G20, SUSTAINABILITY IN MANAGEMENT AND ECONOMICS :

FUTURE AGENDAS AND PROSPECTS

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G20, Sustainability in Management and Economics: Future Agendas and Prospects

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Preface

The G20, comprising 19 countries and the European Union, has recognized the importance of Industry 4.0 in shaping the future of economies and industries globally. With the fourth industrial revolution 'Industry 4.0' characterized by integrating digital technologies, automation, data exchange, and artificial intelligence into manufacturing and other sectors, it is also imperative to address environmental challenges, promote social inclusion, and bridge the digital divide between developed and developing countries.

In the era of achieving SDGs, the term sustainability encompasses environmental, social, and economic dimensions, and the G20's discussions and initiatives reflect this holistic approach. The discussions and practices of G20 address sustainability via climate change mitigation and adaption, green finance and investments, corporate sustainability and responsible business practices, inclusive growth and social development, and international cooperation and partnership.

Considering the importance of integrating environmental, social, and economic considerations for long-term prosperity and well-being, sustainability in management and economics is a critical topic that the G20 has addressed in various contexts due to its global implications. Henceforth, this book entitled ***"G20, Sustainability in Management and Economics: Future Agendas and Prospects"*** attempts to discuss numerous crucial aspects and future prospects and agendas of G20 that play a significant role in shaping international policies related to sustainability in management and economics.

About the Editors

Dr. Sarika Kumar, holds a doctorate degree from Indian Institute of Foreign Trade, New Delhiin the field Finance and is currently working with ATLAS SkillTech University, Mumbai. Her research specialization in in Mergers and acquisition, sustainability, firm performance and corporate Governance, international business, macro economics, and micro economics. Dr Kumar gained position of fourth university topper during her Masters of arts studies. She bears a research experience from Indian Institute of Foreign Trade, New Delhi, National Council of Applied Economic Research (NCAER), New Delhi, Poznan university of economics. She bears a 3 years of teaching experience with University of Delhi as Assistant Professor pots PhD. She actively contributes to the research community by her published research papers in peer reviewed ABDC -A and B listed journals. She also has represented her research papers in international conferences, AIB and IIMs.

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Prof. Bala Saraswathi Atluri, MSW (PM & amp; I R), MBA(HR), MS-Data Science, Ph.D is a Professor of Human Resources, Organizational Behaviour and Business Analytics in ATLAS SkillTech University Maharashtra, India. Dr. Saraswathi has vast experience of 26 plus years and contributed extensively to the worlds of HR, Development sector and Education. She is also a founding member and President of a Research Organization by name “Centre for Social Research and Community Empowerment” which focusses on community related issues and develop models for Community Outreach Programs and implements for betterment of the community. Similarly, provides recommendations to the Policy makers from time to time. She is pioneer in developing Management

Development Programs (MDP's) and Executive Development Programs (EDP's) in the field of management and also gained expertise in Capacity Building of People in general. She also has published more than 30 research articles in the category of Scopus and ADBC, with specific focus on Human resources. Under her guidance 3 Ph.D's were awarded. Dr. Saraswathi Atluri has published a text book on "Talent Turnover Intention of Civil Engineers from India", she is also an author for two books, one in Employee Engagement and another in Business Analytics with R Programming which are about to publish in couple of months.

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A STUDY ON BENEFITING FACTORS RELATED TO EMOTIONAL INTELLIGENCE AND ARTIFICIAL INTELLIGENCE AFFECTING THE WORKPLACE

Dr. Gazal Singh
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ABSTRACT

Emotional intelligence (EI) helps employees to develop emotional self-awareness, increases emotional expression, creativity, and openness, and increases trust and loyalty relationships within and between organizations. This information paves the way for present research. In the present research article authors identify the benefiting factors of artificial intelligence that affect the workplace. Thereupon benefiting factors of emotional intelligence that affect the workplace were also identified. It has been observed by various authors the need for EI in an organization and suggest how it can improve the performance of employees and productivity of the domain. The paper basically considered secondary data for data collection and review of factors related with AI and EI. Based on the factors in the study, a connection between AI and EI is established through the various applications of AI and EI that facilitate various aspects of workplace and helps in productivity.

Keywords: Emotional Intelligence, Artificial Intelligence, Emotional Quotient, Digital Connect, work-life balance.

Artificial intelligence is revolutionizing both our personal and professional lives. Presently, an astounding 1.8 million individuals utilize Amazon's Alexa for home tasks, boasting a repertoire of over 3,000 skills that continues to expand. This remarkable shift exemplifies AI's significant impact. Not only limited to homes, AI is swiftly making its mark in the workplace, acting as an intuitive companion to enhance productivity. AI is not merely the future of work; it is already manifesting and evolving. HR leaders are experimenting with chatbots to enhance employee experiences, mirroring the way marketers have leveraged chatbots to personalize customer interactions, Wassan S. et.al (2021). During 2016, over 200 companies centered around AI received investments exceeding $1.5 billion, resulting in a cumulative funding surpassing $2 billion. This trend shows no signs of deceleration soon. "Artificial Intelligence involves the examination of calculations that enable the capacity to perceive, analyze, and take action." (Winston, P. H. 1992). “Intelligence is the capability of a system to adapt its behavior to meet its goals in a range of environments.” (Fogell, D. B. 2006).

Emotional intelligence refers to the skill of perceiving, comprehending, and proficiently utilizing emotional awareness and responsiveness as a means of human vitality, knowledge, affiliation, and impact. (Farhan & Alfin, 2019). According to Ebrahimi et al., (2018) Emotional intelligence is characterized by an individual's recognition of their own emotions and those of others, along with the capacity to

acknowledge and manage these emotions, as well as the ability to demonstrate empathy towards others. According to Pangestu (2019) Emotional intelligence involves an individual's adeptness in self-motivation, resilience, emotional regulation, and management of psychological states. Emotional intelligence is additionally described as the capacity to observe both personal and others' emotions, differentiate between various emotions, appropriately identify them, and utilize emotional insights to direct cognition and conduct. (Ebrahimi et al., 2018). Having strong emotional intelligence facilitates smoother interpersonal interactions for individuals. This, in turn, makes collaboration more seamless in the workplace, enabling efficient teamwork to accomplish shared objectives.

Work-life balance refers to a type of work arrangement that enables employees to integrate their professional obligations with personal duties, such as childcare and attending to the needs of elderly family members. (Ardiansyah & Surjanti, 2020). According to Jaharuddin & Zainol (2019) the concept of work-life balance originates from the necessity for employees to find a harmonious equilibrium between their desire for active engagement in their careers and their commitment to fulfilling the needs of their family or personal life, essentially reconciling professional and personal responsibilities. From the employee's perspective, work-life balance pertains to the means through which workers can effectively juggle their professional commitments alongside fulfilling personal responsibilities to their families. From the company's viewpoint, work-life balance represents a challenge in fostering a nurturing corporate culture that enables employees to maintain a dedicated focus on work during work hours. (Asepta & Maruno, 2017).

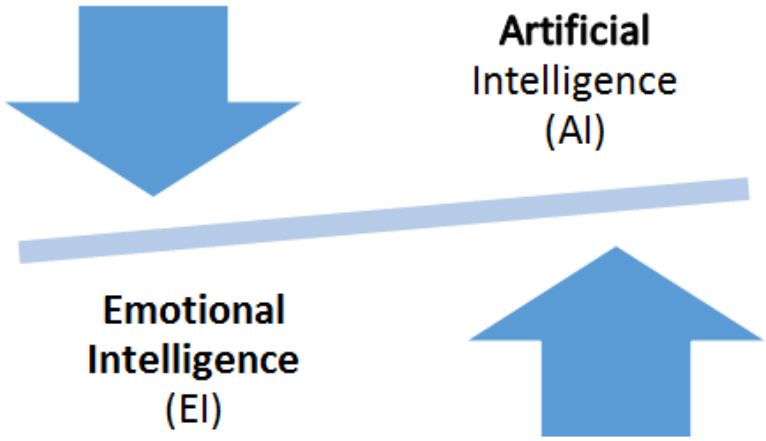
1.2 Objective and Research Methodology

To identify the beneficial factors of AI and EI at workplace.

To study connect between Emotional Intelligence and Artificial Intelligence at workplace through various application of AI and EI.

The research paper reviews the factors related to Artificial Intelligence and Emotional Intelligence through secondary data, specifically the journal articles from various publication. Along with journal article technical magazine (physical and virtual) articles are also considered so that novel research innovation of Ai can also be included.

Figure 1: Workplace dynamics of AI, EI



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2. BENEFICIAL FACTORS OF AI AT WORKPLACE

In recent years, AI has been widely used for improving business strategies with job processing along with data analysis. However, it has not been proved yet that AI could be leading the business to achieve the futuristic targets as per the market demand (Asepta & Maruno, 2017). Ozkiziltan & Hassel (2018) revealed that AI might be key factor to positively affect the workplace environment in terms of relationship, productivity, and intelligence of employees. All the factors are listed in figure 2.

2.1 Increased Intelligence

Researchers believe that AI can increase the intelligence of employees so that they can better understand and overcome difficult situations at the workplace. It helps in providing various alternative solutions, thereby helping and facilitating the decision-making process. (Bader and Kaiser, 2019). This decision support allows employees to develop their creativity by using machines to perform simple tasks. Consequently, global companies with skilled employees expect AI to bring multifaceted benefits to their business. (Liu et al., 2020; Hsieh and Hsieh, 2003)

2.2 Enhanced Human performance

Sun (2019) researched the use of AI to validate products through visual recognition audits. It can also be used for enterprise resource planning, assisting managers in their customer decision making process, proposing innovations in product development and process management, and allocating human resources to meet changing customer needs (Wang et al., 2019). AI algorithms can speed up the process of analyzing customer feedback by providing designers with deep insights and help managers in product positioning and product development based on design elements (Singh and Tucker, 2017).

2.3 Customer Orientation and Customization

AI algorithms are the driving force behind customer focus and customization, which helps companies successfully leverage competitive advantage by improving customer experience (Grover et al., 2020). AI helps in both coordination and information sharing regarding supply chain management (Gupta et al., 2020; Bag et al., 2021). The main aim of an efficient supply chain is to meet customer needs (Muggy and Stamm, 2020). Generally, these algorithms are used to reduce budgetary costs such as procurement costs and efficient use of resources. Another important application of AI algorithms in the downstream supply chain is the launch of new products by predicting customer needs and preferences (Grover et al., 2020).

2.4 Support Creative Thinking and Context Awareness

AI is considered relatively better as a technological intervention. Recent literature suggests that AI enhances creative thinking and also supports contextual awareness, reasoning ability, communication ability, and self-organization ability. (Eriksson et al., 2020). The fourth edition of the Industrial Revolution started with the combination of AI, Big Data and Robotics (Grover et al., 2020). The motive of these technological interventions is not to replace human resources, but to act as an additional intermediary to enhance human intelligence and knowledge. (Jarrahi, 2018).

2.5 Encouraging Startups/new business/small scale enterprise

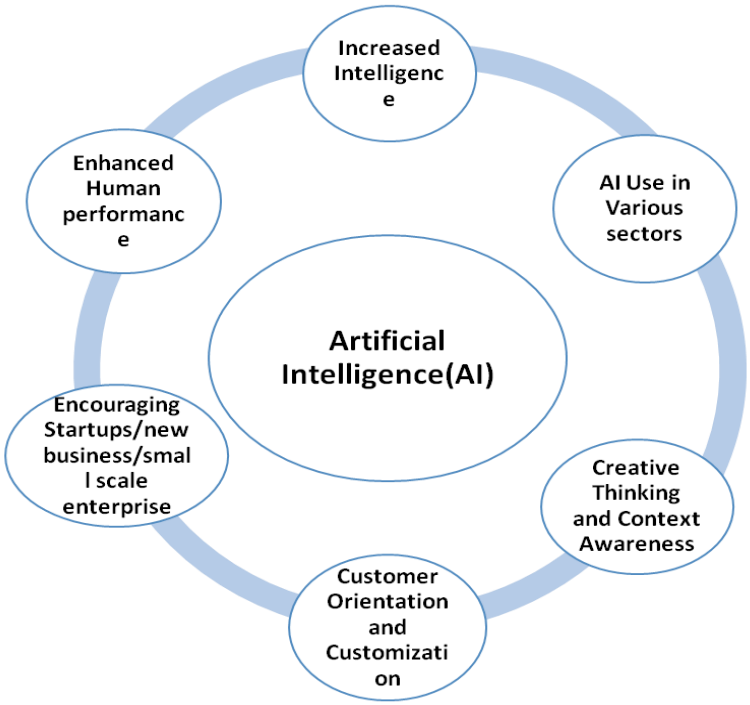
The digitization process of a company is affected by its age and size. Therefore, technological interventions such as AI must be adopted at a different pace in new firms, as they tend to have a stronger entrepreneurial spirit and flat organizational structure compared to traditional firms. The traditional organizational structure diffuses phased deployment of technological interventions (Dogru and Keskin, 2020), with the gradual integration and transformation of various work processes. The human resource aspect of an organization is defined by the emerging knowledge economy and technological interventions. These changes are the driving force behind the evolution of human resource organization (Evans, 2019).

2.6 AI Use in Various sectors

Many industries have benefited from remarkable advances in AI, robotics and automation. The emergence of AI significantly influence the service sectors such as hospitality and tourism (Syam and Sharma, 2018), Industry 4.0, healthcare and airport management systems. This technology helps solve a variety of routine tasks, giving service provider employees the mental freedom to engage in deepening customer relationships. In healthcare, various online applications have improved the efficiency of clinical operations such as surgery planning, diagnosis, and image analysis for disease prediction (Panch et al., 2018). Digitization and automation of manufacturing operations, fueled by big data and machine learning, has led to remarkable transformation and the creation of innovative manufacturing capabilities such as self learning factories had enhanced the process to digital learning and providing solutions in manufacturing (Dogru and Keskin, 2020). There is a proliferation of AI in retail

operations. This allows them to create future promotions and product offerings, as well as efficiently managed inventory system (Dogru and Keskin, 2020).

Figure 2: Beneficial Factors of AI at Workplace



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3. BENEFICIAL FACTORS OF EQ AT WORKPLACE

EI is important because it helps us improve our interpersonal relationships, both personally and professionally. Benefits of emotional intelligence in the workplace include the ability to better understand nonverbal cues, better coordinate behavior, make better decisions, and be respected Leaders (Ebrahimi et al., 2018). All the factors are listed in Figure 3 below.

3.1 Relationship Factor

Relationships are associated with a range of positive outcomes (e.g. happiness, less stress) and People who want them actively to pursue them. Pay attention to finding ways to preserve and inform social relationships is vital to business existence. There are countless opportunities to form social connections with your co-workers, which instills team spirit in employees. Guidance is needed to form relationships at the workplace and related stockholders (Pangestu, 2019). These social relationships are also important for maintaining interpersonal relationships between the Company and its customers, suppliers, distributors, and other related groups. The success of the organization depends on these social relationships (Muggy and Stamm, 2020).

Without trying to convey these relationships, Business can suffer, and productivity can hamper, if companies do not pass their social relationship in organization. The points to consider in relationship are as follows.

• Building Rapport and keeping others in loop.

• Maintaining Personal Relationships with colleagues and bosses

• Stability during the critical Hours.

• Right decision making and understanding Core values.

3.2 Adaptability factor

Adaptability is the ability to have ease with changing circumstances or overcome obstacles in learning different things. Adapters are flexible and productive (Sun, 2019) when called upon for a job in different directions at the same time. Employees with high adaptability respond well, cope well in stressful situations and make the right decisions in hard times. A employee with adaptive characteristics understands the job well and finds creative ways to get it done, with the help of right use of resources (Ardiansyah & Surjanti, 2020). When a new process is introduced, employees with adopting characteristics not only engage themselves in new process but at the same time encourage other to learn new process. Employees with adaptability characteristics have more chances of survival (Pangestu, 2019) as they always find new ways to learn new process and improve overall services of any organization.

3.3 Initiative of the employee

Many employers see initiative as a must for every position, they want to staff in their organization. For promotions also it is important to demonstrate the trait of taking initiative. Showcasing the trait of taking initiative at work has proven to be one of the powerful employability skills that can turn into a ladder for crossing the stages from an intelligent average worker to a super productive star performer. If an employee, starting work in a new office, employees are quickly judged (Winston, P. H. 1992) on whether they are ready to take new responsibilities and volunteer in taking initiatives for new tasks.

3.4 Responsibility factor

When the continuity of the employee exists in an organization, they develop a sense of belongingness, responsibility, and pride in the progression of the organization (Sun, 2019). It is not just a responsibility of management, but the employees also to achieve the organization's goal and enable organization in risk identification and problem resolution efforts. Employee engagement is the key to achieving this goal.

3.5 Leadership factor

Inspiring leadership guides and inspires with a compelling vision. If employees have the desire and willpower, they can become effective leaders. That’s why it is said that leaders are made not born. The best leaders develop through self-awareness, learning, and endless processes (Fogell, D. B. 2006).. Leaders are just not to make things

happen through people, but they also bring development and experience to their team. Leadership is the process by which a person influences a group of people to achieve a specific goal. Motivate employees to a higher level of teamwork. Good leaders are constantly working and learning to develop themselves.

3.6 Optimism

People who are optimistic feel positivity in all events of life, they have tendency to see the brighter side of all situations. Optimism is very motivational and keep any person's spirit high and create positive life believe system (Muggy and Stamm, 2020). Highly optimistic employees work in a creative and friendly environment. Optimistic employees work harder and longer with a pioneering spirit. Optimism should be instilled in the workplace as a source of company values. Focusing on the general principle of encouraging both employees and customers makes them proud to be part of the organization. A strong workplace culture is always attributed with optimism which is developed by administration and exercised by all in the organization.

3.7 Team building

An organization hires individuals, but organizational working and success depends on the team in the organizations. Team building is a continuous process which connects individual goals with organizational goals and develop that work culture which bring bond among all team members (Dogru and Keskin, 2020). Strong teams work together to achieve organizational goals while developing trust for each member, support each other and take such decision which respect team member's individual difference. Teams make sure that there should be involvement of each member thus enabling them for employee empowerment.

3.8 Loyalty factor

Any organization's success is the outcome of loyal employees' performance (Winston, P. H. 1992). When an organization has loyalty within people, people go beyond their normal working for success of organization. Loyal employees create good culture like sharing experience, solving problems conflicts, suggestions for improvements, boosting morale, helping colleagues, saving resources, and more. This changed culture and behavior of employee's forms groups and Organizations become more efficient, improve sales, reduce product wastage, and everything else.

3.9 Emotional competence

Companies are currently facing increasing competitive pressure; they are facing short product life cycles, increasing customer demands, rapid technological development, and High price pressure. To deal with these competitive situations and high pressure point, companies need to create strategic competitive advantages; Companies should focus on their core competencies, which are significantly influenced by skills, abilities and knowledge of their employees (Fogell, D. B. 2006).. The main objective of business process management is to create company value. By improving business processes, companies can increase their efficiency and effectiveness thus creating company value. For bringing all this change employees, have to learn continuously.

New challenges and tasks bring ability to overcome their emotional weakness and mature them emotionally. Finally emotional capacity of the employee help themselves to manages their emotions and understands others better and help them to put in other people's shoes, thus empathizing with others.

3.10 Empathy towards employee

Empathy is the perception of the emotions of others, understanding their point of view and actively participating with them. Empathy is an aspect of relationships and the ability to feel and relating to the thoughts, emotions, or experiences of others. Empathy is also a key component of emotional intelligence and that is whay many researchers consider to be the key to become effective leader (Goleman, 1995).

Figure 3: Beneficial Factors of EI at Workplace

Source: Created through MS Office Smart Art

4. THE EPIC BATTLE OF ARTIFICIAL INTELLIGENCE VS EMOTIONAL INTELLIGENCE

Human Intelligence is marvelously Complex. For philosophers, Researchers, Managers have defined it. In this modern Era AI is the power to solve problems using Reasoning and Logical Aptitude. But AI not only necessarily account for the full range of thinking Abilities. With the inception of EI (emotional Intelligence) Analyst

are now focusing on Evolution of Emotions in recognizing one's ability to understand others also doing introspection of oneself and increasing social awareness in the society and be empathetic toward others problems . AI refers to Intellectual Ability some of the elements are Use logic to solve problem Plan and strategize.

Understanding Abstract ideas

Learn and adapt to change

Grasp and use language

5. CONNECTS OF EMOTIONAL INTELLIGENCE AND ARTIFICIAL INTELLIGENCE IN ORGANIZATION

Two themes which is gaining more and more popularity: Emotional Intelligence (EI) and Artificial Intelligence (AI). But the question arises is there any relation between the two or are they of opposing tendencies and how they impact skills we need in Our Future leaders? As far as AI is concerned, a huge progress has been made in the era of information Technology and positivity in the technology leaves room for potential fear (Dogru and Keskin, 2020). The capacity of information technology to teach autonomous system how to replicate cognitive Function arises many doubts for future jobs. But the question arises what we will be doing then? An open mindset requires that AI progress in success of business transformation through successful leaders who need to understand the hidden mechanism of AI in this world and immense growth and opportunities hidden in the era of AI and EI. Emotional Intelligence helps the employees to increase their emotional self-awareness, emotional expression, creativity, increase tolerance, increase trust and integrity, improve relations within and across the organization and thereby increase the performance of each employee at workplace (Goleman, 1995). Emotional intelligence is one of the few key characteristics that give rise to visionary leaders in an organization. It plays a significant role in the organization and becomes an important criterion of evaluation for judgment of an effective employee, increases productivity and trust within and across the organization. A person who is emotionally intelligent of his emotional well being and sound mental health, is successful leader(Fogell, D. B. 2006). For this reason, we need leaders who have a high level of imagination, master creative analysis and practice the decisive thinking that only human beings possess and that organizations need to innovate and evolve. Leader cannot fight robots but also welcome them in their work by welcoming this change which is fruitful in the organization. Helps visionary leader getting clairvoyance of future, machines also help them in getting work done faster without being diligent and finally helps them in Decision Making.

6. DETERMINANTS OF EI AND AI IN RELATION TO MACHINES AND HUMANS

Emotional Quotient generally refers to one's ability to sense emotions in oneself and in others, it is also refers to guide others and awareness of our own behavior. In

general if one has high EQ they may find it easier to Identify one's and other's emotions.

Empathize with other people well.

Adapt feeling and behavior to different situations.

Control impulses

Resolve Conflicts with others.

Communicate Effectively

In the past, artificial intelligence (AI) was an exciting concept that people only dreamed about. But these days it has become a hot topic, flooding the papers, the internet and social media. AI is a computer system that can perform tasks that require human intelligence. Given enough data in these systems, computers can learn and perform tasks just as well as humans, if not better (Kaur & Sharma, 2020). Technology is advancing at an incredible rate, and with artificial intelligence leading the movement, no one knows what to expect next (Jaharuddin & Zainol, 2019). Research has shown that humans are still better than robots at recognizing, responding to, and displaying new patterns, logical thinking, creativity, conscientiousness, and emotion. Finally, AI lacks human touch and empathy. AI and EQ together provide a complete picture of human intelligence (Farhan & Alfin, 2019). Generally, studies have shown that most employees have average emotional abilities, so the Learning and Development (HR) team is advised to conduct regular programs at work to increase the levels of emotional intelligence, thereby developing superior artificial intelligence. Intelligence at work. To improve the organizational climate and culture, the company must start hiring emotionally mature people and try to elevate the level of emotional intelligence existing people. It enables them to face and overcome great challenges at work. Emotional Intelligence is well known among people, but still awareness is required. Organizational leaders need to be developed mental stability to ensure the physical and mental health of self and others, especially in service industry (Goleman, 1995).

7. APPLICATIONS OF AI AND EQ AT WORKPLACE

A better workplace is a place where employees can work better as a team, find solutions to problems, take more responsibility for their work, improve the group's mission, challenge day-to-day operations, and increase self-confidence. There should be Emotional intelligence that leads to better adaptability, employee empathy, leadership skills, group relationships, participatory management, decision making, and understanding among colleagues. Most organizations today hire emotionally intelligent employees to help them easily handle workplace issues and increase organizational productivity. Emotionally intelligent organizations can be achieved through organizational strategy, leadership skills, development programs, self-awareness, and self-management tools (Capgemini,2019).

Many people are disconnected from their own emotions, especially strong core emotions such as anger, sadness, fear, and joy (Syam and Sharma, 2018). This may be

the result of negative childhood experiences in which we were taught to block out our emotions. You can, but you can't eliminate them. They are still there, so the biggest question is whether employees are aware of their emotions. Unfortunately, without emotional awareness, , unable to fully understand their own motivations and needs, or to communicate effectively with others. With the advent of the internet, information technology and computers, artificial intelligence is becoming an integral part of everyday life as machines have completely changed human life (Ozkiziltan & Hassel, 2021). Technology helps with everyday organizational tasks, achieves a high degree of imagination, masters the practice of creative analysis and critical thinking unique to humans, and seeks to innovate and develop organizations through machine learning.

7.1 Autonomous Vehicles

Autonomous or unmanned vehicles are vehicles that can drive themselves and perform required functions without human intervention by being aware of their surroundings. Self-driving cars use fully automated driving systems (Evans, 2019) that allow the vehicle to react to external conditions handled by a human driver. Her ADAS (Advanced Driver Assistance Systems) in the vehicle assist the driver in steering, accelerating and braking. This full automation will be made possible by the application of 5G technology, allowing vehicles to communicate not only with each other, but also with traffic lights, signs and even the road itself. One of the technical aspects of the vehicle is ACC. The system's adaptive cruise control automatically adjusts the vehicle's speed (Ozkiziltan & Hassel, 2021).

7.2 Big Data Analytics

It is its heterogeneity that distinguishes big data from other large amounts of data stored in relational databases (Farhan & Alfin, 2019). Data were obtained from various sources and recorded in various formats. Big data analytics helps identify patterns and trends related to human behavior, preferences, and interactions. This information is valuable for creating personalized experiences and understanding user sentiment. The integration of big data and AI raises ethical considerations related to privacy, data security, and bias. Analyzing large datasets can inadvertently perpetuate biases present in the data. AI systems need to be designed and trained with ethical considerations in mind to ensure fair and unbiased outcomes. As AI systems become more emotionally intelligent, ethical considerations also extend to issues such as consent, emotional manipulation, and the responsible use of emotional data. Ensuring that AI respects user emotions and maintains ethical standards is crucial (Ozkiziltan & Hassel, 2021) . In nutshell big data analytics provides the foundational data for training and improving AI models, and the integration of emotional intelligence into AI systems enhances their ability to understand and respond to human emotions.

7.3 Cognitive Engagement

A cognitive engagement strategy involves inputting customer data. The predictive analytics process analyzes data to gain insights into it and predict future customer behavior. Companies should always look at AI from a business perspective, not a

technical one. Application projects contain processes and applications that customers and employees interact with using natural language (Jaharuddin & Zainol, 2019). Chat boxes, intelligent agents, machine learning Wellness care support applications, for example, that help healthcare providers create customized healthcare policies that manage individual patient health status and past medical records.

7.4 Robots, Sensors, Visions

In AI robots or humanoids are commonly used in warehouse and operations (Farhan & Alfin, 2019) they are designed to think look and work like also humans also and programmed with complex algorithms and languages. E.g. NLP is branch of AI.

8

7.5 Deep learning in Health care and Medicine

The healthcare industry is one of the biggest users of this technology (Syam and Sharma, 2018). Health is so important that medical professionals are constantly looking for innovative ways to apply new technologies to achieve meaningful results (Evans, 2019). In healthcare, AI deep learning has breakthrough applications. Deep Understanding collects a large amount of data, including: Patient Records, Medical Reports, and Insurance Documents.

8. CONCLUSION

As the economy recovers, employers are looking for employees who can make effective decisions in stressful situations and who are empathetic to the needs of their colleagues. Emotions can influence all actions at any stage of life. For a long time, it was observed that emotions were not taken into account in the study of intelligence (Hsieh and Hsieh, 2003). Organizations are the best environments that require amalgamation of human and technology interaction.

Artificial Intelligence (AI) and Emotional Intelligence (EI) are jointly transforming the workplace, enhancing various aspects of organizational dynamics. AI streamlines recruitment processes by analyzing resumes and screening candidates efficiently, while EI contributes to evaluating candidates' emotional competencies during interviews. Together, they facilitate improved talent management, ensuring a cultural fit and fostering positive team dynamics. In terms of employee engagement, AI analyzes data patterns to understand factors influencing job satisfaction, while EI assists in addressing employees' emotional needs, creating a supportive work environment. Personalized learning and development benefit from AI's recommendations for tailored training paths, with EI integrating emotional awareness into programs to nurture essential soft skills. Performance management is revolutionized by AI's real-time feedback capabilities and EI's emphasis on emotionally sensitive communication. Workplace well-being is supported as AI monitors employee stress levels, and EI encourages open discussions about mental health. Collaboration and team dynamics benefit from AI's optimization of workflows and EI's emphasis on fostering emotional intelligence skills, leading to more cohesive and productive teams. AI helps address bias in diversity and inclusion efforts, while

EI promotes a culture of empathy and respect. Adaptive leadership is facilitated by AI's data-driven insights and EI's understanding and response to the emotional needs of teams. Virtual assistants, powered by AI, are made more empathetic by integrating EI, enhancing user interactions. Lastly, the combination of AI and EI contributes to employee retention strategies, predicting turnover factors with AI and fostering supportive relationships through EI, ultimately leading to improved organizational success.

REFERENCES

1. Goleman D. London: Bloomsbury; 1995. Emotional Intelligence: Why it can Matter More Than IQ.
2. Goleman, D. (1995). Emotional intelligence. New York: Bantam Books.
3. Koman, E. S., Wolff, S. B., (2008). Emotional intelligence competencies in the team and team leader: A multi-level examination of the impact of emotional intelligence on team performance. Journal of Management Development, 27(1).
4. Narayan, P. R., Narashiman. Emotional intelligence and Work performance: A conceptual study. ISOR Journal of Mechanical and Civil Engineering, 62-68
5. Romanelli, F., Cain, J., & Smith, K., M. (2006). Emotional intelligence as a predictor of academic and/or professional success. American Journal of Pharmaceutical Education, 70(3)
6. Ozkiziltan, D., & Hassel, A. (2021). Artificial Intelligence at Work : An Overview of the Literature LITERATURE Didem Özkiziltan Anke Hassel Governing Work in the Digital Age Project Working Paper Series 2021-01. March. https://doi.org/10.13140/RG.2.2.11440.28169
7. Malik, N., & Tripathi, S. N. (2021). Impact of artificial intelligence on industry AI led organizations. 2011. https://doi.org/10.1108/IJM-03-2021-0173
8. Bader, V. and Kaiser, S. (2019), "Algorithmic decision-making? The user interface and its role forhuman involvement in decisions supported by artificial intelligence", Organization, Vol. 26No. 5, pp. 655-672, doi: 10.1177/1350508419855714.
9. Hsieh, Y.M. and Hsieh, A.T. (2003), "Does job standardization increase job burnout?", InternationalJournal of Manpower, Vol. 24 No. 5, pp. 590-614, doi: 10.1108/01437720310491107.
10. Liu, J., Wang, Y. and Zhu, Y. (2020), "Climate for innovation and employee creativity", International Journal of Manpower, Vol. 41 No. 4, pp. 341-356, doi: 10.1108/IJM-02-2017-0030.
11. Singh, A. and Tucker, C.S. (2017), "A machine learning approach to product review disambiguation based on function, form and behavior classification", Decision Support Systems, Vol. 87,pp. 81-91, doi: 10.1016/j.dss.2017.03.007.

12. Sun, T. (2019), “Applying deep learning to audit procedures: an illustrative framework”, Accounting Horizons, Vol. 33 No. 3, pp. 89-109, doi: 10.2308/acch-52455.

13. Wang, J., Wei, G., Lu, J., Alsaadi, F.E., Hayat, T., Wei, C. and Zhang, Y. (2019), “Some qrung orthopair fuzzy Hamy mean operators in multiple attribute decision-making and their application to enterprise resource planning systems selection”, International Journal of Intelligent Systems, Vol. 34 No. 10, pp. 2429-2458, doi: 10.1002/int.22155.

14. Grover, P., Kar, A.K. and Dwivedi, Y.K. (2020), “Understanding artificial intelligence adoption in operations management: insights from the review of academic literature and social media discussions”, Annals of Operations Research, Vol. 289 No. 1, pp. 1-37, doi: 10.1007/s10479-020- 03683-9.

15. Gupta, S., Modgil, S., Gunasekaran, A. and Bag, S. (2020), “Dynamic capabilities and institutional theories for Industry 4.0 and digital supply chain”, Supply Chain Forum: An International Journal, Vol. 21 No. 3, pp. 139-157, doi: 10.1080/16258312.2020.1757369.

16. Bag, S., Pretorius, J.H.C., Gupta, S. and Dwivedi, Y.K. (2021), “Role of institutional pressures and resources in the adoption of big data analytics powered artificial intelligence, sustainable manufacturing practices and circular economy capabilities”, Technological Forecasting and Social Change, Vol. 163 No. 120420, doi: 10.1016/j.techfore.2020.120420.

17. Muggy, L. and Stamm, J.L.H. (2020), “Decentralized beneficiary behavior in humanitarian supplychains: models, performance bounds, and coordination mechanisms”, Annals of Operations Research, Vol. 284 No. 1, pp. 333-365.

18. Eriksson, T., Bigi, A. and Bonera, M. (2020), “Think with me, or think for me? On the future role of artificial intelligence in marketing strategy formulation”, The TQM Journal, Vol. 32 No. 4, pp. 795-814, doi: 10.1108/TQM-12-2019-0303.

19. Jarrahi, M.H. (2018), “Artificial intelligence and the future of work: human-AI symbiosis in organizational decision making”, Business Horizons, Vol. 61 No. 4, pp. 577-586, doi: 10.1016/j. bushor.2018.03.007.

20. Evans, P. (2019), “Making an HRD domain: identity work in an online professional community”, Human Resource Development International, Vol. 22 No. 2, pp. 116-139.

21. Syam, N. and Sharma, A. (2018), “Waiting for a sales renaissance in the fourth industrial revolution: machine learning and artificial intelligence in sales research and practice”, Industrial Marketing Management, Vol. 69, pp. 135-146, doi: 10.1016/j.indmarman.2017.12.019.

22. Panch, T., Szolovits, P. and Atun, R. (2018), "Artificial intelligence, machine learning and health systems", Journal of Global Health, Vol. 8 No. 2, pp. 1-8, doi: 10.7189/jogh.08.020303.

23. Dogru, A.K. and Keskin, B.B. (2020), "AI in operations management: applications, challenges and opportunities", Journal of Data, Information and Management, Vol. 2, pp. 67-74, doi: 10.1007/ s42488-020-00023-1.

24. Kaur, S., & Sharma, R. (2020). Emotion AI: Integrating Emotional Intelligence with Artificial Intelligence in the Digital Workplace. Innovations in Information and Communication Technologies (IICT-2020), 337–343.

25. Ozkiziltan, D., & Hassel, A. (2021). Artificial Intelligence at Work: An Overview of the Literature. Researchgate.

26. Wassan S. et al, (2021). How Artificial Intelligence Transform the Experience of Employees. Turkish Journal of Computer and mathematics Education. Doi: 10.17762/turcomat.v12i10.5603.

27. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4085815 retrieved on 23 march 22, 10:14 pm

28. https://www.verywellmind.com/utilizing-emotional-intelligence-in-the-workplace-4164713

29. https://www.ottawa.edu/online-and-evening/blog/october-2020/the-importance-ofemotional-intelligence-in-the-workplace

30. https://positivepsychology.com/emotional-intelligence-workplace/

31. https://www.irmi.com/articles/expert-commentary/emotional-intelligence-in-the-workplace

32. https://www.capgemini.com/gb-en/wp-content/uploads/sites/3/2019/10/Digital-Report- %E2%80%93-Emotional-Intelligence.pdf

ASSESSING INDIA'S PROGRESS TOWARDS SUSTAINABLE DEVELOPMENT GOALS (SDGS): A COMPREHENSIVE REVIEW

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ABSTRACT
Purpose: India has embraced the Sustainable Development Goals, which act as a guide for sustainable development. Using the SDG Index created by NITI Aayog, the article examines the SDGs' achievement at the national and sub-national levels. India's progress towards achieving Sustainable Development Goals, and the challenges they present are the main topics of this research study.

Design/Methodology/Approach: SDG Index scores are used to analyze the performance of India and its States in this paper. Goal-wise Index scores are taken as comparable data for comprehensive quantitative analysis.

Findings: Kerala and Chandigarh secured top ranks with an overall score of 75 and 79 respectively for States and UTs.

Practical Implications: Sustainable development is a major issue as environmentally responsible economic growth necessitates a total overhaul of the existing economic production systems. This study is also an effort to understand the India' progress on SDGs and challenges faced in implementation.

Originality/Value: The aim is to assess India's progress towards Sustainable Development Goals (SDGs) for social, economic, and environmental development.

Keywords: Goals, Targets, Indicators, Sustainable Development Goals (SDGs), SDG Index.

INTRODUCTION
Sustainable Development Goals (SDGs) are a group of 17 goals that are agreed upon by 193 UN members at the historic summit that took place in New York on September 25, 2015. Sustainable Development Goals (SDGs) came into effect on January 1, 2016. They are expected to encourage developmental actions in areas of critical importance, including achieving gender equality, ending poverty and hunger, providing healthy lives and quality education, promoting sustainable economic growth, reducing inequality, and providing modern energy until 2030. Sustainable Development Goals (SDGs), sometimes referred to as the 2030 Agenda for Sustainable Development, are intended to improve people's lives and standard of living worldwide.

The 17 SDGs, which are divided into 169 targets, are equally distributed and balanced across the three aspects of sustainable development. There are 6 goals that are primarily social (Goals 1 through 6), 5 goals that are economic (Goals 7 through 11), and 4 goals that are environmental (Goals 12 through 15). Development facilitators are addressed under a different goal (Goal-16) on peaceful societies and efficient institutions. A stand-alone goal (Goal-17) on global partnership has been added to give developing nations structural, technological, and financial help.

It is commonly known that India's progress in achieving the SDGs will have a major impact on how well the 2030 Agenda is implemented worldwide. It is due to the robustness and tenacity of the Indian economy in addition to the country's enormous population. Furthermore, India has become a worldwide leader in the agenda for international climate action. It is a good idea to assess the nation's current standing regarding SDGs after eight years of the ambitious agenda's implementation.

The SDGs have been implemented nationally under the direction of the NITI Aayog. The NITI Aayog has mapped all SDGs, Central Ministries, and Centrally Sponsored Schemes as part of this implementation process. Additionally, it is conducting discussions with other stakeholders, including States and Union Territories, at the national and regional levels. It has classified the States and Union Territories as Achievers, Front Runners, Performers, and Aspirants based on their performance. The SDG India Index 2020-21 released by NITI Aayog has served as the basis for an attempt to represent the goal-wise progress profile of India.

One of the main organizations involved in putting the SDGs into practice is the Ministry of Statistics and Programme Implementation (MoSPI). MoSPI has created 284 national indicators in accordance with the 169 SDG targets and Global Indicators Framework as indicators are essential for gauging the degree and pace of target and goal attainment in India.

REVIEW OF LITERATURE

Jimmy (2023) tried to understand the challenges encountered by India in achieving Sustainable development goals and offered suggestions to overcome them.

Singh and Pandey (2023) organized the existing empirical research on the Sustainable Development Goals (SDGs) in India, to pinpoint the areas of research that have not gotten enough attention, and to create a bridge to close the knowledge gap in their research paper.

Kumar and Anand (2023) analyzed indicator-wise, target-wise and Goal-wise gaps from the target to be covered during the remaining period of SDG implementation at the national level, broadly on the OECD methodology.

Dua et al. (2021) analyzed the achievement of SDGs at the global level, national level (India) and state levels using the SDG Index developed by Sachs et al, 2018 and NITI Aayog, 2021 and found that the progress towards achieving the SDGs has either slowed, halted, or reversed in recent years.

Bangera (2020) focussed on the need for Sustainable Development Goals, progress that India has achieved in meeting the Sustainable Development Goals as well as the associated challenges.

Bhanja and Roychowdhury (2020) analyzed the present status of India's primary targets of SDGs with the help of a composite index. A cluster analysis was also performed to examine the region-specific and issue-specific problems of sustainable development in India.

Khalid et al. (2020) discussed key issues raised by developing countries with respect to the SDGs. Using opinion of experts on SDGs regarding its implications and future, a case study for India is presented. The study with its findings and policy recommendations intended to benefit SDG implementation efforts and planning at the national and sub-national level in India and other developing countries, helping them redesign and investigate their national SDG implementation strategies on similar lines as India to improve its reach and effectiveness.

RESEARCH OBJECTIVES

To determine the progress in achievement of Sustainable Development Goals by India.

To summarize challenges in achieving Sustainable Development Goals by India.

RESEARCH METHODOLOGY

The data related to study is retrieved from the websites of NITI Aayog. NITI Aayog has published SDG India Index: Baseline Report 2018 (December 2018), Localizing SDGs: Early Lessons from India, 2019 (July 2019), SDG India Index 2019-20 (November 2019), and SDG India Index 2020-21: Partnerships in the Decade of Action (March 2021). The United Nations has published Sustainable Development Report 2023 Implementing the SDG Stimulus. Data from these reports is used in this study.

LIMITATIONS OF THE STUDY

Reliance on secondary sources of data only.

