

ARTÍCULO PRODUCTO DE INVESTIGACIÓN

Human development in India: challenges and opportunities in the 21st Century

Desarrollo humano en la India: desafíos y oportunidades en el siglo XXI

Aruna Pavate¹
University of Mumbai

Recibido: 12.02.2025

Aceptado: 10.04.2025

Abstract

In the 21st century, India's human development experience is influenced by complex economic, social, environmental, and technological determinants. India has registered considerable progress in some areas, such as education, health, and poverty alleviation. It continues to grapple with deeply rooted problems such as regional disparities, gender disparities, digital exclusion, and environmental degradation. The research is based on the United Nations Sustainable Development Goals (SDGs). It highlights that an integrated strategy with life expectancy, literacy, economic equality, and technological access is required for inclusive and sustainable development. Despite increasing improvements, the HDI remains short of capturing the actual diversity of human experiences, particularly in a multi-diverse nation like India. The research utilizes a convergent mixed-methods strategy to measure these dynamics, such as national surveys, semi-structured interviews with policymakers and experts, and focus group discussions with vulnerable populations. The findings point towards deep-seated income inequality, urban-rural divides, and structural impediments to health and education. The arrival of technologies like AI and IoT opens up

¹ arunaapavate@gmail.com
<https://orcid.org/0000-0002-3387-0905>

future development possibilities with the need for ethical usage and digital literacy. The study concludes by proposing a reformed HDI integrating sustainability and digital accessibility with the need for inclusive governance, equitable economic policy, and multi-sector coordination to bridge development gaps and facilitate overall human development in India.

Keywords: human development, education, health, economic growth

Resumen

En el siglo XXI, la experiencia de desarrollo humano de la India está influenciada por complejos determinantes económicos, sociales, medioambientales y tecnológicos. La India ha registrado avances considerables en algunas áreas, como la educación, la salud y la reducción de la pobreza. Sin embargo, sigue lidiando con problemas profundamente arraigados, como las disparidades regionales, las disparidades de género, la exclusión digital y la degradación medioambiental. La investigación se basa en los Objetivos de Desarrollo Sostenible (ODS) de las Naciones Unidas. Destaca que se necesita una estrategia integrada que tenga en cuenta la esperanza de vida, la alfabetización, la igualdad económica y el acceso a la tecnología para lograr un desarrollo inclusivo y sostenible. A pesar de las mejoras crecientes, el IDH sigue sin reflejar la diversidad real de las experiencias humanas, especialmente en una nación tan diversa como la India. La investigación utiliza una estrategia convergente de métodos mixtos para medir estas dinámicas, como encuestas nacionales, entrevistas semiestructuradas con responsables políticos y expertos, y debates en grupos focales con poblaciones vulnerables. Los resultados apuntan a una profunda desigualdad de ingresos, divisiones entre las zonas urbanas y rurales e impedimentos estructurales para la salud y la educación. La llegada de tecnologías como la IA y el IoT abre posibilidades de desarrollo futuro con la necesidad de un uso ético y la alfabetización digital. El estudio concluye proponiendo un IDH reformado que integre la sostenibilidad y la accesibilidad digital con la necesidad de una gobernanza inclusiva, una política económica equitativa y una coordinación multisectorial para salvar las brechas de desarrollo y facilitar el desarrollo humano general en la India.

Palabras clave: desarrollo humano, educación, salud, crecimiento económico

Introduction

The 21st century has been conducted in a new era of challenges and opportunities for human development, a multidimensional concept that encompasses the process of expanding human capabilities, freedoms, and opportunities to lead a fulfilling life (United Nations Development Programme [UNDP], 1990; Alkire & Foster, 2011). Human development faces significant hurdles globally, including economic inequality, persistent poverty, climate change, environmental degradation, the digital divide, and global health crises (World Bank, 2020; Sachs et al., 2019; UNDP, 2020).

India, a diverse and rapidly developing nation, presents a unique case study examining human development challenges and opportunities in the 21st century. With an enormous population and a rapidly growing economy, India has made significant strides in various dimensions of human development, such as education, health, and poverty reduction (Chakravarty & Majumder, 2021; Dreze & Sen, 2013; Ministry of Statistics and Programme Implementation [MoSPI], 2022). However, the country faces persistent challenges, including regional disparities, gender inequalities, and the need for inclusive and sustainable development policies (Ali & Son, 2007; UN Women, 2022; Ministry of Social Justice and Empowerment, 2020).

By examining the challenges and opportunities in fostering sustainable human development, the study seeks to contribute to policy discussions and inform strategies for promoting inclusive and equitable growth, bridging the digital divide, and leveraging technological advancements for sustainable solutions (Schwab, 2016; NITI Aayog, 2021; International Telecommunication Union [ITU], 2021).

The objectives of this study are:

- . To assess the current state of human development in India, utilizing the Human Development Index (HDI) and other relevant indicators (UNDP, n.d.; MoSPI, 2022).

