate Vulnerability:

Economic differences determine the way communities and individuals respond to climate change. Wealthy groups can afford adaptive resources such as air conditioning, flood insurance, and relocation, while economically disadvantaged populations have no money to mitigate risks.

Examples include:

- Low-income communities usually locate themselves in areas more vulnerable to environmental risks, such as coastal areas and floodplains.
- Informal settlements, for example, in developing countries, lack infrastructure, leading to high exposure to climate-related disaster risks.
- Poor-weather-related crop failures and shortages of water in poor regions push farmers further into poverty.

2. Political Exclusion and Climate Governance

Political exclusion further augments climate inequality by preventing marginalized communities from participating in climate decision-making processes. Consequently, frameworks for policy formulation often support economic growth conversions over environmental justice, which in effect translates into:

- Indigenous and marginalized voices not being adequately represented in climate negotiations.
- Inadequate funds for climate adaptation projects in disadvantaged areas.
- Government policies that support industrial development over the well-being of marginalized communities.

In this manner, the lack of inclusive governance structures increases the vulnerability of excluded groups, as they are then unlikely to be able to claim their rights against climate threats.

3. Social and Cultural Exclusion:

The Disproportionate Impact on Women and Indigenous Groups:

Social and cultural exclusion, therefore, constitutes another sphere reinforcing climate-induced inequalities. Women and indigenous populations are often systemically barred from responding to environmental changes.

Women: Climate change impacts women disproportionately, especially in agrarian and developing societies, where they primarily shoulder the burden of water collection, agriculture, and household energy. Limited land rights and economic opportunities further inhibit their adaptive capacity.

Indigenous Groups: A great number of indigenous communities depend on their traditional knowledge systems to manage natural resources. However, encroachment upon their land, deforestation, and climate-induced displacement all threaten their cultural heritage and very existence.

Climate Change as a Driver of Forced Migration and Social Displacement

The most observable form of climate inequality is that of forced migration due to environmental degradation. Climate-induced displacement brings:

- An outright loss of livelihoods and a breaking of the community.
- An increase in competition over dwindling resources, giving rise to social conflicts.
- The painfully slow imposition and implementation of laws, procedures, and institutions for climate refugees as international legal frameworks do not adequately address their rights and resettlement.

The sociology of exclusion gives useful insights into how already marginalised groups are being further impoverished and destabilised by displacement.

Pathways for Inclusion: Policies and Social Movements

To combat climate inequity, inclusive policies must be undertaken across levels:

1. **Just Climate Policy:** Governments and international institutions must ensure that climate adaptation and mitigation strategies give preference to vulnerable communities.

2. **Community-Based Adaptation:** Involving local communities in decision-making develops resilience and sustainability practices.

3. **Intersectional Climate Justice Movements:** Movements that combine environmental concerns with racial, gender, and economic justice create progressively effective solutions.

4. **Legal Recognition of Climate Refugees:** Setting up an international framework can ensure that displaced communities receive protection and resettlement.

Conclusion:

Climate change is not just an environmental issue; it is primarily social; in that it contributes to magnifying the present inequalities by fortifying their exclusionary structures. The sociological study of exclusion and inclusion helps us ascertain who bears the major burdens and how systemic solutions would work. Measures against climate inequity should be inclusive in nature; they should build upon grassroots movements and uphold the rights of climate justice so that no one is left out in the struggle against environmental change.

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THE AI DILEMMA : ETHICS IN AN AUTOMATED WORLD

Midhun Moorthi. C

Introduction

Artificial intelligence (AI) has rapidly progressed from a futuristic notion to a current reality, influencing a wide range of industries such as healthcare, banking, and transportation. As AI systems become more integrated into everyday life, they bring not only technological advances, but also complex ethical quandaries. This article investigates the ethical implications of AI, concentrating on topics like as bias, privacy, accountability, and the future of labour. By analysing these challenges, we hope to highlight the need of creating AI ethically so that it benefits society as a whole.

Bias and Fairness in AI

One of the most important ethical challenges in AI is the existence of prejudice. AI systems are trained using enormous datasets, which may contain biased information. This can result in discriminatory behaviour, especially in sensitive areas such as recruiting, law enforcement, and financing. An AI hiring tool, for example, may prefer candidates from a specific demographic if the training data replicates prior hiring prejudices.