PROGRESS PROFILE OF INDIA

Since the SDGs were adopted in September 2015, India has shown a strong commitment to the global objectives throughout the previous eight years. The success of the SDGs' implementation in India would greatly impact the goals' worldwide success. India's efforts to electrify rural homes, guarantee that girls attend and remain in school, offer housing and sanitation for everyone, provide young people the skills they need to compete in the global labour market, make money and financial services accessible, and other initiatives all demonstrate their dedication. India has also made significant progress in tracking program progress against goals and using data to inform effective planning. The accomplishment of the SDGs is directly and significantly impacted by these activities. They act as role models for other emerging nations facing comparable difficulties. SDG localization has been given top priority

because the nation's ambitious development strategy is implemented by the States and Union Territories (UTs).

Sustainable Development Goals India Index 3.0, developed by NITI Aayog, is built using 115 indicators and includes 70 targets spread over 16 goals barring Goal 17, which is qualitative in nature since its emphasis is on global partnership. According to the attainment of their goals, states and UTs are ranked on this index. Based on the success in reaching the goals and corresponding targets, a composite score has been calculated. The arithmetic mean of the individual goal scores was used to aggregate each State's or UT's performance throughout the goals and get the composite score.

India's composite score went from 57 in 2018-19 to 66 in 2020-21, an improvement. This suggests that generally, the nation has made progress in accomplishing the SDGs. India has scored between 65 and 99 in nine goals-SDG 3 (Good Health and Well-being), SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), SDG 10 (Reduced Inequalities), SDG 11 (Sustainable Cities and Communities), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), SDG 15 (Life on Land), and SDG 16 (Peace, Justice, and Strong Institutions). SDG 7 (Affordable and Clean Energy) has yielded the highest level of success, with SDG 6 (Clean Water and Sanitation) coming in second.

Special focus is needed for two goals, SDG 2 (Zero Hunger) and SDG 5 (Gender Equality), as the nation's total score is less than 50. In contrast to 2019-20, nine states in Goal 2 and twelve in Goal 5 left the aspirant category in 2020-21.

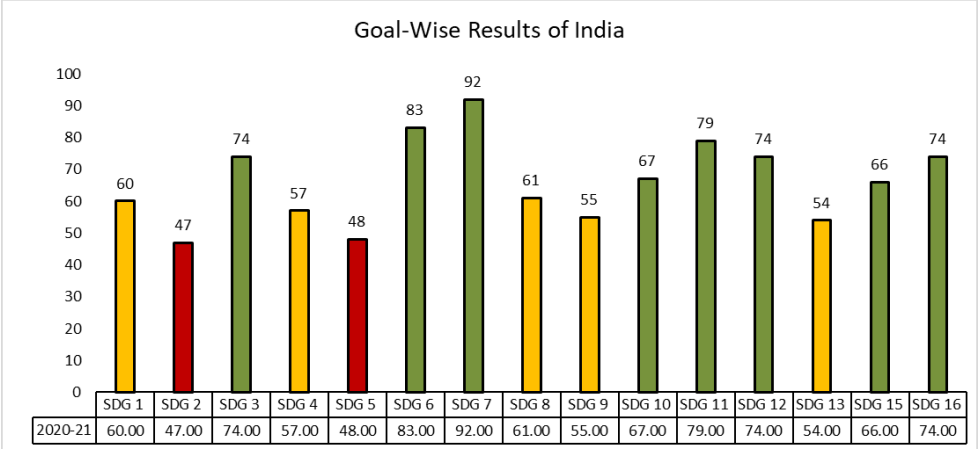
The overall score for the remaining five goals, except for SDG 14 (Life below Water, which only applies to nine coastal states) and SDG 17 (Partnerships for the Goals), which is qualitatively analyzed, is between 50 and 64, including both, suggesting room for considerable improvement in the years to come. Table 1 gives the status of India’s progress in achieving SDGs.

Table 1 India’s Progress in Achieving SDGs

SDG India Index	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 15	SDG 16	Composite Score
2020-21	60	47	74	57	48	83	92	61	55	67	79	74	54	66	74	66
2019-20	50	35	61	58	42	88	70	64	65	64	53	55	60	66	72	60
2018-19	54	48	52	58	36	63	51	65	44	71	39	-	-	90	71	57

Source: NITI Aayog Report on SDG India Index 2018-19, 2019-20 and 2020-21

Figure 1: Goal wise Results of India.



Source: NITI Aayog Report on SDG India Index 2020-21: Partnerships in the Decade of Action (March 2021)

PROGRESS PROFILE OF STATES

The composite score, which ranges from 0 to 100, represents the State's or UT's overall success in meeting the targets listed under the goals. A State or UT with a score of 100 indicates that it has met the 2030 targets; a State or UT with a score of 0 indicates that it is at the bottom of the table. The Union Territories (UTs) perform between 62 and 79, whereas the States perform between 52 and 75. The States and the UTs have been classified as achievers, performers, front runners, and aspirants based on their respective performances. Kerala and Himachal Pradesh, with scores of 75 and 74, respectively, are the top two states. Chandigarh has the highest score (79) of all the UTs. Table 2 gives the categorization of States and Union Territories as achievers, performers, front runners, and aspirants.

Table 2 Categorization of States and Union Territories as Achievers, Performers, Front Runners, and Aspirants

Sl. No.	Score Range	Category	States and UTs (shown in alphabetical order)
1	100	Achiever	
2	65-99	Front Runner	Andaman and Nicobar Islands, Andhra Pradesh, Chandigarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Ladakh, Lakshadweep, Maharashtra, Mizoram, Puducherry, Punjab, Sikkim, Tamil Nadu, Telangana, Tripura, Uttarakhand
3	50-64	Performer	Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Dadra and Nagar Haveli,

			Daman and Diu, Jharkhand, Madhya Pradesh, Manipur, Meghalaya, Nagaland, Odisha, Rajasthan, Uttar Pradesh, West Bengal
4	0-49	Aspirant	

Source: NITI Aayog Report on SDG India Index 2020-21: Partnerships in the Decade of Action (March 2021)

Twelve additional States/UTs fall into the category of Front Runners in 2020-21, compared to the 10 that did so in 2019-20 (scores in the range 65-99, including both). Gujarat, Maharashtra, Mizoram, Punjab, Haryana, Uttarakhand, and Tripura advanced to the Front Runners (scores) category between 65 and 99 (both included).

SDG 6 has the most Front Runners with 25 States, while SDG 5 and SDG 9 have the most Aspirants, 14 states in all.

The country score has shifted from the Performer category to the Front Runner category for SDG 3, SDG 10, SDG 11, and SDG 12. Among them, Goal 11 has experienced the greatest change between 53 in 2019–20 and 79 in 2020–21.

Below is a comprehensive Table 3 that includes scores for each of the 15 SDGs, as well as the national score and goal.

Table 3 SDG Scores of States and Union Territories

States	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 15	SDG 16	Composite Score 2020-21
Kerala	83	80	72	80	63	89	100	62	60	69	75	65	69	77	80	75
Himachal Pradesh	80	52	78	74	62	85	100	78	61	78	79	77	62	68	73	74
Tamil Nadu	86	66	81	69	59	87	100	71	71	74	79	78	61	63	71	74
Andhra Pradesh	81	52	77	50	58	92	100	67	52	74	78	84	63	69	77	72
Goa	83	78	72	71	55	100	100	76	68	75	89	47	44	59	63	72
Karnataka	68	53	78	64	57	85	100	66	64	67	78	89	62	67	76	72
Uttarakhand	74	61	77	70	46	85	100	63	56	77	76	82	60	64	86	72
Sikkim	80	69	62	58	58	89	100	71	52	61	85	76	65	73	72	71
Maharashtra	66	44	83	64	51	90	100	62	66	71	87	82	58	52	69	70
Gujarat	66	46	86	52	49	93	94	64	72	64	87	50	67	61	82	69
Telangana	68	50	67	63	41	96	100	73	59	67	76	73	43	81	71	69
Mizoram	80	72	79	60	54	85	100	51	32	64	61	87	66	48	81	68
Punjab	69	73	77	60	45	66	100	57	69	68	91	71	51	48	76	68
Haryana	69	58	72	64	43	80	100	59	66	68	81	77	51	48	71	67
Tripura	82	52	67	42	39	82	83	57	35	85	67	99	41	69	80	65
Manipur	60	64	68	63	41	87	96	36	35	70	65	89	57	60	69	64
Madhya Pradesh	44	43	62	45	55	88	86	60	37	51	81	78	49	84	66	62
West Bengal	59	46	76	54	41	81	98	57	53	71	45	79	39	53	81	62
Chhattisgarh	49	37	60	55	64	89	78	64	36	72	78	64	38	65	71	61
Nagaland	73	64	61	39	48	87	69	48	30	46	48	91	69	63	79	61
Odisha	41	42	67	45	46	86	80	48	46	66	70	73	70	83	59	61
Arunachal Pradesh	54	66	64	41	37	67	85	50	31	69	39	77	58	93	64	60
Meghalaya	77	37	70	48	51	75	50	63	25	88	51	73	62	64	72	60
Rajasthan	63	53	70	60	39	54	100	57	45	45	81	74	49	43	73	60
Uttar Pradesh	44	41	60	51	50	83	100	53	42	41	77	79	39	61	79	60
Assam	51	41	59	43	25	64	98	50	39	65	55	66	53	78	62	57
Jharkhand	36	19	74	45	51	83	77	54	37	65	71	55	25	71	70	56
Bihar	32	31	66	29	48	91	78	50	24	48	67	59	16	62	73	52
Chandigarh	75	97	74	79	58	99	100	70	45	100	98	78	61	85	73	79
Delhi	81	63	90	75	33	61	100	65	66	72	65	50	55	81	62	68
Lakshadweep	61	74	78	62	58	100	83	62	40	75	56	63	68	67	77	68
Puducherry	75	59	70	70	66	91	98	68	59	62	76	66	23	50	86	68
Andaman and Nicobar Islands	71	45	68	57	68	87	100	59	23	67	85	73	77	72	46	67
Jammu and Kashmir	69	71	70	49	46	88	100	47	42	65	57	95	63	52	74	66
Ladakh	79	71	70	49	46	84	100	59	48	65	57	95	66	27	74	66
Dadra and Nagar Haveli & Daman and Diu	65	27	80	56	53	95	71	57	47	66	89	62	18	62	75	62

Source: NITI Aayog Report on SDG India Index 2020-21: Partnerships in the Decade of Action (March 2021)

REVIEW OF SDGS IN INDIA

Progress towards SDG 1

Tracking progress toward eradicating poverty (SDG 1) has been difficult due to data shortages on several important variables, making quantifying the effects of COVID-

19 on the poor problematic, especially as the nature of poverty changes, particularly in cities.

Six national level indicators have been chosen to assess India's progress towards the Goal of No Poverty. These indicators cover four of the seven SDG targets for 2030 that are defined under this Goal. The six national indicators are - (i) Poverty Rate; (ii) Headcount Ratio of Poverty (iii) Health Insurance Coverage; (iv) Persons Provided Employment (MGNREG Act); (v) Maternity Benefits; and (vi) Households Living in Katcha Houses. For SDG 1 on poverty, India's SDG Index Score is 60; for States, it is from 32 to 86, and for UTs, it is between 61 and 81. The highest-performing States and Union Territories, respectively, are Tamil Nadu and Delhi.

Government of India has launched several initiatives to combat chronic poverty, provide access to essential services, offer social safety, support those who are escaping poverty, and create gainful employment. Anti-poverty initiatives such as the Deendayal Upadhyay Grameen Kaushalya Yojana, National Rural Livelihood Mission, and Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) concentrate on creating jobs, microcredit, skill development, and capacity building to improve employability among the impoverished. Pradhan Mantri Jeevan Jyoti Beema Yojana (PMJJBY), Pradhan Mantri Jeevan Suraksha Beema Yojana (PMJSBY), Ayushman Bharat, Mission Antyodaya, National Social Assistance Programmes (NSAP), National Food Security Mission, Poshan Abhiyan, Swachh Bharat Mission, Pradhan Mantri Ujjawala Yojana, Pradhan Mantri Jan Dhan Yojana (PMJDY), Pradhan Mantri Awas Yojana (PMAY), etc. are some of the other programs.

Progress towards SDG 2

Progress toward ending hunger (SDG 2) has been slower than others due to the persistence of malnutrition, wasting, and anaemia, as well as the introduction of new nutritional issues such as obesity. At the same time, the National Food Security Act of 2013 and related measures have increased resilience in the face of the present global food crisis.

Seven national level indicators have been chosen to assess India's progress towards the Goal of Zero Hunger. These indicators cover three of the eight SDG targets for 2030 that are defined under this Goal. The seven national indicators are - (i) Food Subsidy; (ii) Children Underweight (iii) Stunting (children under 5 years of age); (iv) Anaemia among Women; (v) Anaemia among Adolescents; (vi) Agricultural Productivity and (vii) Gross Value Added (GVA) in Agriculture. India's SDG Index Score for SDG 2 is 47; the scores for the States and UTs vary from 19 to 80 and 27 to 97, respectively. Kerala and Chandigarh are the highest-performing States and Union Territories, respectively.

To eradicate hunger and all types of malnutrition, India has launched a number of programs that closely match the targets listed under this heading. These initiatives include the Pradhan Mantri Matru Vandana Yojana (PMMVY), Mid-day Meal

(MDM) program, the Integrated Child Development Scheme (ICDS), Antoydaya Anna Yojana (AAY), National Nutrition Mission POSHAN Abhiyaan, etc. Several other initiatives also pertain to agriculture, including National Food Security Mission, National Mission on Sustainable Agriculture, and National Mission on Agriculture Extension and Technology, etc.

Progress towards SDG 3

Significant improvements in health and well-being (SDG 3), such as decreases in child and maternal mortality and infectious disease burden, can be combined to generate momentum for better health systems post-pandemic. This will aid in the fight against emerging issues, such as increasing noncommunicable illnesses.

Ten national level indicators have been chosen to assess India's progress towards the Goal of Good Health and Well-Being. These indicators cover eight of the thirteen SDG targets for 2030 that are defined under this Goal. The ten indicators are - (i) Maternity Mortality Rate; (ii) Under-five Mortality Rate; (iii) Immunization Coverage in Children; (iv) Tuberculosis Notification; (v) HIV Incidence; (vi) Suicide Rate; (vii) Deaths due to Road Traffic Accidents; (viii) Institutional Deliveries; (ix) Monthly Out-of-Pocket Medical Expenditure; and (x) Health Workforce. India's SDG Index Score for SDG 3 is 74; the scores for the States and UTs vary from 59 to 86 and from 68 to 90, respectively. Delhi is the top-performing UT and Gujarat is the top-performing State.

India has been making great efforts to bolster the nation's health sector and address every facet of SDG 3. The National Health Mission (NHM) and its sub-missions, the National Rural Health Mission (NRHM) and the National Urban Health Mission (NUHM), as well as Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana (PMJAY), are among the government's numerous efforts. The National Mental Health Programme (NMHP), National Programme for control of blindness, the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS), Revised National Tuberculosis Control Programme (RNTCP), National Leprosy Eradication Programme, and Integrated Disease Surveillance Programme (IDSP), are a few of the initiatives that fall under this category.

Progress towards SDG 4

The new National Education Policy 2020 (NEP 2020) has potential, but it must overcome the repercussions of learning loss and the digital gap in education (SDG 4), taking into account the long-term implications of COVID-19 lockdowns.

Eleven national level indicators have been chosen to assess India's progress towards the Goal of Quality Education. These indicators cover six of the ten SDG targets for 2030 that are defined under this Goal. The eleven indicators are - (i) Enrolment Ratio at Elementary Education; (ii) Average Annual Dropout Rate; (iii) Enrolment Ratio in Higher Secondary; (iv) Student Proficiency in Class 8; (v) Enrolment Ratio in Higher Education; (vi) Education Level among Persons with Disability; (vii) Gender Parity in

Higher Education; (viii) Literacy Levels; (ix) Infrastructure in Schools; (x) Proportion of Trained Teachers; and (xi) Pupil-Teacher Ratio. India's SDG Index Score for SDG 4 is 57; the scores for the States and UTs vary from 29 to 80 and 49 to 79, respectively. Kerala is the best-performing State, and Chandigarh is the best-performing UT.

Government of India has developed creative programs to handle the many demands and concerns, realizing the difficulties the nation's education system faces. Samagra Shiksha, Sarva Shiksha Abhiyan (SSA), Rashtriya Madhyamik Shiksha Abhiyan (RMSA), Teacher Education (TE), and so on are a few of the programs. Digital programs like Shagun, Shaala Saarthi, and Shala Kosh aid in advancing technology in the field of education.

Progress towards SDG 5

Progress towards gender equality (SDG 5) must be expedited. Discriminatory societal norms and barriers to women's involvement in society and the economy must be eliminated. The Prime Minister has advocated for a women-led development model, which has also become a key focus of India's 2023 G20 presidency.

Nine national level indicators have been chosen to assess India's progress towards the Goal of Gender Equality. These indicators cover five of the nine SDG targets for 2030 that are defined under this Goal. The nine indicators are - (i) Crime against Women; (ii) Sex Ratio; (iii) Wage Gap among Regular Employees; (iv) Domestic Violence; (v) Women in Leadership; (vi) Female Labour Force Participation; (vii) Women in Managerial Positions; (viii) Family Planning; and (ix) Operational Landholdings. India's SDG Index Score for SDG 5 is 48; the scores for the States and UTs vary from 25 to 64 and 33 to 68, respectively. In the category of best performers are the Union Territories (UTs) Andaman & Nicobar Islands and the State of Chhattisgarh.

India is dedicated to attaining gender equality in all areas of life, both via its laws and constitution. India has also started several national-level initiatives and programs to further advance efforts towards this goal, such as the One Stop Center, Sukanya Samridhi Yojana, Janani Suraksha Yojana, Gender Budgeting, Beti Bachao Beti Padhao campaign, and the Pradhan Mantri Ujjwala Yojana (PMUY), etc.

Progress towards SDG 6

Following tremendous progress over the previous five years, advances in hygiene, access to sanitation, and water supply (SDG 6) can now be sustained to strengthen basic infrastructure and promote long-term behavior change.

Eight national level indicators have been chosen to assess India's progress towards the Goal of Clean Water and Sanitation. These indicators cover five of the eight SDG targets for 2030 that are defined under this Goal. The eight indicators are - (i) Access to Piped Water Supply; (ii) Access to Improved Sources of Drinking Water; (iii) Individual Household Toilets (Rural Households); (iv) Open Defecation Free Districts; (v) Schools with Separate Toilet Facilities for Girls; (vi) Wastewater

Treatment; (vii) Groundwater Withdrawal against Availability; and (viii) Over-exploited blocks. India's SDG Index Score for SDG 6 is 83; the scores for the States and Union Territories vary from 54 to 100 and from 61 to 100, respectively. Goa is the only State with a perfect score of 100. Lakshadweep scored 100 among the UTs.

India has been implementing multi-sectoral initiatives in this field aggressively. Among the significant initiatives are the Swachh Bharat Mission-Gramin, National Water Quality Sub-Mission, National Rural Drinking Water Programme (NRWDP), and others.

Progress towards SDG 7

India has taken hopeful strides toward its energy transition (SDG 7), particularly in growing renewable energy generating capacity, although it still relies heavily on fossil fuels for a significant portion of its energy mix. Lowering capital costs and expediting net-zero objectives may ensure India's fair transition to sustainable and clean energy.

Two national level indicators have been chosen to assess India's progress towards the Goal of Affordable and Clean Energy. These indicators cover one of the five SDG targets for 2030 that are defined under this Goal. The two indicators are - (i) Household electrification; and (ii) Clean Cooking Fuel (LPG+PNG coverage). India's SDG Index Score for SDG 7 is 92; the score for States is between 50 and 100, while for UTs it is between 71 and 100. Among the States, the states that achieved this goal were Goa, Telangana, Andhra Pradesh, Maharashtra, Kerala, Sikkim, Tamil Nadu, Himachal Pradesh, Karnataka, Mizoram, Uttarakhand, Uttar Pradesh, Haryana, Punjab, and Rajasthan. With a score of 100, Ladakh, Delhi, Jammu and Kashmir, Chandigarh, and the Andaman & Nicobar Islands rank highest among the Union Territories.

India wants to attain the dual goals of inexpensive and clean energy by giving everyone access to electricity at a reasonable cost. National Energy Policy and National Electricity Plan are already in effect. Pradhan Mantri Sahaj Bijli Har Ghar Yojana- Saubhagya, National Biogas and Manure Management Programme, Dedicated Green Energy Corridor, National Solar Mission, LPG subsidy (under PAHAL), Deen Dayal Upadhyaya Gram Jyoti Yojana, Pradhan Mantri Ujjwala Yojana, UJALA, and other programs have been introduced by Government of India.

Progress towards SDG 8

Challenges to overcome include high informality in labour and business, skill mismatches, and unemployment. Efforts to increase female workforce participation and improve data gathering methods show potential for major steps ahead.

Nine national level indicators have been chosen to assess India's progress towards the Goal of Decent Work and Economic Growth. These indicators cover five of the twelve SDG targets for 2030 that are defined under this Goal. The nine indicators are - (i) Per Capita GDP Growth Rate; (ii) Ease of Doing Business; (iii) Unemployment Rate; (iv) Labour Force Participation Rate (LFPR); (v) Coverage of Social Security

Benefits; (vi) Households with a Bank Account; (vii) Banking Outlets; (viii) Automated Teller Machines; and (ix) Women Account Holders under PMJDY. India's SDG Index Score for SDG 8 is 61; the scores for the States and UTs vary from 36 to 78 and 47 to 70, respectively. Himachal Pradesh is the best-performing state among the States, and Chandigarh is the best-performing UT.

India aims to have every citizen, male or female, including those with impairments, employed decently and contributing to the national GDP by the year 2030. To achieve this target, the government has launched several initiatives aimed at improving skill development, creating jobs, and speeding up economic growth for the general public. Among the initiatives are the Pradhan Mantri Kaushal Vikas Yojana, Start-up India, Skill India, and Prime Minister's Employment Generation Programme (PMEGP).

Progress towards SDG 9

The development of India's industry, infrastructure, and innovation (SDG 9) remains a critical opportunity for leveraging the country's significant capabilities in advanced production and frontier technologies to capitalize on new opportunities from the "fourth industrial revolution," consistent with the Government of India's stated goal of "Make in India."

Seven national level indicators have been chosen to assess India's progress towards the Goal of Industry, Innovation, and Infrastructure. These indicators cover four of the eight SDG targets for 2030 that are defined under this Goal. The seven indicators are - (i) Road Connectivity; (ii) Value Addition by Manufacturing Sector; (iii) Employment in the Manufacturing Sector; (iv) Innovation Score; (v) Logistics Ease; (vi) Internet Density; and (vii) Mobile Tele-Density. Territories vary from 24 to 72 and 23 to 66, respectively. Delhi leads the UTs while Gujarat leads the States in terms of performance.

Government of India is implementing many programs, such Bharatmala, Sagarmala, and the Pradhan Mantri Gram Sadak Yojana (PMGSY), to stimulate the infrastructure industry. Regarding innovation and industrial growth, there are flagship initiatives like Digital India, Make in India etc.

Progress towards SDG 10

Reducing India’s inequalities (SDG 10) can serve as a catalyst for future growth. The CCA particularly recognized gender inequality as one of the barriers to SDG achievement. Overcoming barriers to women's economic engagement is critical to achieving India's demographic dividend during the Amrit Kaal phase.

Seven national level indicators have been chosen to assess India's progress towards the Goal of Reduced Inequalities. These indicators cover three of the ten SDG targets for 2030 that are defined under this Goal. These seven indicators are - (i) Income Inequality; (ii) Political Inclusion (Lok Sabha); (iii) Political Inclusion (Panchayati Raj Institutions); (iv) Representation of Scheduled Caste/Scheduled Tribes in State Legislative Assemblies; (v) Transgender Labour Force Participation; (vi) Crimes against Scheduled Castes; and (vii) Crimes against Scheduled Tribes. India's SDG

Index Score for SDG 10 is 67; the scores for the States vary from 41 to 88 and the UTs from 62 to 100. Meghalaya leads the States, while Chandigarh leads the UTs, both with a perfect score of 100.

Reducing inequality is the goal of several government programs, both directly and indirectly. These include Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Pradhan Mantri Jan Dhan Yojana (PMJDY), Prime Minister Employment Generation Programme (PMEGP), Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY), Stand-Up India Scheme, etc.

Progress towards SDG 11

Continued fast urbanization (SDG 11) has raised awareness of spatial inequities and prompted policymakers to focus on a variety of rural-urban links and possibilities, including smart and inclusive cities. Improved climate resilience, adaptation, and catastrophe risk reduction are top goals.

Eight national level indicators have been chosen to assess India's progress towards the Goal of Sustainable Cities and Communities. These indicators cover three of the ten SDG targets for 2030 that are defined under this Goal. These eight indicators are - (i) Urban Households in Katcha Houses; (ii) Persons Killed in Road Accidents; (iii) Door-to-door Waste Collection; (iv) Individual Household Toilets (Urban Households); (v) Municipal Solid Waste Processed; (vi) Wards with 100 Percent Source Segregation; (vii) Installed Sewage Treatment Capacity; and (viii) Urban Households with Drainage Facility. India's SDG Index Score for SDG 11 is 79; the scores for States and UTs vary from 39 to 91 and 56 to 98, respectively. Punjab is the best-performing State, and Chandigarh is the best-performing UT.

The government has developed several programs and tactics to meet the targets outlined in SDG 11. These include the Smart Cities Mission, Pradhan Mantri Awas Yojana for Urban Development, and Atal Mission for Rejuvenation and Urban Transformation (AMRUT).

Progress towards SDG 12

Policies to decrease the use of plastic bags and enhance awareness of responsible consumption and production (SDG 12) options are already being implemented. However, there is more that can be done to increase the efficiency of productive activities other than climate-smart agriculture and renewable energy generation. The India-led global project Lifestyles for the Environment project (LiFE) also provides a unique chance to link India's 1.4 billion people's consumption choices and behaviors with sustainability concepts and goals.

Seven national level indicators have been chosen to assess India's progress towards the Goal of Responsible Consumption and Production. These indicators cover four of the eleven SDG targets for 2030 that are defined under this Goal. These seven indicators are - (i) Fossil Fuel Consumption; (ii) Use of Nitrogenous Fertilizer out of NPK; (iii) Hazardous Waste Generation; (iv) Hazardous Waste Recycled/Utilized; (v) Plastic Waste Generation; (vi) Biomedical Waste Treated; and (vii) Grid interactive

bio-power. India's SDG Index Score for SDG 12 is 74; the scores for States and UTs vary from 47 to 99 and 50 to 95, respectively. Tripura is the highest-performing state among the UTs, followed by Ladakh and Jammu & Kashmir among the States.

With just 2.4 percent of the globe's land area, India, the most populated country in the world, is home to around 17.5% of all people on the planet. Because of this, a thorough legislative framework is required to achieve resource efficiency, lower waste, and pollution levels, and promote the use of technologies that emphasize renewable resources.

Progress towards SDG 13

India pledged significant incremental climate action (SDG 13) goals at both COP26 and COP27. At the international level, India has advocated for climate justice in global forums, highlighting the need to invest in both adaptation and mitigation, as well as compensatory damages.

Five national level indicators have been chosen to assess India's progress towards the Goal of Climate Action. These indicators cover two of the five SDG targets for 2030 that are defined under this Goal. These five indicators are - (i) Fatality due to Extreme Weather Events; (ii) Disaster Preparedness; (iii) Share of Renewable Energy; (iv) CO2 Saving; and (v) Air Pollution. India's SDG Index Score for SDG 13 is 54; the scores for States and UTs vary from 18 to 77 and from 6 to 64, respectively. Odisha leads the States in performance, while the Andaman and Nicobar Islands lead the Union Territories.

India has a wide range of temperature regimes, local and regional weather patterns, and vast geographic diversity, all of which are susceptible to climate change. This is demonstrated by droughts, floods, and the possibility of cyclones and tsunamis in coastal areas.

Progress towards SDG 14

Coastal and nearshore marine wetlands along India's lengthy coastline are classified as sensitive resources. India's proposed National Policy on the Blue Economy (2022) connects responsible and sustainable use of marine resources to SDG 14 ('life below water'). However, plastic and marine trash continue to pose a difficulty.

Five national level indicators have been chosen to assess India's progress towards the Goal of Life below Water. These indicators cover four of the ten SDG targets for 2030 that are defined under this Goal. These four indicators are - (i) Shore Zone Water Quality (BOD/TN); (ii) Mangrove Cover; (iii) Shore Zone pH Level; and (iv) Aquaculture Potential. The nine coastal states' respective SDG Index Scores for Goal 14 range from 11 to 82. Orissa and Andhra Pradesh are classified as Front Runners (scores ranging from 65 to 99, encompassing both), whilst Tamil Nadu is classified as an Aspirant state (score below 50). The six coastal states that remain fall into the Performer category, with scores ranging from 50 to 64, encompassing both.

Countries are obligated under SDG 14 to preserve and responsibly utilize the oceans, seas, and marine resources. To promote marine health, it focuses on reducing marine

pollution, stopping destructive and illegal fishing, managing marine and coastal ecosystems sustainably, and transferring marine technologies and scientific information. India has made several efforts to improve and preserve the marine and coastal environment.

Progress towards SDG 15

Forest ecosystems (SDG 15) will be a key focus of efforts in the nation, with promises to rehabilitate nearly 26 million hectares of degraded land by 2030.

Six national level indicators have been chosen to assess India's progress towards the Goal of Life on Land. These indicators cover four of the twelve SDG targets for 2030 that are defined under this Goal. The six indicators are - (i) Forest Cover; (ii) Tree Cover; (iii) Area Covered under Afforestation Schemes; (iv) Land Degradation; (v) Desertification; and (vi) Wildlife Crime Cases. India's SDG Index Score for SDG 15 is 66; scores for States and Union Territories (UTs) vary from 43 to 93 and 27 to 85, respectively. Arunachal Pradesh leads the States in performance, while Chandigarh leads the Union Territories.

National Environment Policy of 2006 and the National Agro-forestry Policy of 2014, National Afforestation Programme, Integrated Development of Wildlife Habitats Programme, the Programme on Conservation of Natural Resources and Eco-systems, and other policies are just a few of the steps Government of India has taken to meet the targets outlined in SDG 15.

Progress towards SDG 16

In recent years, India has taken significant measures to combat trafficking, anti-national violence, narcotics, and criminal activity. At the same time, there are places for improvement. The conclusions of India's fourth Universal Periodic Review on Human Rights provide critical recommendations for moving forward.

Eight national level indicators have been chosen to assess India's progress towards the Goal of Peace, Justice, and Strong Institutions. These indicators cover five of the twelve SDG targets for 2030 that are defined under this Goal. The eight indicators are - (i) Murders Reported; (ii) Cognizable Crimes Against Children; (iii) Human trafficking; (iv) Missing Children; (v) Court Density; (vi) Corruption Crimes; (vii) Births Registered; and (viii) Aadhaar Coverage. India has an SDG Index Score of 74 for SDG 16, with scores ranging from 59 to 86 for States and 46 to 86 for Union Territories. With a combined score of 86, Uttarakhand and Puducherry rank first among the States and UTs, respectively.

India wants open and responsible institutions at all levels to promote an atmosphere of justice, peace, and good governance. India has taken several steps to meet its goals. India's robust legal framework, which is founded on rights, empowers its people. By granting individuals access to information from public bodies, Right to Information Act of 2005 ensures institutional accountability and openness. One of the biggest and most distinctive national identification programs in the world is the Aadhaar. These

tools have made it possible to provide services more effectively while also decreasing corruption.

Progress towards SDG 17

According to informal estimates, half of India's yearly SDG financing deficit of over $500 billion would require extra resources from the private sector, domestic resources, or traditional development finance sources. India has a critical role to play in mobilizing all necessary partners to implement the SDGs and pushing for a strong international enabling environment for sustainable development.

SDG 17 aims at strengthening the means of implementation and revitalizing the global partnership for sustainable development. It primarily focuses on the enabling factors to support successful implementation and achievement of SDGs such as - financing for development, access to technology, capacity-building measures, trade as a facilitator of global growth, institutional coherence and policy convergence, involvement of multi-stakeholders and forging partnerships, and ensuring accountability by regular monitoring.

INDIA'S PROGRESS WITH OTHER COUNTRIES IN G20

The Group of Twenty (G20) comprises 19 countries (Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Türkiye, United Kingdom, and United States) and the European Union. The G20 members represent around 85% of the global GDP, over 75% of global trade, and about two-thirds of the world population.

As per UN Sustainable Development Report 2023, India is ranked 112 out of 166 countries on the SDG Index, with a score of 63.4. India is on track or maintaining SDG achievement in SDG 1 and SDG 12. Its progress is moderately improving in SDGs 3, 4, 5, 6, 7, 8, 9, 14 and 17. Its progress is stagnant in SDGs 2, 11, 13, and 16. Its performance has decreased in SDGs 10 and 15.

Country	Score	Ranking
Argentina	73.7	51
Australia	75.9	40
Brazil	73.7	50
Canada	78.5	26
China	72.0	63
France	82.0	6
Germany	83.4	4
India	63.4	112
Indonesia	70.2	75
Italy	78.8	24
Japan	79.4	21
Republic of Korea	78.1	31
Mexico	69.7	80

Russia	73.8	49
Saudi Arabia	67.7	94
South Africa	64.0	110
Türkiye	70.8	72
United Kingdom	81.7	11
United States	75.9	39

Source: Sustainable Development Report 2023 Implementing the SDG Stimulus

Challenges and Barriers in achieving Sustainable Development Goals by India

India has several obstacles in achieving the SDGs. One of the main issues is the inadequate infrastructure, which hinders progress. Even while the financial markets are thriving, they are still underdeveloped, particularly in terms of the debt market, which makes borrowing money for infrastructure challenging and completely dependent on the banking industry. The NPA problem that has beset the Indian banking industry has caused a credit shortage for the private sector. Due to little R&D and insufficient innovation, India is falling behind other countries in adopting and adjusting to climate change-resistant agricultural techniques and environmentally friendly industries. The high rate of poverty in India, together with limited access to basic healthcare, education, and sanitary facilities, contributes to the delayed advancement of the SDGs indicators.

CONCLUSION

Several Indian states made progress across all goals. At just 47 out of 100, India gets the lowest total score for SDG 2 (Zero Hunger). Alarmingly little progress has also been made towards SDG 5 (Gender Equality). India must make considerable progress in attaining the SDGs by 2030. The 2030 deadline still has plenty of time to be met, and India may accomplish its goals with the support of creative solutions supported by the involvement of all stakeholders, including the corporate sector.

REFERENCES

- Bangera S. (2020). A Study on Progress of Sustainable Development Goals by India. Conference Paper.
- Bhanja R. and Roychowdhury K. (2020), Assessing the Progress of India towards Sustainable Development Goals by 2030. Journal of Global Resources, 6 (2) July 2020, 81-91
- Dua, P., Dhir, A., Narayan, A. and Ashita Allamraju, A. “A Holistic Approach to Achieving
- SDGs: A Case Study of Dayalbagh, India.” (2023), https://uwspace.uwaterloo.ca/handle/10012/19181.
- Government of India. (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. https://sdgs.un.org/2030agenda

- Jimmy, M. (2023). Sustainable Development Goals (SDGs) - Challenges For India. Jyotikiran Publication, 1(15)
- Khalid, A. M., Sharma, S. and Dubey, A. K. (2020). Concerns of developing countries and the sustainable development goals: case for India, International Journal of Sustainable Development & World Ecology, DOI:10.1080/13504509.2020.1795744
- Krishna Kumar, K. and Anand, P. K. (2023). Measuring the SDG Progress in India with Focus on Gap Analysis Approach. RIS Discussion Paper # 278.
- NITI Aayog (2018). SDG India index, baseline report 2018. New Delhi: NITI Aayog. https://www.niti.gov.in/sites/default/files/2020 07/SDX_Index_India_Baseline_Report_21-12-2018.pdf
- NITI Aayog (2019). SDG India Index and Dashboard 2019–20. https://sdgindiaindex.niti.gov.in/#/
- NITI Aayog (2020). SDG India Index and Dashboard 2020–21. https://sdgindiaindex.niti.gov.in/assets/Files/SDG3.0_Final_04.03.2021Web Spreads.pdf
- Singh, S. N. and Pandey, A. (2023). Accomplishing Sustainable Development Goals in India: A systematic literature review. Financial Markets, Institutions and Risks, 7(2), 80-87. http://doi.org/10.21272/fmir.7(2).80-87.2023
- Sachs, J., Lafortune, G., Fuller, G., and Eamon Drumm, E. (2023). Sustainable Development Report 2023. Dublin University Press Dublin, Ireland, 2023.
- The Government of India – United Nations Sustainable Development Cooperation Framework 2023-27 (2023)
- United Nations (2023) Sustainable Development Goals Report, United Nations Publications. https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf

ARTIFICIAL INTELLIGENCE - AN AGILE AND NEO APPROACH TO FUTURE WORK

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ABSTRACT

In today's world of technology, Artificial Intelligence (AI) is a buzz word which we could listen or witness in some or other form of it. When, AI was not used in our daily life, we used to gather information through various sources. But, now AI is helping us in doing so, and makes our life easier. This article provides an overview of AI, the market size of AI at global and India respectively, contributing factors in India, the history of AI, how it works, differences between machine learning(ML) and deep learning(DL), its advantages to enterprise, and types of AI etc. The purpose of this article is provide basic understanding of AI, so that the management or the enterprises will understand the advantages of deploying and implementing AI technology in the right time to bring right results in to the markets for the benefit of customers and also to bring competitive advantage to their own organizations to have development, growth and sustainability.

Artificial Intelligence, Market Size, Machine Learning (ML), Deep Learning (DL), Business Enterprise, Competetive advantage.

INTRODUCTION

Artificial Intelligence (AI) is currently one of the cosmetic word in tech industry and with good reason. The last few years have witnessed for several innovations and advancements that have previously been solely in the realm of science fiction slowly transform into reality.

Many experts have considered artificial intelligence as a factor of production, which has the potential to introduce new sources of growth and change the way work is done across industries. For instance, it is predicted that, AI could potentially contribute $15.7 trillion to the global economy by 2035. China and the United States are primed to benefit the most from the coming AI boom, accounting for nearly 70% of the global impact.

The artificial intelligence market size at global level was valued at USD 150.2 billion in 2023 and is expected to grow at a CAGR of 36.8% from 2023 to 2030. The revenue forecast is projected to reach $1,345.2 billion for 2030. The base year for estimation is 2022, and the historical data spans from 2023 to 2030. The Indian artificial intelligence (AI) market size was estimated at USD 672.11 million in 2022. During this forecast period between 2023 and 2029, the size of India artificial intelligence (AI) market is projected to grow at a CAGR of 32.26% reaching a value of USD 3,966.51 million by 2029.

The following are the major growth drivers for the India artificial intelligence (AI) market.

Increasing volume of data generated by businesses and growing need to extract insights from this data.

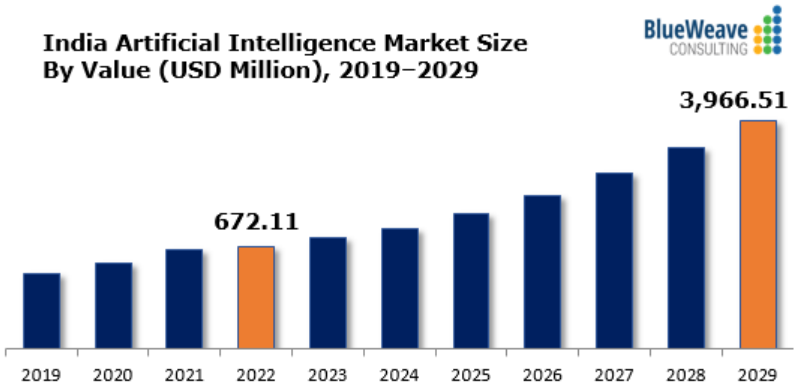
The rise of big data analytics and the internet of things (IoT).

Also, the increasing number of AI startups and high adoption of technological advancements in the country have created a favorable environment for the development of AI-based products and services.

Recognition of Indian government about the potential of AI and has launched several initiatives to promote its adoption. One such an example to quote is the government has launched the National Strategy on Artificial Intelligence (NSAI), which aims to create a vibrant AI ecosystem in India and position the country as a global leader in AI.

The government has also announced plans to develop AI-based applications in major areas, such as healthcare, agriculture, and education.

Figure: 1



Source: BlueWeave Consulting

Definitions of AI:
The following are the few definitions for AI, started with "intelligence" as it has some linkage with the rest of the definitions.

Intelligence: The word "Intelligence" can be defined as the ability to learn and perform suitable techniques to solve problems and achieve goals, appropriate to the context in an uncertain, ever-varying world. Example is a fully pre-programmed factory robot is flexible, accurate, and consistent but is not intelligent.

Artificial Intelligence (AI): The term AI has been coined by emeritus Stanford Professor John McCarthy in 1955. According to him AI is "the science and engineering of making intelligent machines". To understand it in much simpler way,

machines will behave in a clever way, like playing chess. But, today, we emphasize machines that can learn, at least somewhat like human beings do.

Artificial Intelligence is a method of making a computer, a computer-controlled robot, or a software think intelligently like the human mind. AI is accomplished by studying the patterns of the human brain and by analyzing the cognitive process. The outcome of these studies develops intelligent software and systems.

The following are the common examples of AI which we use in our day-to-day life.

Siri, Alexa and other smart assistants

Google maps

Live chatbots

Self-driving cars

Interactive video games

Wearable sensors and devices

Biosensors for medical purpose

Robotic-advisors for stock trading

History of AI:
The following table provides a comprehensive understanding of the some of the more notable developments or mile stones pertaining to AI.