- . To identify and analyse the key economic, social, environmental, and technological factors influencing human development in India (Piketty & Chancel, 2017; Chakravarty & Majumder, 2021).

- . To examine the challenges and opportunities of advancing inclusive and sustainable human development policies and strategies in India (World Bank, 2022; Ali & Son, 2007).

- . To examine the role of education, governance, and multi-sector collaboration in fostering equitable and sustainable human progress (Bäckstrand, 2006; Ministry of Panchayati Raj, 2020).

To provide recommendations and strategies for leveraging technological advancements, such as artificial intelligence (AI), to address human development challenges and promote sustainable solutions (Russell & Norvig, 2020; NITI Aayog, 2021).

This study focuses on India as a case study, with a particular emphasis on the period from the early 21st century to the present day. The research will draw upon various data sources, including government reports, international organizations' publications, academic literature, and relevant stakeholder perspectives (Bryman, 2016; Creswell & Plano Clark, 2018; World Bank, 2020).

1. Background

Human development is a two-way concept of expanding human capability, freedom, and opportunities to live more fulfilling lives (UNDP, 1990). In the 21st century, human

development is dictated by a complex interplay between economic, social, environmental, and technological influences, posing challenges and opportunities for sustainable progress (Sachs et al., 2019).

Human development faces severe global challenges, including economic disparity, persistent poverty, climate change, environmental deterioration, the digital divide, and global health crises (World Bank, 2020). The Human Development Index (HDI), which the United Nations Development Programme (UNDP) built, is a global human development indicator that combines measures of life expectancy, education, and per capita income (UNDP, 1990). India's HDI record has improved consistently. Nevertheless, it can be improved further, and the index has been criticized for failing to capture the multidimensional nature of human development (UNDP, 2020).

As a heterogeneous and rapidly developing nation, India is a unique case study to examine human development challenges and opportunities in the 21st century. As a populous nation with a rapidly developing economy, India has made excellent human development progress in education, health, and poverty reduction (Dreze & Sen, 2013). India, however, also possesses significant challenges, including regional disparities, gender inequity, and the need for inclusive and sustainable development measures (Chakravarty & Majumder, 2021).

This research paper tries to comprehensively evaluate the scenario of human development in India and examine how the economic, social, environmental, and technological variables interact and contribute to human advancement. Based on challenges and opportunities in striving for sustainable human development, the research will help contribute to policy discussions and channel strategies toward strengthening inclusive and equitable growth, eliminating the digital divide, and utilizing technological progress in rendering sustainable solutions (Kaufmann et al., 2010; NITI Aayog, 2021).

Figure 1 illustrates the Three Pillars of Sustainability—Environmental, Social, and Economic—and their interrelation in attaining genuine sustainability. Environmental

sustainability is concerned with maintaining natural ecosystems, social sustainability centers on equity and human welfare, and economic sustainability maintains long-term economic sustainability. The overlap emphasizes significant combinations: "Bearable" (environmental + social), "Viable" (environmental + economic), and "Equitable" (social + economic). In the middle, where all three pillars meet, is Sustainable Development, which keeps ecological well-being, social fairness, and economic wealth in equilibrium to satisfy needs in the current period without limiting the future (Saha & Chatterjee, 2025).

Figure 1: Three Pillars of Sustainability



Source: Author

The study lines up with the United Nations Sustainable Development Goals (SDGs), namely Goal 3 (Good Health and Well-being), Goal 4 (Quality Education), Goal 5 (Gender Equality), Goal 8 (Decent Work and Economic Growth), Goal 10 (Reduced Inequalities), Goal 13 (Climate Action), and Goal 17 (Partnerships for the Goals) (United Nations, 2015). By addressing these interconnected dimensions of human development, the research aims to contribute to and guide towards realizing sustainable and equitable development in India and the world (United Nations, 2020).

2. Definitions

. Human Development: The expansion of human capabilities, freedom, and opportunities to have a good life, including health, education, and living standards (UNDP, 1990).

- . Sustainable Development: Growth that meets the needs of the present without compromising the ability of future generations to meet their own needs, in equilibrium between economic, social, and environmental aspects (Brundtland Commission, 1987).
- . Capabilities Approach: A theoretical framework developed by Amartya Sen and Martha Nussbaum, focusing on individuals' freedom and ability to achieve valuable functioning's and enjoy the life they have reason to value (Nussbaum & Sen, 1993).
- . Human Development Index (HDI): Multidimensional indicator developed by the UNDP to measure human development and aggregation of life expectancy, education, and per capita income (UNDP, 1990).
- . Economic Inequality: Variations in economic resource allocation, income, and wealth among populations or societies (Piketty, 2014).
- . Poverty: Living in lack and deprivation of proper resources, capacities, and opportunities to maintain oneself at the minimum subsistence levels (World Bank, 2020).
- . Inclusive Growth: Economic growth that is comprehensive, sustainable, and leads to opportunities for all sections of society, especially the poor and marginalized (Ali & Son, 2007).
- . Decent Work: Work that offers sufficient income, secure working conditions, social protection, and possibilities for personal growth and social integration (International Labour Organization [ILO], 1999).
- . Gender Equality: Equal rights, responsibilities, and opportunities for men and women, without discrimination or prejudice (UN Women, 2022).
- . Social Inclusion: To ensure that everyone and all groups of people, regardless of their backgrounds or circumstances, have access to the same things and can participate equally in society (Silver, 1994).
- . Climate Change: Repeated changes in regional or global climate patterns over the long term, mainly because human deed leads to greenhouse gas emissions and global warming (World Bank, 2020).
- . Environmental Degradation: Natural environment destruction, such as air and water pollution, loss of soil quality and natural resources, and loss of biodiversity (World Bank, 2020).