To solve this, developers should prioritize fairness and inclusion in AI design. This includes employing a variety of datasets, integrating bias detection algorithms, and regularly monitoring AI systems for biased behaviour. As AI researcher Joy Buolamwini points out, “We must ensure that the data we use to train AI systems is representative of the diverse world we live in” (Buolamwini 2018).

Privacy Concerns

AI’s ability to handle massive volumes of data presents serious privacy concerns. From facial recognition to predictive analytics, AI systems frequently rely on personal information to perform properly. However, this can lead to invasive surveillance and a loss of personal privacy.

The ethical use of AI necessitates striking a balance between using data for innovation and safeguarding people’s privacy rights. Regulations such as the European Union’s General Data Protection Regulation (GDPR) provide vital data protection requirements, but worldwide privacy rules

are continually growing. As can be observed, there is no means to deal with AI in India at all. With the use of outdated software and useless ideas, technological advancement has come to a halt. As AI continues to advance, it is crucial to establish robust privacy safeguards and ensure transparency in how data is collected and used.

Accountability and Transparency

Another important ethical aspect is accountability. When AI systems make judgments, it can be difficult to discern who is accountable for the results—whether the creators, users, or the AI itself. This is especially problematic in high-risk circumstances like autonomous vehicles or medical diagnostics.

To address this, AI systems must be built with transparency in mind. This includes building algorithms that humans can audit and understand, as well as establishing explicit accountability requirements. According to philosopher Luciano Floridi, “transparency is not just about making AI systems explainable, but also about ensuring that their decision-making processes are aligned with ethical principles” (Floridi 2019).

The Future of Work

Another ethical worry is how AI will affect the labour market. Even though artificial intelligence (AI) can boost productivity and open up new career paths, it also threatens several job categories. Jobs that need regular decision-making or repetitive operations are more susceptible to automation.

Society must prioritize reskilling and upskilling people to prepare them for the evolving nature of the labour market in order to address this issue. Businesses, governments, and educational institutions all have a part to play in making sure that the labour force is prepared to prosper in an AI-driven economy. According to economist Erik Brynjolfsson, “The challenge is not just to create new jobs, but to ensure that those jobs are meaningful and provide a decent standard of living” (Brynjolfsson 2020).

Conclusion

The ethical issues raised by AI must be addressed as it continues to change our world. By giving fairness, privacy, responsibility, and the future of employment top priority, we can maximize AI’s advantages while lowering its threats. Policymakers, technologists, and the general public must work together to achieve this. We cannot guarantee that this potent technology advances society unless we successfully negotiate the ethical complexities of AI.

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CLIMATE CHANGE : CAUSES, EFFECTS, & SOLUTIONS THROUGH ARTIFICIAL INTELLIGENCE AND DATA ANALYTICS

Dr. Piyush Kumar Pathak

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Introduction:

Climate change represents one of the most pressing global challenges of our time, driven largely by human activities. While traditional solutions such as renewable energy and sustainable agriculture are critical, emerging technologies like Artificial Intelligence (AI) and data analytics offer innovative ways to address the causes and mitigate the impacts of climate change. This essay delves into the causes and effects of climate change and explores how AI and data analytics can play a pivotal role in creating solutions. As the world seeks effective solutions, Artificial Intelligence (AI) emerges as a promising ally, offering innovative ways to mitigate the effects of climate change and adapt to its consequences.

The Nature, Causes & Effect of Climate Change

Climate change refers to long-term alterations in temperature, precipitation, wind patterns, and other elements of the Earth's climate system. While natural factors like volcanic eruptions and solar variations contribute to climate fluctuations, human activities are the primary drivers of the current crisis.

Greenhouse Gas Emissions

The burning of fossil fuels for energy, transportation, and industrial processes releases greenhouse gases (GHGs) like carbon dioxide (CO₂) and methane (CH₄). These gases trap heat in the atmosphere, leading to global warming.

Deforestation

Forests act as carbon sinks, absorbing significant amounts of CO₂. However, widespread deforestation for agriculture and urbanization reduces this capacity, exacerbating the problem.