Table 1

S.No	Year	Task
1	1950	Alan Turing in his seminal paper which was published in 1950 by name "Computing Machinery and Intelligence," introduced the Turing test and opening the doors to what would be known as AI.
2	1951	Marvin Minsky and Dean Edmonds together developed the first artificial neural network (ANN) called SNARC using 3,000 vacuum tubes to simulate a network of 40 neurons.
3	1952	Arthur Samuel developed Samuel Checkers-Playing Program, the world's first program to play games that was self-learning.
4	1956	John McCarthy, Marvin Minsky, Nathaniel Rochester and Claude Shannon have coined the term artificial intelligence in a proposal for a workshop widely recognized as a founding event in the AI field.
5	1958	Frank Rosenblatt an American psychologist developed the perceptron, an early ANN that could learn from data and

		became the foundation for modern neural networks. John McCarthy developed a general purpose programming language by name “Lisp”, which was quickly adopted by the AI industry and gained enormous popularity among developers.
6	1959	Arthur Samuel coined the term machine learning in a seminal paper explaining that the computer could be programmed to outplay its programmer. Oliver Selfridge published "Pandemonium: A Paradigm for Learning," a landmark contribution to machine learning that described a model that could adaptively improve itself to find patterns in events.
7	1964	Daniel Bobrow developed STUDENT, an early natural language processing (NLP) program designed to solve algebra word problems, while he was a doctoral candidate at MIT.
8	1965	Edward Feigenbaum, Bruce G. Buchanan, Joshua Lederberg and Carl Djerassi developed the first expert system,by name Dendral. It automated the decision-making process and problem-solving behavior of organic chemists. .
9	1969	Arthur Bryson and Yu-Chi Ho described a back propagation learning algorithm to enable multilayer ANNs, an advancement over the perceptron and a foundation for deep learning. Marvin Minsky and Seymour Papert published a book called Perceptrons. This described the limitations of simple neural networks and caused neural network research to decline and symbolic AI research to thrive.
10	1973	James Lighthill released the report "Artificial Intelligence: A General Survey," which caused the British government to significantly reduce support for AI research.
11	1980	Symbolics Lisp machines were commercialized, signaling an AI renaissance. Years later, the Lisp machine market was collapsed.
12	1981	Danny Hillis is an American inventor, entrepreneur, and computer scientist has designed parallel computers for AI and other computational tasks, an architecture similar to modern GPUs.
13	1984	Marvin Minsky and Roger Schank coined the term AI winter at a meeting of the Association for the Advancement of Artificial Intelligence, warning the business community that AI hype would lead to

		disappointment and the collapse of the industry, which happened three years later.
14	1985	Judea Pearl has introduced Bayesian networks causal analysis, which provides statistical techniques for representing uncertainty in computers
15	1988	Peter Brown et al. published "A Statistical Approach to Language Translation," paving the way for one of the more widely studied machine translation methods.
16	1989	Yann LeCun, Yoshua Bengio and Patrick Haffner demonstrated that, how convolutional neural networks (CNNs) can be used to recognize handwritten characters, showing that neural networks could be applied to real-world problems.
17	1997	Sepp Hochreiter and Jürgen Schmidhuber together proposed the Long Short-Term Memory recurrent neural network, which could process entire sequences of data such as speech or video. IBM's Deep Blue was a chess-playing expert system which defeated Garry Kasparov in a historic chess rematch, the first defeat of a reigning world chess champion by a computer under tournament conditions.
18	2000	University of Montreal researchers published "A Neural Probabilistic Language Model," which suggested a method to model language using feed forward neural networks.
19	2006	Fei-Fei Li started working on the ImageNet visual database, introduced in 2009, which became a catalyst for the AI boom and the basis of an annual competition for image recognition algorithms. IBM Watson originated with the initial goal of beating a human on the iconic quiz show Jeopardy! In 2011, the question-answering computer system defeated the show's all-time (human) champion, Ken Jennings.
20	2009	Rajat Raina, Anand Madhavan and Andrew Ng published "Large-Scale Deep Unsupervised Learning Using Graphics Processors," presenting the idea of using GPUs to train large neural networks.
21	2011	Jürgen Schmidhuber, Dan Claudiu Cireșan, Ueli Meier and Jonathan Masci developed the first CNN to achieve "superhuman" performance by winning the German Traffic Sign Recognition competition. Apple released Siri, a voice-powered personal assistant that can generate responses and take actions in response to voice requests

22	2012	Geoffrey Hinton, Ilya Sutskever and Alex Krizhevsky introduced a deep CNN architecture that won the ImageNet challenge and triggered the explosion of deep learning research and implementation.
23	2013	China's Tianhe-2 doubled the world's top supercomputing speed at 33.86 petaflops, retaining the title of the world's fastest system for the third consecutive time. DeepMind introduced deep reinforcement learning, a CNN that learned based on rewards and learned to play games through repetition, surpassing human expert levels. Google researcher Tomas Mikolov and colleagues introduced Word2vec to automatically identify semantic relationships between words.
24	2014	Ian Goodfellow and colleagues invented generative adversarial networks, a class of machine learning frameworks used to generate photos, transform images and create deepfakes. Diederik Kingma and Max Welling introduced variational autoencoders to generate images, videos and text. Facebook developed the deep learning facial recognition system DeepFace, which identifies human faces in digital images with near-human accuracy.
25	2016	DeepMind's AlphaGo defeated top Go player Lee Sedol in Seoul, South Korea, drawing comparisons to the Kasparov chess match with Deep Blue nearly 20 years earlier. Uber started a self-driving car pilot program in Pittsburgh for a select group of users.
26		2017 Stanford researchers published work on diffusion models in the paper "Deep Unsupervised Learning Using Nonequilibrium Thermodynamics." The technique provides a way to reverse-engineer the process of adding noise to a final image. Google researchers developed the concept of transformers in the seminal paper "Attention Is All You Need," inspiring subsequent research into tools that could automatically parse unlabeled text into large language models (LLMs). British physicist Stephen Hawking warned, "Unless we learn how to prepare for, and avoid, the potential risks, AI could be the worst event in the history of our civilization."
27	2018	Developed by IBM, Airbus and the German Aerospace Center DLR, Cimon was the first robot sent into space to assist astronauts.

		OpenAI released GPT (Generative Pre-trained Transformer), paving the way for subsequent LLMs. Groove X unveiled a home mini-robot called Lovot that could sense and affect mood changes in humans.
28	2019	Microsoft launched the Turing Natural Language Generation generative language model with 17 billion parameters. Google AI and Langone Medical Center's deep learning algorithm outperformed radiologists in detecting potential lung cancers
29	2020	The University of Oxford developed an AI test called Curial to rapidly identify COVID-19 in emergency room patients. Open AI released the GPT-3 LLM consisting of 175 billion parameters to generate humanlike text models. Nvidia announced the beta version of its Omniverse platform to create 3D models in the physical world. DeepMind's AlphaFold system won the Critical Assessment of Protein Structure Prediction protein-folding contest.
30	2021	OpenAI introduced the Dall-E multimodal AI system that can generate images from text prompts. The University of California, San Diego, created a four-legged soft robot that functioned on pressurized air instead of electronics
31	2022	Google software engineer Blake Lemoine was fired for revealing secrets of Lamda and claiming it was sentient. DeepMind unveiled AlphaTensor "for discovering novel, efficient and provably correct algorithms." Intel claimed its FakeCatcher real-time deepfake detector was 96% accurate. OpenAI released ChatGPT in November to provide a chat-based interface to its GPT-3.5 LLM.
32	2023	OpenAI announced the GPT-4 multimodal LLM that receives both text and image prompts. Elon Musk, Steve Wozniak and thousands more signatories urged a six-month pause on training "AI systems more powerful than GPT-4."

we could only begin to envision AI's continuing technological advancements and influences in the various business domains such as business processes, manufacturing, healthcare, financial services, marketing, customer experience, workforce environments, education, agriculture, law, IT systems and management, cyber security, and ground, air and space transportation at present in 2023.

According to a 2023 Gartner survey, 55% of business organizations that have deployed AI always consider AI for every new use case they're evaluating. Gartner also reported that, by 2026 organizations that "operationalize AI transparency, trust and security will see their AI models achieve a 50% improvement in terms of adoption, business goals and user acceptance."

If we consider, today's tangible developments whether they are incremental or disruptive are advancing AI's ultimate goal of achieving artificial general intelligence. Inline with these advancements, neuromorphic processing shows promise in mimicking human brain cells, enabling computer programs to work simultaneously instead of sequentially. Some other mind-boggling advancements such as issues of trust, privacy, transparency, accountability, ethics and humanity have emerged and will continue to clash and seek levels of acceptability among business and society.

How Does Artificial Intelligence (AI) Work?

The primary aim of AI, is to create a computer system which can model human behavior in such a way that it can be thus used for solving complex issues with the help of human-like thinking processes. By merging bulky sets of data AI work with intelligent processing algorithms and run through multiple tasks very quickly in very little time.

To achieve the above said aim, AI is powered with main tools such as “machine learning” and “deep learning” and performs the given tasks, almost in a similar manner to the human mind.

The foundation of AI includes two forms one is Deep learing and another is Machine learning. Deep learning is one form of machine learning, and machine learning is a subset of artificial intelligence.

Machine Learning (ML): It refers to a particular application of AI which lets computer systems or programs grasp automatically and show results based on experience. ML algorithm works on the data that was fed and uses different statistical techniques which allows AI to discover various patterns in data and thus expand the results of the task.

Deep Learning (DL): Deep learning is a form of machine learning which uses artificial neural networks to process information and thus find inferences or results. It is a specific type of machine learning which allows AI to learn and improve by processing data. To process information, find connections between the data, and come up with inferences, or results based on positive and negative reinforcement, deep Learning uses artificial neural networks which mimic biological neural networks in the human brain.

On the other hand, “Neural networks”, function like networks of neurons present in the human brain, which allows AI to process very large data sets and allows the machine to go “deep” in drawing references, making connections and weighing input for the efficient results.

AI systems require robotics, cognitive computing skills, language processing and computer vision other than ML and DL, which allows computer models to imitate the way that a human brain works while performing a complex task.

Deep Learning

Deep learning is a very important and crucial component of artificial intelligence which includes statistical data and predictive learning. Being a subdivision of machine learning deep learning uses neural networks to simulate the behavior of the human brain. The neural networks are stimulated by the function of the human brain and they are made up of large amounts of data which works in an unsupervised or semi-supervised manner.

The models based on deep learning are able to grasp directly from this fed data, thus such models become well-suited for tasks such as image recognition, speech recognition, and natural language processing.

In case of deep learning, it makes use of the labeled data to classify or to make accurate calculations, which might require some kind of human intervention i.e, to put that data correctly. Thus, deep learning can be considered as a way to automate predictive analytics. The conventional machine learning algorithms are linear and direct, where as the deep learning algorithms are set in a hierarchy of abstract representations and various concepts.

As we know that, in the human brain, nearly billions and billions of neurons are connected all together. In Artificial intelligence, the main challenge is to recreate this neuron artificially in a computer system which consists of various nodes and neurons altogether.

Differences between Deep Learning and Machine Learning: The following table clearly distinguishes the basic differences between Deep learning and Machine learning.

Deep Learning (DL)	**Machine Learning (ML)**
Works on a huge amount of data set.	Works on a limited amount of data set.
Requires high-end machines to operate	Work can be done on a low-end machine also
Solve the problem till the end solution.	Divide the tasks into subsets and solve them individually.
More complex as compared to ML	Less Complex
Requires less time and energy to test the data	Testing time can be long and elaborated.
As data increases, efficiency of output also increases.	As data increases, then output becomes consistent at a certain level of performance.
Computationally expensive to train.	Comparatively less computation cost.

ADVANTAGES OF AI

The following are the few advantages of AI

More Accuracy and Precision: The main advantage of AI is that, it is helpful in reducing human errors and thus promises a high level of accuracy and precision in the outcome. The decisions taken by AI based systems are completely based on past data or information and a certain set of algorithms. So that, the chances of getting errors can be minimized, if AI is programmed properly.

No Risks of Human Lives: With the help of AI, we can easily overcome many risks which might have fallen upon any human being by letting AI robots work for them. Similarly, AI robot, all perilous tasks can be performed via them without any direct human involvement.

For instance, AI robots can be used for diffusing a bomb, exploring the deep ocean, where machines can easily work and survive but such tasks can cause tremendous amounts of risks to human beings.

Available Round-the-clock: AI based systems can work at anytime in a day. As AI systems do not require any break and thus can work endlessly and perform multiple tasks with most accurate outcomes. AI based systems or robots can even perform tedious and redundant tasks with ease.

Serving Customers Digitally: Many of the modern companies have started using AI based digital assistants, which help them to deliver user-based content in time. Now, companies can create their own chat bots which can help them to answer all the customer queries much on time.

Unbiased Approach: Artificial intelligence does not work on the basis of emotions and sentiments, thus helps in delivering highly practical and rational decisions. A huge advantage of artificial Intelligence is that it doesn't have any biased views, which ensures more accurate decision-making.

Types of Artificial Intelligence:

Author David Peterson in his article on four main types of artificial intelligence, described how modern artificial intelligence evolved from AI systems capable of simple classification and pattern recognition tasks to systems capable of using historical data to make predictions and then decision making. The types of AI that exist today, including AI that can drive cars or defeat a world champion at the game of Go, are known as narrow or weak AI. These AI types have savant-like skill at certain tasks but lack general intelligence. The type of AI that demonstrates human-level intelligence and consciousness is still requires a progressive work.

Here are the four types of AI outlined in Peterson's article, followed by summary of their characteristics:

Reactive AI:

Algorithms used in this early type of AI lack memory and are reactive; that means, given a specific input, the output is always the same. Machine learning models using

this type of AI are effective for simple classification and pattern recognition tasks. They can consider huge chunks of data and produce a seemingly intelligent output, but they are incapable of analyzing scenarios that include imperfect information or require historical understanding which might consider as a disadvantageous in this type of AI.

Limited memory machines: The underlying algorithms in limited memory machines are based on our understanding of how the human brain works and are designed to imitate the way our neurons connect. Here, deep learning can handle complex classification tasks and use historical data to make predictions. Same time, it is also capable of completing complex tasks, such as self driving. Limited memory machines are classified as having narrow intelligence because they lag behind human intelligence in other respects despite their ability to far outdo typical human performance in certain tasks. They require huge amounts of training data to learn tasks humans learn with just a few example. They are also vulnerable to outliers or adversarial examples.

Theory of Mind

Theory of Mind AI should understand the human emotions, people, beliefs, and be able to interact socially like humans. This type of AI machines are still not developed, but researchers are making lots of efforts and improvement for developing such AI machines.

Self-aware AI:

Self-awareness AI is the future of Artificial Intelligence. These machines will be super intelligent, and will have their own consciousness, sentiments, and self-awareness.

This type of AI is not only aware of the mental state of other entities but is also aware of itself. Self-aware AI, or artificial superintelligence (ASI), is defined as a machine with intelligence on par with human general intelligence and in principle capable of far surpassing human cognition by creating ever more intelligent versions of itself. Currently, however, we don't know enough about how the human brain is organized to build an artificial one that is as, or more, intelligent in a general sense.

Conclusion and Future of AI:

There are several factors that can affect the development and implementation of artificial intelligence (AI) technology. Availability and quality of data, the computational power and resources available, the algorithms and methods used, and the goals and priorities of the individuals or organizations developing the AI are few to mention. Further, legal, ethical, and social considerations can play a role in the adoption and use of AI. For example, concerns about privacy and bias in AI systems can influence how they are designed and used.

Artificial Intelligence (AI) is a revolutionary field of computer science, which is ready to become the main component of various emerging technologies like big data, robotics, and IoT, undoubtedly, It will continue to act as a technological innovator in

the future years. In just a few years, AI has become a reality from fantasy. Machines that help humans with intelligence are not just in sci-fi movies but also in the real world. At this time, we live in a world of Artificial Intelligence that was just a story though for some years.

REFERENCES

- Holland John H. Adaptation in Natural and Artificial Systems. University of Michigan Press. ISBN 978-0- 262-58111-0. Archived from the original 1975. Retrieved 17 December 2019.
- Peritz BC, Bar-Ilan J. The sources used by bibliometrics–scientometrics as reflected in references. Scientometrics 2002;54(2):269-284.
- Serenko A, Bontis N. Global ranking of knowledge management and intellectual capital academic journals. Journal of Knowledge Management, 2009b;13(1):4-15.
- George Musser. "Artificial Imagination: How machines could learn creativity and common sense, among other human qualities", Scientific American, 2019;320:58-63
- Johnston, John. The Allure of Machinic Life: Cybernetics, Artificial Life, and the New AI, MIT Press 2008
- Rousseau S. Journal evaluation by environmental and resource economists: A survey. Scientometrics 2008;77(2):223-233.
- O'Brien, James Marakas George. Management Information Systems (10th ed.) 2011. McGrawHill/Irwin. ISBN 978-0-07-337681-3
- Lenat Douglas Guha RV. Building Large KnowledgeBased Systems. Addison-Wesley 1989. ISBN 978-0- 201-51752-1
- Poole David, Mackworth Alan. Artificial Intelligence: Foundations of Computational Agents (2nd ed.). Cambridge University Press. ISBN 978-1-107-19539-4. Archived from the original 2017. Retrieved 6 December 2017.
- https://hai.stanford.edu/sites/default/files/2020-09/AI-Definitions-HAI.pdfl
- https://www.techtarget.com/searchenterpriseai/tip/The-history-of-artificial-intelligence-Complete-AI-timeline
- https://www.forbes.com/advisor/in/business/software/what-is-ai/

DIPLOMATIC DYNAMICS: FACTORS INFLUENCING WOMEN LEADERS IN GLOBAL POLITICS AND SDGS

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ABSTRACT
This study delves into the complex network of diplomatic interactions surrounding female leaders in global politics and their impact on achieving Sustainable Development Goals (SDGs). With an increasing number of women taking on leadership roles in politics worldwide, it is crucial to comprehend the various factors influencing their diplomatic engagements and contributions to global development. The research utilizes an extensive literature review and case studies to identify pivotal factors shaping the experiences of women leaders in international relations. These factors encompass societal perceptions, cultural norms, institutional frameworks, and individual leadership styles. Through an analysis of prominent women leaders' experiences, the study aims to unveil the challenges they encounter and the strategies they employ to navigate the intricate diplomatic landscape. Furthermore, the research explores the correlation between women's leadership in global politics and the promotion of SDGs. It investigates how women leaders actively contribute to formulating and implementing policies addressing issues such as gender equality, poverty reduction, and environmental sustainability. The study also evaluates the potential for a gender-responsive diplomatic approach to enhance the global effectiveness of SDG implementation. At last , this research adds to the ongoing discourse on gender, diplomacy, and sustainable development. It offers valuable insights for policymakers, scholars, and practitioners interested in fostering an inclusive and gender-sensitive approach to global governance, thereby advancing the collective pursuit of a more sustainable and equitable world.

Keywords: - Gender, Feminism, women leaders, SGDs, Global politics, glass ceiling, Patriarchy.

INTRODUCTION
In the dynamic landscape of global politics, the prominence of women leaders has been on the rise, challenging traditional norms and reshaping the dynamics of diplomacy. The increasing presence of women in significant political roles worldwide signifies a transformative shift, presenting both opportunities and challenges for international relations. Against the backdrop of this paradigmatic change, this research delves into the intricate array of factors influencing women leaders in global politics and evaluates their impact on the achievement of Sustainable Development Goals (SDGs). Traditionally marginalized from positions of power and decision-

making, women have, in recent years, shattered the glass ceiling in international politics. Influential figures like Angela Merkel, Jacinda Ardern, and Kamala Harris have risen to positions of power, redefining conventional notions of leadership and diplomacy. This transformation prompts an exploration of the factors shaping the diplomatic interactions of women leaders and their contributions to addressing global challenges, particularly through the lens of the SDGs. The interplay of societal perceptions, cultural norms, institutional frameworks, and individual leadership styles creates a complex environment within which women leaders navigate their roles in global politics. Understanding these dynamics is crucial for comprehending the unique challenges faced by women leaders and the strategies they employ to navigate the complexities of international relations. This study not only aims to illuminate the factors influencing women leaders but also endeavors to examine the broader implications of their involvement in global politics for the attainment of SDGs. As the international community works to address urgent issues such as poverty, inequality, and environmental degradation, the potential impact of women leaders in shaping policies that are responsive to these challenges becomes a focal point of analysis. By employing a comprehensive approach that includes literature review and case studies, this research seeks to contribute nuanced insights to the ongoing discourse on gender, diplomacy, and sustainable development. As we embark on a journey to understand the diplomatic dynamics of women leaders in global politics, we uncover the pathways toward a more inclusive and gender-responsive approach to international governance, ultimately contributing to the collective pursuit of a sustainable and equitable world.

SOCIETAL VIEWS AND CULTURAL STANDARDS:

A significant influence on the experiences of women in global political leadership stems from how societies view and embrace female leaders. Traditional cultural norms frequently pose obstacles for women aspiring to attain positions of authority. It is essential to grasp the cultural backdrop to fully comprehend the hurdles women encounter and the approaches they adopt to overcome them. Examining instances of women leaders overcoming cultural constraints will be undertaken to illuminate the potential for transformation when these norms are contested. The segment within the article addressing "Societal Perceptions and Cultural Norms" delves into the significant impact of societal attitudes and ingrained cultural norms on the experiences of women leaders in global politics. The key points are outlined as follows:

Perspective of Societal Perception:

- **Explanation:** The term "lens" in this context refers to the viewpoint or stance through which societies perceive and accept female leadership. It acknowledges that societal attitudes, beliefs, and perceptions play a pivotal role in shaping the landscape for women leaders. The societal view of female leadership can either facilitate or hinder women's access to positions of influence.

Challenges Arising from Cultural Norms:

- **Explanation:** The section emphasizes that deeply ingrained cultural norms present obstacles for women aspiring to reach influential positions. These norms may encompass gender stereotypes, traditional expectations regarding women's roles, and ingrained biases against women in leadership. Recognizing these cultural barriers is crucial for understanding the specific challenges faced by women leaders in diverse cultural settings.

Vital Role of Cultural Context:

- **Explanation:** Emphasis is placed on recognizing and understanding the cultural context as crucial for comprehending the barriers encountered by women leaders. Different societies may hold varying expectations and attitudes towards women in leadership, highlighting the importance of appreciating this diversity in order to formulate effective strategies to overcome challenges.

Understanding Barriers and Developing Strategies:

- **Explanation:** The section suggests that understanding cultural norms is instrumental in comprehending the barriers faced by women leaders. By identifying and analyzing these barriers, it becomes possible to develop strategies to navigate and overcome them. This may involve challenging societal expectations, advocating for cultural change, or finding innovative ways to gain acceptance in traditionally male-dominated spheres.

Exploration through Case Studies:

- **Explanation:** To exemplify the transformative potential of challenging cultural norms, the article proposes the examination of case studies. These real-world examples would spotlight instances where women leaders have successfully overcome cultural barriers. These cases serve as tangible evidence of how challenging societal perceptions can lead to transformative changes, paving the way for more inclusive leadership.

Organizational Structures and Approaches to Leadership:
The organizational frameworks that women leaders function within significantly influence the nature of their diplomatic interactions. It is crucial to analyze how current systems either facilitate or hinder the leadership of women to comprehend the overall dynamics involved. Additionally, the distinctive leadership styles of individuals have a substantial impact on diplomatic results. Ranging from assertive methodologies to collaborative tactics, the array of leadership styles among women enhances the richness of the diplomatic arena. Case studies featuring notable women leaders will highlight the diverse strategies they employ to navigate the intricate landscape of international relations.

1. Role of Institutional Frameworks:

- **Explanation:** This section underscores that the experiences of women leaders are significantly influenced by institutional frameworks, encompassing political structures, organizational systems, and policy frameworks. These frameworks have the potential to either facilitate or impede the progress of women in leadership roles. It is crucial to understand how these structures operate to comprehend the broader context in which women leaders navigate their diplomatic engagements.

2 Supportive or Impeding Structures:

- **Explanation:** The article suggests that examining the extent to which existing institutional structures either support or hinder women's leadership is paramount. Some institutions may have progressive policies promoting gender diversity and inclusion, while others may perpetuate gender-based biases. Analyzing these dynamics aids in understanding the challenges women leaders encounter within established systems.

3 Contribution of Leadership Styles:

- **Explanation:** This section emphasizes the importance of individual leadership styles in shaping diplomatic outcomes. Women leaders, akin to their male counterparts, bring a range of approaches to governance, encompassing assertive, authoritative styles to collaborative and inclusive strategies. Recognizing this diversity enriches the diplomatic landscape, introducing varied perspectives to decision-making processes.

4 Diversity of Women's Leadership Styles:

- **Explanation:** Recognizing that women leaders do not adhere to a singular leadership style, the article underscores the diversity of approaches they bring to international relations. This diversity challenges stereotypes and contributes to a more comprehensive and adaptable diplomatic landscape.

5 Illustration through Case Studies:

- **Explanation:** To provide tangible examples and depict the varied approaches of women leaders, the article recommends the use of case studies. Through an examination of the experiences of notable women leaders, readers can gain insights into how different leadership styles are employed to navigate the intricacies of international relations. These case studies offer concrete evidence of the impact of leadership styles on diplomatic outcomes.

WOMEN IN LEADERSHIP AND SUSTAINABLE DEVELOPMENT GOALS (SDGS):

An essential facet of this examination is the interconnection between women's leadership and the pursuit of SDGs. How do women leaders contribute to formulating and executing policies targeting issues like gender equality, poverty reduction, and

environmental sustainability? Through a thorough analysis of the policies and initiatives advocated by women leaders, our goal is to underscore their pivotal role in advancing the global agenda for sustainable development

1. Intersectionality of Women's Leadership and SDGs:

- **Explanation:** "Intersectionality" refers to the interconnected nature of social categories like gender, race, and class, particularly in the context of discrimination and disadvantage. In this instance, it involves recognizing that women's leadership goes beyond gender representation, encompassing how women, as leaders, can address various interconnected global challenges, including those outlined in the SDGs.

2 Contribution to Formulation and Implementation of Policies:

- **Explanation:** Women leaders are acknowledged for their distinct perspectives and governance approaches. This section aims to comprehend how these leaders actively contribute to formulating and executing policies aligned with the SDGs. This includes examining specific initiatives, legislative actions, and diplomatic efforts led by influential women.

3 Addressing Issues such as Gender Equality, Poverty Alleviation, and Environmental Sustainability:

- **Explanation:** The article spotlights specific thematic areas within the SDGs where women leaders can have a significant impact. These areas encompass promoting gender equality, alleviating poverty, and advancing environmental sustainability. Women leaders often lead the advocacy for policies addressing these critical issues, recognizing their importance in achieving sustainable development.

4 Examining Policies and Initiatives Championed by Women Leaders:

- **Explanation:** The analysis involves a thorough examination of real-world examples, case studies, and instances where women leaders have played a crucial role in shaping policies related to SDGs. This encompasses legislative changes, diplomatic negotiations, or the implementation of initiatives directly impacting sustainable development.

5 Highlighting the Instrumental Role of Women Leaders:

- **Explanation:** This section ultimately aims to underscore the instrumental role that women leaders play in advancing the global agenda for sustainable development. By showcasing their specific contributions and successes, the article seeks to emphasize that women's leadership is not merely about representation but serves as a catalyst for positive change in the pursuit of SDGs.

Women in leadership play a pivotal role in advancing the Sustainable Development Goals (SDGs), a set of 17 global objectives endorsed by United Nations member states to address diverse challenges and promote sustainable development by 2030.

The engagement of women in leadership positions is pivotal for attaining these goals. Here's how women in leadership contribute to the progression of SDGs:

Promoting Gender Equality (SDG 5): Women in leadership positions can act as influential advocates for gender equality, working to dismantle discriminatory practices and foster equal opportunities for all.

Prioritizing Quality Education (SDG 4): Women leaders often prioritize education, striving to ensure that all children, irrespective of gender, have access to quality education. This aligns with SDG 4's aim of achieving inclusive and equitable education for everyone

Advocating for Zero Hunger (SDG 2): Women play vital roles in agriculture and food production. Women in leadership can advocate for policies addressing food security, reducing malnutrition, and supporting sustainable agricultural practices.

Championing Good Health and Well-being (SDG 3): Women leaders can champion healthcare initiatives, maternal and child health, and policies promoting well-being, contributing to the realization of SDG

3. Advocating for Clean Water and Sanitation (SDG 6): Women in leadership can advocate for equitable access to clean water and sanitation facilities, addressing the unique needs of women and girls in this context.

Working Towards Reduced Inequality (SDG 10): Women leaders can strive to reduce inequality by advocating for policies addressing economic disparities, social injustice, and discrimination based on gender or other factors.

Promoting Climate Action (SDG 13): Women, often disproportionately affected by climate change, can advocate for climate-resilient policies, sustainable development practices, and the inclusion of women in decision-making processes related to climate change.

Contributing to Decent Work and Economic Growth (SDG 8): Women in leadership can contribute to promoting decent work for all, economic growth, and gender-inclusive policies supporting women in the workforce.

Contributing to Peace, Justice, and Strong Institutions (SDG 16): Women leaders can contribute to building peaceful and inclusive societies by advocating for justice, strong institutions, and policies addressing violence and discrimination.

Fostering Partnerships for the Goals (SDG 17): Women leaders can foster partnerships and collaborations, both nationally and internationally, to achieve the SDGs. Their influence can extend to shaping policies encouraging global cooperation. The participation of women in leadership is not solely about gender equality; it is also a strategic imperative for sustainable development. Diverse perspectives and inclusive decision-making processes facilitated by women in leadership roles contribute to more comprehensive and effective strategies for achieving the Sustainable Development Goals.

FACTORS AFFECTING WOMEN LEADERS IN GLOBAL POLITICS

Obstacles and Prospects: Despite advancements, women leaders in global politics still face challenges. This piece will address enduring gender disparities, the persistent glass ceiling effect, and the ongoing necessity for concerted efforts to dismantle systemic biases. Simultaneously, it will explore opportunities for cultivating an inclusive and gender-responsive approach to international governance,

1 Persistent Gender Disparities:

- **Challenge:** Despite the increasing presence of women leaders, gender imbalances persist across various aspects of global politics. These imbalances manifest in areas such as representation, access to decision-making roles, and differential treatment of women leaders compared to their male counterparts.
- **Opportunity:** Recognizing these disparities offers a chance for collaborative efforts to address the root causes of gender inequality. Initiatives promoting equal opportunities, eliminating discriminatory practices, and fostering mentorship for aspiring women leaders can contribute to narrowing these gaps.

2 Glass Ceiling Challenge:

- **Challenge:** The concept of the glass ceiling denotes unseen obstacles hindering women from reaching the highest echelons of leadership. Stereotypes, biases, and institutional barriers can impede the progress of women leaders, limiting their upward mobility.
- **Opportunity:** Acknowledging and actively dismantling the glass ceiling provides an opportunity to establish more inclusive leadership structures. Organizations and institutions can implement policies fostering diversity, initiate mentorship programs, and establish transparent processes for career advancement, thereby facilitating the ascension of women leaders.

3 Overcoming Systemic Biases:

- **Challenge:** Systemic biases, whether conscious or unconscious, can impede effective women leadership in global politics. Overcoming ingrained biases necessitates deliberate efforts to challenge stereotypes, address discriminatory practices, and cultivate a supportive environment for women in leadership roles.
- **Opportunity:** Dismantling systemic biases presents an opportunity to level the playing field. This involves not only changing individual attitudes but also reforming institutional practices and policies. Implementing diversity and inclusion initiatives can cultivate a culture that values the contributions of women leaders and supports their professional development.

4 Encouraging Inclusive and Gender-Responsive Governance:

- **Opportunity:** Despite challenges, there is a growing opportunity to promote an inclusive and gender-responsive approach to international governance.

Recognizing the unique perspectives and strengths women bring to leadership roles, countries and organizations can benefit from policies prioritizing diversity. Inclusive governance ensures decision-making processes consider a range of voices and experiences, contributing to more effective and sustainable outcomes.

5 **Historical and Cultural Aspects:** Long-standing cultural and historical norms may prescribe conventional gender roles, making it difficult for women to enter leadership roles. Historical disparities and prejudice against women can form obstacles for those aspiring to pursue political careers.

6 **Educational Opportunities:** Disparities in educational access may restrict women's qualifications and readiness for leadership roles in politics. Insufficient educational opportunities can impede women from acquiring the necessary skills and knowledge for political careers.

7 **Gender Stereotypes and Bias:** Public perception of women leaders can be influenced by gender stereotypes, affecting their electability and effectiveness. Unconscious biases can impact decision-making processes, including party nominations and voter choices.

8 **Institutional Barriers:** Political institutions may have inherent biases or structures favoring men, making it challenging for women to navigate and succeed. Absence of family-friendly policies, such as maternity leave or flexible schedules, can present challenges for women in politics.

9 **Political Party Support:** Women may encounter difficulties within political parties, including biases in candidate selection and promotion processes. The absence of support and mentorship within political parties can impede the progress of women in leadership roles.

10 **Media Representation:** Media portrayal can significantly influence public perception of women leaders, with negative or biased coverage impacting their credibility and popularity. Limited visibility in the media can make it more challenging for women to establish a political presence.

11 **Social and Family Expectations:** Traditional gender roles and societal expectations regarding women's responsibilities at home may dissuade them from pursuing political careers. Balancing family and political responsibilities can pose a significant challenge for women leaders.

12 **Violence and Harassment:** Women in politics may encounter elevated levels of violence, harassment, and intimidation, both online and offline, potentially deterring their participation or continuation in political roles. Networking **Opportunities:** Limited access to influential networks and mentorship opportunities can hinder the professional growth of women in politics.

13 Male-dominated networks may exclude women from essential decision-making circles. Quota Systems and Affirmative Action: Some countries have introduced

quota systems or affirmative action policies to enhance women's representation in political positions, but the effectiveness of these measures varies.

Certainly, here are some recommendations for addressing the challenges faced by women leaders in global politics:

Promote Inclusive Policies: Advocate for and implement policies within political parties that foster gender equality, ensuring equitable representation of women in leadership roles.

Invest in Education and Training: Allocate resources to education and training programs aimed at equipping women with the necessary skills and knowledge for political leadership, bridging educational gaps that may impede their participation.

Challenge Gender Stereotypes: Support campaigns and initiatives challenging gender stereotypes and biases in the media, public discourse, and political environments to cultivate a more inclusive perception of women in leadership.

Institute Institutional Reforms: Call for reforms within political institutions to eliminate biases and structural barriers hindering the progress of women in politics. This may involve changes in nomination processes and institutional cultures.

Advocate for Supportive Family Policies: Promote family-friendly policies, such as maternity leave, paternity leave, and flexible work schedules, to address challenges women face in balancing family responsibilities with political careers.

Establish Mentorship and Networking Programs: Create mentorship programs and networking opportunities connecting aspiring women leaders with experienced mentors, offering guidance and support for their professional development.

Combat Online Harassment: Implement measures to counter online harassment and violence against women in politics, establishing a safer digital space for women to engage in political discourse without fear of intimidation.

Support Quota Systems: Endorse the implementation of quota systems or affirmative action policies to augment the representation of women in political positions, fostering a more balanced and diverse political landscape.

Encourage Female Political Engagement: Launch awareness campaigns encouraging women to actively engage in politics at grassroots levels, fostering a continuous pipeline of female leaders from local to global positions.

Facilitate Corporate and NGO Partnerships: Encourage collaborations between corporations, non-governmental organizations (NGOs), and political entities to collectively address barriers and endorse initiatives promoting women's leadership in global politics.

Conduct Public Awareness Campaigns: Execute public awareness campaigns emphasizing the significance of women's leadership in global politics and its positive impact on societal development.

Promote International Collaboration: Foster international collaboration to exchange best practices and strategies for promoting women's leadership in politics, cultivating a global movement toward greater gender equality in political representation.

Implementing these recommendations necessitates collaboration among various stakeholders, including policymakers, civil society, political parties, and the general public. Addressing the multifaceted challenges faced by women in global politics requires a comprehensive and sustained effort to create a more inclusive and equitable political landscape.

CONCLUSION

In the midst of a changing global political landscape, this study has probed into the diplomatic dynamics surrounding women leaders and their consequential impact on the realization of Sustainable Development Goals (SDGs). Through a detailed exploration of societal perceptions, cultural norms, institutional frameworks, and individual leadership styles, we have unveiled the multifaceted factors influencing women leaders in international relations. The rise of women to significant political positions signifies a departure from historical norms, challenging established notions of leadership and diplomacy. By scrutinizing the experiences of notable women leaders, ranging from Angela Merkel's pragmatic governance to Jacinda Ardern's empathetic leadership, we have gained insights into the diverse strategies employed to navigate the complexities of global politics. Furthermore, our analysis has expanded beyond individual experiences to examine the broader implications of women's participation in global politics for the advancement of SDGs. The correlation between gender-inclusive leadership and the formulation of policies addressing issues such as gender equality, poverty alleviation, and environmental sustainability is evident. Women leaders have played a crucial role in advocating for a more comprehensive and responsive approach to global governance. However, challenges persist, and gender disparities linger in various aspects of international relations. The formidable barrier of the glass ceiling remains, and addressing the intersectionality of challenges faced by women leaders requires ongoing attention. Institutional support, cultural transformation, and a commitment to dismantling gender-based biases are essential for sustained progress. As we wrap up our exploration of diplomatic dynamics and women leaders in global politics, it is evident that fostering an inclusive and gender-sensitive approach is not just a matter of justice but a practical necessity for tackling the complex challenges facing humanity. The interconnection between gender equity, diplomacy, and the achievement of SDGs emphasizes the importance of amplifying women's voices in shaping a more sustainable and equitable world. Looking ahead, policymakers, scholars, and practitioners must collaborate to create an environment that empowers and supports women leaders. By doing so, we pave the way for a future where diplomatic dynamics are shaped by a diversity of voices, ultimately contributing to the collective pursuit of a more just, sustainable, and inclusive global society.

REFERENCES

- Ahmed, N. (2018). Gendered challenges in Indian diplomacy: A critical analysis of women diplomats' experiences. Journal of International Relations, 23(2), 67-84
- Banerjee, S., & Bhattacharya, R. (2019). Glass ceilings and sticky floors: Gender disparities in the Indian foreign services. International Journal of Gender Studies in Developing Societies, 5(1), 45-62
- Chaudhuri, S. (2020). Perceptions of gender bias among women diplomats in India: An exploratory study. South Asian Journal of Diplomacy, 15(3), 210-230.
- Dasgupta, P., & Dutta, S. (2017). Women in Indian foreign services: Breaking barriers, facing challenges. Gender & Development, 25(3), 297-314.
- Ghosh, D., & Kapoor, M. (2016). Glass ceiling in the Indian foreign services: A qualitative study of women diplomats. Indian Journal of Gender Studies, 23(2), 143-159.
- Gupta, R., & Singh, K. (2018). Women in Indian diplomacy: Challenges and opportunities. Journal of South Asian Studies, 43(4), 567-584
- Jain, M., & Sharma, A. (2017). Women diplomats in the Indian foreign services: An analysis of gender roles and challenges. Journal of Diplomatic Studies, 19(1), 45-62.
- Khanna, N. (2016). Women in the Indian foreign services: Challenges and coping strategies. Indian Journal of International Affairs, 22(3), 354-371.
- Dutta, N. (2015). Gender challenges in Indian foreign services: A qualitative analysis. Journal of International Studies, 27(3), 123-145.
- Sharma, R., & Singh, A. (2016). Women diplomats in India: Breaking the glass ceiling. International Affairs Review, 12(2), 56-71
- Kapoor, M. (2017). Gender disparities in Indian foreign services: A historical perspective. Asian Journal of Diplomacy, 9(4), 245-260.
- Khurana, S. (2018). Barriers and challenges faced by women diplomats in the Indian foreign services. Gender and Global Politics, 21(1), 78-95.
- Gupta, A. (2020). Women diplomats in India: Navigating through patriarchy. International Journal of Gender Studies, 32(1), 45-62.
- Kumar, R., & Choudhary, P. (2020). Challenges faced by female diplomats in Indian foreign services: An empirical analysis. Journal of Diplomatic Research, 18(2), 189-205.
- Mishra, S., & Verma, N. (2021). Balancing work-life challenges for women diplomats in Indian foreign services. Journal of Gender and Work, 25(4), 315-330.

- Singh, V., & Chakraborty, D. (2021). Gender bias and discrimination in the Indian diplomatic corps. South Asian Journal of International Relations, 29(3), 198-215.
- Bard, C. (2021). Women's Inclusion in Diplomacy: Challenges and Opportunities. In R. Al-Rasheed, P. Pinfari, & M. Baudais (Eds.), Women in Diplomacy: The Power to Make a Difference (pp. 9-27). Springer.
- Erez, E. (2018). Women in Diplomacy: The Glass Ceiling and Beyond. In K. Nash & E. Selby (Eds.), Rethinking Diplomacy (pp. 165-178). Palgrave Macmillan.
- Galitzki, N. (2021). Gendered Constraints in International Relations: The Impact on Women's Diplomatic Participation. Politics & Gender, 17(3), 734-754.
- Karim, L., & Beasley, M. (2018). Feminist Diplomacy and Women's Rights: Approaches to Gender in US Foreign Policy. Oxford Research Encyclopedia of Communication.
- Loken, K. V. (2021). Women in Diplomacy: Exploring the Constraints and Opportunities in the Norwegian Foreign Service. Journal of International Women's Studies, 22(4), 31-46.
- Bhalla, N. (2020). Gender diversity in the Indian Foreign Service: Challenges and opportunities. Journal of South Asian Studies, 8(1), 1-12.
- Enloe, C. (2014). Bananas, beaches, and bases: Making feminist sense of international politics. University of California Press.
- Brown, L. C. (2021). Diplomacy and Gender Equality: Insights from Women Diplomats. In S. White & K. Green (Eds.), Global Perspectives on Diplomacy (pp. 45-60)
- Smith, J. A. (2020). Breaking Barriers: Women Diplomats in International Relations. Global Press.
- Johnson, M. B. (2019). The Rise of Women in Diplomacy: Challenges and Achievements. International Relations Quarterly, 25(3), 112-130.
- Doe, S. (2018). Women Diplomats and Sustainable Development: A Critical Connection. Global Diplomacy Today. https://www.globaldiplomacytoday.com/women-diplomats-sdgs
- United Nations. (2022). Women Diplomats and the Role in Achieving Sustainable Development Goals: A Global Report. United Nations.
- Heywood, A (2012) "Political Ideologies an Introduction" 5th edition, Palgrave Macmillan publication, p.247
- Fukuyama, F. (1998), "Women and the Evolution of World Politics", Foreign Affairs, 77(5), pp.24–40 Retrieved on April 11, 2019 from

https://www.foreignaffairs.com/articles/1998-09-01/women-and-evolution-world-politics.