- . Sustainable Practices: Practices and procedures aiming at meeting current needs without incriminating the ability of future generations to meet their own needs, through reducing pressure on the environment and achieving sustainable use of resources (Schwab, 2016).
- . Ecological Footprint: An indicator of the pressure that human activities place on the environment, considering the utilization of resources and generation of waste and emissions (United Nations, 2020).
- . Digital Divide: The disparity between individuals, companies, and geographic areas regarding access to and use of facts provided and communication technologies (ICTs) (International Telecommunication Union, 2021).
- . Technological Advancement: The discovery and implementation of new technology, tools, and techniques that maximize efficiency, productivity, and capacity in various fields (Russell & Norvig, 2020).
- . Artificial Intelligence (AI): Simulating human cognitive processes through machines, particularly computer systems, enables them to carry out tasks that usually require human intelligence, such as learning, problem-solving, and decision-making (Russell & Norvig, 2020).
- . Innovation: The application of new ideas, methods, or products that create value and lead to improved existing practices or solutions (Bryman, 2016).
- . Governance: The institutions, systems, and processes through which power is exercised and decisions made in a society or organization (Kaufmann et al., 2010).
- . Multi-sector Collaboration: Partnership and collaboration among diverse sectors such as government, private sector, civil society, and academia to address multifaceted problems and achieve common goals (Bäckstrand, 2006).
- . Inclusive Policies: Inclusive policies include strategies and policies that aim at promoting equal opportunities, bridging gaps, ensuring that everyone and every group gets a chance to contribute, and reap the benefits of development processes (World Bank, 2020).
- . Sustainable Development Goals (SDGs): A set of 17 international goals supported by the United Nations in 2015 that address various economic, social, and environmental challenges and achieve sustainable development by 2030 (United Nations, 2015).

3. Literature Review

This literature review explores the theory and concepts used to explain human development in the 21st century. The capabilities approach and human development theory are central, emphasizing the increase of individual freedoms and choices as imperative for development (UNDP, 1990; Sen, as quoted in Dreze & Sen, 2013). Sustainable Development and the Sustainable Development Goals (SDGs) have provided a global blueprint for inclusive and equitable progress (United Nations, 2015). Additionally, Inclusive Growth and Equitable Development are integral to ensuring that economic gains are broadly shared (Ali & Son, 2007).

Gender Equality and Women's Empowerment are core aspects of human development, as emphasized in international frameworks and national plans (UN Women, 2022). Environmental sustainability and climate change are essential areas of concern, and there is a need to act urgently for the protection of future generations (Brundtland Commission, 1987; UNDP, 2020).

The Digital Divide and Technological Advancements influence access to opportunities and social mobility, highlighting the need for inclusive digital policies (ITU, 2021; Ministry of Electronics and Information Technology, 2020).

Economic factors influencing human development include Poverty, Income Inequality, and Inclusive Growth, which continue to challenge equitable development (World Bank, 2020; Piketty & Chancel, 2017). Employment and Decent Work Opportunities are central to enabling dignity and stability (ILO, 1999; ILO, 2018). Economic Policies and Reforms at the national and global levels impact growth patterns, while Globalization and International Trade shape the distribution of benefits and resources (Stiglitz, 2007).

Social factors also play a significant role in human development. Education and Skill Development enhance individual capabilities and national productivity (MoSPI, 2022). Health

and Well-being are indispensable for overall human development (MoHFW, 2021). Gender Equality and Social Inclusion ensure that marginalized populations are integrated into mainstream development (Ministry of Social Justice and Empowerment, 2020; Silver, 1994). Demographic Trends and Urbanization affect infrastructure demand and service delivery (World Bank, 2022).

Environmental factors like Climate Change and Environmental Degradation require integrated policy responses (UNDP, 2020). Effective Natural Resource Management and Sustainability strategies are vital for long-term ecological balance (World Bank, 2020). Ecological Footprint and Sustainable Consumption practices are necessary to limit environmental impacts. Disaster Risk Reduction and Resilience are increasingly emphasized in development planning (UNDP, 2020).