Agriculture

Agricultural practices, particularly livestock farming, generate substantial methane emissions. Additionally, synthetic fertilizers release nitrous oxide, another potent greenhouse gas.

Causes of Climate Change:

Climate change is primarily driven by the increase of greenhouse gases (GHGs) in the atmosphere due to human activities. The following are the main contributors:

Deforestation

Forests act as carbon sinks, absorbing CO₂. However, widespread deforestation for agriculture, urbanization, and logging reduces this capacity, exacerbating climate change.

Industrial Processes

Industries such as cement production, chemical manufacturing, and steel production release significant amounts of CO₂ and other GHGs. These emissions are often overlooked in climate discussions but are critical to address.

Agriculture

Agricultural activities, particularly livestock farming, release methane (CH₄), a potent greenhouse gas. The use of synthetic fertilizers also contributes to nitrous oxide (N₂O) emissions.

Waste Management

Landfills generate methane as organic waste decomposes. Poor waste management practices, including inadequate recycling, compound the problem.

Effects of Climate Change

The consequences of climate change are widespread and interconnected, affecting ecosystems, economies, and human societies.

Rising Temperatures

Global average temperatures have risen significantly, leading to heatwaves, droughts, and altered weather patterns. This affects agriculture, water availability, and energy demand.

Melting Ice and Rising Sea Levels

Polar ice caps and glaciers are melting at unprecedented rates, contributing to sea-level rise. Coastal regions face increased risks of flooding, erosion, and habitat loss.

Extreme Weather Events

Hurricanes, cyclones, and heavy rainfall events have become more intense and frequent. These disasters cause extensive damage to infrastructure, displace communities, and strain resources.

Economic Impacts

Climate change has significant economic consequences across various sectors, including agriculture, infrastructure, health, and trade. Extreme weather events such as storms, wildfires, and rising sea levels

cause extensive damage to infrastructure, increasing public expenditure on repairs and climate adaptation strategies. Coastal regions and low-lying areas face heightened risks, requiring substantial investments in flood prevention and disaster preparedness.

Solutions Through Artificial Intelligence and Data Analytics

AI and data analytics have emerged as powerful tools to combat climate change. They enable more precise monitoring, predictive modeling, and optimized decision-making.

AI in Climate Modeling

AI enhances climate models by analyzing vast datasets from satellites, sensors, and historical records. Machine learning algorithms can identify patterns and predict future climate scenarios with greater accuracy.

- **Example:** AI-powered climate models from organizations like NASA provide detailed insights into temperature changes, precipitation patterns, and sea-level rise.

Optimizing Energy Systems

AI can optimize energy consumption and integrate renewable energy sources into power grids. Smart grids use AI to balance supply and demand, reducing energy waste.

- **Example:** Google's DeepMind reduced energy usage in its data centers by 40% through AI-driven efficiency improvements.

Monitoring Deforestation

AI-powered satellite imagery analysis can track deforestation and illegal logging in real-time. Early detection enables governments and organizations to take prompt action.

- **Example:** Platforms like Global Forest Watch use AI to monitor forest cover changes globally.

Promoting Sustainable Transportation

AI facilitates the development of autonomous electric vehicles and intelligent traffic management systems, reducing emissions from transportation.

- **Example:** AI algorithms optimize public transit schedules to reduce idle times and fuel consumption.

Data Analytics: Turning Information into Action

Data analytics complements AI by extracting actionable insights from complex datasets. It plays a critical role in understanding climate trends, tracking progress, and guiding interventions.

Climate Data Visualization

Data visualization tools translate complex climate data into intuitive formats, making it accessible to policymakers, researchers, and the public.

- **Example:** Interactive dashboards showing CO2 levels, temperature trends, and renewable energy adoption rates drive informed decision-making.

Emissions Tracking

Data analytics enables precise tracking of GHG emissions across sectors. This helps identify high-emission areas and monitor the effectiveness of mitigation strategies.

- **Example:** Companies can use analytics platforms to calculate their carbon footprints and develop targeted reduction plans.

Public Awareness Campaigns

Data-driven campaigns leverage analytics to target specific demographics, tailoring messages to maximize engagement and behavioral change.

- **Example:** AI algorithms analyze social media data to understand public sentiment and refine communication strategies.