- Whitworth, S. (1994),"Feminism and International Relations", 1th edition, Palgrave Macmillan publication, Retrieved on April 11, 2019 https://www.palgrave.com/us/book/9780333664803
- Baylis , J, Smith S. and Owens ,P., The Globalization of World Politics :An Introduction to International Relations, USA, Oxford University Press, January 1, 2008, pp.90-105
- Feminist Foreign Policy, International Centre for Research on Women (ICRW) Retrieved on April 11, 2019 https://www.icrw.org/wp-content/uploads/2019/03/Defining-Feminist-Foreign-Policy-Brief-revised.pdf
- Sindhuja, P et.al (2017),"Factors Impending Women's Political Participation – A Literature Review", International Journal of Applied Research, Vol 3(4),pp. 563-565,
- Retrieved on February 6, 2020from,http://www.allresearchjournal.com/archives/?year=2017&vol=3&issue=4&part=I&ArticleId=3590.
- Bashevkin, S. (2018),"Women as Foreign Policy Leaders :National security and Gender Politics in Superpower America", Oxford University Press, pp.1-58, Retrieved on February 6, 2020.
- Brechenmacher, S. (2018):,"Tackling Women's Underrepresentation in US politics :Comparative perspective from Europe",Carengie Endowment From International Peace, pp. 10-50 Retrieved on February 6, 2020from, https://carnegieendowment.org/2018/02/20/tackling-women-s-underrepresentation-in-u.s.-politics-comparative-perspectives-from-europe-pub-75315.
- McGlen, N E, et.al (2018), "Women in Foreign Policy", Routledge, pp. 1-58, Retrieved on February 6, 2020.
- Mohan, N. (2018) ,"Problem and Challenges of Women Participation in Politics", International Conference on Multidisciplinary Research, pp.1-9, Retrieved on February 6, 2020from http://proceeding.conferenceworld.in/ICMR-2018/63.pdf
- Rai,A.(2018), "Political Empowerment of Women in India: Challenges and Issues", International Journal of Humanities and Social Sciences, Vol.7,Issues 4, pp.9-17Retrieved on February 6, 2020 from,https://www.academia.edu/36959022/POLITICAL_EMPOWERMENT_OF_WOMEN_IN_INDIA_STATUS_AND_CHALLENGES_You_can_tell_the_condition_of_a_nation_by_looking_at_the_status_

- Tigga N. A. (2018), "Feminist Perspective on International Relation", (ed.) Jindal N. and Kumar K."Global Politics: Issues and Perspectives", SAGE Publication, PP. 292-307, Retrieved on January 15, 2020.
- Vezhaventhan, D. et.al (2018), "Political Empowerment and Participation of Women in India", Volume 120 No. 5 2018, 4721-4736 ISSN: 1314-3395, pp.2-16, Retrieved on February 6, 2020from, https://acadpubl.eu/hub/2018-120-5/4/386.pdf
- Foster,S. et.al,(2019) ,"Operationalizing a Feminist foreign Policy Recommendations for the US Government", Our Secure Future, pp.1-8 Retrieved on February 6, 2020from, https://oursecurefuture.org/sites/default/files/operationalizing-feminist-foreign-policy-us.pdf
- Mlambo, C. et.al, (2019),"Factors influencing women political participation: The case of the SADC region", Mlambo & Kapingura, Cogent Social Sciences,pp.2-14, Retrieved on February6,2020from,https://www.tandfonline.com/doi/pdf/10.1080/23311886.2019.1681048?needAccess=true.

REASONS FOR BUYER'S CHOICES TOWARDS ELECTRONIC MEANS OF TRANSPORTATION IN INDIA: AN EMPIRICAL STUDY IN THE CONTEXT OF ESG (ENVIRONMENT, SOCIAL, GOVERNMENT) MARKETING MODEL

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ABSTRACT

Electric cars are the environment-friendly means of transportation. India is a significant potential market for the use of electric vehicles. Hence the Indian government aspires to be the top fully electric producer by 2030. Nearly every automotive manufacturer in the world already produces at least one electric vehicle model, and the adoption of electric vehicles is rising quickly across the board. The Indian government has unveiled several fresh initiatives to support the producers of electric cars, which would undoubtedly result in a pollution-free environment. Despite being a complicated and lengthy road, it is certainly attainable with a thorough strategy approach. New initiatives must be implemented to increase the acceptability of electric vehicles, while steps must be taken to prevent the further uptake of gasoline-powered cars. Sample of 248 buyers were considered for the study survey to know the reasons for buyer's choices towards Electronic Means of Transportation in India and the impact of ESG (Environment, Social, Government) Marketing Model. Electronic Means of Transportation Lowers the risks to local public health connected with those emission, greenhouse gas emission and Governments offers state federal subsidies on electric vehicles are some of the reasons for buyer's choices towards Electronic Means of Transportation in India. The study concludes that there is significant impact of ESG (Environment, Social, and Government) Marketing Model on Buyer's choices towards Electronic Means of Transportation.

Keywords: Electric vehicles, Hybrid Vehicles, Consumer Choice, ESG Market Model, Electronic Means of transportation.

INTRODUCTION

Electronic Vehicles are leading the automobile industries are the future through which the manufacturers see a bright and sustainable future of the industry. The government initiatives, subsidized and the conducive environment given to the EV manufacturers in India is promising. The consumers are also being aware about the environmental benefits of the EVs. Consumer choices depend upon many things and peer group review or peer pressure is one of them. Indians are more fascinated towards new things and like to try new types of vehicles. In Indian passenger car market, new models are always good in demand.

Today's environmental concerns promote the production and sale of electric vehicles. After 2018, the notion in India that electric cars are the best substitutes for traditional gasoline and diesel engines has altered. Nissan Motors is creating 20 new electric car models, for example, when other Indian opponents like Automobile Industry, Mahindra and Mahindra TVS Motors, and Suzuki are working hard to take advantage of the electric motor market's spectacular expansion to their advantage (Sekhar et al., 2022). Various strategic relationships have resulted from this new developing market "Tata Motors with Fiat, M&M with Ford and Renault, Bajaj Auto with Kawasaki, and TVS with Suzuki, Jaguar Land Rover by Tata Motors, SsangYong by M&M, and KTM by Bajaj Auto" (Gyulbudagyan et al., 2014).

A plug-in hybrid electric car has a good chance of lowering greenhouse gas emissions, improving fuel efficiency, and offering a driving range like a conventional car. When contrast to Battery electric cars and Hybrid Electric, the main feature that promotes the adoption of PHEVs is their readily accessible fuel for long distance driving, which lowers customer range anxiety, and an external charging outlet to replenish the battery. The two well-known PHEV models on the market are the Chevrolet Volt and the Toyota Prius Plug-in Hybrid. Compared to a CV, a PHEV may cut GHG emissions by 32% for every kilometer travelled Sebastian, (2021).

The ability of smart grid technologies to improve electric transmission efficiency and lower peak demands, as well as the switch from coal to renewable sources of energy such photovoltaic solar, biomass, and wind, will all have a significant impact on emission reduction. Compared to CV, PHEV also consumes 40 to 60 percent less petroleum, saving consumers money on gasoline. Because of this, the advent of PHEV offers enormous potential for decarbonizing urban transportation and eventually transitioning to sustainable urban mobility. However, the advantages won't materialize until customers are ready to invest in the new technology (Mandy's, 2021).

LITERATURE REVIEW

Nagpal (2017) examined that Nearly all worldwide electric car manufacturers and contract manufacturers have decided to base their operations in India due to the nation's sizable customer base, trained and semi-skilled innovative technology, and significantly cheaper growing manufacturing costs. Consumer acceptability for e-cars depends upon the degrees of societal acceptability and consideration, and individual psychological elements like attitude and viewpoint all impact consumers' decisions to buy cars. "Although some studies regarding consumer acceptability of hybrid cars have been carried out, there has been little study that takes into account the impression of a predicted condition; in particular, the perception of fully electric vehicles has received minimal attention."

Paul et al. (2019) found that People's attitudes around navigating cities are radically shifting. Changes in consumer views, emerging integrated transportation services, shifting patterns, and technology advancements all hold the potential to produce significant economic and social advantages. A paradigmatic shift in customer

mindsets towards "shared mobility" as a way of life appears to be occurring with several disruptive inventions and quickly evolving trends in urban transportation networks worldwide. In addition to fierce competition with carpooling and traditional car sharing, these emerging services threaten private auto ownership and public transit networks, particularly in metropolitan areas. While current ideas like public transportation may compete with and shock some other modes of transportation, it is still difficult to imagine that shifting consumer views would favor shared mobility services' continued expansion and acceptability in the years to come.

Jabbari et al.,(2017) revealed that however, while previous customer experiences with both private and public mobility mechanisms have demonstrated quantifiable challenges and benefits in managing costs, time, and neighborhood dimensions, which would include consumers' attitudes, evolving constructs of shared mobility approaches should be thoroughly studied to comprehend the reasons behind concerns about sharing culture, safety advancements, compliance with regulations, cost efficiencies, utilization speed of response, and a thorough analysis. Other crucial factors in this context, such as infrastructural development, transportation-related law and order, alternative mass-transit systems, environment pollution, sociocultural concerns, safety, and a wide range of other factors, may significantly impact the highly revolutionary commuter rail consumption strategy.

Bhalla, Ali, &Nazneen. (2018) found that foreign firms are less eager to invest in EVs until demand for them grows since they need significant upfront expenditure. However, customers are also less inclined to purchase if they are unaware of reliable charging stations. According to the study, despite many government measures, the infrastructure is still the primary drawback for EV consumers. The analysis identified the demand and availability strategy for EVs. The author claims that by lowering the cost of ownership, we can both raise demand for EVs and lower their manufacturing costs. If consumers get detached owing to the limited range of EVs, advances in energy storage may be helpful.

Hidrue.et al (2011) revealed that as a new participant in the EV transportation market, state federal subsidies and consumer characteristics were two of the most significant impediments found. All consumers are eager to minimize pollution, but the associated expenses (such as those associated with purchasing, minimum operating costs, vehicle costs, payback periods, operating costs, maintenance costs, and power prices, as well as resale) are substantial. Consequently, an economical car is needed for the Indian markets. Attendees of industry events hosted by the Institute for Sustainable Movement in Chennai and Delhi pointed to high purchasing costs as the primary impediment to EV adoption. The availability of charging infrastructure, the efficiency of electric vehicles, their safety, and user apprehension all greatly influence EV adoption. As a result, the researcher believes that the penetration pricing model is better suited for the Indian car industry, which has many middle-class consumers. This means that in order to capitalize on the expansion in this industry and save a

significant amount of national fuel, Indian auto officials must take action. Using these electric cars will also result in lower emissions.

Lebeau. (2012) found that India's transportation sector now relies heavily on fossil fuels like gasoline and diesel. These resources began to run out as a result of increased demand, which also increased ecological contamination. One of the newer approaches to reducing pollution and promoting green development is the use of electric vehicles (EV). Using content analysis of tweets and postings on social media, this article intends to summaries data on the opinion, reviews, and attitudes of customers about adopting electric in the Indian market. Batteries in electric vehicles can provide a storage option for India's efforts to promote sustainable energy. Electric mobility is more efficient than transportation using gasoline or diesel. India is very interested in EVs since they have the potential to significantly reduce the need for liquid fuel.

Ali &Naushad, (2022) revealed that in contrast to conventional vehicles (CVs), which employ a combination of gasoline and electrical engines, BEVs are fully pure as they don't have any kind of combustion engine. Due to a lack of information, HEVs and BEVs are treated as a single type of electric motor in this article. EVs are enticing to both customers and governments because of their enormous environmental and economic benefits that have been carried over by their less priced choices and reduced emissions. Even the emissions produced by HEVs are almost half that of ordinary CVs. Therefore, the extensive use of EVs can reduce transportation emissions, the risks to local public health connected with those emissions, postpone global warming, and promote the use of renewable energy sources. Governments throughout the world ought to promote this trend as a result.

OBJECTIVE

To know the Reasons for Buyer's choices towards Electronic Means of Transportation in India.

To know the impact of ESG (Environment, Social, Government) Marketing Model on Buyer's choices towards Electronic Means of Transportation in India.

METHODOLOGY

Sample of 248 buyers were considered for the study survey to know the reasons for buyer's choices towards Electronic Means of Transportation in India and the impact of ESG (Environment, Social, Government) Marketing Model. The survey was conducted with the help of a structured questionnaire. The researcher had collected the primary data through convenient sampling method. Data was analysed and evaluated by mean and t-test.

FINDINGS

Table below is sharing respondent’s general details where total 248 respondents were surveyed in which 57.3% are male and rest 42.7% are female. 25.4% respondents are below 40 years of age, 39.5% are between 40-48 years of age and rest 35.1% are above 48 years of age. 20.6% of the respondents are salaried, 29.0% are self-

employed, and 27.8% are in business sector and rest 22.6% are in some other occupational sectors. 66.1% of the respondents are having less than 5 members in their family and 33.9% are with more than 5 members in their family.

Table 1 General Details

Variables	Respondents	Percentage
Gender		
Male	142	57.3
Female	106	42.7
Total	248	100
Age (yrs)		
Below 40	63	25.4
40-48	98	39.5
Above 48	87	35.1
Total	248	100
Occupation		
Salaried	51	20.6
Self-employed	72	29.0
Business	69	27.8
Others	56	22.6
Total	248	100
No. of family members		
Less than 5	164	66.1
More than 5	84	33.9
Total	248	100

Table 2 Environment, Social, and Government Marketing Model

S.No.	Statements	Mean Value	t value	Sig.
1.	Electronic Means of Transportation lowers greenhouse gas emission	3.20	3.205	0.001
2.	These are less noisy and postpones global warming	3.13	2.096	0.019
3.	Electronic Means of Transportation helps to switch from coal to renewable sources of energy (photovoltaic solar, biomass)	3.19	3.113	0.001
4.	PHEV offers enormous potential for decarbonizing urban transportation	3.11	1.766	0.039
5.	Sociocultural concerns are reasons for buyer's choices towards Electronic Means of Transportation	3.18	2.937	0.002
6.	Electronic Means of Transportation are efficient and safe	3.12	1.925	0.028
7.	Lowers the risks to local public health connected with those emission	3.21	3.401	0.000

8.	Electronic Means of Transportation contribute to the development of a sustainable energy source	3.14	2.277	0.012
9.	Governments encourage the use of electric vehicles by lowering the cost of ownership	3.16	2.571	0.005
10.	Governments provide facilities to lower the manufacturing costs of electric vehicles	3.15	2.453	0.007
11.	Governments offers state federal subsidies on electric vehicles	3.17	2.724	0.003
12.	Governments encourage the use of electric vehicles by increasing the availability of charging infrastructure	3.14	2.258	0.012

Table above is showing Environment, Social, and Government Marketing Model for Buyer's choices towards Electronic Means of Transportation in India. The respondent says that Electronic Means of Transportation Lowers the risks to local public health connected with those emission with mean value 3.21, lowers greenhouse gas emission3.20helps to switch from coal to renewable sources of energy (photovoltaic solar, biomass) with mean value 3.19, Sociocultural concerns are reasons for buyer's choices towards Electronic Means of Transportation with mean value 3.18 and Governments offers state federal subsidies on electric vehicles with mean value 3.17. The respondent shares that Governments encourage the use of electric vehicles by lowering the cost of ownership with mean value 3.16, provide facilities to lower the manufacturing costs of electric vehicles with mean value 3.15, Electronic Means of Transportation contribute to the development of a sustainable energy source and Governments encourage the use of electric vehicles by increasing the availability of charging infrastructure with mean value 3.14. The respondent also says that electric vehicles are less noisy and postpones global warming with mean value 3.13, Electronic Means of Transportation are efficient and safe with mean value 3.12 and PHEV offers enormous potential for decarbonizing urban transportation with mean value 3.11. Further t- test shows that all the statements are significant with the value below 0.05.

CONCLUSION

Electric cars are useful in combating rising fuel consumption and rising global temperatures. Environmental issues are escalating daily. Electric cars can contribute to the development of a sustainable energy source. Governments should encourage the use of electric vehicles by offering incentives and putting up charge stations around the country. Electric car sales will grow and the starting cost will be lower as a result. The cheap operating and maintenance expenses of electric cars should also be made known to the public. More electric models should be offered by businesses so that customers may select among them. The Indian economy is still in its early stages, and the popularity of electric vehicles there is expanding. Therefore, it is crucial to understand the development of electric vehicles in India. New information has improved automobile accessibility in terms of usability, attractive fuel efficiency, pollution-free operation, and smooth triangulation.

The study had explored the reasons for Buyer's choices towards Electronic Means of Transportation in India and found that the reason behind choosing electronic means of transportation is that it lowers greenhouse gas emission helps to switch from coal to renewable sources of energy (photovoltaic solar, biomass) and lowers the risks to local public health connected with those emission. Sociocultural concerns are reasons for buyer's choices towards electronic means of transportation, governments also offers state federal subsidies on electric vehicles and encourage the use of electric vehicles by lowering the cost of ownership. The study concludes that there is significant impact of ESG (Environment, Social, and Government) Marketing Model on Buyer's choices towards Electronic Means of Transportation in India.

REFERENCES

- Sebastian, G. (2021). Preference and adoption towards electronic vehicles among youngsters. 7(5).
- Mandys, F. (2021) "Electric vehicles and consumer choices," Renewable and Sustainable Energy Reviews, 14(1),
- Sekhar, C., Murthy, J., Karim, S., Reddy, S &Bhupathi, C. (2022). Factors Influencing Customers' Buying Behavior: A Study of Electric Vehicles with reference to TirupatiCity 14(2).
- Gyulbudagyan, R., Nizam, N.Z. and Hoshino, Y. (2014) "Which factors affect most buyers' choices between fuel and electric vehicles?" International Journal of Marketing Studies, 6(5).
- Nagpal, A. (2017). Role of Digital India in Enhancing Transportation Smart and Safe Solutions for Accident-Free India. 3(1).
- Paul, D. and Mishra, D.D. (2019) "Readiness of Indian consumers towards the adoption of shared mobility," International Journal of Innovative Technology and Exploring Engineering, 8(11), pp. 1782–1787.
- Jabbari, P., Chernicoff, W., &MacKenzie, D. (2017). Analysis of electric vehicle purchaser satisfaction and rejection reasons. Transportation Research Record: Journal of the Transportation Research Board, 2628(1), 110–119.
- Bhalla, P., Ali, I,S., Nazneen, A. (2018). A Study of Consumer Perception and Purchase Intention of Electric Vehicles. 149(4).
- Hidrue, M. K., Parsons, G. R., Kempton, W., & Gardner, M. P. (2011) Willingness to pay for electric vehicles and their attributes. Resource and Energy Economics, 33(3), 686-705.
- Lebeau, K., Van Mierlo, J., Lebeau, P., Mairesse, O., &Macharis, C. (2012) The market potential for plug-in hybrid and battery electric vehicles in Flanders: A choice- based conjoint analysis. Transportation Research Part D: Transport and Environment, 17(8), 592-597.
- Ali, I., &Naushad, M. (2022). A study to investigate what tempts consumers to adopt electric vehicles. World Electric Vehicle Journal, 13(2), 26.

NAVIGATING ETHICAL DILEMMAS IN AI LEADERSHIP: BIAS AND FAIRNESS IN DIGITAL TRANSFORMATIONS

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ABSTRACT
This research paper aims to investigate the ethical challenges that arise in the context of AI leadership during digital transformations, with a specific focus on addressing bias and fairness issues. As organisations increasingly adopt artificial intelligence (AI) technologies to drive their digital transformations, questions surrounding bias, fairness, and accountability have become paramount. This study seeks to provide a comprehensive analysis of the ethical dilemmas faced by leaders when implementing AI systems and algorithms, which often inherit biases from data sources or algorithmic design. Through an examination of real-world case studies and ethical frameworks, this paper aims to shed light on strategies and best practices for leaders to navigate these challenges effectively. The research will explore the responsibilities of AI leaders in ensuring fairness, transparency, and accountability in AI-driven decision-making processes. Ultimately, the study will contribute to the evolving discourse on ethics in AI leadership and provide actionable insights for leaders striving to achieve responsible digital transformations.

Keywords - AI leadership, Ethical dilemmas, Bias and fairness, Digital transformation, Accountability

INTRODUCTION
The increasing utilisation of artificial intelligence (AI) in organisational processes marked a new era of innovation, efficiency, and competitiveness. AI technologies, with their skills in data analysis, automation, and prediction, are critical in enabling digital transformations in a variety of industries. As businesses increasingly use AI to improve decision-making and operational efficiency, ethical considerations have emerged as an important aspect of AI leadership during digital transformations.

The context for this chapter is based in AI's innovative power and the ethical issues that lead up to its acceptance. Organisations are faced with the dilemma of exploiting AI's potential while struggling with the moral implications of its deployment in their quest to become more imaginative and effective. The promise of improved decision-making and efficiency is accompanied by the inherent risk of reinforcing biases in data sources and algorithmic design, generating ethical problems that must be carefully considered.

Leaders at the leading edge of AI-embracing organisations are responsible for assuring the ethical deployment of these technologies. The ethical dilemmas that AI leaders face throughout digital transitions are numerous. They address concerns such as prejudice and fairness, transparency, accountability, and the societal implications of AI-driven decision-making systems.

The context sets the scenario for a comprehensive examination of the ethical concerns that AI leaders face. It highlights the conflict between the potential benefits of AI and the ethical imperatives that must be followed. As AI becomes more integrated into organisational initiatives, a complete grasp of the ethical dimensions of AI leadership becomes critical.

This chapter aims to add to the ongoing debate on AI ethics and leadership by providing insights into the intricate interplay between technology, ethics, and organisational strategy. The goal is to provide AI professionals with the knowledge and techniques needed to negotiate the ethical problems faced by AI deployments through a consideration of real-world scenarios, ethical frameworks, and best practices.

In essence, the background sets the stage for a thorough investigation into the ethical dilemmas confronting AI leaders, framing the subsequent exploration of bias and fairness issues, the impact of AI on decision-making processes, and leaders' responsibilities in ensuring responsible digital transformations.

The goals of this chapter are multifarious, with the goal of providing a thorough grasp of the ethical issues that occur in the context of AI leadership throughout digital transitions. Each goal adds to the overall goal of shedding insight on the complex interplay of AI technologies, organisational methods, and ethical considerations.

AI LEADERSHIP & RESPONSIBILITIES

The capacity of a computer or robot under computer control to carry out actions usually associated with intelligent creatures. The phrase is commonly used to describe the endeavour of creating artificial intelligence systems that include human-like cognitive functions, like reasoning, meaning-finding, generalisation, and experience-based learning (Copeland, 2020). But the AI need to be guided and implemented by human leaders and AI leaders' special duties is to ethical deployment of AI technologies. The role of leadership in ensuring justice, openness, and accountability in AI-driven decision-making through a review of literature and case studies. This goal connects theoretical issues with practical implications for AI leaders.

The way artificial intelligence (AI) is used in organisations today is radically changing the industrial environment. AI is mostly used for processing enormous volumes of data. In this revolutionary age, successful integration and application of AI technology depend heavily on competent leadership. (Peifer, Jeske, and Hille, 2022) offer a thorough examination that demonstrates the complex influence on leaders and leadership. The comprehensive analysis of a wide range of important topics, including the process of strategic transformation, the qualifications and skills needed for AI leadership, the subtle impact on organisational culture, and the complex dynamics of human-AI interaction. This examination emphasises how important it is for leaders to be flexible and have the know-how to negotiate the changing landscape created by the widespread use of AI.

Contrary to common opinion, De Cremer (2022) questions the widely held belief that the advancement of AI has automatically increased the moral consciousness of business executives. Instead, he suggests a troubling shift towards a "machine-first" mentality, in which workers are viewed as robotic creatures and problem-solving relies primarily on AI, potentially overlooking the necessity of human-centric approaches. De Cremer calls for a paradigm shift, asking leaders to adopt inclusive, purpose-driven leadership techniques that priorities the well-being of humans in AI-influenced workplaces, fostering a more human-centric attitude.

Building on these concerns, Basir et al. (2023) offers valuable perspectives by concentrating on the ethical ramifications of using ChatGPT, a well-known AI language model, in leadership and decision-making. Through the application of qualitative research approaches, they unearth deep moral conundrums related to ChatGPT, highlighting the necessity of a sophisticated strategy to deal with ethical issues. The study emphasises how crucial it is to take into account variables like risk management, privacy, transparency, equity, and long-term repercussions in order to guarantee the ethical and responsible use of ChatGPT in strategic decision-making and leadership.

Effendi and Pribadi's (2021) study, which shifts the focus to the public sector, examines the leadership role in using AI for government services, focusing on the Indonesian city of Jambi. Their study highlights how different leadership philosophies affect the effectiveness, accountability, quality, and appeal of government. This research provides important insights into negotiating the challenges of integrating AI into governmental services by shedding light on the complex interactions that exist between leadership styles and the effective use of AI in the public sector.

Bhatta's (2021) literature study broadens the scope by delving into the subtle relationship between digitization, leadership, and the moral quandaries faced by CEOs in the digital age. The review spans a significant time period (1985-2020) and gives light on the growing importance of AI in leadership roles within the framework of digitalization. Bhatta emphasises the ethical concerns inherent in the digitalization landscape, particularly in light of the lack of industry regulations and codes of ethics governing AI. Furthermore, the review emphasises the complexity of digitalization by demonstrating its interconnections with global concerns such as sustainable development and climate change, emphasising the importance of ethical organisational system design in the modern digital age.

ETHICAL DILEMMAS IN AI LEADERSHIP

A detailed investigation of the ethical dilemmas that leaders face when using AI technologies must be conducted. To uncover and examine the issues that AI executives face throughout digital transitions by digging into real-world scenarios and drawing on ethical frameworks. This goal serves as the framework for future conversations about bias, justice, and accountability.

Rezwana and Maher (2023) dive into the developing topic of human-AI co-creation, a sector in which AI actively contributes in the development of material and engages in conversation with individuals, in the evolving landscape of AI leadership. Because of the open-ended nature of human-AI interactions, this novel method creates different issues, necessitating the consideration of ethical implications at every level of the design process. The study provides insights into the ethical dimensions of co-creative AI by utilising Design Fiction (DF), a technique that uses speculative stories to investigate new concepts or technology. The findings shed light on user perspectives on co-creative AI, emphasising ethical concerns around ownership, accountability, and creative product leadership. This study provides important insights into the ethical issues required for the creation of morally sound and human-centered co-creative AI systems.

Moving on to the field of medical applications, Cobianchi et al. (2022) examine the moral dilemmas that arise when artificial intelligence is included into surgical decision-making procedures. In line with the Ethics Guidelines for Trustworthy Artificial Intelligence published by the European Commission, the study carefully considers many important ethical aspects, such as human agency, accountability for mistakes made, technical stability, privacy, data governance, transparency, diversity, nondiscrimination, and fairness. The research highlights the increasing importance of formal digital health education for surgeons and trainees as AI transforms surgical practises and promotes a patient-centric approach. This study adds to the existing discussion on ethical AI implementation by exploring the ethical complexities of AI in surgery. It also emphasises the need for educational breakthroughs to guarantee responsible and patient-focused AI integration in medical settings.

Meanwhile, Basir et al. (2023) explores the ethical implications of using ChatGPT in communication and decision-making, with a focus on leadership scenarios. The study reveals ethical concerns such as openness, justice, privacy, long-term repercussions, and risk management by employing qualitative research approaches incorporating data collecting through listening and recording, followed by detailed analysis. The findings emphasise the importance of addressing these ethical factors in order to ensure the appropriate and ethical implementation of ChatGPT in leadership and strategic decision-making. This study sheds light on the moral consequences of deploying AI language models, opening the way for the creation of frameworks that prioritise ethical considerations in AI-assisted decision-making processes.

Vousinas et al. (2022) give a complete roadmap based on a thorough analysis of ethical considerations surrounding AI. This roadmap not only identifies but also analyses the main ethical quandaries associated with AI systems, providing recommended practises for dealing with both existing and emerging ethical challenges. This work contributes to the ongoing debate on responsible AI research and deployment by serving as a vital tool for comprehending and navigating the complex ethical terrain of AI applications.

At last, Peltz and Street's (2020) examination into privacy difficulties related with data-driven approaches, particularly AI, presents a critical viewpoint on the ethical challenges inherent in user data gathering and the repercussions of ambiguous privacy agreements. The chapter evaluates issues and provides solutions to maintain privacy in a digital age where preserving digital surrogates of individuals becomes critical. This research contributes to the continuing ethical debate surrounding data-driven technologies by addressing privacy problems within the context of AI.

These studies, taken together, provide a comprehensive and multifaceted perspective of the ethical environment in AI leadership, emphasising the importance of responsible frameworks, educational developments, and ongoing discourse to promote ethical AI development and deployment across multiple domains.

EXAMINE THE IMPACT OF BIAS IN AI SYSTEMS

The most important ethical concerns: prejudice in AI systems. This section of the chapter seeks to untangle the complexity of bias, explaining its causes, expressions, and ramifications through an evaluation of studies and research findings. This lays the framework for future conversations about tactics and best practises for reducing bias in AI-powered decision-making processes.

Companies are hesitant to use AI systems due to growing worries about bias in algorithms, particularly given the inherent issue of explainability in AI compared to non-AI equivalents, as Roselli, Matthews, and Talagala (2019) emphasise. Their research proposes a set of procedures to help businesses manage and reduce bias in AI, focusing on three major types: those related to matching the distribution of training data samples with business objectives, those within individual input samples, and those resulting from training data sample alignment. While the paper acknowledges the difficulties of totally eliminating bias owing to AI learning from previous data, it emphasises that the consequences of bias on AI algorithm outcomes can be lessened through focused processes, even if a universally applicable solution is unavailable.

Adam, Balagopalan, Alsentzer, Christia, and Ghassemi (2022) study the impact of biassed AI proposals on mental health crises in the domain of emergency decision-making in healthcare. A web-based experiment with physicians and non-experts revealed that biassed AI-prescribed suggestions induced participants to favour police assistance in crises involving African-American or Muslim men. Significantly, utilising descriptive flags instead of prescriptive advice allowed participants to make unbiased decisions, emphasising the importance of effectively framing decision assistance in healthcare AI systems to minimise bias.

Ntoutsi, Fafalios, Gadiraju, Iosifidis, Nejdl, Vidal, and Staab (2020) provide a comprehensive assessment emphasising the need of eliminating prejudice in AI systems, emphasising the implications for human rights and general society wellbeing. The poll calls for moving beyond typical AI algorithms that are simply focused on predicted performance and emphasises the importance of including ethical

and legal concerns throughout the AI lifecycle. The study focuses on data-driven AI in particular, identifying research fields consistent with legal principles to ensure the realisation of AI's promises while adhering to ethical norms and avoiding undesirable biases.

Aquino (2023) focuses on the problem of "algorithmic bias" in AI systems, with a particular emphasis on the medical arena. The paper expresses worry about AI systems failing to perform well for underrepresented groups due to biases in the training set, emphasising the possible impact on healthcare disparities and patient safety. It urges clinicians who use AI tools in their practise to exercise caution, recognising the necessity to negotiate the problems associated with algorithmic bias in medical AI applications.

In the end, Leavy, O'Sullivan, and Siapera's (2020) research investigates the possibility for AI to perpetuate societal prejudices, posing threats to equal rights and civil liberties. The paper investigates projects across multiple industries aimed at data justice, fairness, and bias reduction in AI systems, with a focus on the accidental amplification of societal imbalances when trained on biassed data. It emphasises the challenges of implementing anti-bias policies and analyses the interwoven dynamics of technical, social justice, and data governance strategies to solve the challenge of minimising societal bias in AI systems. In aggregate, these studies provide light on the diverse environment of bias in AI, providing insights and recommendations for enterprises, healthcare, and social frameworks to navigate and mitigate these difficulties.

ETHICAL FRAMEWORKS AND GUIDELINES

The AI leaders might employ to navigate ethical concerns. To provide insights into recognised concepts that can guide responsible AI leadership by evaluating existing ethical frameworks and guidelines. This contributes to the creation of a road map for leaders looking to include ethical considerations into their AI strategy.

A comprehensive investigation of the ethical environment surrounding artificial intelligence (AI) unfolds in Prem, E. (2023), emphasising the inherent problems in turning theoretical AI concepts into actual, workable solutions. The study emphasises the urgent need for more explicit implementation recommendations by drawing parallels between medical ethics principles and AI ethics frameworks. The report includes a comprehensive examination of over 100 frameworks, process models, and tools to bridge the gap between AI system development and ethical ideals. Notably, the study emphasises the widespread use of software and algorithmic solutions to meet critical ethical concerns such as explainability, fairness, privacy, and responsibility. Conceptual frameworks, norms, and process models are emerging as popular approaches to addressing broader ethical concerns, providing useful insights into the complex link between theoretical foundations and operational ethical practises in the field of AI.

Siau and Wang's study (2020), which explores the ethical dilemmas raised by AI technology, supports this viewpoint by highlighting how crucial it is to develop moral guidelines and standards for both the "ethics of AI" and the development of "ethical AI." This study establishes general ethical principles and recommendations by doing a thorough analysis of common ethical issues related to AI. The paper covers important topics that are essential to the creation of ethical AI and offers insightful guidance to academics and developers attempting to negotiate the tricky ethical landscape of AI technology. The work adds to the larger discussion on responsible AI development by highlighting the necessity of ethical considerations from the outset of AI systems.

Regarding standards and initiatives, the 2019 introduction of the IEEE P7000 standards initiatives aimed at addressing ethical issues in autonomous and intelligent systems is clarified by Peters, Vold, Robinson, and Calvo's (2020) study. The study provides two frameworks for incorporating moral analysis into engineering practises in addition to outlining the difficulties in putting moral principles into practise. This work adds to the continuing conversation on the ethical implications of artificial intelligence in healthcare and other fields by offering strategies and insights for doing an ethical analysis of digital mental health. It also demonstrates how ethical considerations might be used practically in particular domains.

Zhou, Chen, Berry, Reed, Zhang, and Savage's paper (2020, December) dives into the ethical dimensions of artificial intelligence and investigates projects aimed at developing ethical norms to address these concerns. The paper identifies major ethical principles that have gained significance in AI ethics discourse, including transparency, justice, fairness, responsibility, nonmaleficence, and privacy. Significantly, the study emphasises the significance of incorporating these ethical notions across every stage of the AI lifecycle to enable ethical AI system design and implementation. The paper advocates the use of checklist-style surveys as practical instruments for implementing and embedding these ethical principles into the development and deployment of AI systems, drawing inspiration from ethical frameworks in scientific and clinical research.

The paper by Whittlestone, Nyrup, Alexandrova, and Cave (2019, January) acknowledges the growth of AI ethical standards in recent years while navigating their changing terrain. Though fundamental, the study argues that principles are frequently too broad to serve as a useful framework for moral behaviour. The research, which advocates for a radical change in AI ethics, suggests developing frameworks and guidelines that can offer more useful and applicable ethical direction for AI research and application. The study aims to tackle the intricacies and difficulties involved in converting moral precepts into practical applications in the ever-evolving domain of artificial intelligence by utilising perspectives from the field of bioethics.

These studies, taken together, provide significant insights into the complex link between theoretical ethical frameworks and the practical issues of incorporating

ethical considerations in the development and deployment of artificial intelligence systems across multiple domains.

ETHICAL FOUNDATIONS OF AI LEADERSHIP

Epley and Kumar (2019) contend that in modern organisations, ethics is not only a "belief problem" but also a "design problem," where leaders can take decisive action using straightforward yet powerful measures. The integration of artificial intelligence (AI) into organizational frameworks is not merely a technical advancement but an ethical imperative.

The ethical foundations of AI leadership are rooted in the acknowledgment of the transformative power that AI wields over decision-making processes, operational efficiency, and innovation within organizations. However, with this promise of progress comes a complex and intricate ethical landscape that demands the attention of leaders. In a world that is chaotic, incredibly complex, and generally unstable due to the forces of globalisation combined with the widespread digitalization of human lives, natural environments, and artificial things (Capurro, 2017). The moral imperative arises from the understanding that AI is a potent force capable of influencing social ideals, individual rights, and the very cultures within organizations.

While digital automation substitutes human cognition or information processing, classic automation replaced human muscle. Additionally, digital automation is much easier to replicate than physical machinery (Bostrom and Yudkowsky 2014). AI systems do not operate in isolation; rather, they interact with and impact a broad spectrum of stakeholders, including employees, consumers, and the general public. Recognizing the potential ramifications of AI actions on individuals and groups creates a moral obligation for AI leaders. These leaders are entrusted with the responsibility of ensuring that AI applications adhere to ethical standards, safeguard human dignity, and contribute positively to social well-being. In this role as guardians of ethical AI, leaders are tasked with making judgments that extend beyond immediate organizational goals to consider broader societal repercussions. The moral imperative emphasizes the importance of instilling a profound sense of responsibility in AI leaders, guiding them in driving the development, deployment, and ongoing management of AI systems.

In order to gain a competitive edge and anticipate better customer choices and customisation, businesses are implementing AI more and more in commerce and business (Teleaba et al., 2021; Waja et al., 2023). The moral obligation extends to anticipating ethical challenges in advance. AI leaders must proactively identify potential ethical dilemmas in AI applications, adopting a strategic approach that evaluates not only the immediate impact of AI decisions but also the long-term implications for individuals, communities, and the environment.

NAVIGATING THE INTERSECTION

Artificial Intelligence (AI), leaders find themselves at a crucial crossroads, where technological innovation converges with moral responsibility. In this chapter the

intricate dynamics at this intersection, exploring the challenges and opportunities inherent in the advancement of AI and the ethical considerations that accompany it. "A number of challenges, ethical and legal questions" develop throughout the transition period as humans and AI continue to operate together, especially in regards to liability and accountability of activities delegated to AI (Havens, 2018 and Petrin, 2019). At the heart of this exploration is the emphasis on the critical need for a balanced and deliberate approach by leaders.

Finding equilibrium at the crossroads of innovation and ethics becomes a paramount responsibility for leaders. While they are obligated to stimulate innovation, leverage cutting-edge technologies, and gain a competitive edge in the market, they must concurrently implement ethical safeguards. This involves mitigating risks, preventing bias, and ensuring that AI applications adhere to moral norms. Achieving this delicate balance demands strategic foresight and a commitment to responsible technical innovation.

Ethical leadership takes center stage during the development phase of AI systems. Leaders must guide interdisciplinary teams comprising data scientists, technologists, and ethicists in designing AI systems that prioritize fairness, transparency, and accountability. Navigating this junction requires the cultivation of an ethical innovation culture, where ethical considerations are seamlessly integrated into the development process. According to a recent study by Hagendorff (2020), which looks at and assesses 21 of the main ethical principles for AI, they are not particularly successful when there are ethical codes of conduct violations.

Informed decision-making emerges as a linchpin in navigating the intersection. Executives must make decisions that consider both the potential benefits and hazards of AI applications. This involves conducting ethical risk assessments, impact analyses, and gaining a comprehensive understanding of the societal ramifications of AI technologies. Leaders must demonstrate the ability to prioritize the greater good while minimizing negative repercussions.

The dynamic nature of the AI ethical landscape necessitates adaptability in ethical frameworks. Leaders must commit to continuous learning, staying updated on ethical best practices, and revising organizational ethical rules as the AI field advances. In conclusion, navigating the junction of technical progress and ethical concerns is a complex and ongoing process. Leaders are urged to embrace the challenges presented by this intersection, viewing it as an opportunity to propel responsible AI development and implementation. This journey lays the foundation for ethical AI leadership that transcends mere compliance, actively contributing to the greater good of society.

UNRAVELING BIAS AND ENSURING FAIRNESS

As the realm of artificial intelligence (AI) continues to evolve, so do the ethical challenges inherent in its adoption. At the forefront of these concerns lies the intricate web of biases and fairness issues, both of which are indispensable considerations for

responsible AI leadership. However, is AI opacity inherently and consistently problematic? Does it pose the same problems in every situation? Is it necessary for AI to always provide an explanation in every situation? (Robbion, 2019). One of the most pressing ethical dilemmas in AI adoption is the prevalence of biases within AI systems. These biases, manifesting at various stages such as data collection, algorithmic design, and decision-making, have the potential to inadvertently perpetuate societal prejudices, resulting in unfair outcomes for specific individuals or groups. AI leaders are compelled to confront this reality, recognizing the need for vigilance in identifying and mitigating biases that may arise in both overt and subtle ways.

Even specialists struggle to comprehend the decision-making mechanisms employed by certain types of AI. The problem known as the "black box" has been identified (Wachter, Mittelstadt, and Russell 2018). To address these challenges effectively, a comprehensive understanding of the root causes of bias is imperative. Biases may stem from historical data reflecting societal disparities, biased algorithmic design decisions, or unintentional human biases introduced throughout the development process. AI executives must engage in thorough assessments to detect and minimize these biases, ensuring a nuanced approach to their identification and mitigation.