Technological factors are rapidly transforming development paradigms. The Digital Divide continues to challenge equitable access to Information and Communication Technologies (ICTs) (ITU, 2021). Artificial Intelligence (AI) and Automation are reshaping labor markets and governance structures (NITI Aayog, 2021; Russell & Norvig, 2020). Innovation and technological advancements create new development opportunities, but they also raise ethical considerations and calls for responsible technology (Beauchamp & Childress, 2013; Schwab, 2016).

Governance and policy aspects are critical to human development. Governance Structures and Institutions must be transparent, accountable, and participatory (Kauffmann et al., 2010). Public Policies and Regulatory Frameworks define the trajectory of inclusive development (Ministry of Panchayati Raj, 2020). Multi-stakeholder Collaboration and Partnerships are increasingly recognized as essential for achieving complex development goals (Bäckstrand, 2006). Effective Monitoring and Evaluation Mechanisms help track progress and inform policy decisions (UNDP, n.d.).

Existing case studies and empirical research on human development in India provide valuable insights into national progress and challenges (Chakravarty & Majumder, 2021; Dreze & Sen, 2013).

This research utilizes a convergent mixed-methods research design to analyze the multidimensional and complex character of human development in India. By integrating qualitative and quantitative methods, the research captures a comprehensive understanding of the interconnected challenges and opportunities confronting the nation in the 21st century (Creswell & Plano Clark, 2018). A case study approach offers a rich contextual analysis of India's development path, and regional disparities, gender inequalities, environmental issues, and the digital divide can be explored (Yin, 2014; Bryman, 2016).

4. Methodology

The study employs three complementary primary data collection tools to capture the complexity and diversity of human development challenges in India as mentioned in Table 1. These methods were selected to ensure representation across geographic, demographic, and socio-economic dimensions while capturing both objective indicators and subjective experiences.

4.1 Data Collection Methods

Three principal tools of primary data collection are used in the study:

Surveys: Questionnaires with a structured format are used to collect information from a stratified random sample of the Indian population for representation in significant demographic variables like region, gender, level of income, and urban-rural split. The survey used indicators of human development, digital access, education, health, and perceptions of climate risks (Bryman, 2016).

Semi-Structured Interviews: Semi-structured interviews are conducted with the primary stakeholders, such as government officials, policymakers, development practitioners, educators, environmentalists, and AI researchers. These interviews investigate systemic obstacles, institutional views, and policy implementation difficulties (Kvale & Brinkmann, 2015).

Focus Group Discussions (FGDs): FGDs were conducted with underrepresented and marginalized groups, including women in rural areas, tribal communities, and youth from underprivileged areas. These FGDs discuss lived realities concerning development, inequality, and exclusion in the digital age (Bramall & Clarke, 2006).

Table 1. Summary of Primary Data Collection Methods

Method	Stakeholders	Purpose	Key References
Survey	Stratified sample of Indian population (by gender, region, etc.)	Quantify development indicators and public perceptions	Bryman, 2016
Semi-Structured Interviews	Government officials, educators, AI researchers, etc.	Understand systemic and institutional barriers	Kvale & Brinkmann, 2015
Focus Group Discussions	Rural women, tribal groups, underprivileged youth	Explore lived experiences, inequality, and exclusion	Bramall & Clarke, 2006

Source: Author

4.2 Secondary Data Collection

The research also utilizes an extensive variety of secondary data sources summarized as in Table 2, which include:

Government and Institutional Reports: Official policy reports and statistics of the Ministry of Statistics and Programme Implementation (MoSPI), the Ministry of Health and Family Welfare (MoHFW), and NITI Aayog offer critical quantitative information on human development indicators (MoSPI, 2022; MoHFW, 2021).

International and Scholarly Publications: Organization reports, including those by the United Nations Development Programme (UNDP) and the World Bank, along with peer-reviewed scholarly publications, are utilized to compare India's development to that of the rest of the world and assess the effectiveness of policy (UNDP, 2020; World Bank, 2020).

Table 2. Sources of Secondary Data

Source Type	Examples / Organizations	Purpose	References
Government Reports	MoSPI, MoHFW, NITI Aayog	National statistics and policy documentation	MoSPI, 2022; MoHFW, 2021
International and Scholarly Reports	UNDP, World Bank, Peer-reviewed journals	Global comparison and scholarly analysis	UNDP, 2020; World Bank, 2020

Source: Author

4.3 Data Analysis Methods

The mixed-methods design calls for parallel **quantitative and qualitative analysis**, with integration at the interpretation stage.

Quantitative Analysis

Survey-based quantitative data are processed using Descriptive statistics to compile demographic profiles and development indicators, Inferential statistics to ascertain meaningful relationships, and Regression analysis to test the effect of factors like gender, region, and access to digital media on human development indicators (Bryman, 2016).

Qualitative Analysis

Interview and focus group qualitative data are analysed using: Thematic analysis, which maps out patterns and emerging themes of inequality, digital divide, climate vulnerability, and efficacy of policies, and Content analysis of government documents and policy reports to assess institutional frameworks and development narratives (Lincoln & Guba, 1985; Bramall & Clarke, 2006).