Challenges and Ethical Considerations

While AI and data analytics offer immense potential, their deployment comes with challenges:

Data Quality and Accessibility

Reliable and comprehensive datasets are essential for accurate analysis. However, data gaps and inconsistencies can hinder progress.

Energy Consumption

AI models, particularly deep learning systems, require substantial computational power, which can increase energy demand and emissions if not sourced from renewables.

Ethical Concerns

AI systems must be transparent and unbiased. Decisions influenced by flawed algorithms could exacerbate inequalities or lead to unintended consequences.

Cost and Scalability

Implementing AI and data analytics solutions requires significant investment, which may be a barrier for developing nations.

Integrating AI and Data Analytics with Traditional Solutions

AI and data analytics are not standalone solutions but must be integrated with traditional climate strategies. For instance, AI can enhance renewable energy systems, while data analytics can support policy design and implementation.

Use of Artificial Intelligence and Data Mining in Renewable Energy Roles of Data Mining

Data mining involves analyzing vast amounts of data to uncover hidden patterns, trends, and relationships. In renewable energy systems, data mining is extensively used for:

- Energy Forecasting: Analyzing historical weather and performance data to predict solar irradiance, wind speeds, and hydropower output, allowing energy providers to optimize power generation.
- Grid Management: Understanding energy consumption patterns and demand trends to manage grid operations effectively and ensure the balance between supply and demand.

Conclusion

By improving climate modelling, optimizing energy systems, enhancing agriculture, and supporting sustainable practices, these technologies can make a significant impact. However, their success depends on overcoming challenges related to data quality, energy consumption, and ethical considerations. As humanity grapples with the climate crisis, harnessing the potential of AI and data analytics will be critical to building a sustainable and resilient future.

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ABSTRACT

Artificial Intelligence (AI) has emerged as a transformative force, influencing various aspects of human life, from healthcare and education to business and governance. However, the rapid development and deployment of AI technologies raise significant ethical concerns. Issues such as bias in algorithms, data privacy, job displacement, and decision-making accountability challenge the moral and social framework of AI applications. This article explores the ethical implications of AI, examining potential risks and proposing guidelines for responsible AI development and deployment. Ethical AI should prioritize fairness, transparency, accountability, and human-centric values to ensure technology serves humanity without exacerbating social inequalities or ethical dilemmas.

Keywords: Artificial Intelligence, Ethics, Bias, Data Privacy, Accountability, Transparency, Fairness, Human-Centric AI, AI Governance, Ethical AI Development

Introduction

Artificial Intelligence (AI) has become an integral part of modern society, influencing various sectors, including healthcare, education, finance, and governance. While AI offers numerous benefits, such as increased efficiency, automation, and data-driven decision-making, it also raises significant ethical concerns. The rapid advancement of AI technologies has led to debates regarding privacy, bias, accountability, and the potential misuse of AI-powered systems (Bostrom & Yudkowsky, 2014).

One of the primary ethical concerns associated with AI is algorithmic bias, which can reinforce existing societal inequalities. Research has shown that biased training data can result in discriminatory AI systems, affecting marginalized communities disproportionately (O'Neil, 2016). Moreover, the issue of transparency and accountability in AI decision-making remains unresolved, as many AI-driven systems function as "black boxes," making it difficult to interpret their outputs (Burrell, 2016).

Another significant ethical dilemma revolves around data privacy and surveillance. AI-driven data analytics enable organizations and governments to collect and process vast amounts of personal information,

often without explicit user consent (Zuboff, 2019). This raises concerns about digital rights, individual autonomy, and the potential for mass surveillance. Additionally, the rise of autonomous AI systems, such as self-driving cars and military drones, poses challenges regarding liability and moral responsibility in case of failures or unintended consequences (Bryson, 2018).

Background of the Study:

AI's growing presence in daily life has sparked discussions on its ethical implications. Governments, organizations, and researchers are developing ethical guidelines to address concerns like algorithmic bias, discrimination, and lack of human oversight. The ethical dimension of AI is crucial for maintaining societal trust and preventing harmful consequences. This study investigates historical and contemporary debates surrounding AI ethics, highlighting key principles such as fairness, accountability, and transparency.