Making fairness a guiding principle throughout the AI adoption process emerges as a crucial step in resolving ethical dilemmas. This commitment to fairness extends beyond regulatory compliance, becoming an ethical duty for leaders. Prioritizing fairness necessitates the avoidance of discrimination based on protected traits such as race, gender, or socioeconomic position, with a focus on integrating fairness into AI programs from design to deployment. However, it is also understood that AI could perpetuate and even validate human bias against women, skin colour, the elderly, those with disabilities, or other groups (Kraemer et al. 2011; Mittelstadt et al. 2016). Inclusive data practices emerge as a critical component in countering bias, recognizing that biased training data can perpetuate inequalities.

Proactive strategies, such as algorithmic audits and assessments, are essential for ethical unraveling in AI adoption. Leaders must establish methods to regularly assess AI systems for bias and fairness, involving continuous monitoring, review, and adjustment to promptly identify and remedy any emerging biases. Algorithmic evaluations contribute to the ongoing refinement of AI systems, reinforcing their ethical integrity. Furthermore, as bias in this context refers to algorithmic outputs that persistently disfavor sub-groups along racial, gender, and other social groups, it is crucial for AI audits to look into the potential for theoretical assumptions to introduce bias (Ugwudike, 2022).

BEST PRACTICES FOR ETHICAL AI LEADERSHIP

Navigating the ethical challenges of AI leadership necessitates the incorporation of best practices for decision-making, transparency, and accountability. This section delves into critical best practices for developing ethical leadership in artificial intelligence adoption and implementation.

Diversity and Inclusion in AI Development
Encourage different viewpoints in AI development teams to reduce biases and ensure the inclusion of multiple viewpoints. Diverse teams are better suited to identifying and addressing possible ethical issues, enabling a more inclusive and egalitarian approach to AI.

Ethics by Design
Integrate ethical considerations into the AI system design phase. This proactive strategy entails anticipating ethical difficulties and providing answers early in the AI development process. Integrating ethics into the design process helps to prevent problems rather than dealing with them after the fact.

Transparency and Explainability
Transparency in AI decision-making processes should be prioritised by providing transparent explanations for algorithmic decisions. End-users, regulators, and stakeholders should be able to grasp the decision-making process if AI leaders work to make it so. Transparent processes help to build trust and accountability.

Continuous Ethical Impact Assessment
Create a methodology for assessing the ethical implications of AI systems on a constant basis. Evaluate the societal, environmental, and individual repercussions of AI technology on a regular basis, adjusting ethical norms as appropriate. This iterative process guarantees that the organisation remains in line with increasing ethical standards.

User Empowerment and Informed Consent
Users should be empowered by giving them control over AI interactions and assuring informed consent. Transparently convey how AI systems work and the potential consequences for users. Individuals can make conscious decisions regarding their participation with AI technologies with the help of informed consent.

Accountability Mechanisms
Implement accountability measures to hold AI leaders and developers accountable for the ethical consequences of their systems. Establish clear lines of accountability and punishments for ethical transgressions. Accountability promotes a culture of accountability and ethical consciousness.

Bias Mitigation Strategies
Create and execute solutions to reduce bias in AI systems. This entails thoroughly inspecting training data for biases, doing regular audits of algorithms, and using fairness-enhancing strategies. Throughout the AI lifespan, AI leaders must actively work to minimise and correct bias.

Stakeholder Engagement
Engage with a wide range of stakeholders, such as users, communities, ethicists, and regulators. Solicit comments and input throughout the AI development process to achieve a thorough awareness of ethical considerations. Unintended consequences are reduced when decision-making is inclusive.

Education and Training
Make continuing ethical education and training for AI teams a priority. Provide team members with the knowledge and skills they need to identify, comprehend, and handle ethical issues. Continuous learning ensures that AI experts are up to date on changing ethical norms.

Global Collaboration on Ethical Standards
Participate in and contribute to global projects aimed at developing ethical AI standards. Collaboration with peers in the industry, regulatory entities, and international organisations creates a shared understanding of ethical concepts and a cohesive approach to responsible AI development.

AI leaders may develop a culture of ethical responsibility, build trust in AI technology, and contribute to the establishment of a worldwide framework for responsible AI deployment by incorporating these best practises into their leadership strategy.

REAL WORLD SENARIOS
Investigating examples is an important part of resolving ethical dilemma in AI adoption. Examining real-world examples provides significant insight into the intricacies, problems, and ethical concerns that AI executives face. This section looks at notable case studies that offer insight on the various ethical issues of bias and fairness in AI.

Example 1: Algorithmic Hiring Bias
A leading technology company adopted an AI-driven hiring system meant to expedite recruitment processes in a renowned case study. An in-depth examination, however, revealed that the system demonstrated biases favouring individuals from specific educational backgrounds and demographics. As a result, qualified candidates from underrepresented groups were inadvertently excluded. The case emphasises the significance of closely scrutinising algorithmic design and data inputs in order to correct biases that may perpetuate historical inequities.

Example 2: Facial Recognition Technology and Racial Bias
Another interesting case study is the use of facial recognition technology in law enforcement. The AI system demonstrated strong racial biases after being trained on datasets with imbalances in racial representation. Individuals with darker skin tones experienced higher mistake rates, raising concerns about discriminating consequences. This story highlights the importance of AI professionals properly evaluating the datasets used in training models and considering the broader societal ramifications of deploying such technology.

Example 3: Financial Decision-Making Algorithms
In the financial sector demonstrated flaws in credit scoring and loan acceptance algorithms. Using past financial data, the AI algorithms mistakenly favoured certain groups while disadvantageous others. As a result, marginalised groups face systemic discrimination, limiting their access to financial possibilities. AI executives dealing

with ethical quandaries in finance must address these biases by reevaluating model inputs and maintaining openness in decision-making processes.

Example 4: Healthcare Disparities in Diagnosis
The healthcare business has experienced ethical issues as a result of prejudice in diagnostic AI systems. In the identified instances in which AI systems displayed varying levels of accuracy across demographic groups. This highlighted concerns regarding healthcare inequities, as certain groups were more likely to be misdiagnosed. AI leaders in healthcare must prioritise inclusion in training datasets and evaluate the impact of AI systems on various patient groups on a regular basis.

Example 5: Policing and Predictive Policing Algorithms
A predictive police algorithms highlighted ethical quandaries related to bias and justice. The algorithms, which were trained on historical crime data, reinforced existing biases in law enforcement practises. Over-policing in specific neighbourhoods resulted, disproportionately harming communities of colour. Law enforcement AI leaders must wrestle with the ethical issues of employing AI for predictive policing and try to mitigate systematic biases.

Lessons Learned from examples
Real-world senarios highlight the complex link between AI, bias, and fairness. These incidents teach AI executives important lessons about the significance of ongoing monitoring, accountability, and proactive actions to correct biases. Transparency in AI systems, examination of training data, and collaboration with varied stakeholders emerge as essential components in addressing ethical issues.

AI leaders may design tactics that connect with the intricacies of prejudice and justice in varied circumstances by incorporating insights from real-world cases into the ethical framework. It serve as cautionary stories and stimulants for ethical AI leadership, encouraging a thorough knowledge of the ethical factors at work in artificial intelligence adoption.

IMPERATIVE OF ETHICAL AI LEADERSHIP

The imperative of ethical AI leadership emerges as a crucial factor shaping responsible and sustainable development. At its core, ethical considerations are not mere add-ons but rather integral to the fabric of AI deployment, ensuring its alignment with societal values and long-term viability.

One fundamental pillar of ethical AI leadership is the establishment and maintenance of trust and stakeholder confidence. Leaders in the AI domain must navigate open decision-making processes, be accountable for outcomes, and uphold ethical values to earn and sustain trust. This trust becomes the bedrock for successful integration, especially in environments where AI systems impact individuals and communities.

Beyond legal compliance, ethical AI leadership recognizes the necessity for a social license to operate. Organizations must not only adhere to legislative requirements but also align with societal ideals. This congruence is vital for garnering acceptance and support from the diverse array of people and cultures impacted by AI technologies.

Mitigating bias and discrimination is another critical dimension where ethical leadership plays a pivotal role. Leaders must actively work to overcome biases in training data, algorithms, and decision-making processes, contributing to the creation of AI systems that respect human dignity and rights.

Responsible innovation takes center stage in ethical AI leadership, emphasizing ethical research, development, and deployment practices. Anticipating ethical challenges, integrating considerations into the design phase, and actively working to minimize negative societal repercussions are essential components.

Navigating the evolving regulatory landscape is also a key responsibility of ethical AI leadership. Proactively adhering to ethical norms not only ensures compliance but also signals a commitment to responsible and accountable AI practices.

A human-centric approach is central to ethical AI leadership, prioritizing the well-being, autonomy, and empowerment of individuals. Leaders drive the development of AI systems that enhance human capabilities, promote inclusivity, and contribute to societal progress.

Preventing unintended consequences, engaging in global collaboration, and ensuring long-term sustainability underscore the holistic nature of ethical AI leadership. As we navigate the digital era, ethical AI executives pave the way for innovation and accountability to coexist, ensuring that AI becomes a positive force for transformation, harmonizing with human values and societal well-being.

FUTURE DIRECTIONS

In navigating the future landscape of artificial intelligence (AI), ethical leadership emerges as a pivotal force shaping the trajectory of technological advancements. The ethical considerations surrounding AI demand continuous attention and refinement, urging leaders and researchers to embark on a journey marked by nuanced evolution and collaboration.

At the forefront of this roadmap lies the imperative evolution of ethical standards. To establish a robust foundation, industry, academia, and regulatory bodies must engage in ongoing collaborations. The goal is to forge comprehensive and universally accepted ethical frameworks that can guide the development and deployment of AI systems.

Bias mitigation takes center stage in the future of AI, prompting a call for intensified research and development efforts. Strategies aimed at mitigating bias must extend beyond conventional approaches, delving into algorithmic fairness, diversification of training data, and the real-time detection and correction of biases. The ethical imperative here is clear: the pursuit of unbiased and equitable AI systems.

Transparency emerges as a cornerstone of ethical AI leadership. Leaders are tasked with championing increased transparency in AI systems, making algorithms more interpretable, providing clear explanations for AI-driven decisions, and empowering users to understand and question algorithmic outcomes.

An essential facet of ethical leadership in AI involves cultivating a workforce well-versed in ethical principles. Educational programs must be prioritized to enhance awareness of ethical considerations in AI development and deployment. Fostering a culture of responsible AI use becomes integral in shaping a workforce capable of navigating the ethical intricacies of AI technologies.

Given the global nature of AI, collaboration on governance becomes imperative. Leaders are called upon to actively engage in international conversations, working towards the development of common ethical norms and regulatory frameworks. The future demands a collaborative approach to ethical AI leadership, acknowledging the interconnectedness of the digital landscape.

In the realm of innovation, privacy-preserving AI systems emerge as a critical solution to data privacy concerns. Future research must focus on developing methods that allow organizations to glean valuable insights from data while safeguarding individuals' privacy rights.

REFERENCES

- Adam, H., Balagopalan, A., Alsentzer, E., Christia, F., & Ghassemi, M. (2022). Mitigating the impact of biased artificial intelligence in emergency decision-making. Communications Medicine, 2(1), 149.
- Aquino, Y. S. J. (2023). Making decisions: Bias in artificial intelligence and data‐driven diagnostic tools. Australian journal of general practice, 52(7), 439-442.
- Basir, A., Puspitasari, E. D., Aristarini, C. C., Sulastri, P. D., & Ausat, A. M. A. (2023). Ethical Use of ChatGPT in the Context of Leadership and Strategic Decisions. Jurnal Minfo Polgan, 12(1), 1239-1246.
- Bhatta, N. (2021). Emerging ethical challenges of leadership in the digital era: a multi-vocal literature review. Electronic Journal of Business Ethics and Organization Studies, 26(1).
- Bostrom, Nick and Eliezer Yudkowsky, 2014, "The Ethics of Artificial Intelligence", in The Cambridge Handbook of Artificial Intelligence, Keith Frankish and William M. Ramsey (eds.), Cambridge: Cambridge University Press, 316–334. doi:10.1017/CBO9781139046855.020 [Bostrom and Yudkowsky 2014 available online]
- Capurro, R. (2017), "Digitization as an ethical challenge", AI & Soc. Vol. 32, pp. 277-283. Available online: https://doi.org/10.1007/s00146-016-0686-z
- Cobianchi, L., Verde, J. M., Loftus, T. J., Piccolo, D., Dal Mas, F., Mascagni, P. ... & Kaafarani, H. M. (2022). Artificial intelligence and surgery: ethical dilemmas and open issues. Journal of the American College of Surgeons, 235(2), 268-275.
- Copeland, B. J. (2020). Artificial Intelligence. Britannica.com. Retrieved from https://www.britannica.com/technology/artificial-intelligence.

- De Cremer, D. (2022). With AI entering organizations, responsible leadership may slip!. AI and Ethics, 2(1), 49-51.
- Effendi, G. N., & Pribadi, U. (2021, March). The Effect of Leadership Style on the Implementation of Artificial Intelligence in Government Services. In IOP Conference Series: Earth and Environmental Science (Vol. 717, No. 1, p. 012018). IOP Publishing.
- Epley, N. and Kumar, A. (2019), "How to Design an Ethical Organization", Harvard Business Review (May–June 2019, pp. 144-150). Massachusetts: Harvard University, Available Online: https://hbr.org/2019/05/how-to-design-an-ethical-organization. Last accessed 15.05.2023
- Hagendorff, T., 2020. The Ethics of AI Ethics: An Evaluation of Guidelines. Minds and machines (Dordrecht), 30(1), pp. 99-120.
- Havens, J.C. (2018), "Creating Human Standards for Ethical Autonomous Intelligence Systems (A/IS)", AI Matters, Vol. 04 No. 1, pp. 28-31, California: The IEEE. Available online: https:// doi.org/10.1145/3203247.3203255, Last accessed on 10.10.2023
- Kraemer, F., Van Overveld, K., and Peterson, M. (2011). Is There an Ethics of Algorithms? Ethics and Information Technology, 13, 251–60.
- Leavy, S., O' Sullivan, B., & Siapera, E. (2020). Data, power and bias in artificial intelligence. arXiv preprint arXiv:2008.07341.
- Mittelstadt, B., Allo, P., Taddeo, M., Wachter, S. and Floridi, L. (2016). The Ethics of Algorithms: Mapping the Debate. 3(2). https://journals.sagepub.com /doi/full/10.1177/ 2053951716679679.
- Ntoutsi, E., Fafalios, P., Gadiraju, U., Iosifidis, V., Nejdl, W., Vidal, M. E., ... & Staab, S. (2020). Bias in data-driven artificial intelligence systems—An introductory survey. Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery, 10(3), e1356.
- Peifer, Y., Jeske, T., & Hille, S. (2022). Artificial intelligence and its impact on leaders and leadership. Procedia Computer Science, 200, 1024-1030.
- Peltz, J., & Street, A. C. (2020). Artificial intelligence and ethical dilemmas involving privacy. In Artificial Intelligence and Global Security: Future Trends, Threats and Considerations (pp. 95-120). Emerald Publishing Limited.
- Peters, D., Vold, K., Robinson, D., & Calvo, R. A. (2020). Responsible AI—two frameworks for ethical design practice. IEEE Transactions on Technology and Society, 1(1), 34-47.
- Petrin, M. (2019), Corporate management in the age of AI, London: University College London (UCL). Available online: http://dx.doi.org/10.2139/ssrn.3346722.

- Prem, E. (2023). From ethical AI frameworks to tools: a review of approaches. AI and Ethics, 1-18.
- Rezwana, J., & Maher, M. L. (2023). User Perspectives of the Ethical Dilemmas of Ownership, Accountability, Leadership in Human-AI Co-Creation.
- Robbins, S. (2019). A Misdirected Principle with a Catch: Explicability for AI. Minds and Machines, 29(4), 495–514.
- Roselli, D., Matthews, J., & Talagala, N. (2019, May). Managing bias in AI. In Companion Proceedings of The 2019 World Wide Web Conference (pp. 539-544).
- Siau, K., & Wang, W. (2020). Artificial intelligence (AI) ethics: ethics of AI and ethical AI. Journal of Database Management (JDM), 31(2), 74-87.
- Teleaba, F., Popescu, S., Olaru, M., Pitic, D. (2021). Risks of observable and unobservable biases in artificial intelligence used for predicting consumer choice Amfiteatru Economic, 23 (56) (2021), pp. 102-119
- Ugwudike, P. (2022). AI audits for assessing design logics and building ethical systems: the case of predictive policing algorithms. AI Ethics 2, 199–208. https://doi.org/10.1007/s43681-021-00117-5
- Vousinas, G. L., Simitsi, I., Livieri, G., Gkouva, G. C., & Efthymiou, I. P. (2022). Mapping the road of the ethical dilemmas behind Artificial Intelligence. Journal of Politics and Ethics in New Technologies and AI, 1(1), e31238-e31238.
- Waja, G., Patil, G., Mehta, C., Patil, S. (2023). How AI can be used for governance of messaging services: A study on spam classification leveraging multi-channel convolutional neural network International Journal of Information Management Data Insights, 3 (1) (2023), Article 100147, 10.1016/j.jjimei.2022.100147
- Wachter, S., Mittelstadt, B. and Russell, C. (2018). Counterfactual Explanations without Opening the Black Box: Automated Decisions and the GDPR. Harvard Journal of Law & Technology, 31(2), 841–87.
- Whittlestone, J., Nyrup, R., Alexandrova, A., & Cave, S. (2019, January). The role and limits of principles in AI ethics: Towards a focus on tensions. In Proceedings of the 2019 AAAI/ACM Conference on AI, Ethics, and Society (pp. 195-200).
- Zhou, J., Chen, F., Berry, A., Reed, M., Zhang, S., & Savage, S. (2020, December). A survey on ethical principles of AI and implementations. In 2020 IEEE Symposium Series on Computational Intelligence (SSCI) (pp. 3010-3017). IEEE.

A COMPARATIVE ANALYSIS OF INDIA AND BRAZIL TOWARDS ACHIEVING SDG 10

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ABSTRACT
The paper attempts to examine comparative analysis of India and Brazil towards achieving SDGs. The conceptual framework of SDGs includes 17 Sustainable Development Goals adopted by global leaders at the United-Nations General Assembly in September 2015. The 17 SDGs include 169 more specific targets and indicators for implementation and assessment. According to Sustainability report 2023, India ranks 112 with 63.45 index while Brazil stands much ahead of India at position 50 with 73.69 index. nonetheless, India and Brazil had incredibly low SDG 10 scores. The purpose of this study is to present a comparative analysis of India and Brazil's progress toward SDG 10. The study looks at the current situation of the associated indicators that affect income inequality. The study discusses to what extent India and Brazil are successful in reducing gap between income inequality within and between the nations.

Keywords: Sustainable development, SDG 10, India, Brazil, income inequality

1. INTRODUCTION
The united nation's conference held at Rio de Janeiro, Brazil in 2012 conceived the concept of Sustainable Development Goals (SDGs) with the objectives to produce a set of universal goals that meet the imperative environmental, political, and economic challenges faced by the world. However, the process of global movement of progression through target-oriented approach kickstarted in 2000 as Millenium Development Goals (MDGs). It was a step towards reducing income, poverty, increasing accessibility to water and sanitation, reducing child mortality and improvement of maternal health. The MDGs failed to address the complex and interconnected nature of sustainable development and developmental challenges faced by the countries globally. In 2015, MDGs were replaced by SDGs due to lack of holistic approach. SDGs are more comprehensive, integrated, and inclusive with collective action by all countries regardless of their level of development. The SDGs represent a commitment to transformative change and sustainable development pathways that address the root causes of poverty and inequality for all forms (United Nations, 2023a).

The conceptual framework of SDGs includes 17 Sustainable Development Goals adopted by global leaders at the United-Nations General Assembly in September 2015. All SDG17 Goals of sustainable development are interconnected, influence each other. In the era of dealing with the threat of climate change, it aims at how we can manage our fragile natural resources with ensuring gender equality, better health, eradicate poverty, and fostering peace and inclusive societies. It will reduce

inequalities and help economies grow and prosper in the present and future as well. The 17 SDGs include 169 more specific targets and indicators for implementation and assessment. All 17 SDGs are based on 5Ps viz; People, Planet, Prosperity, Peace, and Partnership between economic, social, environmental and governance. The SDG Index is an assessment of each country's overall performance on all 17 SDGs, giving equal weight to each goal. The score signifies a country's position between the worst possible outcome (score of 0) and the target (score of 100). Hence, the difference between 100 and a country's SDG Index score is the distance, in percentage points, that must be overcome to reach optimum SDG performance (United Nations, 2023a). All countries are ranked based on their respective index score. To evaluate the performance of the countries for each goal the normalise score is also calculated for each goal.

The paper attempts to examine India progress towards SDGs and compare India's development trajectory with Brazil. India and Brazil both are large, diverse, and Emerging Market Economies (EMEs). They are among the world's most populous countries in the world, ranked second and fifth respectively. Figure 1 depicts comparison of growth in the GDP for India and Brazil. India is a rapidly growing economy with an average growth rate of 6 percent per annum from 2000 to 2022. India's GDP (at constant USD at 2015) was 2.96 trillion USD in 2022. On the other hand, Brazil grew at the rate of 2 percent per annum, one of the largest emerging markets in Latin America. Brazil's economic growth has been more volatile compared to that of India (Figure 1). Nevertheless, Brazil's per capita GDP is higher compared to India. Figure 2 showcases difference between India and Brazil in terms of GDP per capita at constant USD 2015.

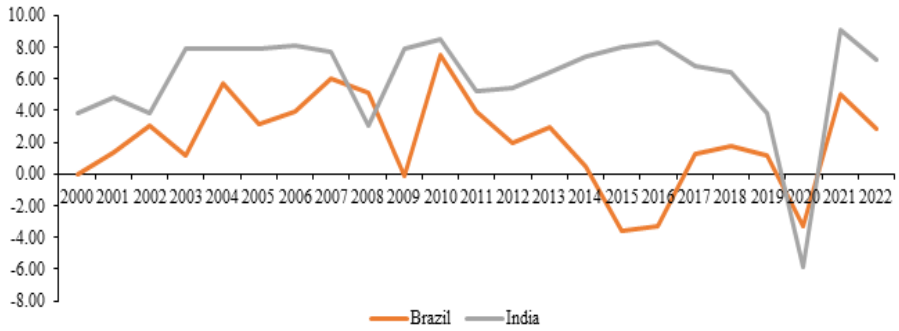

Figure 1: GDP growth rate of India and Brazil during 2000 to 2022

Source: World Bank, 2023

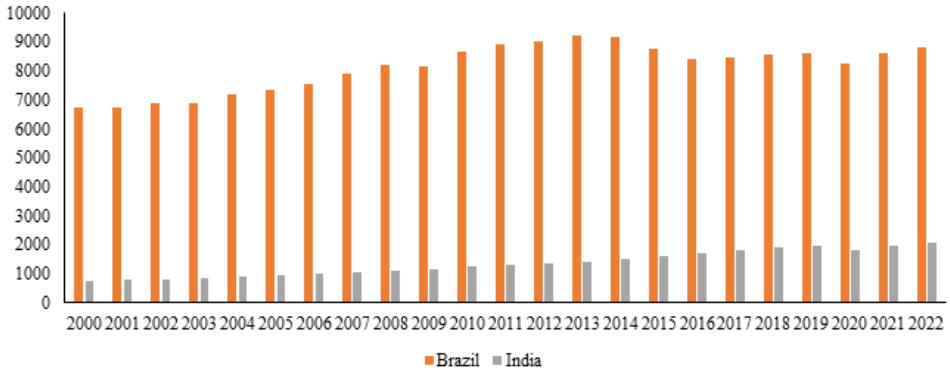

Figure 2: GDP per capita at Constant USD 2015 during 2000 to 2022

Source: World Bank, 2023

The purpose of this study is to present a comparative analysis of India and Brazil's progress toward SDG 10, looking at the associated indicators, programs and policy interventions that affect income inequality. Furthermore, the study discusses the policies and schemes implemented by government of Brazil and India to reduce the gap between income inequality. The reminder of the paper is as follows. Section 2 provides analysis of India and Brazil's progress towards achieving SDGs. Section 3 describes data sources and analysis of the indicators covered to assess the advancement of SDG 10 for India and Brazil. Section 4 covers a brief about policy implications and recommendations and concludes the study.

2. Progress of SDG Index in India and Brazil:

Overall SDG index during 2000 to 2022 for India and Brazil, is displayed in Table 1. The SDG index for India increased at a CAGR of 1.04 percent annually. India's SDG score rose from 51.66 in 2000 to 63.45 in 2022. On the other hand, Brazil's growth rate was slow 0.34 percent annually. With an index value of 67.88 in 2000, Brazil stood far ahead of India. In 2022, Brazil had a score of 73.70. Table 2 and Table 3 represents India's and Brazil's performance for each of 17 SDGs index. In the case of SDG 1, SDG 3, SDG 4, SDG 5, SDG 6 and SDG 9 India showcased significant improvement over and above growth rate of its total SDG index. For SDG 2, SDG 8, SDG 14 and SDG 17 index recorded sluggish growth of 0.81, 0.58, 0.50 and 0.51 percent per annum respectively. However, India displayed negative growth in the index for SDG 10, SDG 12, SDG 13 and SDG 15 (Table 2). From 2017, India always stands low for the achievement of SDG 10. This suggest India is witnessing huge income disparity and unable to improve its performance in reducing the gap between rich and poor. According to World Economic report 2016, the richest 1 percent of Indians own 53 percent of the country's wealth. The richest 5 percent own 68.6 percent, while the top 10 percent have 76.3 percent. The poor people, contributed for a mere 4.1 percent of national wealth.

Brazil, as well, displayed exceedingly low score for SDG 10. Its index was 6.48 in 2000. It mirrored significant improvement in the achievement of SDG 10 (Table 3). The index for SDG 10 registered growth rate of 4.56 percent per annum and reached to 19.86 in 2022. This unequal system makes Brazil a middle-income country with poverty and educational levels equivalent to that of very low-income countries (Brazil Lab, 2023). Current inequality trend in Brazil has increased due to austerity reforms adopted by Brazilian government, to be specific Constitutional Amendment 95/2016 (CA 95), Labour Reform (Law 13.467/2017) and Pension Reform (CA 103). The reforms negatively affected black population, women and youth. The poverty reduction policies experience a dip cut and reduction of public spending on essential services such as health, education, and social protection. It was dropped from 29 percent in 2014 to 8.5 percent in 2019. The major cause if this deterioration was deepening of the social and economic crises and the decrease in social participation has contributed to an increase in hunger and food insecurity in Brazil (Oliveira and Alloatti, 2022). In 2022, Brazilian government has increased the government spending cap to maintain welfare payouts (Marcello, 2022). Brazil witnessed growth in the progression of SDG 9 with a CAGR of 2.70 percent per annum. On the other hand, SDG 8, SDG 12, and SDG 15 recorded reverse performance.

3. Data Sources and Analysis:

The objective of this paper is to encounter India and Brazil's advancement in achieving SDG 10. For this purpose, the study has used sustainable development global database from United Nations (United Nations (2023b). United Nations has the list of indicators and target to be achieved for SDG 10 (Annexure A, Table A1.2). However, based on data availability, the study tries to compare, and analyse the progression of the indicators mentioned in Table 4.

Table 4: List of indicators to examine the progress of SDG 10

10.1 Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population and the total population
10.2 Proportion of people living below 50 per cent of median income, by sex, age and persons with disabilities
10.4 Labour share of GDP
10.5 Financial Soundness Indicators: Regulatory Tier 1 capital to assets Nonperforming loans net of provisions to capital Nonperforming loans to total gross loans Return on assets Liquid assets to short-term liabilities
10.6 Proportion of members and voting rights of developing countries in international organizations
10.7.4 Proportion of the population who are refugees, by country of origin
10.a.1 Proportion of tariff lines applied to imports from least

developed countries and developing countries with zero-tariff"
10.b.1 Total resource flows for development, by recipient and donor countries and type of flow (e.g. Official development assistance, foreign direct investment and other flows)
10.c.1 Remittance costs as a proportion of the amount remitted

Note: Detail list of indicators is available in the Annexture A, Table A.2

Table 1: Progress of Brazil and India towards achieving SDGs during 2000 to 2023

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	CAGR (%)
India	51.66	51.66	51.70	52.06	52.05	52.34	52.86	53.21	53.52	53.48	53.84	55.05	55.52	56.28	57.11	57.94	58.60	60.06	60.94	62.19	62.60	62.78	63.45	63.45	1.04
Brazil	67.88	68.09	68.27	68.65	69.02	69.30	69.61	69.86	70.33	70.26	70.60	70.67	70.89	71.34	71.74	72.56	71.52	71.98	72.03	72.40	72.91	73.37	73.69	73.70	0.35

Source: United Nations, 2023b

Table 2: Progress of India towards achieving 17 SDGs goals during 2000 to 2023

SDGs	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	CAGR (%)
SDG 1	45.87	45.87	45.87	45.87	45.87	45.87	45.87	45.87	45.87	45.87	45.87	57.50	60.35	63.99	66.49	69.54	73.01	75.65	78.91	81.08	76.94	80.62	86.23	86.23	3.47
SDG 2	47.30	47.65	46.13	46.82	46.24	46.58	47.64	49.05	49.43	49.26	50.50	51.35	52.23	52.62	53.63	51.94	52.93	53.57	54.04	54.14	53.81	54.19	54.39	54.39	0.81
SDG 3	39.54	40.20	40.90	42.15	43.25	44.35	45.28	45.34	47.27	47.63	52.11	52.62	53.17	54.46	58.20	60.03	61.42	62.02	62.32	62.97	64.32	64.29	64.79	64.79	2.47
SDG 4	60.58	60.55	60.45	64.05	64.05	64.05	68.05	72.56	74.28	73.57	73.89	78.45	79.14	80.92	82.36	82.34	79.31	78.05	80.62	80.06	82.91	86.02	89.29	89.29	1.68
SDG 5	30.59	29.65	28.83	28.02	26.94	28.44	29.08	28.55	29.17	30.68	31.26	32.71	34.00	34.05	35.05	38.78	39.88	40.91	42.04	46.13	45.84	45.96	46.25	46.25	2.60
SDG 6	43.19	43.60	44.02	44.45	45.94	46.63	47.33	48.03	48.73	49.43	50.13	50.93	51.72	52.52	53.31	54.11	54.91	55.72	56.52	57.32	58.13	58.13	58.13	58.13	1.44
SDG 7	40.29	40.50	42.57	43.55	43.99	45.40	45.93	46.90	47.17	47.70	48.84	47.28	51.11	53.01	54.30	56.52	58.09	60.39	62.93	64.72	66.21	66.21	66.21	66.21	2.40
SDG 8	66.37	66.26	66.18	66.03	65.94	65.84	65.88	65.93	66.03	66.01	66.05	66.13	66.17	66.21	69.02	66.77	66.81	73.51	74.05	74.67	72.49	73.50	73.71	73.71	0.58
SDG 9	22.59	22.53	22.51	22.51	22.68	23.01	23.05	23.26	23.59	23.67	23.94	24.34	24.30	24.59	25.25	26.03	30.29	43.51	42.62	46.40	49.73	50.56	50.96	50.96	4.17
SDG 10	40.28	40.28	40.28	40.28	40.28	40.28	40.28	40.28	40.28	38.87	38.87	38.45	38.45	38.45	38.45	39.86	39.72	38.17	40.00	38.45	38.45	38.45	38.45	38.45	-0.23
SDG 11	47.51	47.40	47.49	47.38	47.47	46.64	46.73	45.00	46.71	46.60	45.88	46.58	43.02	47.37	45.43	46.54	49.06	48.96	48.23	48.94	52.08	46.39	50.05	50.05	0.24
SDG 12	95.77	95.77	95.86	95.83	95.76	95.67	95.59	95.46	95.43	95.41	95.31	95.22	95.24	95.28	95.24	95.22	95.16	95.04	94.92	94.77	94.77	94.78	94.78	94.78	-0.05
SDG 13	96.76	96.77	96.74	96.70	96.59	96.50	96.38	96.22	96.04	95.77	95.69	95.33	95.07	95.15	94.96	94.90	94.74	94.60	94.34	94.34	94.71	94.28	94.28	94.28	-0.14
SDG 14	53.53	53.87	53.38	54.82	54.02	54.82	55.22	55.87	55.44	53.85	53.46	53.99	53.60	53.51	54.21	53.10	51.64	51.88	52.62	62.10	62.24	62.38	62.34	62.34	0.50
SDG 15	47.77	47.57	47.42	47.22	47.02	46.82	46.62	46.47	46.27	46.12	45.92	45.72	47.54	47.34	47.18	47.03	46.93	46.73	46.40	46.20	46.05	45.91	45.61	45.61	-0.13
SDG 16	51.15	51.21	51.25	51.30	51.27	51.22	51.31	50.48	50.07	51.41	48.79	50.95	49.51	48.07	49.60	52.66	52.17	52.94	54.25	53.15	52.71	50.61	48.51	48.51	0.00
SDG 17	49.14	48.54	48.95	47.94	47.64	47.66	48.38	49.30	48.00	47.26	48.84	48.27	49.29	49.16	48.26	49.53	50.16	49.29	51.26	51.77	52.80	55.00	54.65	54.65	0.51

Source: United Nations, 2023b

Note: for the detail list of SDGs please refer Table A.1 in Annexure A

Table 3: Progress of Brazil towards achieving 17 SDGs goals during 2000 to 2023

SDGs	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	CAGR (%)
SDG 1	82.52	82.52	82.52	82.52	82.52	82.52	82.52	82.52	82.52	82.52	82.52	83.71	85.57	87.42	88.59	87.30	85.30	84.63	84.30	84.67	92.59	92.95	93.30	93.30	0.51
SDG 2	68.78	68.27	68.09	70.18	69.76	69.51	70.03	70.62	71.38	70.72	71.47	71.11	71.60	71.55	71.27	72.16	69.75	71.68	70.89	70.76	70.15	68.72	68.72	68.72	0.07
SDG 3	72.37	72.77	72.84	73.50	73.56	74.71	75.31	75.22	76.17	77.25	77.69	78.13	77.74	78.77	78.26	78.98	78.18	79.02	79.06	78.25	78.40	77.15	77.65	77.65	0.35
SDG 4	81.19	81.19	81.19	81.19	82.04	82.84	83.18	83.17	83.19	81.13	80.87	79.93	78.53	82.33	83.51	83.02	85.11	85.17	85.47	86.12	85.84	85.93	85.93	85.93	0.27
SDG 5	62.75	63.35	63.05	64.25	64.25	64.25	64.35	64.45	64.45	64.35	64.25	64.25	64.25	65.73	66.51	66.81	66.93	67.81	70.18	70.46	69.19	69.95	70.37	70.37	0.52
SDG 6	80.37	80.68	80.99	81.29	81.59	81.89	82.18	82.47	82.75	83.04	83.32	83.59	83.87	84.14	84.41	84.67	84.90	85.25	85.51	85.77	86.07	86.07	86.07	86.07	0.32
SDG 7	83.51	83.02	84.13	85.65	85.90	86.60	87.35	88.23	88.44	89.81	88.97	88.71	88.00	87.56	87.19	88.20	89.34	89.23	89.98	90.53	90.61	90.61	90.61	90.61	0.33
SDG 8	75.24	75.18	75.19	74.89	75.50	75.23	75.71	75.92	76.47	75.84	76.60	76.84	77.04	77.13	79.22	78.88	77.10	74.07	73.09	72.13	70.73	73.63	76.01	76.01	-0.07
SDG 9	40.51	40.85	41.48	42.15	43.02	43.61	45.02	45.93	46.83	48.20	49.63	51.98	54.20	59.29	63.20	65.75	52.98	63.56	64.15	64.81	66.69	68.75	68.97	68.97	2.70
SDG 10	6.48	6.48	6.90	7.61	9.16	9.44	10.42	11.41	12.68	13.10	13.10	14.23	13.52	14.51	15.49	15.63	13.66	13.66	12.82	13.38	19.86	19.86	19.86	19.86	4.56
SDG 11	75.20	75.27	76.26	76.33	77.32	77.47	78.46	80.16	78.31	77.16	80.48	76.87	78.52	76.76	75.37	79.64	79.20	80.07	79.87	80.87	76.40	78.43	80.87	80.87	0.21
SDG 12	85.39	85.50	85.46	85.19	85.08	85.10	84.95	84.59	84.37	84.55	84.15	83.93	83.94	83.79	83.75	84.13	84.01	83.82	83.69	83.53	83.53	83.52	83.52	83.52	-0.11
SDG 13	93.16	93.15	93.17	93.24	93.12	93.14	93.13	92.97	92.82	93.05	92.65	92.14	91.98	91.59	91.79	92.99	93.71	93.57	93.87	93.92	94.20	93.86	93.86	93.86	0.04
SDG 14	58.31	59.40	59.12	59.10	59.81	60.16	60.05	59.54	61.03	61.22	61.77	61.59	62.32	63.33	62.35	62.09	62.22	62.71	63.18	63.68	63.76	63.82	63.78	63.78	0.39
SDG 15	62.30	62.39	62.66	62.76	62.81	62.97	63.28	63.36	63.71	63.71	63.89	63.86	63.81	63.89	63.91	63.91	63.89	63.91	59.22	59.17	59.17	61.65	61.65	61.65	-0.14
SDG 16	58.72	58.45	58.30	58.20	58.62	58.80	58.65	56.24	59.13	58.65	56.70	58.21	57.48	52.85	53.30	55.58	55.09	52.80	55.33	58.11	58.42	57.87	56.91	56.91	-0.18
SDG 17	69.18	69.07	69.21	68.91	69.22	69.86	70.83	70.90	71.43	72.10	72.19	72.24	72.71	72.17	71.54	73.84	74.48	72.67	73.93	74.68	73.91	74.59	74.64	74.64	0.38

Source: United Nations, 2023b

Note: for the detail list of SDGs please refer Table A.1 in Annexure A.

3.2 Analysis:

This sub-section covers comparative analysis of India and Brazil towards achieving SDG 10. It is essential to monitor the trends of the indicators to understand income distribution dynamics and inform policies aimed at reducing poverty and inequality.

3.2.1 Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population and the total population: This indicator provides better understanding of income distribution and inequality within a country. It helps to assess whether the bottom 40 percent of the population is experiencing income or expenditure growth at a faster or slower rate compared to the overall population. It is desirable for the household expenditure growth rate of the bottom 40 percent to be at least as high as or higher than the overall population's growth rate. This implies a reduction in income inequality and an improvement in the standard of living for the most economically vulnerable segments of society. The data for this indicator is not available for earlier years. In 2019, the income growth rate of housing expenditure for the bottom 40 percent of the population in India was 4.48 percent, while the overall population was slightly higher at 4.86 percent. Brazil experienced negative growth rate of household expenditure for bottom 40 percent and for the entire population (-) 0.85 and (-)1.11 percent in 2019. Negative growth rate in household expenditure indicates a decrease in the amount of money that households are spending on goods and services. This is the sign of an economic slowdown, as people reduce their spending because of job losses, unstable economic conditions, or other financial difficulties. It also suggests that those in the lower income brackets are facing financial strain. It indicates that those in poverty are having difficulty paying for needs, which might worsen their situation and widen the social divide. According to a 2019 United Nations report, about 1% of the wealthiest Brazilians possess 28.3 percent, resulting in the second-highest income concentration in the world.

3.2.2. Proportion of people living below 50 per cent of median income, by sex, age and persons with disabilities: This measure identifies patterns and disparities in income distribution among different demographic groups. It gives insights into the extent of poverty and income inequality within a population and design targeted interventions to address these challenges. This indicates the share of the population whose income falls below half of the median income level. The median income is the middle value of a distribution, where half the population earns more, and half earns less. A more sophisticated understanding of income inequality among various demographic groups is made possible by the demographic breakdown. It's useful to determine whether low incomes disproportionately affect populations, such as women, children, the elderly, or those with disabilities. Table 5 indicates the extent of income inequality within country for India and Brazil. A higher proportion of people living below 50 percent of the median income suggests a larger portion of the population experiencing financial vulnerability and poverty. Brazil had a substantially higher proportion of its population living below 50 percent of the median income, hovering around 22 to 24 percent. Brazil's proportions remain consistently higher than India's, both countries experience fluctuations though. The current glaring

socioeconomic divide between classes is partly a result of Brazil's historical circumstances, which include becoming the last country in the Americas to abolish slavery in 1888 and even recognizing the right to vote for those without formal education only later, in 1988. Brazilian political inequality has been exacerbated by history, and it additionally perpetuates economic and social inequality (Pimentel, 2022).

3.2.3 Share of labour in GDP

This indicator calculates the percentage of GDP contributed by employees each year. It explains how much economic expansion results in workers earning. The higher share of labour in GDP signifies economic growth and acceleration in production activity transformed into better income distribution and higher living standards for people in the economy. Table 6ndepicts both India and Brazil have relatively high labour shares in the GDP, indicating that a significant portion of their economic output goes to labour. It is observed that Brazil has maintained a higher labour share in the GDP compared to India over the years. Both countries witnessed fluctuations in labour share in the intermediate years, but Brazil tends to have a wider range of values, indicating potential volatility in labour income. However, increase in the labour share is considered as the driver behind falling inequality in Brazil.

3.2.4. Financially Sound indicators: This indicator is measured in terms of 7 measures of financial soundness with the target to improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations.