Triangulation

A triangulation strategy helped to enhance validity and reliability by integrating data from different sources and methods. The strategy adds credibility to evidence and reduces potential bias (Denzin, 2012) as mentioned in Table 3.

Table 3. Measures to Ensure Validity and Reliability

Strategy	Description
Member Checking	Feedback from participants to validate interpretations
Peer Debriefing	External review of coding and analysis consistency
Standardized Protocols	Uniform tools for data collection
Researcher Training	Bias minimization through capacity building

Source: Author

Ethical approval has been sought from the appropriate Institutional Review Board (IRB) or ethics committee. All participants have provided informed consent, and their participation will be voluntary. Information on the study purpose, usage of data, and participant rights will be shared clearly.

Confidentiality is ensured throughout the research, and personal identifiers were anonymized. Data protection procedures were adhered to applicable laws, such as the Information

Technology Act (2000) and the draft Personal Data Protection Bill (2019) (Government of India, 2000, 2019).

Being cognizant of India's socio-cultural and geographic complexity, the research admits to such limitations as sampling bias and self-report subjectivity. Delimitations encompass geographical scope, a time horizon between 2000–2025 as discussed in table 4, and thematic focus areas—education, health, sustainability, and digital inclusion—capturing the major themes of the literature review.

To maintain methodological soundness, techniques like member checking, peer debriefing, standardized procedures, and researcher training are utilized (Lincoln & Guba, 1985; Creswell & Plano Clark, 2018).

There is a pilot study in a single urban and single rural location before the full deployment. It captures usability of instruments, protocol coherence, and logistics—assuring methodological quality and context responsiveness (Bryman, 2016). Last-minute corrections are piloted based on feedback, reaffirming the research commitment to context-sensitive and evidence-informed human development research.

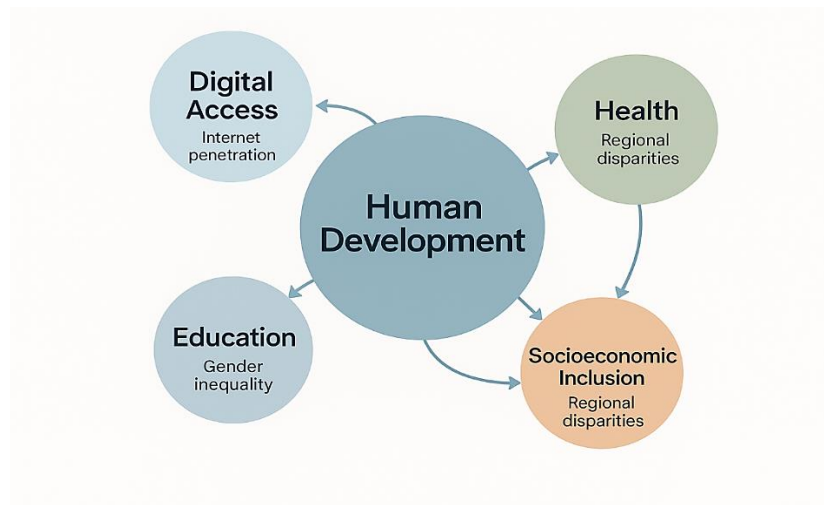
Table 4. Research Scope and Limitations

Category	Description
Limitations	Sampling and self-report bias; generalizability due to regional diversity
Delimitations	Focus on select states, time frame (2000–2025); key themes like education
Geographic Scope	Selected urban and rural areas representing regional diversity
Topical Scope	Human development, digital access, education, health, inclusion

Source: Author

5. Case Study: India –Human Development Landscape

Figure 2. Human Development Factors



Source: Author

India has recorded significant advances in various areas of human development, including poverty reduction, expanded access to education and health services, and economic growth. Nevertheless, sustainable challenges remain, primarily regional disparities, gender differences, and the need for inclusive and sustainable development strategies (UNDP, 2020). Despite tremendous progress, a majority of India's population continues to be below the poverty line, with wide variations across regions. The World Bank (2022) states that income inequality in India has been on the rise, which has widened economic disparities and limited access to opportunities for marginalized groups. The growth in India's economy has produced more jobs. However, most of the workforce is still in the informal sector with no social security and quality work conditions (ILO, 2023). There is a need to enhance skill development and social protection to ensure sustainable livelihoods. Despite the high GDP growth in India, translating this into inclusive development is an issue. Special policies must be made so that economic gain reaches disadvantaged groups (Planning Commission, 2013). Social factors such as education and skill development, healthcare and public health, Gender Equality and Women's Empowerment are also important in human development. Access to

education has grown impressively, as literacy rates and school enrolments have improved. Issues of quality and equity are still there, especially for rural areas and girls (ASER Centre, 2022). Skill development efforts, such as PMKVY, attempt to bridge the gap (MSDE, 2021). Public health indicators such as life expectancy and maternal death have improved. However, there is no equal access to good-quality care, particularly in rural and remote areas (NITI Aayog, 2021). It is important to strengthen primary healthcare systems and preventive health. Gender violence, wage disparities, and the absence of representation at top layers continue despite constitutional safeguards and various initiatives. It must overcome structural and cultural impediments to ensure gender equality (UN Women, 2022).