Literature Review:

Smith, (2021) Conducted a study on the ethical implications of artificial intelligence (AI) in decision-making systems. The research employed qualitative methods, including interviews with AI developers and policymakers, to analyze the ethical concerns surrounding bias, transparency, and accountability. The findings revealed that AI systems often inherit biases from training data, leading to ethical dilemmas in automated decision-making. The study emphasized the need for robust ethical guidelines and transparency measures to mitigate these risks.

Brown & Lee, (2020) Examined the role of AI in workplace automation and its ethical impact on employment. Using a mixed-methods approach, the study surveyed 300 professionals across various industries. The results indicated significant concerns about job displacement and ethical responsibility in AI-driven automation. The researchers suggested that ethical AI development should include retraining programs for workers and policies ensuring fair employment transitions.

Chen et al., (2019) Investigated ethical challenges in AI healthcare applications, focusing on data privacy and informed consent. A sample of 150 healthcare professionals and AI researchers participated in the study. The findings highlighted that while AI enhances diagnostic accuracy, concerns over patient data security and algorithmic transparency remain critical. The study recommended stronger regulatory frameworks to ensure ethical AI deployment in healthcare.

Methodology

The methodology used for the present study is Descriptive analysis method. Here, data is collected through various journals, Research paper, Books etc.

Objectives:

1. To analyse the ethical challenges associated with AI.
2. To assess existing ethical frameworks and policies for AI governance.
3. To explore potential solutions for ensuring ethical AI practices.

Purpose of the Study:

The purpose of this study is to examine the ethical dimensions of Artificial Intelligence (AI) and its implications for society. AI has become an integral part of modern technological advancements, influencing various sectors such as healthcare, education, business, and governance. However, its rapid evolution has raised critical ethical concerns, including bias in AI algorithms, privacy infringement, accountability, job displacement, and the moral status of AI systems. This study aims to explore how ethical frameworks can be integrated into AI development to ensure fairness, transparency, and accountability. It will investigate the role of policymakers, technology developers, and stakeholders in addressing ethical dilemmas associated with AI applications.

Statement of the Problem:

The present study is entitled as “Artificial Intelligence and Ethics”

Findings of the Study:

1. AI systems often reflect societal biases, necessitating diverse and inclusive data practices.
2. There is a lack of standardized global AI regulations, leading to inconsistent ethical practices.
3. Transparency and accountability mechanisms improve AI trustworthiness and effectiveness.

Suggestions for Future Research:

1. Developing AI systems with built-in ethical constraints.
2. Investigating the role of AI in ethical decision-making.
3. Assessing the long-term societal impact of AI ethics policies.

Conclusion:

The integration of Artificial Intelligence (AI) into various aspects of human life has brought about profound advancements, but it also raises significant ethical concerns. The rapid development of AI

technologies demands a balanced approach that ensures innovation does not come at the cost of fundamental human values. Issues such as bias in algorithms, privacy breaches, job displacement, and accountability in decision-making require urgent attention from policymakers, researchers, and technology developers. Ethical AI should be designed with transparency, fairness, and inclusivity in mind, ensuring that it serves humanity rather than exacerbates existing inequalities. Responsible AI governance, guided by legal frameworks and ethical principles, can mitigate risks and promote social good.

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Trending Interdisciplinary Research in 2025 is a forward-looking exploration of the dynamic and rapidly evolving landscape of interdisciplinary research. As global challenges become increasingly complex, the need for innovative solutions that draw upon multiple fields of study has never been greater. This book highlights the most significant trends in interdisciplinary research, focusing on how diverse disciplines like technology, social sciences, healthcare, environmental science, and engineering are converging to address pressing issues facing society today and in the near future.

With expert insights and real-world case studies, this book illuminates the power of collaboration across disciplines, showcasing how the fusion of knowledge from various fields is pushing the boundaries of innovation. From artificial intelligence and biotechnology to climate change and social equity, *Trending Interdisciplinary Research in 2025* provides a roadmap for navigating the future of research and discovery.

Whether you're a researcher, academic, or practitioner, this book offers invaluable perspectives on the key trends set to shape the future of interdisciplinary research in 2025 and beyond. Prepare to understand, adapt to, and participate in the future of research that is already transforming our world.

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