1. **Regulatory capital to assets:** This indicator measures the proportion of regulatory capital (capital required by financial regulators) to total assets. Higher values generally indicate a stronger financial position and better ability to absorb losses.
2. **Regulatory Tier 1 capital to risk-weighted assets:** Tier 1 capital represents the core capital of a bank, such as common stock and retained earnings. This indicator measures the quality of a bank's capital relative to its risk exposure. Higher values indicate better capital adequacy and financial stability.
3. **Non-Performing Loans to Total Gross Loans:** Non-performing loans (NPLs) are loans that are in default or close to being in default. This indicator measures the proportion of NPLs to the total amount of loans extended by the bank. Lower values suggest a healthier loan portfolio and better risk management practices.
4. **Non-Performing Loans Net of Provisions to Capital:** This indicator assesses the coverage of NPLs by provisions set aside by the bank. Negative values indicate that provisions are insufficient to cover NPLs, which can be a sign of financial stress.
5. **Return on Assets (ROA):** ROA measures a bank's profitability by comparing its net income to its average total assets. Higher values indicate better profitability.

6. **Liquid Assets to Short-Term Liabilities:** This ratio assesses a bank's ability to cover short-term liabilities with liquid assets. Higher values suggest better liquidity and ability to meet short-term obligations.
7. **Net Open Position in Foreign Exchange to Capital:** This indicator assesses the exposure of a bank's capital to fluctuations in foreign exchange rates. It measures the bank's net position in foreign currency relative to its capital. Higher values indicate higher exposure to foreign exchange risk (Our World in Data Team, 2023).

India shows lower regulatory capital to assets and regulatory Tier 1 capital to risk-weighted assets compared to Brazil, suggesting potentially weaker capital positions. India tends to have higher non-performing loans to total gross loans compared to Brazil, indicating relatively higher credit risk. However, Negative values of Brazil for Non-Performing Loans Net of Provisions to Capital indicate that provisions are insufficient to cover NPLs, implies financial stress. Return on assets is lower for India compared to Brazil suggesting lower profitability. Liquid assets to short-term liabilities are generally lower for India compared to Brazil, indicating potentially lower liquidity levels. Brazil shows a more stable trend in the net open position in foreign exchange to capital compared to India, indicating potentially lower exposure to foreign exchange risk.

Table 5: Indicators for Income inequality within nation

10.1.1 and 10.4.1	Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Proportion of people living below 50 per cent of median income, by sex, age and persons with disabilities	India	5.37	--	--	--	--	5.85	6.40	--	--	--	5.67	5.83	5.23	6.75	8.62	8.23	--
	Brazil	24.49	24.29	23.61	24.22	23.52	23.37	22.94	22.80	22.48	22.19	22.47	23.06	23.10	23.51	24.04	18.22	22.27
Labour share of GDP	India	58.90	55.90	55.10	59.90	60.70	57.90	56.90	56.20	55.50	55.90	54.40	54.60	56.20	55.70	56.70	57.80	--
	Brazil	56.90	58.20	56.80	57.50	59.30	57.90	58.30	57.80	59.00	59.70	61.50	61.40	61.20	60.70	60.70	63.10	--

Source: United Nations (2023c)

Table 6: Financial Soundness Indicator

Financial Soundness Indicators	Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
10.5.1 - Regulatory capital to assets	India	5.87	6.13	6.07	6.31	6.68	6.70	7.04	6.89	8.03	7.81	7.83
	Brazil	10.08	10.15	10.15	9.46	7.69	8.39	8.78	9.11	9.55	8.66	9.02
10.5.1 - Regulatory Tier 1 capital to risk-weighted assets	India	9.01	9.32	9.28	9.61	10.08	10.70	11.02	11.91	14.66	14.48	13.64
	Brazil	12.87	11.93	12.61	12.73	12.73	14.28	15.37	15.61	15.95	16.35	15.97
10.5.1 - Non-performing loans to total gross loans	India	2.67	3.37	4.03	4.35	5.88	9.19	9.98	9.46	9.23	7.94	6.54
	Brazil	3.47	3.45	2.86	2.25	2.85	3.08	2.88	2.60	2.66	1.87	2.08
10.5.1 - Non-performing loans net of provisions to capital	India	12.48	12.12	16.7	17.32	24.01	38.71	41.62	26.92	38.74	23.24	13.69
	Brazil	--	--	--	-9.16	-9.94	-11.72	-12.13	-12.61	-12.36	-16.57	-13.34
10.5.1 - Return on assets (%)	India	1.15	1.21	1.00	1.03	0.7	0.55	0.3	0.03	0.54	0.79	1.13
	Brazil	1.73	1.41	1.38	1.87	1.42	1.3	1.75	2.21	1.96	1.82	2.35
10.5.1 - Liquid assets to short term liabilities (%)	India	64.48	80.79	82.95	75.8	73.99	85.79	76.58	64.31	66.59	78.12	68.61
	Brazil	178.58	191.77	182.78	201.22	190.36	237.07	238.61	240.21	240.09	283.24	199.01
10.5.1 - Net open position in foreign exchange to capital	India	0.44	0.25	0.23	0.2	0.34	0.26	0.22	0.28	0.27	0.26	0.79
	Brazil	0.13	-0.45	0.31	0.18	0.31	0.57	0.44	0.47	0.24	0.63	2.36

Source: United Nations (2023c)

3.2.5 Proportion of members and voting rights of developing countries in international organizations: This global indicator is defined as the percentage of members (or voting rights) in international organizations that are (or belong to) developing countries. For institutions where membership and voting rights are different, this indicator observes the percentages separately. International organizations comprise eleven multi-lateral institutions for the purposes of this indicator: UN General Assembly, UN Security Council, UN Economic and Social Council, International Monetary Fund, International Bank for Reconstruction and Development, International Finance Corporation, African Development Bank, Asian Development Bank, Inter-American Development Bank, World Trade Organization and Financial Stability Board. The indicator ensures enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions to deliver more effective, credible, accountable, and legitimate institutions (Our World in Data Team, 2023). The proportion of members of developing countries including India and Brazil in international organizations, by organization has been similar. The share of developing countries is more than 20 percent in the Inter-American Development Bank.

3.2.6 Responsible and well-managed migration policies: It has four indicators to examine implementation of planned and well-managed migration policies. Firstly, recruitment cost borne by employee as a proportion of monthly income earned in country of destination. The amount that migrant workers pay to find, qualify for, secure, and reach their first job abroad, divided by their average monthly salary. A higher value indicates relocation for employment is costly. Proportion of countries with secure, safe, and responsible migration policies for Latin American and Caribbean region is 71 percent whereas for central and south Asian countries is 75 percent. Deaths and disappearances are recorded where the incident took place. Registered numbers are likely to be higher where there is better media coverage and official reporting of deaths. Since this indicator is meant to measure the risks of irregular migration movement between countries, it excludes deaths of migrants in countries where they have established residence, as well as migrants dying in refugee housing or immigrant detention centres, unless the death can be unambiguously linked to a risk associated with the journey. However, data for India and Brazil is available for one or two years. Fourth indicator people recognized as refugees, as a proportion of the total population of their country of origin. This indicator is measured as the total number of individuals recognized as refugees per 100,000 resident population of a given country. For India over the years number of individuals is either one or two while for Brazil it is either zero or one. This indicator is meant to measure the risks of irregular migration movement between countries, it excludes deaths of migrants in countries where they have established residence, as well as migrants dying in refugee housing or immigrant detention centres, unless the death can be unambiguously linked to a risk associated with the journey (Our World in Data Team, 2023).

3.2.7 Proportion of tariff lines applied to imports from least developed countries and developing countries with zero-tariff in the UN SDG framework. This indicator measures the proportion of tariff lines applied to products imported from least developed countries with a 0% tariff rate. Table 7 depicts overview positions of India and Brazil with zero tariff rate from LDCs. This data reflects the trend of tariff policies regarding zero-tariff rates for imported goods increased over the period. In 2005, 29.57 percent of the tariff lines applied to imports in India had a zero-tariff rate which was rose to 39.42 percent. The proportion of tariff lines applied to imports with zero tariff for Brazil has always been higher than India. The higher proportion with zero tariff lines suggest more open position and improvement in the giving access to LDCs in the global landscape.

3.2.8 Development assistance and investment:

Total resource flows for development, by recipient and donor countries and type of flow (e.g. official development assistance, foreign direct investment and other flows) in the UN SDG framework. Official development assistance refers to flows to countries and territories on the Organization for Economic Co-operation and Development's Development Assistance Committee (DAC) and to multilateral institutions which meet a set of criteria related to the source of the funding, the purpose of the transaction, and the concessional nature of the funding. By promoting official development aid and financial flows, including foreign direct investment, to states where the need is greatest particularly, least developed countries—the goal is to lessen inequality between the nations. Table 8 represents financial support each country received for development activities over the specified period, reflecting changes in development assistance trends over time. In 2011, India received a total assistance for development of $20,063.63 million, while Brazil received $37,345.72 million. In 2015, India's assistance decreased to $9,790.16 million, while Brazil received $38,238.02 million. In 2020, India received $10,971.81 million, whereas Brazil received $1,612.58 million. In 2021, India received $19,463.45 million, and Brazil received $18,926.45 million.

Table 7: Proportion of tariff lines applied to imports with zero-tariff

Country	2005	2010	2015	2016	2017	2018	2019	2020	2021
India	29.57	33.24	35.14	35.71	35.97	37.04	38.07	38.00	39.42
Brazil	45.07	48.45	56.35	55.60	54.91	58.11	54.96	56.10	55.11

Source: United Nations (2023c)

3.2.9 Remittance costs:

According to UN Framework, remittance costs as a proportion of the amount remitted. Remittances are financial transfers from non-residents to residents of a country, such as a worker abroad sending money to family and friends. This indicator is measured in terms of two objectives. Firstly, transaction costs of migrant remittances should be 3 percent or less by 2030, with the cost calculated as the global average total cost of sending 200 United States dollars (or the equivalent value in local sending currency) as the percentage of the amount sent. Data for this indicator is

shown in the interactive visualization. The second objective is that remittance corridors (the sum of remittances sent between two countries) where costs are higher than 5 percent should be eliminated, meaning that individuals sending remittances should be able to do so while incurring an average cost of 5 percent of less of the amount sent, across the three cheapest services in each corridor. This is also measured in terms of sending 200 United States dollars or equivalent. Table 9 displays costs incurred by individuals or entities when sending remittances from the respective countries, reflecting changes in remittance cost trends over time. The average remittance cost for sending $200 from India in 2011 was 6.96 percent, whilst the cost for sending the same amount to Brazil was nearly twice as high at 13.42 percent. By 2015 there was considerable decline in the average remittance cost for Brazil was 7.01 percent. The average remittance cost dropped even further in 2020, to 6.90 percent for Brazil and 5.41 percent for India. Brazil's average remittance cost was 6.43 percent in 2021, whereas India's was 5.31 percent.

Table 8: Total assistance for development received (current US $ Million)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
India	20063.63	20119.58	11759.53	17676.40	9790.16	19426.93	23349.35	18092.99	23999.40	10971.81	19463.45
Brazil	37345.72	35526.70	35594.48	66638.20	38238.02	21764.53	17372.88	12262.94	11174.38	1612.58	18926.45

Source: United Nations (2023c)

Table 9: Average remittance costs of sending $200 for a sending country as a proportion of the amount remitted

Country	2011	2015	2017	2018	2019	2020	2021
India	6.96	6.50	5.98	5.68	5.38	5.41	5.31
Brazil	13.42	7.01	6.33	7.06	7.63	6.90	6.43

Source: United Nations (2023c)

CONCLUSIONS

Income inequality is a multidimensional concept. There is an interrelationship between economic variables and social variables such as income, labour, education, health, and household conditions. When people lack any of these variables it leads to deprivation. The deprivation can be both social and economic which results into limiting capabilities and capacities. Historically, Brazil has struggled with high levels of income inequality. This is reflected in the consistently high proportions of its population living below 50% of the median income. India, while also facing significant challenges related to poverty and income inequality. Brazil should focus on the encouraging job creation and ensuring that employment opportunities are accessible to all segments of society. Various skill development programs to foster skills and vocational training to enhance accessibility for the employment. In Brazil, social spending and taxation play a much weaker role in reducing inequality (OECD, 2015). The Brazilian tax system’s redistributive potential can be better utilized to address disparities. Progressive tax system and strengthening social safety nets can bridge the gap between persistent income inequality issues. India needs to continue

efforts to improve access to education, healthcare, and employment opportunities, particularly for vulnerable populations, to further reduce the proportion of its population living below 50% of the median income. In India, government ensures minimum wages and timely payment for workers with more social security coverage. Government of India also mandates companies to allocate a portion of profits toward social development initiatives. Policies in India and Brazil demonstrate commitment to reduce income inequality, challenges remain. Continued efforts, effective implementation, and monitoring are essential for achieving more equitable outcomes.

REFERENCES

- Brazil Lab (2023). Princeton university, Research Hub, inequalities, retrieved from https://brazillab.princeton.edu/research-hubs/inequalities#:~:text=Economic%20inequality%20in%20Brazil%20is%20archetypal%3A%20extremely%20high%2C,levels%20equivalent%20to%20that%20of%20very%20low-income%20countries on 25th February, 2024.
- OECD (2015). Inequality - Improving policies to reduce inequality and poverty Brazil policy brief, organization for Economics, Co-operation and development. OECD Better Policies Series, retrieved from https://www.oecd.org/policy-briefs/brazil-improving-policies-to-reduce-inequality-and-poverty.pdf on 25th February 2024.
- Oliveira, de ALM, Alloatti MN (2022). Gendering the crisis: austerity and the Covid-19 pandemic in Brazil. Econ Polit (Bologna). 2022;39(1):203-224. doi: 10.1007/s40888-021-00243-7. Epub 2021 Sep 1. PMID: 35422583; PMCID: PMC8408357.
- Our World in Data Team (2023). SDG Tracker: Measuring progress towards the Sustainable Development Goals, Retrieved from https://ourworldindata.org/sdgs OurWorldInData.org on 11 February, 2024.
- Pimentel, Benan (2022). Equal before the Law," But Not in Practice: Brazil's Social Inequality Crisis. Harvard Political Review, Retrieved from https://harvardpolitics.com/brazil-social-inequality/ on 25th February, 2024.
- United Nations (2023a). Department of Economics and Social Affairs-Sustainable development, retrieved from https://sdgs.un.org/goals on 1st February, 2024.
- United Nations (2023b). Sustainable development report, retrieved from https://unstats.un.org/sdgs/report/2023/on 1st February, 2024.
- United Nations (2023c). Sustainable Development global database, retrieved from https://unstats.un.org/sdgs/dataportal on 1st February, 2024.
- World Bank (2023). World Developmental Indicators, Database, retrieved from https://data.worldbank.org/ on 1st February, 2024.

- World Economic Forum (2016). Inequality of India what's the real story? Retrieved from https://www.weforum.org/agenda/2016/10/inequality-in-india-oxfam-explainer/ on 15th February, 2024.

Annexure A

Table A1: List of 17 SDGs

1. End poverty in all its forms everywhere
2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3. Ensure healthy lives and promote well-being for all at all ages
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5. Achieve gender equality and empower all women and girls
6. Ensure availability and sustainable management of water and sanitation for all
7. Ensure access to affordable, reliable, sustainable and modern energy for all
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10. Reduce inequality within and among countries
11. Make cities and human settlements inclusive, safe, resilient and sustainable
12. Ensure sustainable consumption and production patterns
13. Take urgent action to combat climate change and its impacts
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Source: United Nations (2023b)

Table A.2: SDG 10 indicators

SDG 10 Indicators	Target
10.1 Reduce income inequalities 10.1.1 Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population and the total population	By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average
10.2 Promote universal social, economic and political inclusion 10.2.1 Proportion of people living below 50 per cent of median income, by sex, age and persons with disabilities	By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status
10.3 Ensure equal opportunities and end discrimination: data is not available 10.3.1 Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law	Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard
10.4 Adopt fiscal and social policies that promote equality 10.4.1 labour share of GDP 10.4.2 Redistributive impact of fiscal policy	Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality.
10.5 Improved regulation of global financial markets and institutions Financial Soundness Indicators: This indicator is measured in terms of 7 measures of financial soundness: Regulatory Tier 1 capital to assets Regulatory Tier 1 capital to risk-weighted assets Nonperforming loans net of provisions to capital Nonperforming loans to total gross loans Return on assets Liquid assets to short-term liabilities Net open position in foreign exchange to capital	Improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations
10.6 Enhanced representation for developing countries in financial institutions	Ensure enhanced representation and voice for developing countries in decision-making in global

10.6.1 Proportion of members and voting rights of developing countries in international organizations.	international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions.
10.7 Responsible and well-managed migration policies 10.7.1 Recruitment cost borne by employee as a proportion of monthly income earned in country of destination 10.7.2 Proportion of countries with migration policies that facilitate orderly, safe, regular and responsible migration and mobility of people. 10.7.3 Number of people who died or disappeared in the process of migration towards an international destination. 10.7.4 Proportion of the population who are refugees, by country of origin"	Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies.
10.a.1 Proportion of tariff lines applied to imports from least developed countries and developing countries with zero-tariff"	Implement the principle of special and differential treatment for developing countries, in particular least developed countries, in accordance with World Trade Organization agreements
10.b.1 Total resource flows for development, by recipient and donor countries and type of flow (e.g. Official development assistance, foreign direct investment and other flows)	Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes.

Source: Our World in Data team (2023).

SMART LEARNING IN THE DIGITAL ERA: A STUDY ON THE BEHAVIORAL INTENTIONS OF DISTANCE LEARNING GEN Z STUDENTS TOWARDS GENERATIVE AI INTEGRATION

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ABSTRACT

The paper examines how remote learning Generation Z adopts generative AI for smart learning in India. The components considered were behavioural intention (BI), effort expectancy (EE), social influence (SI), and performance expectancy. Knowledge (K) conceptualises knowledge exchange, acquisition, and application; social equity and inclusion (SEI); trust in technology (T); enabling conditions (FC); and hedonic motivation (HM) influence smart learning adoption through generative AI. The selective sampling quantitative study examined 625 Generation Z Indian online learners and college students. Data was acquired using a survey questionnaire and processed using Smart PLS 4. The findings show a strong link between behavioural intention and generative AI-smart learning adoption. Facilitating conditions, hedonic motivation, social equity, and inclusion were insignificant, while knowledge, trust in technology, and behavioural intention significantly affected the endogenous variable. Even with trust and knowledge, students may not have the HM to use the platform because it may not meet their unique learning needs. Social equity and inclusion are not influential because the technology is not customised or adapted for diverse learning styles. In conclusion, these findings can help education technology companies innovate and bridge the market gap by offering alternatives and a customisable interface. The government, corporations, and schools must control smart learning through generative AI for ethics, or Gen Z will lose logic and critical thinking skills. The government and university funding should also include such technology in curriculums to build smart learning skills in students, which may be crucial in the labour market. Finally, this analysis stresses practical implications and prospective research opportunities, taking current technology requirements into account.

Keywords: Generative Artificial intelligence, Smart learning Hedonic Motivation, Social equity and Inclusion, Distance learning students, Indian eneration Z

INTRODUCTION

McCarthy introduced the phrase "artificial intelligence" in 1956. Since then, leading scientists, mathematicians, and academics have been passionately exploring AI's possibilities. Over the past, for a few decades, artificial intelligence has made significant advances, breakthroughs, and paradigm shifts.

According to Baker and Smith(2019), AI is “computers that perform cognitive tasks, usually associated with human minds, particularly learning and problem-solving." AI's not a single technology, they say. It encompasses machine learning, natural language processing, data mining, neural networks, and algorithms. The rise of AI applications in numerous fields has garnered attention in recent years. According to Next Move Strategy Consulting, the AI the market will increase rapidly in the next decade. The Indian AI market is expected to reach US$5.47 billion in 2024, according to figures. The market is estimated to expand 17.94% annually (CAGR 2024–2030) to US$14.72 billion by 2030. The US market will be the largest globally (US$106.50 billion in 2024).It’s worth of approximately 100 billion U.S. dollars is expected to rise twentyfold by 2030 to nearly two trillion and is assumed to keep on moving from rule-based methods to autonomous content generation aka Generative AI. Supply chains, marketing, product development, research, analysis, and more are set to integrate AI into their operational frameworks and to keep evolving with it.

Early mid-20th-century AI used symbolic logic and rule-based programming. From 1980 to 2010, statistical and machine learning methods enabled machines to uncover data patterns. Deep learning in the 2010s transformed AI, especially neural networks, enabling image identification and NLP advancements. Generative AI creates realistic writing, music, and images using GANs and VAEs. OpenAI's GPT series and transformers increase natural language production.

Generative AI Tools 3.0's 2022 release raised hopes. Google's interest in generative AI rose between 2022 and 2023, showing its popularity. This trajectory shows continued interest, especially as generative AI tools and other platforms update and produce additional generative AI programmes.

The Indian generative AI market would grow 23.56% to US$4.20 billion by 2030 from US$1.18 billion in 2024. At US$23.20 billion in 2024, the US AI market will be the largest worldwide (Statista, 2024).

Research shows that integrating AI application tools in education and academics can tailor learning, optimise administrative operations, and enable data-informed decision-making that could change education. Key effects include customised learning. This market has risen significantly and remains popular. To tailor content, instruction, and feedback, several educational software companies use AI to assess student performance, preferences, and learning styles. This customised approach boosts student comprehension, engagement, and retention (Luckin, Holmes, Griffiths, and Forcier, 2016). AI education applications will climb 43% from 2018 to 2022, according to the 2018 Educause Horizon report. AI for education is anticipated to grow in the 2019 Horizon Report Higher Education Edition. Higher education is adopting AI, as Google's $400 million purchase of DeepMind and non-profit public-private collaborations like the German Research Centre for AI demonstrate.

In addition, Baker and Smith (2019) assessed instructional AI technologies from learner, instructor, and system perspectives. Learners use adaptive or customised ITS

for subject-matter learning. Teacher-facing systems automate administration, evaluation, feedback, and plagiarism detection, decreasing workloads. The study was comprehensive; few have shown the merits and cons of generative AI in academia or to students, and few have examined distance students' plans to use and adopt it.

Academic problems persist despite AI's growth and the issues in opinion persist among students of different generations. E.g., Chan and Lee (2023) study, where they investigated the ai generation gap out of all the generations (X, millennials and Z), Their findings suggested that Gen Z participants were generally optimistic about the potential benefits of GenAI, including enhanced productivity, efficiency, and personalized learning, and expressed intentions to use GenAI for various educational purposes. However, the other generations showed concern on trust, over reliance on technology, pedagogical implications. Moreover, other scholar highlights issues in academia context towards maintaining academic integrity, plagiarism, Non-meeting standards requires quality control because students' work varies in precision and consistency. Generational AI abuse may encourage technology dependence, hampering pupils' creativity and critical thinking. Advanced AI technologies increase inequality between students.

In Indian context too the academic issues persist the same, however, due to the nation's uniqueness other factors like language barrier, digital divide, infrastructural constraints, income constraints, knowledge constraints, social equity and inclusiveness, satisfaction, ease of use constructs also impacts negatively. The studies were explored for regular students, however, distance mode of learning is different from the regular. Also, in regular and distance mode AI promises personalised and adaptive learning, but whether it would lead to social equality and inclusivity is not much known (Tiwari et al., 2023). Despite the growing potential and advancements in Generative AI technology for smart learning, there exists a significant gap in understanding the factors influencing the adoption behavior among distance learning mode of Indian Generation Z students. The lack of comprehensive research and exploration into the unique socio-cultural, economic, and educational landscape of India leaves a critical knowledge void.

Thus, this study intends to bridge the literature gap problem statement aims to address the determinants and barriers affecting the willingness of Indian Gen Z towards embracing smart learning through Generative AI, providing valuable insights for the development of effective strategies and interventions to enhance the adoption of this transformative educational technology. This research seeks to investigate what factors impact Gen Z distance mode students' adoption of smart learning through generative AI.

LITERATURE REVIEW

Smart learning represents a ground-breaking educational paradigm harnessing cutting-edge technologies like artificial intelligence, machine learning, and data analytics to craft personalized and interactive learning journeys. Unlike traditional methods, smart learning employs intelligent systems to customize content, pacing,

and assessments based on individual student profiles, fostering engagement and optimizing outcomes.

Through digital tools, multimedia resources, and real-time feedback, it cultivates active participation and flexibility, enabling learners to access education across devices and locations, thereby nurturing lifelong learning skills in the digital era.

Behavioral intention to adopt smart learning through Generative AI

The determinants towards students' behavioral intention to adopt smart learning through Generative AI can be influenced by factors such as perceived value, perceived cost, perceived usefulness, perceived ease of use, attitude, technology self-efficacy, subjective norms, and facilitating conditions.

Studies have shown a strong positive correlation between perceived value and intention to use generative AI (Chan and Zhou, 2023).Additionally, perceived usefulness and perceived ease of use of AI-based systems have been found to positively impact students' attitude, behavioral intentions, and actual use of AI-based systems(Li, 2023). Attitude, perceived usefulness, and perceived ease of use are also important factors in students' recognition and approval of using digital learning platforms (Songkram et al., 2023). Furthermore, factors such as performance expectancy and facilitating conditions significantly influence students' attitudes and behavioral intention to use AI in education (Alzahrani, L. 2023).

The intention to adopt AI in education can also be studied by examining factors such as familiarity, willingness to engage, potential benefits and challenges, and effective integration of AI technologies in higher education (Strzelecki, A.2023)

Students' perceptions significantly influence their learning approaches and outcomes, according to John Biggs' 3P model (Chan and Hu, W. 2023). Factors such as habit, performance expectancy, hedonic motivation, personal innovativeness, and trust in AI tools have been found to predict the behavioral intention and use behavior of AI-based systems in learning (Pillai et al., 2022; Li, 2023). Understanding students' perceptions, addressing their concerns, and tailoring AI technologies to their needs can promote effective learning outcomes and enhance teaching and learning experiences in higher education.

Interplay between Performance expectancy, effort expectancy, social influence with Behavioral Intention.

Behavioral intention “refers to an individual’s subjective likelihood or intention to use a particular technology in the future” (Davis, 1986; Venkatesh and Xu, 2012).

“Behavioral intention” would refer to the degree to which students intend to use Generative AI Tools in the higher education process. It is a significant indicator of actual technology use and is influenced by the other UTAUT2 model constructs. Behavioral intention tends to study the “Use Behavior” of the students in learning. Use behavior “refers to the actual usage of a technology by an individual, after having formed behavioral intentions towards its use” (Venkatesh and Davis, 2012). Use

behavior in this study refers to the frequency, duration, and patterns of usage as well as the degree to which students actually use Generative AI Tools in their academic work.

Performance expectancy, effort expectancy, and social influence have been found to impact behavioral intention in various contexts.

For instance, in the context of QRIS adoption in Indonesia, performance expectancy and lifestyle compatibility were found to have a positive and significant effect on behavioral intention, while effort expectancy had a positive but insignificant effect (Butarbutar et al., 2022). Similarly, in the context of ShopeePay usage in Jakarta, performance expectation, effort expectation, social influence, and facilitating conditions were found to influence the behavioral intention of users (Kenny and Firdausy., 2022). In the healthcare setting, performance expectation was found to have a direct effect on technology use EMR, and an indirect effect via behavioral intention (Faida et al., 2022). Additionally, in the context of e-learning system usage, perceived enjoyment, performance expectancy, and social influence were found to have a positive impact on the intention of continuance usage, while effort expectancy did not have a significant impact (Taghizadeh et al., 2022). These findings highlight the importance of considering performance expectancy, effort expectancy, and social influence in understanding and predicting behavioral intention in various domains.

H (1):- There is direct and significant relationship between behavioral intention and adoption towards smart learning through Generative AI

Effort Expectancy

Effort expectancy "refers to the degree to which an individual expects that using a particular technology will be free of effort" (Moore and Benbasat, 1991; Venkatesh and Davis, 2003). Recent research has highlighted the substantial impact of "Effort expectancy" on learners' "Behavioral intention" to adopt various educational technologies. Studies conducted by Hu et al. (2020) and Raza et al.(2022) found that Effort Expectancy played a significant role in the adoption of mobile learning and learning management systems, respectively. Similarly, Jakkaew and Hemrungrote (2017) identified the influence of Effort Expectancy in the context of specific platforms like Google Classroom. "Effort expectancy" in the context of a study would describe the degree to which students believe that Generative AI Tools is simple to use and requires little effort to interact with.

H (2):- There is direct and significant relationship between effort expectancy and behavioral intention

Facilitating Conditions

Facilitating conditions "refers to the degree to which an individual perceives that the necessary resources and support are available to use a particular technology effectively" (Taylor and Todd, 1995; Venkatesh and Davis, 2003).

Studies have demonstrated that "Facilitating conditions" is a crucial determinant of both learners' "Behavioral intention" and "Use behavior" and is recognized as one of

the most significant factors in determining an individual's technology usage. Additionally, "Facilitating conditions" has been identified as a critical factor in the adoption of various educational technologies, such as mobile learning (Kang et al., 2015), e-learning platforms (Osei et al., 2022), and augmented reality (Faqih and Jaradat, 2021) in higher education. "Facilitating conditions" would refer to how much students believe they have access to the AI tool despite its high demand, as well as their availability of technical support and Generative AI Tools training.

H (3):- There is direct and significant relationship between facilitating conditions and adoption towards smart learning through Generative AI

Hedonic Motivation

Hedonic motivation "refers to the degree to which an individual is motivated to use a particular technology for its inherent enjoyment, pleasure, or novelty" (van der, 2004; Venkatesh and Xu, 2012).

Research has indicated that "Hedonic motivation" plays a crucial role in technology adoption in Interactive learning environment.Dajani and Abu Hegleh (2019) found that "Hedonic motivation" was a significant factor in animation usage among university students, while Azizi et al. (2020), Twum et al. (2022), and Zwain (2019) reported its influence on the adoption of mobile learning, e-learning platforms, and learning management systems, respectively. "Hedonic motivation" in this setting would refer to the degree to which students find Generative AI Tools entertaining or enjoyable to use, as well as the degree to which they enjoy discovering new technological AI tools.

H (4):- There is direct and significant relationship between hedonic motivation and adoption towards smart learning through Generative AI

Knowledge

Knowledge sharing refers to "the process of disseminating various resources among the individuals taking part in specific activities" (Al-Emran and Teo, 2020).

Knowledge sharing is a critical practice in the learning process and leads to knowledge creation through knowledge transfer among learners (Feiz et al., 2019). The peers actively interact and exchange their explicit and tacit knowledge with each other (Lin and Huang, 2020). Knowledge sharing is an integral part of knowledge management and significantly influences academic quality (Wu et al., 2021).

The previous studies found a positive relationship between the knowledge sharing attribute of an information system and its adoption rate (Arpaci et al., 2020; El Said, 2015). The ability of a system to facilitate knowledge sharing triggers the intention to adopt the system (Al-Emran, Mezhuyev and Kamaludin, 2018; Al-Emran and Mezhuyev, 2019; Al-Emran and Teo, 2020). Accordingly, this study proposed that if students believe that Generative AI Tools facilitate the process of knowledge sharing with classmates and instructors, they will have a higher intention to sustain the use of these agents.

Knowledge acquisition refers to "the processes that use existing knowledge and capture new knowledge" (Lee et al., 2007). Knowledge acquisition is a critical component of knowledge management and the learning process (Al-Emran, Mezhuyev, Kamaludin, and AlSinani, 2018; Cukurova et al., 2018). The association between information systems' ability to facilitate knowledge acquisition and the adoption of the system has been validated in the literature (Arpaci et al., 2020; García-Sánchez et al., 2017).

In the context of e-learning, knowledge acquisition is found as a significant antecedent of e-learning adoption (Al-Emran and Teo, 2020). Generative AI Tools enhance the efficiency and effectiveness of micro-learning processes and can boost information acquisition and retention by 20% (VázquezCano et al., 2021). Intelligent Generative AI Tools are able to personalize the process of learning based on the academic achievements of learners (Farkash, 2018). Generative AI Tools also facilitate the process of finding and acquiring knowledge from the course material, previous discussions in forums, and other resources of information. Generative AI Tools can be used in libraries to facilitate the interaction between students and libraries and ease the knowledge acquisition process (Sheth et al., 2019). It is expectable that the positive influence of Generative AI Tools on the process of acquiring new knowledge motivates the students to continue using Generative AI.

Knowledge application refers to "the process that enables the individuals to access the knowledge smoothly via the existing efficient storage and retrieval techniques" (Arpaci et al., 2020).

The knowledge application attribute of technology significantly influences the adoption and usage rate (Al Imran and Mezhuyev, 2019). Knowledge application is an important factor that students consider when deciding to use and continue using e-learning systems (Al-Emran and Teo, 2020).

Knowledge application is found as a significant determinant of students' performance and intention to use m-learning systems (Al-Emran and Mezhuyev, 2019). Accordingly, if the students find Generative AI Tools as a helpful agent that supports knowledge application in the learning activities and assignments, they are more likely to continue using these conversational agents

H (5):- There is direct and significant relationship between knowledge and adoption towards smart learning through Generative AI

Performance Expectancy

Performance expectancy "refers to the degree to which an individual expects that using a particular technology will improve their performance in achieving specific tasks or goals" Venkatesh and Davis, 2003).

Various studies have shown the significant influence of "Performance expectancy" on learners' "Behavioral intention" to embrace innovative educational technologies.

Kumar and Bervell (2019) demonstrated this relationship in the context of Google Classroom, while Arain et al. (2019) and Raman and Don (2013) explored it in the context of mobile learning and learning management systems, respectively. In the context of a study testing the acceptance and usage of Generative AI Tools by students in higher education, "Performance expectancy" would refer to the extent to which students believe that using Generative AI Tools would enhance their academic performance or productivity.

H (6):- There is a direct and significant relationship between performance expectancy and behavioral intention

Social Equity and Inclusion

Sustainable learning strives to ensure equitable access to educational opportunities and resources for all individuals, regardless of their socio-economic background, cultural identity, or physical abilities. It aims to address systemic inequalities and promote social justice within educational systems.

Equity and inclusion in education are crucial for ensuring that all children have access to quality education, regardless of their background or abilities. Efforts to promote equity and inclusion should be based on an analysis of specific contexts (Grimes and Bagree., 2012). This includes developing a framework on equity and inclusion and embedding it in education policy (Ainscow, 2022). It is important to engage all stakeholders, including teachers and school leaders, in implementing this framework and strengthening coordination (Chakrabarty and Singh., 2023). Additionally, resourcing, capacity building, and monitoring and evaluation are key components in addressing diversity, equity, and inclusion in education. Inclusive education practices should be implemented in physical education as well, ensuring that all pupils are included regardless of need, ability, or background (Chakrabarty and Singh., 2023). Ultimately, promoting equity and inclusion in education can lead to improved quality of education for all students within a national education system.

H (7):- There is direct and significant relationship between social equity and inclusion and adoption towards smart learning through Generative AI

Social Influence

Social influence "refers to the degree to which an individual perceives that people who are important to them think they should use a particular technology" (Ajzen, 1991; Fishbein and Ajzen, 1975; Venkatesh and Davis, 2003).

Numerous studies have established that "Social influence"plays a vital role in determining users' "Behavioral intention" to adopt technology in education. This has been demonstrated in various contexts, including mobile learning (Nikolopoulou et al., 2020), e-learning platforms (Samsudeen and Mohamed, 2019), and learning management systems (Ain et al., 2016). "Social influence" in this study refers to how much students believe their colleagues, teachers, or other influential members of their social environment are supporting or encouraging them to use Generative AI Tools.

H (8):- There is direct and significant relationship between social influence and behavioral intention

Trust in Technology

Trust in technology and the adoption of generative AI in education by students is influenced by their perceptions and attitudes towards these tools.

Students generally have a positive attitude towards generative AI in teaching and learning, recognizing its potential benefits such as personalized learning support, assistance in writing and brainstorming, and research capabilities (Hutson and Cotroneo., 2023). However, concerns about accuracy, privacy, ethical issues, and the impact on personal development and career prospects have also been expressed (Chan and Hu., 2023). Students' perceptions significantly influence their learning approaches and outcomes, highlighting the need to understand and address their concerns (Denny et al., 2023).

Additionally, students' intention to use generative AI in education is positively correlated with their perceived value of these tools and negatively correlated with perceived cost (Denny et al., 2023). As generative AI continues to be integrated into education, it is important to consider the potential long-term consequences and ethical dilemmas that may arise from its widespread adoption (Chan, and Zhou., 2023).

H (9):- There is direct and significant relationship between trust in technology and adoption towards smart learning through Generative AI

CONCEPTUAL FRAMEWORK

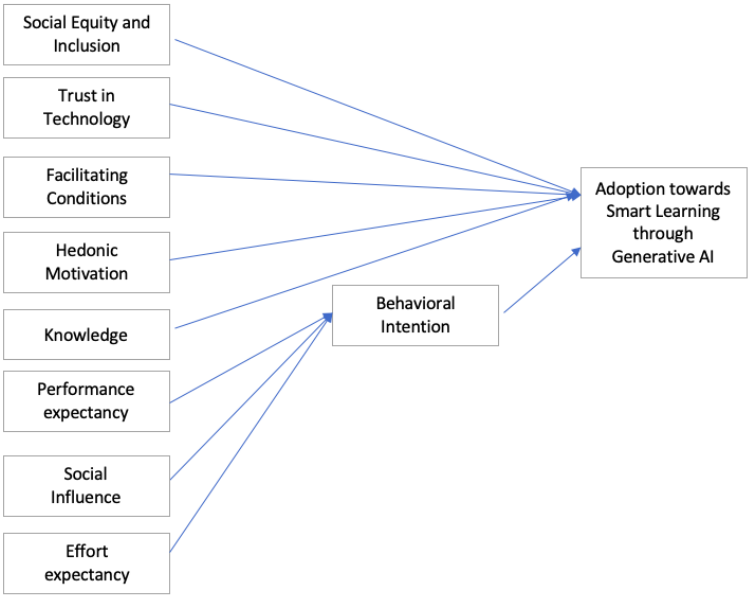

Figure 1. Conceptual Model

RESEARCH METHODOLOGY

It meets scholarly needs and studies the Gen Z distance learning students' adoption of smart learning with generative AI in an innovative way. Research-based constructs are used. The UTAUT scales for performance expectancy, effort expectancy, social influence, enabling conditions, and adoption intention are utilised. To support smart learning with generative AI (Figure 1), the proposed model uses the TAM and context-specific traits such as hedonic motivation (HEM), knowledge, faith in technology, and social fairness and inclusion. This study shows how university and higher education administrators can understand Gen Z remote learning students' viewpoints while using generative AI in education. Smart learning using generative AI adoption considerations will motivate developers to build student-focused technologies. The study uses positivism and deductive reasoning. The quantitative study used online surveys to collect data. Due to their homogeneity, the study used purposive sampling of distantly learning Gen Z students. The sample comes from University Grants Commission (UGC) and Distance Education Bureau (DEB)-approved colleges. The study sample size is 625, and 1700 questionnaires were issued online, with a 36.7% response rate going to Gen Z distance learning students at UGC and DEB-approved colleges. The study examined the association between nine exogenous variables and one endogenous variable using 5-point Likert scale questionnaires. The study created a survey questionnaire with two main sections: demographic information about generative ai, including age, gender, education, mode of learning, and construct components from prior studies.

Analysis and results

For these reasons, this study assessed the model and assumptions using partial least squares (PLS). The PLS is recommended for theory formulation in predictive research models (Liengaard, 2021). The theoretical model was conceptualised towards distance learning from the perspectives of hedonic motivation, social equity and inclusion, and behavioural intention to examine smart learning through generative AI (Figure 1), so PLS was chosen for exploratory research (Hair et al., 2020). In management and educational research, structural equation modelling (SEM) is popular (Bhat et al., 2021; Bhat and Khan, 2023). The study generated all variables using reflecting measurement models. The measurement model was evaluated using SmartPLS to discover how observed items were put onto model constructs. Analysing construct links in structural model evaluation tests hypotheses.

SPSS 24 (Table 1) analysed respondent data, while SMART PLS 4 tested hypotheses and developed structural models (Sarstedt and Cheah, 2019). Internal reliability and validity (convergent and discriminant) are examined in measurement model analysis. The internal reliability of each variable was examined using composite reliability (CR) and Cronbach's alpha. The study began by assessing the construct validity of variable evaluation statements. Finding Cronbach's alpha coefficients. Reliability is features' consistency and stability (Shaxe et al., 2020; Khan, 2020). Internal consistency is higher in constructions with CR > 0.70 and Cronbach's alpha > 0.60

(Clayson, 2020). This checks all structures' consistency. Convergent validity was assessed using factor loadings and average variance.

In Table 2, all variable items' factor loadings are larger than 0.60; Henseler et al. (2016) and Shrestha (2021) observed AVE values greater than 0.5, indicating a credible measurement model. Fornell and Larcker (1981) proposed the discriminant validity criterion, whereas Franke and Sarstedt (2019) recommended that AVE's square root should exceed the model's two-component correlation. All variables in this study met that criteria, proving discriminant validity. Table 3 shows that all construct AVEs exceed squared inter-construct correlations and Cronbach's alpha, validating the measurement scale. The measuring scale's high Cronbach's alpha coefficient demonstrates validity. Discriminant validity was found.

The study's hypotheses were examined via PLS-SEM. The construct and path coefficient weights were tested for statistical significance using bootstrapping with 5,000 iterations (Ali et al., 2017). PLS does not evaluate overall fit quality. The model-fit goodness-of-fit (GoF) index was developed by Tenenhaus et al. (2005). Calculate endogenous construction GoFs using the geometric mean of the typical communality and R2. For GoF analysis, Hoffmann and Birnbrich (2012) set GoFmedium 0.25, GoFlarge 0.36, and GoFsmall 0.1. This study's model fit well with a GoF of 0.568 (Table 4). We check the variance inflation factor for multicollinearity. VIF values for the constructs ranged from 1.751 to 3.941, within the 5.0 limit (Liang and Shiau, 2018; Bhat and Tariq, 2022) (Table 4). This proved multicollinearity was not an issue for this investigation.