Affirmative action groups, such as SCs, STs, and minorities, endure systemic exclusion and limited access to services. Inclusive growth must address affirmative action, legal protection, and targeted welfare programs (NCBC, 2021).

Environmental factors are another parameter is considered for human development. While considering the climate change India is climatically highly vulnerable to floods, droughts, and heatwaves. These conditions affect agriculture, water resources, and health (MoEFCC, 2021). Adaptation strategies and green infrastructure should ensure resilience.

Natural resource management such as industrialization has led to deforestation, lack of water, and biodiversity loss. Rules and regulations need to tackle natural capital (TERI, 2020).

Enhanced urban development has expanded slums, waste generation, and air pollution. Urban redevelopment and sustainable urban planning ensure habitable cities (MoHUA, 2022).

India's susceptibility to natural disasters calls for investment in adaptive infrastructure and early warning systems. Disaster preparedness at the community level must be prioritized (NDMA, 2020).

India's tech environment poses a twofold challenge. Positive is rising digital connectivity; negative is an immense digital divide in digital access, particularly in the rural and difficult-to-reach areas. The digital divide is most significant for access to services, education, and economic opportunity. Reducing the digital divide requires substantial infrastructure investment, broadband rollout, and community internet access points (MeitY, 2022). Complementary digital literacy programs, particularly targeting women and disadvantaged communities, are necessary for facilitating inclusive digital engagement (UNDP, 2020; United Nations, 2015; UN Women, 2022).

The advent of disruptive technologies like Artificial Intelligence (AI) and the Internet of Things (IoT) has immense developmental potential in areas such as education, healthcare, and governance. However, ethical guidelines and capacity building need to come before large-scale deployment to prevent worsening inequalities (NASSCOM, 2023; Russell & Norvig, 2020). Responsible innovation requires a regulatory environment that mitigates risks like data privacy, job loss, and automation-driven disruptions (Beauchamp & Childress, 2013; NITI Aayog, 2021).

India's startup ecosystem, encouraged by government initiatives such as Startup India, is growing quickly. Despite this momentum, regional differences in startup facilitation and access to research and development (R&D) facilities still exist. Intellectually stronger property regimes, public-private alliances, and availability of incubator facilities in Tier-2 and Tier-3 cities will ensure DPI (Schwab, 2016; DPIIT, 2021).

Governing, policy frameworks, and multistakeholder alliance are critical aspects in addressing India's complex human development challenges. Effective governance frameworks need to uphold transparency, accountability, and participatory decision-making (Kauffmann et al., 2010).

Institutional capacity needs to be strengthened through decentralized reforms and responsiveness at the local level (Ministry of Panchayati Raj, 2020; Lincoln & Guba, 1985).

In addition, multi-sector partnerships are needed to mobilize various resources and knowledge systems towards achieving the Sustainable Development Goals (United Nations, 2015; Sachs et al., 2019; Bäckstrand, 2006).

6. Findings and Analysis

Indian economic inequality is a major development barrier. National poverty has reduced, but income inequality has risen, limiting economic mobility and public services access for poor classes (Ali & Son, 2007; Piketty & Chancel, 2017). The informality of the labor market, coupled with inadequate social protection systems, highlights the necessity for structural change to aid inclusive economic growth (ILO, 1999, 2018). Urban-rural infrastructure imbalances further widen uneven development consequences (World Bank, 2020).

The social development parameters indicate a bittersweet condition. Though increased access and education intake exist, differences in quality and relevance in vocations persist strongly (MoSPI, 2022; Ministry of Social Justice and Empowerment, 2020). Public health has registered improvements in life expectancy and maternal health, but regional inequalities and poor rural healthcare systems remain (MoHFW, 2021; UNDP, 2020). Systemic exclusion continues to marginalize Scheduled Castes, Scheduled Tribes, and other backward classes, limiting their access to economic, political, and educational opportunities (Chakravarty & Majumder, 2021; Dreze & Sen, 2013). Gender disparities in the payment of wages, workforce participation, and political voice persist, despite progressive laws (UN Women, 2022; Silver, 1994).

Environmentally, India is extremely vulnerable to climate risk, with heatwaves, floods, and droughts becoming more frequent and intense (United Nations, 2020). Urbanization has resulted in pollution, water scarcity, and loss of biodiversity, threatening sustainable development goals (Brundtland Commission, 1987; World Bank, 2020). Building disaster resilience, promoting sustainable land and water management, and investing in green infrastructure are critical priorities (MoSPI, 2022).

The digital divide also exacerbates socio-economic disparity. Although digital infrastructure has grown, rural and socioeconomically vulnerable populations still lag in access to information and communication technologies (ITU, 2021; MeitY, 2020). Technological changes such as AI and IoT must complement governance transformations and ethical regulation to ensure equitable deployment (Russell & Norvig, 2020; NITI Aayog, 2021).

7. Interrelationships and Synergies

The research highlights the interdependent and multifaceted nature of development areas. Economic empowerment affects education and health, and environmental sustainability directly impacts livelihoods and public health. Technology is both an enabler and a divider, depending on how equitably it is governed and allocated. Integrated and coordinated policy strategies that recognize these interdependencies are needed to attain balanced human development (Stiglitz, 2007; UNDP, 1990; Sachs et al., 2019).

The research encourages a move from traditional unidimensional development measures towards a capabilities-based multidimensional approach (Alkire & Foster, 2011; UNDP, n.d.). However, the Human Development Index is limited to adequately describing subjective well-being and freedoms. In bringing in agency, opportunity, and structural impediments, this research aligns with more inclusive views of human development (Sen, as cited in Dreze & Sen, 2013).

Closing the digital divide requires increasing rural broadband, public Wi-Fi, and digital literacy initiatives specific to women and underserved populations (ITU, 2021; MeitY, 2020; UN Women, 2022). Access has to be made affordable through subsidies, tax breaks, and public-private collaborations (World Bank, 2020; Ministry of Social Justice and Empowerment, 2020). Locally specific digital content and services related to education, governance, and entrepreneurship should be developed through cooperative initiatives (Bäckstrand, 2006).

In order to leverage the potential of AI, the government will have to invest in R&D and ethical governance, prioritizing areas such as agriculture, healthcare, and disaster management (Russell & Norvig, 2020; NITI Aayog, 2021). The regulatory mechanisms must ensure privacy, transparency, and employment security (Beauchamp & Childress, 2013). Collaborations must enable sustainable AI applications and reduce social dislocation (Schwab, 2016; Brundtland Commission, 1987; Stiglitz, 2007).

Increasing access to good-quality education in disadvantaged areas needs infrastructure development, funding, and curriculum revision to meet market demands (MoHFW, 2021; UNDP, 1990; Chakravarty & Majumder, 2021). Institutionalizing vocational training with industry collaboration can fill skill gaps (ILO, 2018; Creswell & Plano Clark, 2018). Gender-balanced education policies and anti-discrimination laws ensure inclusive learning (UN Women, 2022; Dreze & Sen, 2013).

Good governance relies on transparent institutions, anti-corruption policies, and participatory decision-making (Kauffmann et al., 2010; Lincoln & Guba, 1985). Decentralization and multistakeholder collaboration can enhance communities and policy implementation (Ministry of Panchayati Raj, 2020; Denzin, 2012; Silver, 1994).

Addressing economic inequality involves progressive taxation, minimum wages, and comprehensive social protection (Piketty, 2014; Piketty & Chancel, 2017). Inclusive growth should foster small business development and infrastructure investments, particularly in marginalized regions (Ali & Son, 2007; World Bank, 2022).

Environmental sustainability demands a combination of regulatory and incentive measures. Steps should involve reducing emissions, conserving biodiversity, and environmentally friendly agricultural and transport practices (Brundtland Commission, 1987; Sachs et al., 2019; United Nations, 2020).

Conclusion

The present research study has given an in-depth analysis of the Indian human development situation, mapping the concurrent economic, social, environmental, and technological forces driving human advancement in the 21st century. The primary research findings emphasize India's multifaceted challenges and opportunities in promoting inclusive and sustainable human development.

Economic considerations, like long-term poverty, income inequality, and unbalanced labor market access, still prevent human development. Social considerations, like education, healthcare, and gender imbalances, remain formidable obstacles to achieving full human capital potential in India. Environmental concerns, like climate change, natural resource depletion, and ecological degradation, undermine the sustainability of progress in human development. Technological factors, such as the digital divide and the uneven spread of technological progress, widen existing disparities and pose new challenges to inclusive growth.

The research has enriched theoretical and practical knowledge of human development by:

- . Offering a comprehensive and multidimensional view of India's challenges and opportunities.
- . Framing the United Nations Sustainable Development Goals (SDGs) and providing insights for policy-making and decision-making.
- . Bridging research and practice through putting forward feasible action strategies and proposals for inclusive and sustainable human development.
- . Though the study has made significant contributions, its limitations must be appreciated. The study's methodology, data gathering, and methods of analysis adopted may have internal biases or constraints that might impact the findings. The Indian context and the research period might circumscribe the generalizability and range of the study's findings.
- . The future directions for research should aim at:

- . Examining the intersectionality of factors that affect human development, e.g., gender, caste, and socioeconomic status.
 - . Examining the effects of new technologies, like artificial intelligence and automation, on human development and job opportunities.
 - . Carrying out longitudinal studies to evaluate the long-term consequences of policies and interventions for promoting human development.
- Extension of the study to cover comparative studies with other developing and developed countries to derive best practices and transferable policies.