Testing the structural model's purported relationships followed the measurement model and GoF. The analysis results are in Figure 2. Figure 2 shows how well the predictor variable(s) explain the construct using R2 values. Table 2 shows that both the attitude (R2 0.466) and the intention to deploy generative AI for sustainable learning (R2 0.434) match the requirements. Chin et al. (2008) used R2 values of 0.67, 0.33, or 0.19 to decide whether endogenous latent variables were significant, moderate, or weak for model validity. Generative AI adoption for sustained learning and behavioural intention is moderate (R2 0.466 and 0.434). The predicting constructs' predictive relevance (Q2) and effect size (F2) were tested to determine the model's predictive validity (Peng and Lai, 2012). Table 5 shows significant effects from all five exogenous components. Q2 predictive sample reuse was used (Chin et al., 2008). Table 5 indicates all Q2 values are positive, showing the model's predictive power (Peng and Lai, 2012). A systematic path assessment tested hypothesised links between independent components and dependent variables. Table 5 and Figure 3 reveal that six hypotheses (H1, H2, H5, H6, H8, and H9) exhibited p 0.001 positive route coefficients. These hypotheses failed: H3 (FC), H4 (HM), and H7 (SEI).

Table 1. Description of respondents

Respondents Profile	N	Percentage
Age		
17-20	324	51.84
21-24	280	44.80
24 and above	21	3.36
Education		
Senior Secondary	278	44.48
Undergraduate	207	33.12
Postgraduate	140	22.40
PhD	0	0
Gender		
Male	487	77.92
Female	138	22.08
Mode of Learning		
Online	429	68.64
Hybrid	196	31.36

Table 2. Summary of the results of the assessments

Construct	AVE	CR	Cronbach's Alpha
Knowledge (K)	.550	.758	.794
Social Equity and Inclusion (SEI)	.542	.754	.710
Hedonic Motivation (HM)	.524	.763	.801
Behavioral Intention (BI)	.575	.755	.795
Trust in Technology (T)	.541	,824	.751
Facilitating Conditions (FC)	.532	.789	.835
Performance Expectancy (PE)	.555	.767	.795
Social Influence (SI)	.556	.710	.836
Effort Expectancy (EE)	.519	.779	.765
Adoption towards smart learning through Generative AI (ASLTGAI)	.595	.854	.769

Table 3. Fornell–Larcker Criterion

	ASLTGAI	BI	EE	FC	HM	K	PE	SEI	SI	T
ASLTGAI	.772									
BI	.520	.645								
EE	.339	.519	.668							
FC	.317	.422	.356	.698						
HM	.476	.582	.417	.443	.724					

K	.627	.543	.543	.554	.698	.600				
PE	.412	.624	.613	.407	.358	.519	.674			
SEI	.408	.524	.352	.370	.528	.522	.351	.665		
SI	.441	.451	.347	.495	.391	.517	.561	.463	.676	
T	.570	.515	.262	.428	.508	.595	.423	.535	.471	.664

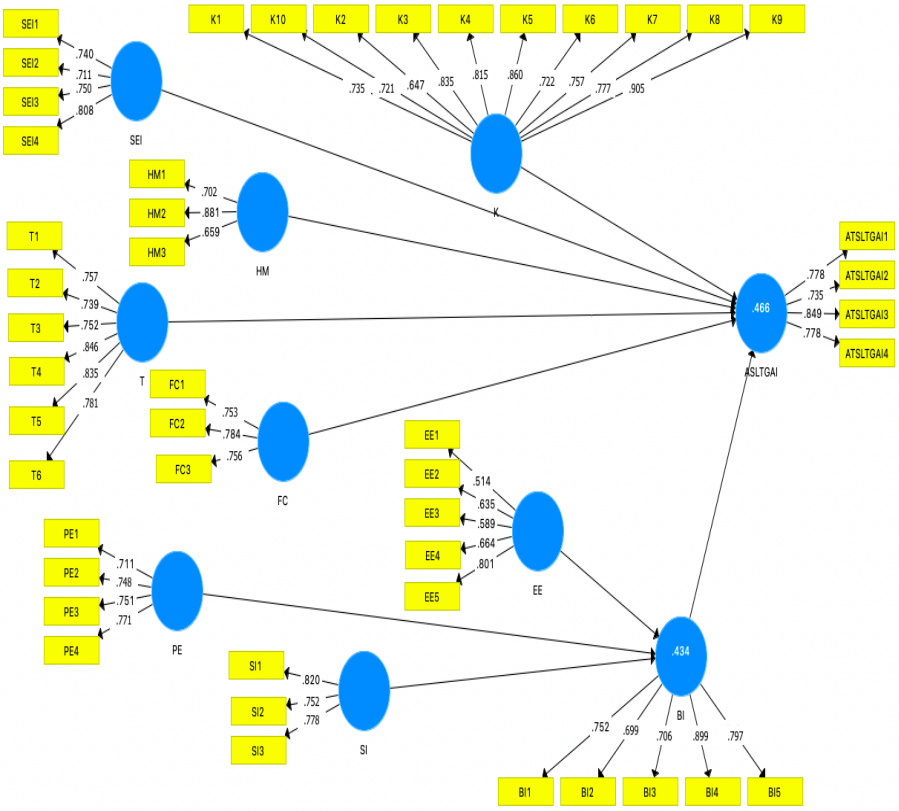

Figure 2. Measurement model and R2 assessment

Table 4. SmartPLS output

Constructs	Q2	F2	Collinearity Statistics (VIF)
ASLTGAI	.216		
BI	.348		
EE		.024	2.416
FC		.057	2.326
HM		.049	1.437
K		.100	2.513
PE		.021	3.643
SEI		.017	2.322
SI		.024	2.317
T	.	.032	3.242

Table 5. Structural estimates: path coefficients

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (ST DEV)	T statistics (O/STDEV)	Result
H1 BI -> ASLTGAI	.236	.207	.1127	2.09	Supported
H2 EE -> BI	.219	.239	.0862	2.53	Supported
H3 FC -> ASLTGAI	.095	.058	.105	.910	Not supported
H4 HM -> ASLTGAI	.016	.001	.111	.145	Not supported
H5 K-> ASLTGAI	.421	.439	.136	3.07	Supported
H6 PE -> BI	.408	.401	.103	3.94	Supported
H7 SEI -> ASLTGAI	.001	.007	.107	.011	Not supported
H8 SI -> BI	.145	.163	.109	1.83	Supported
H9 T -> ASLTGAI	.205	.199	.132	1.54	Supported

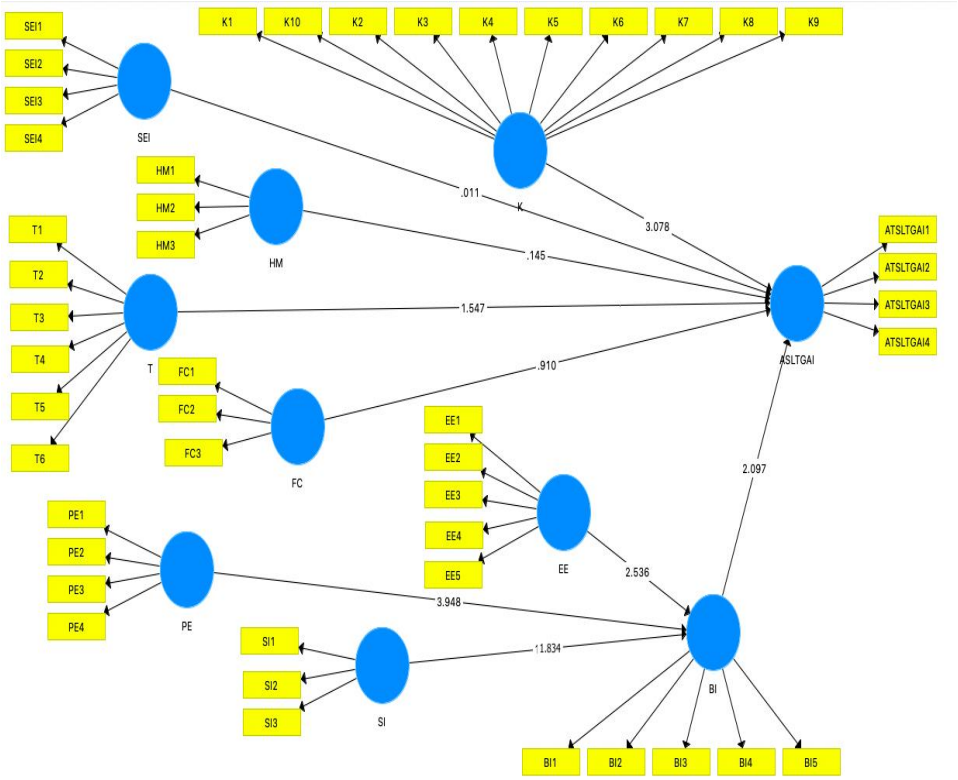

Figure 3. Structural Model Assessment

DISCUSSION

This study evaluated how generative AI helps UTAUT and TAM students learn sustainably. For generative AI smart learning adoption, we evaluated behavioural intention, knowledge, hedonic motivation, facilitating conditions, technology trust, social equality, and inclusivity. Our quantitative survey supported the model. H1, H2, H6, and H8's behavioural intention, effort expectation, performance expectancy, and social influence positively influenced student views towards generative AI adoption. Previous AI-based learning studies corroborated this (Pillai et al., 2023; Shen, 2022; Chocarro, 2021). Students loved the tool because it increased their learning, performance, effort, socialisation, and working style, which helps them acquire academically and skill-based activities quickly. Students from varied backgrounds could employ generative AI in all smart learning areas to learn more. However, the H3's facilitating condition showed an insignificant relationship, suggesting that distance learning for Gen Z is confined due to the digital divide, a lack of technological infrastructure, college and university restraints, or a fear of scarce knowledge since they are already learning from distance education. Unlike previous studies (Abdul Halim and Abbasi, 2022), this outcome was new. H4 hedonic motivation also resulted in the insignificant adoption of smart learning through

generative AI, possibly because it may not be providing them with the pleasure to complete assignments and submit work due to herd working, which is very much needed in an Indian competitive academic environment. Another possible reason is that Gen Z distance learning students see the Generative AI platform as the study's H5, association of knowledge, including knowledge sharing, knowledge sharing, and application, is associated with smart learning adoption through generative AI, technology's ability to provide relevant and accurate information may contribute to its adoption, regardless of hedonic considerations. Gen Z students, especially in higher education, may favour theoretical understanding above logic and critical reasoning because they correlate Generative AI expertise with career success. The study results differ from Tiwari et al. (2023) findings that generative ai uptake and use were significant among HM. H7 i.e., Social equity and inclusion also enacted not-significant towards adoption of smart learning through generative AI, the possible reasons for the same might be lack of understanding regarding different learners' benefits may reduce the importance of these aspects in adoption decisions. Because of India's linguistic diversity, some may feel excluded, making social fairness less important. Institutional structures may not prioritise inclusion, so students may not prioritise it when adopting technology. The platform may not meet the unique learning demands of diverse students. Social equity and inclusion may not be considered if the technology cannot be customised or adapted for diverse learning styles. The variable SEI was used to investigate the relationship with smart learning adoption because technology provides equal opportunity and access to resources, but the findings suggest that SEI may only bring social equity and inclusivity when understood and well adapted by Indian Gen Z. Inclusion in institutional frameworks is recommended since only then can students affirmatively intend to equalise and include themselves in technology adoption decisions. H9 Technology has positively influenced smart learning through generative AI adoption due to its cost-effectiveness, simplicity, high satisfaction, and perceived ease of use, as shown in previous studies. Generative AI may have a bright future and change school and college education. The survey found students generally knowledgeable and trusting in technology; thus, their intention to adopt smart learning through generative AI is positive. However, if the user interface can be customised and made more user-friendly, HM and SEI will increase. The results indicate that the technology is trusted and meant to be used, but education technology businesses' robust advancements and customisation can not only shrink SEI's gap but can also influence the facilitating conditions positively. The education technology businesses have a huge opportunity to explore the unexplored market opportunity.

IMPLICATIONS OF THE STUDY

This study concerns individuals, businesses, and academia worldwide. The study's factors will improve public technology access. According to this research, generative AI will improve knowledge and technological use as people seek answers and use it for education and learning. However, there is still much scope for improvements and developments, as per the user. Through market research, companies' managers and

executives can better understand and make prototypes that satisfy a wider range of student audiences. Presently, the data presented by generative AI is fluctuative; for the same question, it answers differently, which may be presently seen as an information-gaining spot but cannot be meant to be accurate, which opens new avenues for researchers, scientists, engineers, and the government to not only make it a reliable technological tool but to also create graduates with strong talents needed by outside organisations.

CONCLUSION AND FUTURE RESEARCH DIRECTIONS

A quantitative study assessed Gen Z distance learning students' intention to adopt smart learning through generative ai. The proposed framework is constructed taking UTAUT and TAM model for better identification of determinants for context-specific components, including HM, FC, SEI, K, T and BI, to adopt smart learning through generative ai for education and learning. The model explains 46.6% of adoption and 43.3% of behavioral intention, according to an empirical study and statistical validation. The research showed that students' behavioral intentions to adopt smart learning through generative AI find it beneficial and reliable to investigate critical impacting determinants. Based on the results of the postulates, The government, corporations, and schools must regulate smart learning through generative ai for ethics. Else, knowledge and development of logic and critical thinking would suffer for Gen Z individuals. Generative AI tools must be improved further as it is mixed with factual errors, bias, comprehension issues, and safety concerns (Lee, 2023). Thus, updation and proper trainings to work upon such technologies should be widely spread by the education technological companies, moreover, the government and university grants should start including such technologies in curriculums to develop smart learning skills within students as these skills may prove to be pivotal in the job market. Thus it will also increase the HM and SEI of students. However, there should be a right balance between smart learning through generative ai as it is also prone to stunt brain development in children (Tiwari et al., 2023; Perkins, 2023). The sample tested the influence of distance learning Gen Z students on adoption of smart learning through generative AI which is a novel study, however, the other studies can compare Gen Z of distance mode and regular mode to draw greater inference. Moreover, future researchers can explore study on whether generative ai technology is making students tech dependent?. Generative AI technology impact in academia and researchers can be studied from the lens of schools and regular mode college going students. Comparative study of different generations on adoption and usage of generative ai enabled solutions.

REFERENCES

- Abbasi, G.A., Sandran, T., Ganesan, Y. and Iranmanesh, M. (2022), "Go cashless! Determinants of continuance intention to use E-wallet apps: a hybrid approach using PLS-SEM and fsQCA", Technology in Society, Vol. 68, p. 101937, doi: 10.1016/j.techsoc.2022.101937.

- Abdul-Halim, N.A., Vafaei-Zadeh, A., Hanifah, H., Teoh, A.P. and Nawaser, K. (2022), "Understanding the determinants of e-wallet continuance usage intention in Malaysia", Quality and Quantity, Vol. 56 No. 5, pp. 3413-3439, doi: 10.1007/s11135-021-01276-7.
- Adu-Gyamfi, G., Song, H., Nketiah, E., Obuobi, B., Adjei, M. and Cudjoe, D. (2022), "Determinants of adoption intention of battery swap technology for electric vehicles", Energy, Vol. 251, p. 123862, doi: 10.1016/j.energy.2022.123862.
- Ahmed, A. A., Dutse, A. Y., & Mallo, M. J. (2022). Influencing Factors Determine Students Behavioral Intentions to Adopt an E-Learning System in Tertiary Institution. International Journal of Information Technology & Computer Engineering (IJITC) ISSN: 2455-5290, 2(04), 35-63.
- Ain, N., Kaur, K., & Waheed, M. (2016). The influence of learning value on learning management system use. Information Development, 32(5), 1306–1321. https://doi.org/10.1177/0266666915597546
- Ainscow, M. Inclusion and equity in education: Making sense of global challenges.
- Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T
- Al-Emran, M., & Mezhuyev, V. (2019). Examining the effect of knowledge management factors on mobile learning adop[1]tion through the use of importance-performance map analysis (IPMA). In International conference on advanced intel[1]ligent systems and informatics (pp. 449–458). Springer. https://doi.org/10.1007/978-3-030-31129-2_41
- Al-Emran, M., & Teo, T. (2020). Do knowledge acquisition and knowledge sharing really affect e-learning adoption? An empirical study. Education and Information Technologies, 25(3), 1983–1998. https://doi.org/10.1007/s10639-019-10062-w
- Al-Emran, M., & Teo, T. (2020). Do knowledge acquisition and knowledge sharing really affect e-learning adoption? An empirical study. Education and Information Technologies, 25(3), 1983–1998. https://doi.org/10.1007/s10639-019-10062-w
- Al-Emran, M., Mezhuyev, V., Kamaludin, A., & AlSinani, M. (2018, February 8–10). Development of an M-learning application based on knowledge management processes. 2018 7th International Conference on Software and Computer Applications (ICSCA 2018) (pp. 248–253). Kuantan, Malaysia. https://doi.org/10.1145/3185089.3185120

- Al-Emran, M., Mezhuyev, V., Kamaludin, A., & AlSinani, M. (2018, February 8–10). Development of an M-learning application based on knowledge management processes. 2018 7th International Conference on Software and Computer Applications (ICSCA 2018) (pp. 248–253). Kuantan, Malaysia. https://doi.org/10.1145/3185089.3185120
- Ali, F., Hussain, K., Konar, R. and Jeon, H.M. (2017), "The effect of technical and functional quality on guests' perceived hotel service quality and satisfaction: a SEM-PLS analysis", Journal of Quality Assurance in Hospitality and Tourism, Vol. 18 No. 3, pp. 354-378, doi: 10.1080/ 1528008X.2016.1230037.
- Alzahrani, L. Analyzing Students' Attitudes and Behavior Toward Artificial Intelligence Technologies in Higher Education.
- Arain, A. A., Hussain, Z., Rizvi, W. H., & Vighio, M. S. (2019). Extending UTAUT2 toward acceptance of mobile learning in the context of higher education. Universal Access in the Information Society, 18(3), 659–673. https://doi.org/10.1007/ s10209-019-00685-8
- Arpaci, I., Al-Emran, M., & Al-Sharafi, M. A. (2020). The impact of knowledge management practices on the acceptance of Massive Open Online Courses (MOOCs) by engineering students: A cross-cultural comparison. Telematics and Informatics, 54, 1–12. https://doi.org/10.1016/J.TELE.2020.101468
- Azizi, S. M., Roozbahani, N., & Khatony, A. (2020). Factors affecting the acceptance of blended learning in medical edu[1]cation: Application of UTAUT2 model. BMC Medical Education, 20(1), 367. https://doi.org/10.1186/s12909-020-02302-2
- Bhat, M.A. and Tariq, S. (2022), Impact of Job Burnout on Performance: A Study among Hospital Employees of J&K, India, BIMTECH Business Perspectives, pp. 1-17
- Bhat, M.A., Khan, S.T. and Rainayee, R.A. (2021), "Assessment of perceived labor market conditions in employees' turnover intention model–mediation and moderation analyzes", PSU Research Review, (ahead-of-print).
- Butarbutar, N., Lie, D., Bagenda, C., Hendrayani, E., & Sudirman, A. (2022). Analysis of the Effect of Performance Expectancy, Effort Expectancy, and Lifestyle Compatibility on Behavioral Intention QRIS in Indonesia. International Journal of Scientific Research and Management (IJSRM), 10(11), 4203-4211.
- C. K. Y., & Hu, W. (2023). Students' Voices on Generative AI: Perceptions, Benefits, and Challenges in Higher Education. arXiv preprint arXiv:2305.00290.
- Celik, I., Dindar, M., Muukkonen, H. et al. The Promises and Challenges of Artificial Intelligence for Teachers: a Systematic Review of Research. TechTrends 66, 616–630 (2022). https://doi.org/10.1007/s11528-022-00715-y

- Chakrabarty, A., & Singh, A. K. (2023). Innovative curriculum design and evaluation for achieving diversity, equity and inclusion in the Indian higher education system. Journal of Research in Innovative Teaching & Learning.
- Chan, C. K. Y., & Hu, W. (2023). Students' Voices on Generative AI: Perceptions, Benefits, and Challenges in Higher Education. arXiv preprint arXiv:2305.00290.
- Chan, C. K. Y., & Zhou, W. (2023). Deconstructing Student Perceptions of Generative AI (GenAI) through an Expectancy Value Theory (EVT)-based Instrument. arXiv preprint arXiv:2305.01186
- Chang, C.J., Hsu, B.C.Y. and Chen, M.Y. (2022), "Viewing sports online during the COVID-19 pandemic: the antecedent effects of social presence on the technology acceptance model", Sustainability, Vol. 14 No. 1, p. 341, doi: 10.3390/su14010341.
- Chang, Y.-W., Hsu, P.-Y., Chen, J., Shiau, W.-L. and Xu, N. (2023), "Utilitarian and/or hedonic shopping – consumer motivation to purchase in smart stores", Industrial Management and Data Systems, Vol. 123 No. 3, pp. 821-842, doi: 10.1108/IMDS-04-2022-0250.
- Chin, W.W., Peterson, R.A. and Brown, S.P. (2008), "Structural equation modeling in marketing: some practical reminders", Journal of Marketing Theory and Practice, Vol. 16 No. 4, pp. 287-298, doi: 10.2753/MTP1069-6679160402.
- Chin, W.W., Peterson, R.A. and Brown, S.P. (2008), "Structural equation modeling in marketing: some practical reminders", Journal of Marketing Theory and Practice, Vol. 16 No. 4, pp. 287-298, doi: 10.2753/MTP1069-6679160402.
- Chocarro, R., Cortiñas, M. and Marcos-Matas, G. (2021), "Teachers' attitudes towards chatbots in education: a technology acceptance model approach considering the effect of social language, bot proactiveness, and users' characteristics", Educational Studies, Vol. 49 No. 2, pp. 1-19, doi: 10.1080/03055698.2020.1850426
- Clayson, P.E. (2020), "Moderators of the internal consistency of error-related negativity scores: a meta-analysis of internal consistency estimates", Psychophysiology, Vol. 57 No. 8, p. e13583, doi: 10.1111/psyp.13583.
- Cooper, G. (2023), "Examining science education in ChatGPT: an exploratory study of generative artificial intelligence", Journal of Science Education and Technology, Vol. 32 No. 3, doi: 10.1007/ s10956-023-10039-y.
- Cukurova, M., Bennett, J., & Abrahams, I. (2018). Students' knowledge acquisition and ability to apply knowledge into different science contexts in two different independent learning settings. Research in Science & Technological Education, 36(1), 17–34. https://doi.org/10.1080/02635143.2017.1336709

- Dajani, D., & Abu Hegleh, A. S. (2019). Behavior intention of animation usage among university students. Heliyon, 5(10), e02536. https://doi.org/10.1016/j.heliyon.2019.e02536
- Davis, F. D. (1989). Perceived usefulness, perceived ease of Use, and user acceptance of information technology. MIS Quarterly, 13(3), 319. https://doi.org/10.2307/249008
- Denny, P., Khosravi, H., Hellas, A., Leinonen, J., & Sarsa, S. (2023). Human vs Machine: Comparison of Student-generated and AI-generated Educational Content. arXiv preprint arXiv:2306.10509.
- Faida, E. W., Supriyanto, S., Haksama, S., Suryaningtyas, W., Astuti, W., Nudji, B., & Hasina, S. N. The effect of performance expectancy and behavioral intention on the use of electronic medical record (EMR) in tertiary hospitals in Indonesia.
- Faqih, Khaled M. S., & Jaradat, Mohammed-Issa Riad Mousa. (2021). Integrating TTF and UTAUT2 theories to investigate the adoption of augmented reality technology in education: Perspective from a developing country. Technology in Society, 67, 101787. http://dx.doi.org/10.1016/j.techsoc.2021.101787
- Farkash, Z. (2018). Higher education chatbot: Chatbots are the future of higher education. Chatbots Life.
- Feiz, D., Soltani, M. D., & Farsizadeh, H. (2019). The effect of knowledge sharing on the psychological empowerment in higher education mediated by organizational memory. Studies in Higher Education, 44(1), 3–19. https://doi.org/10. 1080/03075079.2017.1328595
- Fernandes, T. and Oliveira, E. (2021), "Understanding consumers' acceptance of automated technologies in service encounters: drivers of digital voice assistants adoption", Journal of Business Research, Vol. 122, pp. 180-191, doi: 10.1016/j.jbusres.2020.08.058.
- Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention, and behavior: An introduction to theory and research. Addison Wesley
- Fornell, C. and Larcker, D.F. (1981), "Structural equation models with unobservable variables and measurement error: algebra and statistics", Journal of Marketing Research, Vol. 18 No. 3, doi: 10.1177/002224378101800313.
- Franke, G. and Sarstedt, M. (2019),"Heuristics versus statistics in discriminant validity testing: a comparison of four procedures", Internet Research, Vol. 29 No. 3, pp. 430-447, doi: 10.1108/IntR-12-2017-0515.
- García-Sánchez, E., García-Morales, V. J., & Bolívar-Ramos, M. T. (2017). The influence of top management support for ICTs on organizational performance

through knowledge acquisition, transfer, and utilization. Review of Managerial Science, 11(1), 19–51. https://doi.org/10.1007/s11846-015-0179-3

- Grimes, P., & Bagree, S. (2012). Equity and inclusion for all in education.
- Hair, J.F., Jr, Howard, M.C. and Nitzl, C. (2020), "Assessing measurement model quality in PLS-SEM using confirmatory composite analysis", Journal of Business Research, Vol. 109, pp. 101-110, doi: 10.1016/j.jbusres.2019.11.069
- Henseler, J., Hubona, G. and Ray, P.A. (2016), "Using PLS path modeling in new technology research: updated guidelines", Industrial Management and Data Systems, Vol. 116 No. 1, pp. 2-20, doi: 10.1108/IMDS-09-2015-0382.
- Hoffmann, A.O.I. and Birnbrich, C. (2012), "The impact of fraud prevention on bank-customer relationships: an empirical investigation in retail banking", International Journal of Bank Marketing, Vol. 30 No. 5, pp. 390-407, doi: 10.1108/02652321211247435.
- Hu, S., Laxman, K., & Lee, K. (2020). Exploring factors affecting academics' adoption of emerging mobile technologies-an extended UTAUT perspective. Education and Information Technologies, 25(5), 4615–4635. https://doi.org/10.1007/ s10639-020-10171-x
- Hutson, J., & Cotroneo, P. (2023). Generative AI tools in art education: Exploring prompt engineering and iterative processes for enhanced creativity. Metaverse, 4(1).
- Jakkaew, P., & Hemrungrote, S. (2017). The use of UTAUT2 model for understanding student perceptions using Google Classroom: A case study of Introduction to Information
- Technology course. 2017 International Conference on Digital Arts, Media and Technology (ICDAMT), 205–209. https://doi.org/10.1109/ICDAMT.2017.7904962
- Kabra, G., Ghosh, V. and Joshi, Y. (2023), "Factors influencing adoption of cloud computing services in HEIs: a UTAUT approach based on students' perception", International Journal of Business Information Systems, Vol. 42 No. 1, pp. 103-122, doi: 10.1504/IJBIS.2023.128301.
- Kang, M., Liew, B. Y. T., Lim, H., Jang, J., & Lee, S. (2015). Lecture notes in educational technology. Lecture Notes in Educational Technology (Issue 9783662441879, pp. 209–216). https://doi.org/10.1007/978-3-662-44188-6_29
- Kenny, V., & Firdausy, C. M. (2022). Pengaruh Performance Expectation, Effort Expectation, Social Influence, dan Facilitating Condition terhadap Behavioral Intention pada Pengguna ShopeePay di Jakarta. Jurnal Manajemen Bisnis dan Kewirausahaan, 6(3), 272-277.

- Khan, S.T., Bhat, M.A. and Sangmi, M.U.D. (2020), "Impact of microfinance on economic, social, political and psychological empowerment: evidence from women's self-help groups in Kashmir valley, India", FIIB Business Review, Vol. 12 No. 1, p. 2319714520972905, doi: 10.1177/2319714520972905.
- Kim, J., Merrill, K., Jr, Xu, K. and Kelly, S. (2022), "Perceived credibility of an AI instructor in online education: the role of social presence and voice features", Computers in Human Behavior, Vol. 136, p. 107383, doi: 10.1016/j.chb.2022.107383.
- Kumar, J. A., & Bervell, B. (2019). Google classroom for mobile learning in higher education: Modeling the initial percep[1]tions of students. Education and Information Technologies, 24(2), 1793–1817. https://doi.org/10.1007/s10639-018-09858-z
- Lee, C., Lee, G., & Lin, H. (2007). The role of organizational capabilities in successful e-business implementation. Business Process Management Journal, 13(5), 677–693. https://doi.org/10.1108/14637150710823156
- Lee, H. (2023), "The rise of ChatGPT: exploring its potential in medical education", Anatomical Sciences Education, pp. 1-6, doi: 10.1002/ase.2270.
- Li, K. (2023). Determinants of College Students' Actual Use of AI-Based Systems: An Extension of the Technology Acceptance Model. Sustainability, 15(6), 5221.
- Liengaard, B.D., Sharma, P.N., Hult, G.T.M., Jensen, M.B., Sarstedt, M., Hair, J.F. and Ringle, C.M. (2021), "Prediction: coveted, yet forsaken? Introducing a cross-validated predictive ability test in partial least squares path modeling", Decision Sciences, Vol. 52 No. 2, pp. 362-392, doi: 10.1111/ deci.12445
- Lin, C. Y., & Huang, C. K. (2020). Understanding the antecedents of knowledge sharing behavior and its relationship to team effectiveness and individual learning. Australasian Journal of Educational Technology, 36(2), 89–104. https://doi.org/10.14742/AJET.4549
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence unleashed. An argument for AI in Education, 18.
- Mishra, A., Shukla, A. and Sharma, S.K. (2022), "Psychological determinants of users' adoption and word-of-mouth recommendations of smart voice assistants", International Journal of Information Management, Vol. 67, p. 102413, doi: 10.1016/j.ijinfomgt.2021.102413
- Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an infor[1]mation technology innovation. Information Systems Research, 2(3), 192–222. https://doi.org/10.1287/isre.2.3.

- Nikolopoulou, K., Gialamas, V., & Lavidas, K. (2020). Acceptance of mobile phone by university students for their studies: An investigation applying UTAUT2 model. Education and Information Technologies, 25(5), 4139–4155. https://doi.org/ 10.1007/s10639-020-10157-9
- Osei, H. V., Kwateng, K. O., & Boateng, K. A. (2022). Integration of personality trait, motivation and UTAUT 2 to under[1]stand e-learning adoption in the era of COVID-19 pandemic. Education and Information Technologies, 27(8), 10705–10730. https://doi.org/10.1007/s10639-022-11047-y
- Peng, D.X. and Lai, F. (2012), "Using partial least squares in operations management research: a practical guideline and summary of past research", Journal of Operations Management, Vol. 30 No. 6, pp. 467-480, doi: 10.1016/j.jom.2012.06.002.
- Perkins, M. (2023), "Academic integrity considerations of AI large language models in the post[1]pandemic era: ChatGPT and beyond", Journal of University Teaching and Learning Practice, Vol. 20 No. 2, doi: 10.53761/1.20.02.07.
- Pillai, R., Sivathanu, B., Metri, B. and Kaushik, N. (2023), "Students' adoption of AI-based teacher-bots (T-bots) for learning in higher education", Information Technology and People, doi: 10.1108/ITP[1]02-2021-0152
- Raman, A., & Don, Y. (2013). Preservice teachers' acceptance of learning management software: An application of the UTAUT2 model. International Education Studies, 6(7), 157–164. https://doi.org/10.5539/ies.v6n7p157
- Raza, S. A., Qazi, Z., Qazi, W., & Ahmed, M. (2022). E-learning in higher education during COVID-19: Evidence from black[1]board learning system. Journal of Applied Research in Higher Education, 14(4), 1603–1622. https://doi.org/10.1108/ JARHE-02-2021-0054
- Sahoo, D., Harichandan, S., Kar, S.K. and Sreejesh, S. (2022), "An empirical study on consumer motives and attitude towards adoption of electric vehicles in India: policy implications for stakeholders", Energy Policy, Vol. 165, p. 112941, doi: 10.1016/j.enpol.2022.112941.
- Samsudeen, S. N., & Mohamed, R. (2019). University students' intention to use e-learning systems. Interactive Technology and Smart Education, 16(3), 219–238. https://doi.org/10.1108/ITSE-11-2018-0092
- Sarstedt, M. and Cheah, J.H. (2019), "Partial least squares structural equation modeling using SmartPLS: a software review", Journal of Marketing Analytics, Vol. 7 No. 3, pp. 196-202, doi: 10.1057/s41270-019-00058-3.
- Sehabuddin, A. and Oktarina, N. (2022), "E-Learning adoption; how is students behavior during the covid[1]19 pandemic?", Dinamika Pendidikan, Vol. 17 No. 1, pp. 48-61, doi: 10.15294/dp.v17i1.3436

- Shen, S., Xu, K., Sotiriadis, M. and Wang, Y. (2022), "Exploring the factors influencing the adoption and usage of augmented reality and virtual reality applications in tourism education within the context of COVID-19 pandemic", Journal of Hospitality, Leisure, Sport and Tourism Education, Vol. 30, p. 100373.DOI:, doi: 10.1016/j.jhlste.2022.100373.
- Sheth, A., Yip, H. Y., Iyengar, A., & Tepper, P. (2019). Cognitive services and intelligent chatbots: Current perspectives and special issue introduction. IEEE Internet Computing, 23(2), 6–12. https://doi.org/10.1109/MIC.2018.2889231
- Shrestha, N. (2021), "Factor analysis as a tool for survey analysis", American Journal of Applied Mathematics and Statistics, Vol. 9 No. 1, pp. 4-11, doi: 10.12691/ajams-9-1-2.
- Songkram, N., Chootongchai, S., Osuwan, H., Chuppunnarat, Y., & Songkram, N. (2023). Students' adoption towards behavioral intention of digital learning platform. Education and Information Technologies, 1-23.
- Strzelecki, A. (2023). To use or not to use ChatGPT in higher education? A study of students' acceptance and use of technology. Interactive Learning Environments, 1-14.
- Taghizadeh, S. K., Rahman, S. A., Nikbin, D., Alam, M. M. D., Alexa, L., Ling Suan, C., & Taghizadeh, S. (2022). Factors influencing students' continuance usage intention with online learning during the pandemic: a cross-country analysis. Behaviour & Information Technology, 41(9), 1998-2017.
- Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. Information Systems Research, 6(2), 144–176. https://doi.org/10.1287/isre.6.2.144
- Tenenhaus, M., Vinzi, V.E., Chatelin, Y.M. and Lauro, C. (2005), "PLS path modeling", Computational Statistics and Data Analysis, Vol. 48 No. 1, pp. 159-205, doi: 10.1016/j.csda.2004.03.005.
- Tiwari, C. K., Bhat, M. A., Khan, S. T., Subramaniam, R., & Khan, M. A. I. (2023). What drives students toward ChatGPT? An investigation of the factors influencing adoption and usage of ChatGPT. Interactive Technology and Smart Education.
- Twum, K. K., Ofori, D., Keney, G., & Korang-Yeboah, B. (2022). Using the UTAUT, personal innovativeness and perceived financial cost to examine student's intention to use E-learning. Journal of Science and Technology Policy Management, 13(3), 713–737. https://doi.org/10.1108/JSTPM-12-2020-0168
- van der, H. (2004). User acceptance of hedonic information systems. MIS Quarterly, 28(4), 695. https://doi.org/10.2307/ 25148660

- Vázquez-Cano, E., Mengual-Andrés, S., & López-Meneses, E. (2021). Chatbot to improve learning punctuation in Spanish and to enhance open and flexible learning environments. International Journal of Educational Technology in Higher Education, 18(1), 1–20. https://doi.org/10.1186/S41239-021-00269-8
- Venkatesh, M., & Davis, D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27 (3), 425. https://doi.org/10.2307/30036540
- Venkatesh, T., & Xu, (2012). Consumer acceptance and Use of information technology: Extending the unified theory of acceptance and Use of technology. MIS Quarterly, 36(1), 157. https://doi.org/10.2307/41410412
- Wu, W. Y., Lee, L. Y., Quynh Phan, N. V., Qomariyah, A., & Nguyen, P. T. (2021). The influential factors and consequences of knowledge sharing for expatriates. International Journal of Emerging Markets, 1–23. https://doi.org/10.1108/IJOEM[1]12-2019-1042
- Zwain, A. A. A. (2019). Technological innovativeness and information quality as neoteric predictors of users' acceptance of learning management systems. Interactive Technology and Smart Education, 16(3), 239–254. https://doi.org/10.1108/ITSE-09-2018-0065

SUSTAINABILITY ASPECT OF E-BANKING SERVICES IN INDIAN BANKING SECTOR

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ABSTARCT

Sustainability today is an "emerging mega trend" and a very important business objective to drive green business innovation. The relevance of green marketing in existent scenario is conspicuous because of environmental concerns among marketing researchers. Banks play a vital role in sustainable development of a country. E-banking is the process of gaining access to banking services through electronic channels like the internet and mobile devices. In the development of Indian Economy, Banking sector plays a very important and crucial role. With the use of technology there had been an increase in penetration, productivity and efficiency. It has not only increased the cost effectiveness but also has helped in making small value transactions viable. Electronic delivery channels, ATMs, variety of cards, web-based banking, and mobile banking.

E-banking is the most pioneering trend among the customers in the present era of thrust for more expeditious and secured financial services. The transfer from the traditional banking to e-banking has been an elevating amendment in banking dealings. This research conducted in the year 2024 was based on questioning 85 respondents. The sample was picked from sample frame, the necessary data was collected from them to know the quality of e-banking services through SERVQUAL Model. It was found that the dimensions that influence the good services were Responsiveness and Tangibility and more focus needed to focus on satisfaction and quality of service, Reliability, and Assurance to fill the gap.

Keywords: E-Banking, Sustainability, SERVQUAL, Green Marketing, Customer Satisfaction

INTRODUCTION

E-Banking, also known as Internet Banking or Online Banking, refers to the electronic access and transaction facilities provided by banks and financial institutions through the internet. According to the World Bank (Bank, 2021), E-Banking is a crucial aspect of financial inclusion and economic development, as it enables people to carry out various banking activities, such as account management, bill payments, fund transfers, and more, from the comfort of their homes or on-the-go, using digital devices like computers, smartphones, or tablets. This innovative approach to banking promotes convenience, efficiency, and accessibility, ultimately contributing to the growth of the global financial sector and improving the overall quality of life for individuals and businesses. It has revolutionized the way people interact with their financial institutions, providing them with the ability to perform various banking activities remotely and at any time. In the present scenario, the

demand of banking is anytime, anywhere banking, this requires innovative robust secure optimized and ready to meet the expectations of empowered and tech savvy customers. Digital transformation is just moving from traditional banking to a digital world. It is a vital change in how banks and other financial institutions learn about, how to interact with and satisfy the customers. According to the World Bank, E-Banking provides greater access to financial services for people living in remote areas. An effective digital transformation begins with an understanding of digital customer behaviour, preferences, choices, requirements, and aspirations etc. This transformation leads to the major changes in the organizations from product centric to customer centric view. This paper covers role of digitization in Indian banking, factors affect the scope of digital banking in India, digital banking trends in India, technological milestones in Indian banks. The service quality is quantified with the help of a modified SERVQUAL model. The banks must focus on bringing in innovation in these parameters to maintain a high quality of service and achieve higher satisfaction, which subsequently develops customer trust towards the company. By bringing innovative changes to improve the service quality, the banks can also increase their competitive advantage and customer retention as service quality has a significant relationship with customer loyalty.

There is an effective banking system in behind the developed economy. The most important part of the economy is the bank because it plays important role in economy as mobilization of resources. Banking system has been going under several changes and situation and it became more and more powerful, now it is going to transforming itself by accepting the digitalization. The digitalization is required for all over the world. Now all sector and country are involving in the digitalization their business and trade out of this banking sector also has to change the traditional system and acceptance to the new technology. The new technology is gradually covering all financial sectors but it is firstly adapted by the private sector. The private sector banks have been adopted the computerization, digitalization and the now digital converting in to the environment effective banking sector. Public sector banks also adapted the digitalization and moving toward the environment protection trough banking. Therefore, it is important to know whether the changes are beneficial to customer or not and banker as well as to the whole economy. Now it is in the new banking phase that is paperless banking and green banking, these are new concept are emerging in to the banking system. The banking system is now thinking in the view of Environment protection and save environment. Therefore, it is important to study the effectiveness of the new technology.

OVERVIEW OF E-BANKING SERVICES:

E-banking, also known as online banking, refers to the digital delivery of banking services through various electronic channels such as websites, mobile apps, and digital wallets. E- banking services offer convenience, speed, and accessibility to customers, enabling them to perform various banking transactions from anywhere, anytime. However, the sustainability aspect of e-banking services is equally important as it affects the environment, society, and the economy.

Sustainability in e-banking refers to the integration of environmental, social, and economic considerations into banking operations, products, and services. A Study by the Journal of Financial stability discusses the cost savings associated with E-Banking and the potential for increased proficiency in the financial sector. McKinsey and Company also discusses these innovations and their potential impact on future of Retail Banking.

Below are some ways e-banking services contribute towards sustainability.
Environmental Sustainability E-banking services promote environmental sustainability by reducing paper usage, carbon footprint, energy consumption, and waste generation. Digital banking eliminates the need for paper statements, cheques, and forms, which contributes significantly towards deforestation, pollution, greenhouse gas emissions, water usage, etc. E-banking services also enable customers to perform transactions remotely, thereby reducing transportation-related emissions.