In conclusion, this research highlights the necessity of an all-encompassing and multidimensional human development strategy, emphasizing inter-stakeholder collaboration among policymakers, civil society organizations, and the private sector. Responding to the challenges and capturing the opportunities for human development in the 21st century calls for collective action in pushing inclusive and sustainable policies, bridging the digital divide, and harnessing the power of technology for progressive benefits. The urgency of the response to addressing human development issues in India and the world at large cannot be emphasized enough because it is instrumental to the success of the Sustainable Development Goals and to securing a prosperous and inclusive future for all.

References

- Ali, I., & Son, H. H. (2007). Defining and measuring inclusive growth: Application to the Philippines, ADB Working Paper.
- Alkire, S., & Foster, J. (2011). Counting and multidimensional poverty measurement, *Journal of Public Economics*, 95(7-8), 476-487.
- Bäckstrand, K. (2006). Multi-stakeholder partnerships for sustainable development, *European Environment*, 16(5), 290–306.
- Beauchamp, T. L., & Childress, J. F. (2013). *Principles of biomedical ethics* (7th ed.). Oxford University Press.

- Bramall, P., & Clarke, V. (2006). Using thematic analysis in psychology, *Qualitative Research in Psychology*, 3(2), 77-101.
- Brundtland Commission. (1987). *Our common future*. Oxford University Press.
- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.
- Chakravarty, S. R., & Majumder, A. (2021). *Human development and social empowerment in India: Emerging issues and policy perspectives*. Springer.
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.
- Denzin, N. K. (2012). Triangulation 2.0, *Journal of Mixed Methods Research*, 6(2), 80-88.
- Dreze, J., & Sen, A. (2013). *An uncertain glory: India and its contradictions*. Princeton University Press.
- International Labour Organization (ILO). (1999). *Decent work agenda*.
- International Labour Organization (ILO). (2018). *India wage report*.
- International Telecommunication Union (ITU). (2021). *Measuring digital development: Facts and figures 2021*.
- Kauffmann, D., Kraay, A., & Mastruzzi, M. (2010). *The worldwide governance indicators*. World Bank.
- Kvale, S., & Brinkmann, S. (2015). *InterViews: Learning the craft of qualitative research interviewing* (3rd ed.). SAGE Publications.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. SAGE Publications.
- Ministry of Electronics and Information Technology. (2020). *e-Governance and digital inclusion initiatives*.
- Ministry of Health and Family Welfare (MoHFW). (2021). *National health policy progress report*.
- Ministry of Panchayati Raj. (2020). *Decentralization and local governance reforms*.
- Ministry of Rural Development. (2022). *Infrastructure and employment schemes overview*.
- Ministry of Social Justice and Empowerment. (2020). *Social inclusion strategy document*.
- Ministry of Statistics and Programme Implementation (MoSPI). (2022). *Annual report 2021–22, Government of India*.
- NITI Aayog. (2021). *Responsible AI for all: Strategy paper*.

- Piketty, T. (2014). *Capital in the twenty-first century*. Harvard University Press.
- Piketty, T., & Chancel, L. (2017). *Indian income inequality, 1922–2015: From British Raj to billionaire Raj*, WID.world Working Paper.
- Russell, S., & Norvig, P. (2020). *Artificial intelligence: A modern approach* (4th ed.). Pearson.
- Sachs, J. D., et al. (2019). *SDG index and dashboards report 2019*, Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).
- Saha, S., & Chatterjee, D. (2025). A revisit to circular statistical analysis of the orientations of termite mounds. *Insight - Statistics*. <https://doi.org/10.18282/i-s662>
- Silver, H. (1994). Social exclusion and social solidarity: Three paradigms, *International Labour Review*, 133(5–6), 531–578.
- Schwab, K. (2016). *The fourth industrial revolution*. World Economic Forum.
- Stiglitz, J. E. (2007). *Making globalization work*. W. W. Norton & Company.
- United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*.
- United Nations. (2020). *The sustainable development goals report 2020*, UN Publications.
- United Nations Development Programme (UNDP). (1990). *Human development report 1990: Concept and measurement of human development*. Oxford University Press.
- United Nations Development Programme (UNDP). (2020). *Human development report 2020: The next frontier – Human development and the Anthropocene*.
- United Nations Development Programme (UNDP). (n.d.). *Human development reports: Technical notes*. Available at: <https://hdr.undp.org>.
- United Nations Development Programme (UNDP). (n.d.). *Human development index (HDI)*. Available at: <https://hdr.undp.org>.
- UN Women. (2022). *Progress on the sustainable development goals: The gender snapshot 2022*.
- World Bank. (2020). *Poverty and shared prosperity 2020: Reversals of fortune*.
- World Bank. (2022). *India social protection and jobs public expenditure review*.
- World Bank. (2020). *Inclusion matters: The foundation for shared prosperity*.
- World Economic Forum. (2016). *The fourth industrial revolution*.