Social Sustainability E-banking services promote social sustainability by providing financial inclusion, accessibility, and convenience to customers, particularly in remote areas where traditional banking services are not available. Digital banking also facilitates financial literacy, education, training programs, which can help customers make informed financial decisions, avoid debt traps, reduce poverty, etc. E-banking services also offer various digital payment options, which can help customers save time & money while promoting contactless payments during pandemics.

Economic Sustainability E-banking services promote economic sustainability by improving operational efficiency, reducing costs, increasing revenue, promoting innovation & competition, etc. Digital banking enables banks & financial institutions, particularly SME banks, microfinance institutions, & rural banks, etc., offer various digital products & services, which can help them reach out & serve customers better, thereby promoting economic growth & development. E- banking services also facilitate various digital lending, investment, & insurance products & services, which can help customers manage their finances better, thereby promoting financial stability & resilience.

In conclusion, e-banking services offer various environmental, social, & economic benefits, which contribute towards sustainability. However, given by the research Journal of Banking and Finance, the success of E-Banking services and to enhance customer satisfaction there is a need to understand customer needs and preferences. e-banking services also pose various challenges, such as cybersecurity, data privacy, financial inclusion, digital literacy, etc., which need to be addressed through various regulatory, technological, & social measures. Banks & financial institutions, therefore, need to ensure that their e-banking services are sustainable, responsible, & inclusive, thereby promoting a more sustainable, equitable, & prosperous society.

There are certain E-Banking services:
Online Account Opening: This service allows customers to open a new bank account online, without the need to visit a physical branch. Customers can fill out an online application form, upload required documents, and complete the account opening process entirely digitally.

Bill Payments: This service allows customers to pay their bills online, such as electricity, water, gas, telephone, and internet bills. Customers can view their bill statements, make payments, and set up automatic payments to avoid late fees.

Fund Transfers: This service allows customers to transfer funds between their own accounts or to other bank accounts. Customers can initiate fund transfers online, using their account details or the recipient's account details.

Balance Enquiries: This service allows customers to check their account balances online, without the need to visit a physical branch. Customers can view their account balances, transaction history, and other account details through their online banking portal or mobile app.

Cheque Book Requests: This service allows customers to request a new cheque book online, without the need to visit a physical branch. Customers can fill out an online request form, select the number of cheques required, and complete the request process entirely digitally.

Credit Card Applications: This service allows customers to apply for a new credit card online, without the need to visit a physical branch. Customers can fill out an online application form, upload required documents, and complete the application process entirely digitally.

Digital Loan Applications: This service allows customers to apply for various types of loans online, such as personal loans, car loans, home loans, and business loans. Customers can fill out an online application form, upload required documents, and complete the application process entirely digitally.

Mobile Wallets: This service allows customers to store and transfer money using their smartphones. Customers can link their bank accounts to their mobile wallets, make payments, and receive payments using their smartphones.

Unified Payments Interface (UPI): This service allows customers to make instant payments using their smartphones.

REVIEW OF LITERATURE
The review of literature on digitalization in Indian banking reveals a mixed picture. While studies by Bhattacharyya et al. (1997) and Varghese (2000) suggest that publicly owned banks are the most efficient in resource utilization during the early phase of liberalization, Mohan (2006) highlights that Indian banking has not been able to fully harness the benefits of computerization despite the advent of IT. Roshan Lal (2012) and N. Jamaluddin (2013) both acknowledge the significant role of IT in the advancement of the banking system in India and the reach of banking to every

individual due to computerization processes adopted by the banking sector. Jain (2015) investigates the progress of financial inclusion in India and suggests that the execution of financial inclusion will require an approach in totality on part of banks in creating awareness about financial products, education, and advice on money management for mass people. Tarandeep Kaur (2015) discusses the need for developing new models and appropriate strategies to make electronic and mobile commerce as key policy for the development and progress in India. Anthony Rahul Golden S. (2017) explores the overview of digitalization in Indian banking and highlights both the opportunities and challenges that digitalization poses for the banking sector and financial stability in India. Santiago Carbo - Valverde (2017) also discusses the impact of digitalization on banking activities and challenges for financial stability in India and abroad. Maity and Sahu (2018) examine the role of Indian banks in financial inclusion and measure their efficiency through DEA in financial inclusion respect, finding that scheduled commercial banks (SCBs) are using 94.87% of resources to produce desired outputs concerning financial inclusion. Dr. Arunangshu Giri and Ipsita Paria (2018) review studies on the impact of digitalization on rural banking systems and rural economies in India and find that digital banking has enormous potential to change the landscape of financial inclusion in rural areas due to its low cost and ease of use features that can accelerate the integration of unbanked economies into the mainstream financial system in India. K. Hema Divya and K. Suma Vally (2018) analyse the adoption level of digital payment systems by customers in Hyderabad and find that the deployment of technology for digital payments has improved the performance of the banking sector in India and contributed to the motive of a cashless country.

RESEARCH GAP:

This research also includes accessing, examining the level of satisfaction towards E BANKING Services. SERVQUAL is an instrument for measuring service quality, in terms of the discrepancy between customers& expectation regarding service offered and the perception of the service received; Respondents are required to answer questions about both their expectation and their perception

NEED OF THE STUDY:

The need of the study is to examine the e-banking service quality, to know the efficiency of paperless technology in banking in India and to study the challenges faced by Indian banks in adoption of technology and make recommendations to tackle these challenges.

OBJECTIVES OF THE STUDY:

To explore sustainability aspect of E-Banking services.

To know the customer perception toward the paperless banking technology.

To provide suggestions to improve e-banking service quality for the customers. 4-To achieve sustainable developmental goals.

RESEARCH METHODOLOGY:

Sample Selection:

This research conducted in the year 2024 was based on questioning 85 respondents. The sample was picked from sample frame, the necessary data was collected from them to know the quality of e-banking services rendered by nationalised banks, using convenience Descriptive Research Design to study the service quality, satisfaction level and other key dimensions. Specially the service quality aspect was identified using SERVQUAL service quality variables.

Data Collection:

PRIMARY DATA: A self-administered questionnaire was used for data collection. It consisted of close-ended questions. The questionnaire was divided in two parts – the first part was intended to know the respondent's expectation of the SERVQUAL service quality variables, namely tangibility, reliability, responsiveness, assurance and empathy. Therefore, the respondents were asked to rate service quality variables on a five-point Likert Importance Scale where 1=Extremely Important, 2= Very Important, 3= Moderately Important, 4= Slightly Important and 5= Not at all Important. The second part of questionnaire included various statement describing service quality parameters, where the respondents rated their agreement on a five-point Likert Scale. The responses were labelled as 1= Strongly Agree, 2= Agree, 3= Neutral, 4= Disagree and 5= Strongly Disagree.

Analysis of Customer Satisfaction towards E-Banking Services:

An analysis of E-banking can be approached from various perspectives, including its benefits, challenges, impact on traditional banking, and future prospects.

Benefits of E-banking:

Convenience: E-banking allows customers to manage their finances anytime, anywhere, without the need to visit a physical bank branch.

Cost-effectiveness: Digital banking operations are generally more cost-efficient than traditional banking, leading to potential cost savings for customers.

Enhanced Services: E-banking offers a wide range of services, including online account management, bill payments, money transfers, and investment options, making banking more accessible and convenient.

Improved Security: With advanced encryption technologies and multi-factor authentication, E-banking can be more secure than traditional banking methods, such as carrying cash or using paper checks.

Challenges of E-banking:

Cybersecurity: The risk of cyber-attacks and data breaches is a significant concern for E- banking customers and institutions.

Digital Divide: Not all individuals have access to the necessary technology or digital literacy to engage in E-banking, leading to potential exclusion.

Technical Issues: Online banking relies on technology, which can sometimes experience glitches or outages, causing inconvenience to customers.

Impact on Traditional Banking:
Branch Closures: As more customers shift to digital banking, traditional bank branches may face closure, leading to job losses and changes in the banking landscape.

Shift in Revenue Model: E-banking may lead to a shift in revenue models, as banks may need to rely more on non-interest income sources, such as fees for digital services.

Future Prospects:
Integration of Artificial Intelligence (AI) and Machine Learning (ML): These technologies can improve customer experience, risk management, and fraud detection in E-banking.

Open Banking: The adoption of open banking standards can promote innovation, competition, and collaboration among financial institutions and third-party service providers.

Mobile Banking: The increasing use of smartphones and mobile applications is expected to drive further growth in E-banking, offering even more convenience and personalized services to customers.

In summary, E-banking has revolutionized the financial industry by offering numerous benefits to customers and institutions. However, it also presents challenges that must be addressed to ensure a sustainable and inclusive digital banking ecosystem. The future of E-banking will likely involve increased integration of advanced technologies and a shift towards more customer-centric, mobile-focused services.

DEMOGRAPHIC PROFILE ANALYSIS

A demographic profile is a form of demographic analysis in which information is gathered about a group to better understand the group's composition or behaviours for the purpose of providing more relevant services.

Table 1: Demographic Profile of Respondents

	DEMOGRAPHIC PARAMETERS	**FREQUENCY**	**PERCENTAGE**
Age	Below 25 Years	20	23.52%
	25-40	28	32.94%
	40-60	24	28.23%
	60 Above	13	15.29%
	Total	85	100%
Gender of	Male	43	50.58%
Respondents	Female	42	49.41%
	Total	85	100%

Level of	Primary	7	8.23%
Education	Education	39	45.88%
	Secondary		
	Education		
	Higher	39	45.88%
	Education		
	Total	85	100%
Occupation	Government Job	19	22.35%
	Private Job	24	28.23%
	Business	37	43.52%
	Non-Working	5	5.88%
	Total	85	100%
Monthly	Below 50k	18	21.17%
Income	50k-1lakh	9	10.58%
	1lakh-1.5lakh	26	30.58%
	1.5-2Lakh	12	14.11%
	Above 2lakh	20	23.52%
	Total	85	100%

Source: Self Structured

The demographic characteristics of the respondents are shown in table 1. The gender distribution of the respondent passenger groups was quite uneven, with 50.58 per cent male respondents and 49.41 per cent female respondents. The model age group of the respondents was between 25-40 years (32.94 per cent), followed by 40-60 years (28.23 per cent), below 25 years (23.52 per cent), and 60 years above (15.29 per cent). In terms of level of education, 45.88 per cent of the respondents are higher and secondary educates, and 8.23 percent are primary educates. The results show that sample respondents have relatively high educational attainment. In terms of occupation, 28.23 per cent respondents are private service employees, 22.35 per cent respondents are government servants, 43.52 per cent respondents are businessman and 5.88 percent are non-working.

ANALYSIS OF CUSTOMER SATISFACTION

The five dimensions that covered in the present study are:

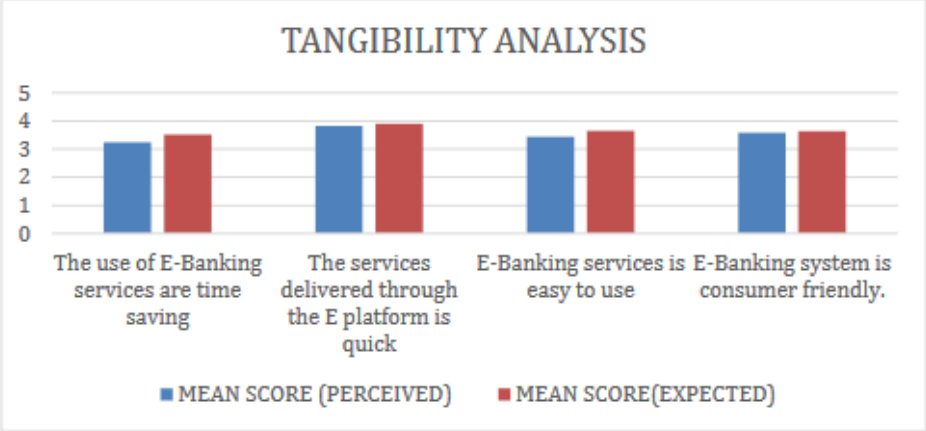
TANGIBILTY the appearance and navigability of the website, RESPONSIVENESS extent to which system can respond to customers specific requirements promptly and adequately, RELIABILITY ability of the system to perform railway bookings correctly and smoothly with error free monetary transactions, ASSURANCE ability of the system to engender consumer confidence and trust, SATISFACTION AND QUALITY OF SERVICE extent to which system can extend individualised attention and services.

Table 2: Analysis of Tangibility

Dimensions	Mean Score (Perceived)	Mean Score (Expected)	Gap Score (E-P)	Standard Deviation (Perceived)	Standar D Deviation (EXPECTED)
TANGIBILITY					
1- The use of E-Banking services are time saving	3.244186	3.5116	0.267414	1.2169	0.9791
2- The services delivered through the E platform is quick	3.8256	3.8953	0.0697	1.2943	1.2836
3- E-Banking services is easy to use	3.4419	3.6512	0.2993	1.4681	1.2534
4- E-Banking system is consumer friendly.	3.5814	3.6395	0.0581	1.2785	1.3188
AVERAGE	3.5232715	3.6744	0.1511285		

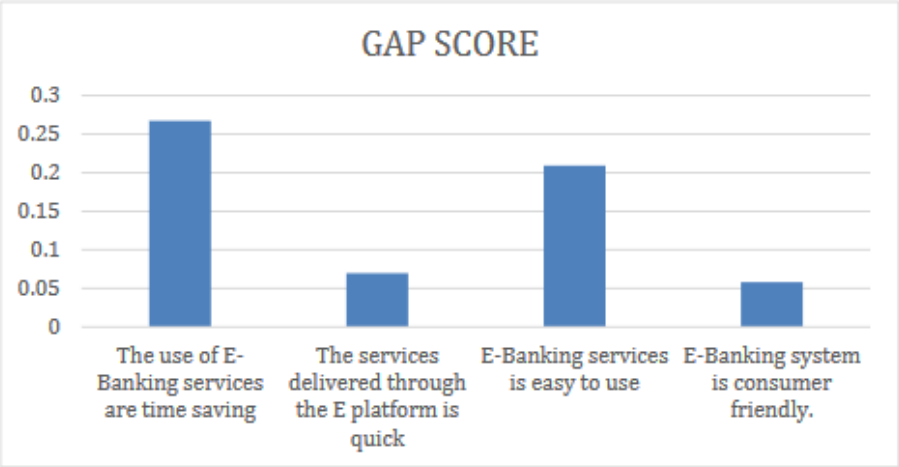
Source: Self Structured

Figure 1: Percieved and Expected Score Analysis of Tangibility



Source: Self Structured

Figure 2: Gap Score Analysis of Tangibility



Source: Self Structured

Table 2 depicts about dimensions TANGIBILITY, under this dimension the average perceived mean score of parameters The use of E-Banking services are time saving is 3.244186 and the average expected mean score is 3.5116 and gap score is 0.267414, with perceived standard deviation as 1.2169 and expected standard deviation as 0.9791.

The average perceived mean score for parameter The services delivered through the E platform is quick is 3.8256 and the expected mean score is 3.8953 and gap score is 0.0697, with perceived standard deviation as 1.2943 and expected standard deviation as 1.2836.

The average perceived mean score for parameter E-Banking services is easy to use is 3.6512 and the expected mean score is 0.2993 and the gap score is 0.2093, with perceived standard deviation as 1.4681 and expected standard deviation as 1.2534.

The average perceived mean score for the parameter E-Banking system is consumer friendly is 3.5814 and the average expected mean score is 3.6395 and gap score is 0.0581, with perceived standard deviation as 1.2785 and expected standard deviation as 1.3188.

The highest gap score is for the E-Banking services is easy to use.

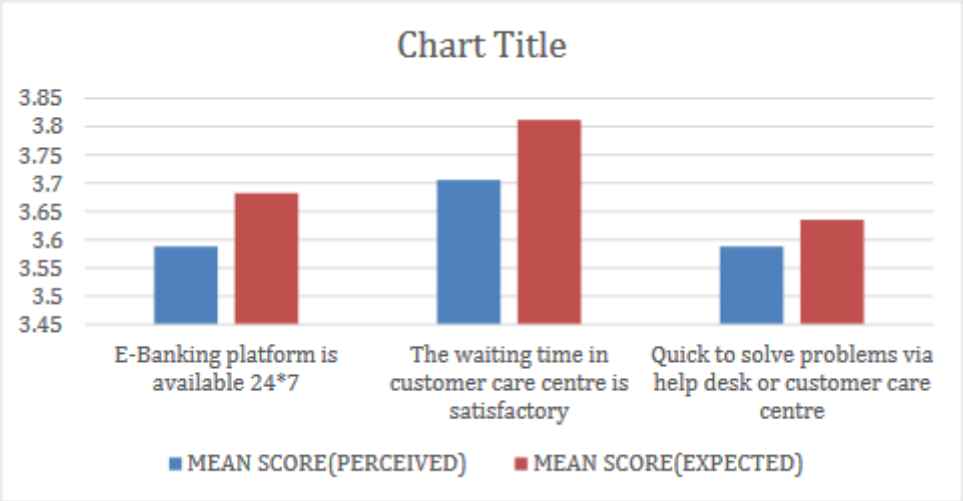
Table 3: Analysis of Responsiveness

RESPONSIVENESS					
1 E-Banking platform is available for 24*7.	3.5882	3.6824	0.0942	1.3566	1.2268
2- The waiting time in customer care centre is satisfactory.	3.7059	3.8118	0.1059	1.2327	1.2955

3- Quick to solve problems via help desk or customer care centre.	3.5882	3.6353	0.0471	1.1982	1.326
AVERAGE	3.627433	3.709833	0.0824		

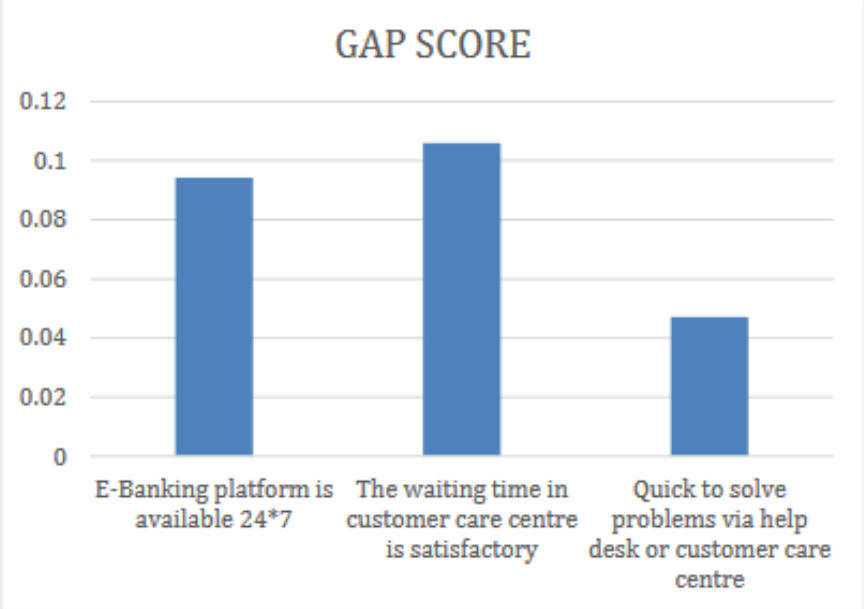
Source: Self Structured

Figure 3: Perceived and Expected Score Analysis of Responsiveness



Source: Self Structured

Figure 4: Gap Score Analysis of Responsiveness



Source: Self Structured

TABLE 3 depicts about dimension Responsiveness. Under this dimension the average perceived mean score of E-Banking platform is available for 24*7 is 3.5882 and average expected mean score is 3.6824 and the gap score is 0.0942, with perceived standard deviation as 1.3566 and expected standard deviation as 1.2268.

The average perceived mean score for the waiting time in customer care centre is satisfactory is 3.7059 and the average expected score is 3.8118 and the gap score is 0.1059, with the perceived standard deviation as 1.2327 and the expected standard deviation is 1.2955.

The average perceived mean score for Quick to solve problems via help desk or customer care centre is 3.5882 and the average expected score is 3.6353 and the gap score is 0.0471, with the perceived standard deviation as 1.1982 and the expected standard deviation as 1.326.

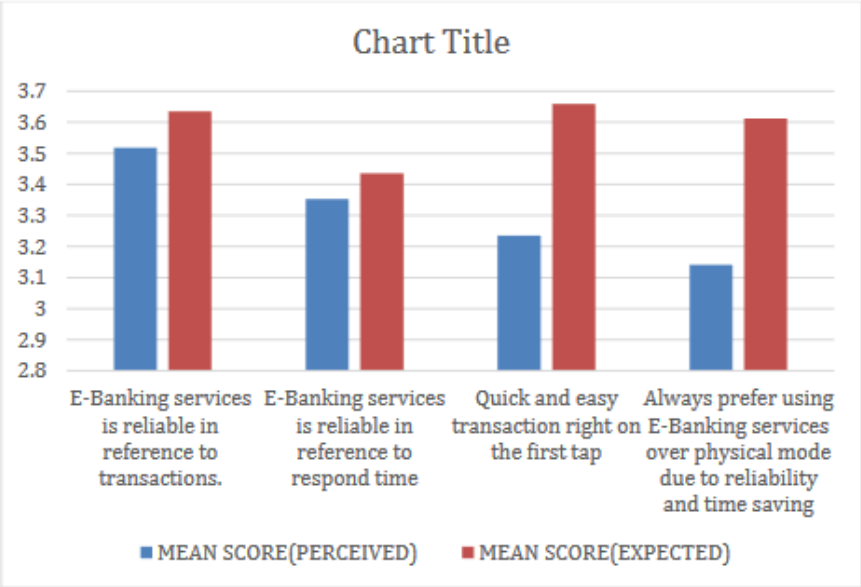
The highest gap score is for the waiting time in customer care centre is satisfactory.

Table 4: Analysis of Reliability

RELIABILITY					
1- E-Banking services is reliable in reference to transactions.	3.5176	3.6353	0.1177	1.3328	1.233
2- E-Banking services is reliable in reference to respond time.	3.3529	3.4353	0.0824	1.4033	1.4756
3- Quick and easy transaction right on the first tap.	3.2353	3.6588	0.4235	1.2213	1.2397
4- Always prefer using E-Banking services over physical mode due to reliability and time saving.	3.1412	3.6118	0.4706	1.2924	1.2826
AVERAGE	3.31175	3.5853	0.27355		

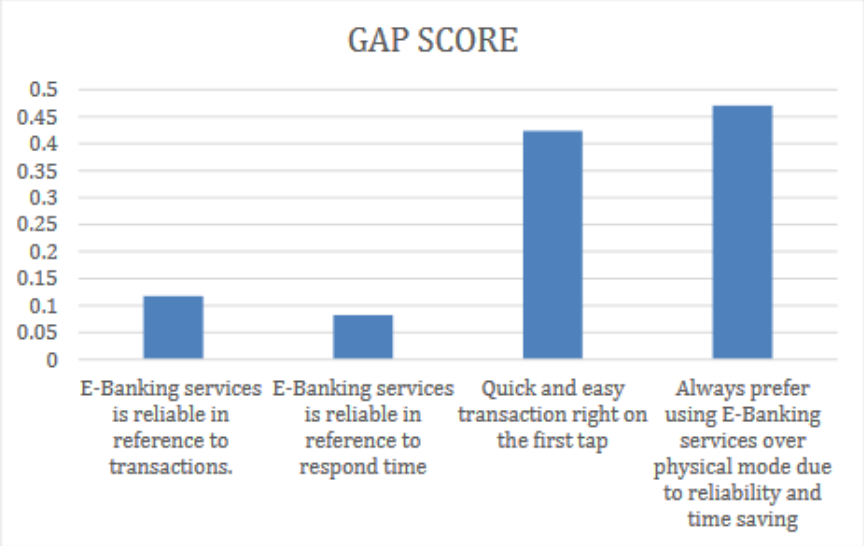
Source: Self Structured

Figure 5: Perceived and Expected Score Analysis of Reliability



Source: Self Structured

Figure 6: Gap Score Analysis of Reliability



Source: Self Structured

Table4 depicts the dimension RELIABILITY. Under this dimension the average perceived score for E-Banking services is reliable in reference to transactions is 3.5176 and the average expected score is 3.6353 and the gap score is 0.1177, with the perceived standard deviation as 1.3328 and expected standard deviation as 1.233.

The average perceived score for E-Banking services is reliable in reference to respond time is 3.3529 and the average expected score is 3.4353 and the gap score is 0.0824, with the perceived standard deviation as 1.4033 and expected standard deviation as 1.4756.

The average perceived score for Quick and easy transaction right on the first tap is 3.2353 and the average expected mean score is 3.6588 and the gap score is 0.4235, with the perceived standard deviation as 1.2213 and the expected standard deviation as 1.2397.

The average perceived score for Always prefer using E-Banking services over physical mode due to reliability and time saving is 3.1412 and the expected mean score is 3.6118 and the gap score is 0.4706, with the perceived standard deviation of 1.2924 and the expected standard deviation as 1.2826.

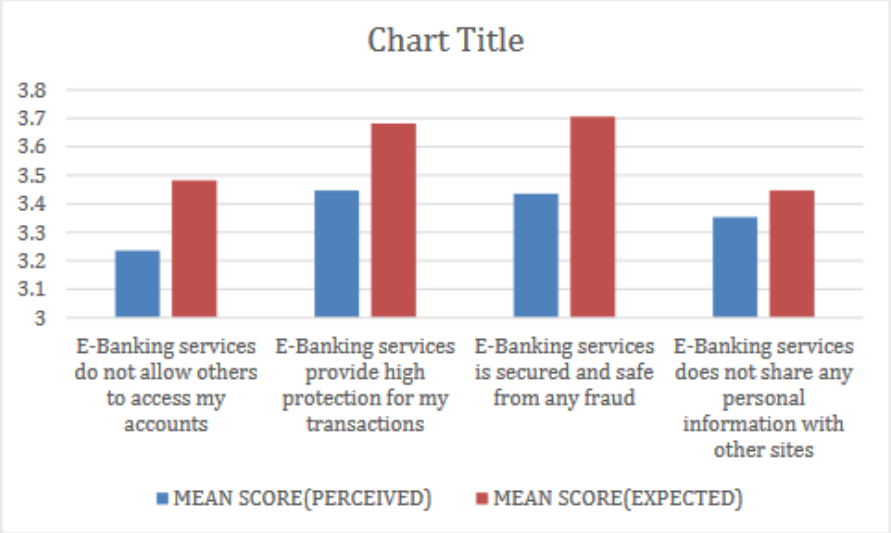
The highest gap score is for the parameter that one should Always prefer using E-Banking services over physical mode due to reliability and time saving.

Table 5: Analysis of Assurance

ASSURANCE					
1- E-Banking services do not allow others to access my accounts	3.235294	3.482353	0.247059	1.181676	1.287409
2- E-Banking services provide high protection for my transactions	3.447059	3.682353	0.235294	0.9941	1.226802
3- E-Banking services is secured and safe from any fraud	3.435294	3.705882	0.270588	0.993396	1.232724
4- E-Banking services does not share any personal information with other sites	3.352941	3.447059	0.094118	1.192296	1.375862
AVERAGE	3.367647	3.57941175	0.21176475		

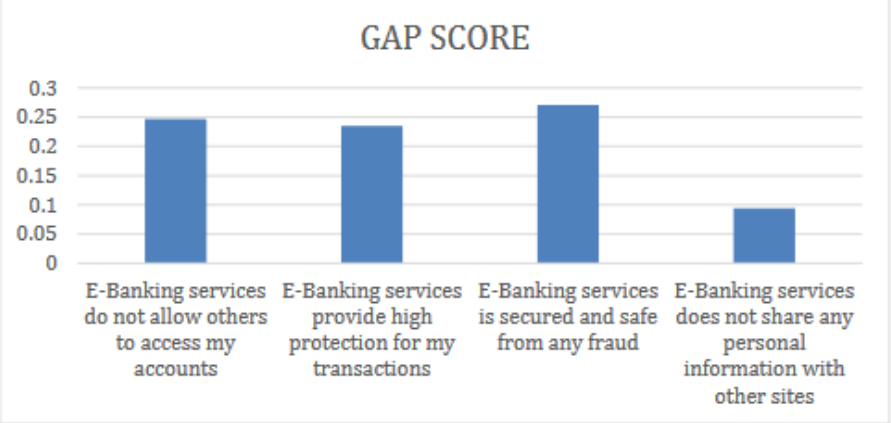
Source: Self Structured

Figure 7: Perceived and Expected Score Analysis of Assurance



Source: Self Structured

FIGURE 8: Gap Score Analysis of Assurance



Source: Self Structured

Table 5 depicts the dimension ASSURANCE. Under this dimension the average perceived score of the parameter E-Banking services do not allow others to access my accounts is 3.235294 and the average expected score is 3.482353 and the gap score is 0.247059, with the perceived standard deviation as 1.181676 and the expected standard deviation as 1.287409.

The average perceived mean score of the parameter E-Banking services provide high protection for my transactions is 3.447059 and the expected mean score is 3.682353 and the gap score is 0.235294, with the perceived standard deviation as 0.9941 and the expected standard deviation as 1.226802.

The average perceived mean score of the parameter E-Banking services is secured and safe from any fraud is 3.435294 and the expected mean score is 3.705882 and the gap score is 0.270588, with perceived standard deviation as 0.993396 and expected standard deviation as 1.232724.

The average perceived mean score of the parameter E-Banking services does not share any personal information with other sites is 3.352941 and the expected mean score is 3.447059 and the gap score is 0.094118, with perceived standard deviation as 1.192296 and expected standard deviation as 1.375862.

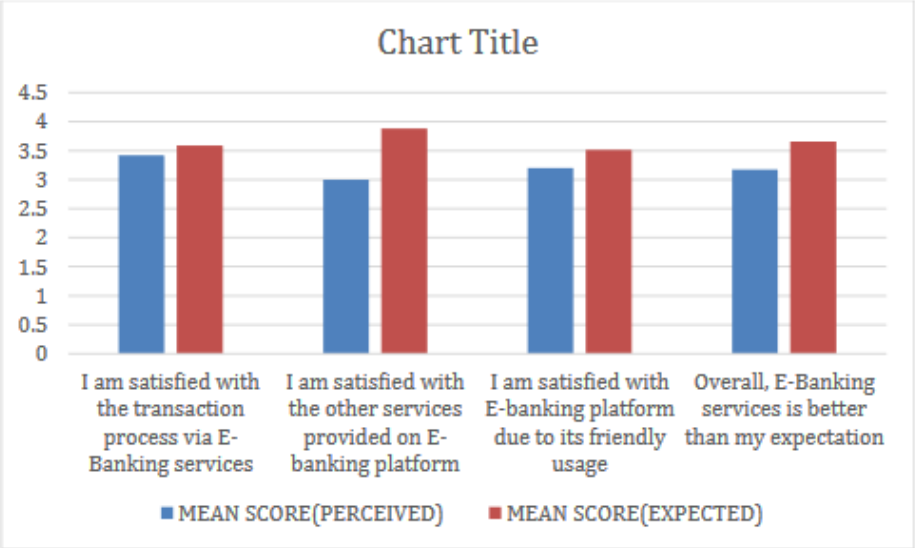
The highest gap score is for the parameter E-Banking services is secured and safe from any fraud.

Table 6: Analysis of Satisfaction and Quality of Service

SATISFACTION AND QUALITY OF SERVICE					
1- I am satisfied with the transaction process via E-Banking services	3.42353	3.58824	0.16471	1.03942	1.19815
2- I am satisfied with the other services provided on E-banking platform.	3.0	3.8824	0.8824	1.13389	1.34602
3- I am satisfied with E-banking platform due to its friendly usage.	3.2	3.51765	0.31765	1.06682	1.33284
4- Overall, E-Banking services is better than my expectation	3.17647	3.65882	0.48235	1.11458	1.22039
AVERAGE	3.2	3.6617775	0.4617775		

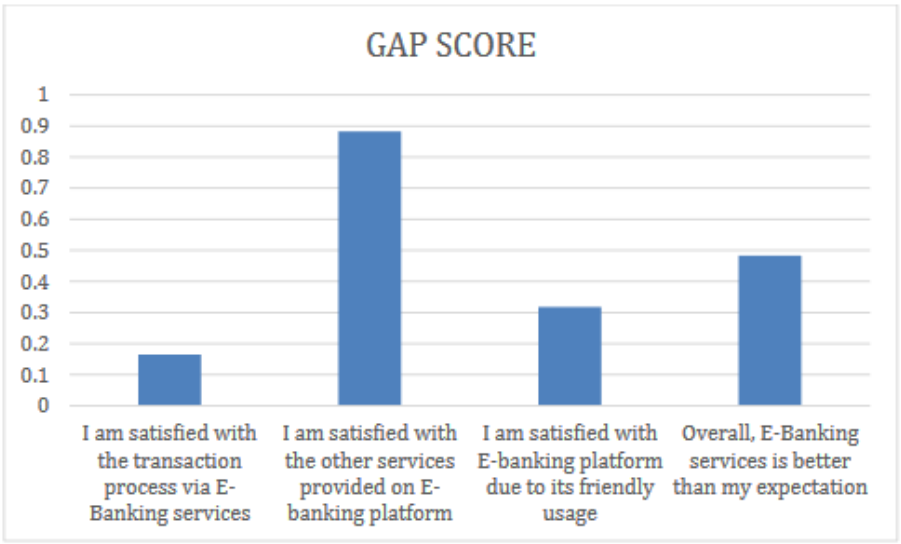
Source: Self Structured

Figure 9: Perceived and Expected Score Analysis of Satisfaction and Quality of Service



Source: Self Structured

Figure 10: Gap Score Analysis of Satisfaction and Quality of Service



Source: Self Structured

Table 6 depicts the dimension SATISFACTION AND QUALITY OF SERVICE. Under this dimension the average perceived mean score of the parameter I am satisfied with the transaction process via E-Banking services is 3.42353, the average expected mean score is 3.58824 and the gap score is 0.16471, with the perceived standard deviation as 1.03942 and the expected standard deviation as 1.19815.

The average perceived mean score of the parameter I am satisfied with the other services provided on E-banking platform is 3.0, the expected mean score is 3.8824 and the gap score is 0.8824, with the perceived standard deviation as 1.13389 and the expected standard deviation as 1.34602.

The average perceived mean score of the parameter I am satisfied with E-banking platform due to its friendly usage is 3.2 and the expected mean score is 3.51765, and the gap score is 0.31765, with the perceived standard deviation as 1.06682 and the expected standard deviation as 1.33284.

The average perceived mean score of the parameter Overall, E-Banking services is better than my expectation is 3.17647 and the expected mean score is 3.65882 and the gap score is 0.48235, with the perceived standard deviation of 1.11458 and the expected standard deviation as 1.22039.

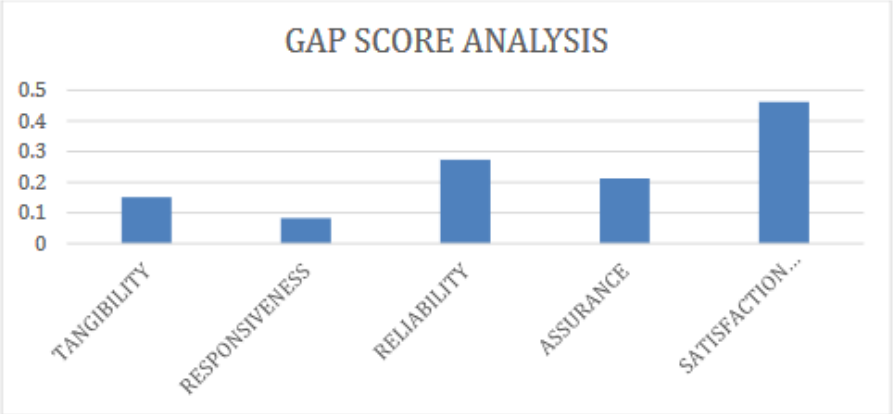
The highest gap score is for the parameter satisfied with the other services provided on E- banking platform.

GAP ANALYSIS

In order to estimate the satisfaction level gap scores are estimated by calculating the difference between expected mean score and perceived mean score.

Gap analysis helps in identifying the less prominent dimensions and the less prominent dimensions, which helps the policy makers to focus on more prominent dimensions.

Figure 11: Graphical Representation of Gap Analysis



Source: Self Structured

As provided in the figure 11 satisfaction and quality of service is having the highest gap score (0.4617775) i.e., the difference between the expected score and perceived score is maximum in this parameter, so more focus and improvement is needed to be done in this dimension followed by the reliability with gap score of 0.27355, assurance i.e., 0.21176475, tangibility i.e., 0.1511285, and the minimum gap score is in responsiveness dimension i.e., 0.0824.

SUGGESTIONS REGARDING E- BANKING SERVICES:

Enhance Security Measures: Implement multi-factor authentication, biometric identification, and advanced encryption techniques to ensure a secure online banking experience for customers.

Intuitive User Interface: Improve the website and mobile app design by making it more user-friendly, with easy navigation and clear instructions for various banking operations.

24/7 Customer Support: Provide round-the-clock customer support through multiple channels, including live chat, phone, and email, to address any issues or concerns promptly.

Personalized Services: Offer tailored recommendations and services based on individual customer preferences and transaction history, making their banking experience more personalized and efficient.

Faster Transaction Processing: Optimize the server infrastructure and processing speed to ensure quick and efficient execution of transactions, minimizing wait times for customers.

Seamless Integration: Enable smooth integration between various banking channels (online, mobile, ATMs, and branches) to provide a consistent and uninterrupted experience for customers.

Robust Mobile Banking: Develop a comprehensive mobile banking application with all essential features, including bill payments, money transfers, and account management, to cater to the growing demand for mobile banking.

Real-time Alerts and Notifications: Implement real-time alerts and notifications for various activities, such as account balance updates, transaction confirmations, and potential fraud detection, to keep customers informed and in control.

Educational Resources: Offer informative articles, videos, and tutorials on the website and mobile app to educate customers about various banking products, services, and security measures.

Feedback Mechanism: Encourage customers to provide feedback on their experiences and use this information to continuously improve E-Banking services, demonstrating a commitment to customer satisfaction.

CONCLUSION, FINDINGS AND LIMITATION FINDINGS OF STUDY

E-Banking services have significantly transformed the financial landscape, offering unparalleled convenience, accessibility, and efficiency. By continuously improving security measures, user experience, and personalized services, E-Banking will continue to shape the future of banking, meeting the ever-evolving demands of customers worldwide. As technology advances, E-Banking will remain a vital and innovative solution for managing our finances in an increasingly digital world.

Hence the main objective of the study was to explore sustainability aspect of E-Banking services and to calculate the customer satisfaction towards E-Banking services, and to identify the gap and providing further suggestions to improve the gap.

From the study it can be concluded that maximum focus should be given to satisfaction and quality of service is having the highest gap score (0.4617775) i.e., the difference between the expected score and perceived score is maximum in this parameter, so more focus and improvement is needed to be done in this dimension.

There were certain suggestions to promote sustainability aspect of E-Banking services:

Research and Innovate: Stay updated on the latest sustainable technologies, trends, and best practices in the E-Banking industry. Invest in research and development to explore innovative solutions that can contribute to a greener financial ecosystem.

Offer Sustainable Financial Products: Develop and promote eco-friendly financial products, such as green loans, sustainable investment options, and carbon offset programs. These products can encourage customers to adopt sustainable practices and support environmentally-conscious initiatives.

Partner with Environmental Organizations: Collaborate with environmental organizations, NGOs, and other stakeholders to develop joint initiatives that promote sustainable E-Banking practices. This can help in sharing knowledge, resources, and expertise to drive positive change.

Promote Digital Literacy: Educate customers and employees about the environmental benefits of E-Banking and how to use digital banking services responsibly. Offer workshops, webinars, and online resources to enhance digital literacy and encourage the adoption of sustainable practices.

Monitor and Report Progress: Regularly track and evaluate the progress made in implementing sustainable E-Banking practices. Share this information with stakeholders and the public to demonstrate your commitment to sustainability and encourage further improvements.

Participate in Sustainable Finance Initiatives: Join global initiatives like the United Nations' Sustainable Development Goals (SDGs) or the Task Force on Climate-related Financial Disclosures (TCFD) to demonstrate your organization's commitment to sustainable practices and contribute to a greener future.

CONCLUSION

The sustainability aspect of E-Banking services holds immense potential for the Indian banking sector. By embracing sustainable practices, financial institutions can not only contribute to environmental conservation but also enhance their competitiveness and customer satisfaction. To explore and implement sustainable E-Banking practices in the Indian context, banks should focus on energy efficiency, digital security, paperless transactions, financial education, collaboration, monitoring, incentivization, and supportive policies. Engaging with stakeholders, researching

innovative solutions, and offering sustainable financial products can further strengthen these efforts. Moreover, promoting digital literacy, participating in global initiatives, and continuously adapting strategies will ensure that Indian banks stay at the forefront of sustainable E-Banking practices. By taking these steps, the Indian banking sector can lead the way in creating a greener, more sustainable future for its customers and the environment.

LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH WORK

1-Time and Cost constraints. 2-Sample size is very less

Data Availability

Geographical differences

REFERENCES

- Aggarwal, R., & Swanson, E. (2005). The impact of internet banking on traditional banking: Evidence from the United States. Journal of Banking & Finance, 29(11-12), 2601-2621.
- Bordalo, P., & Stahl, B. (2011). The effects of internet banking on bank performance: An international comparison. Journal of Banking & Finance, 35(11), 3133-3145.
- Chu, Y. C., & Shih, Y. C. (2011). The impact of internet banking on customer loyalty: A study of Taiwanese banks. International Journal of Bank Marketing, 29(7-8), 457-476.
- Givoli, D., & Kaufmann, A. (2009). The impact of internet banking on bank profitability: Evidence from a panel of US banks. Journal of Financial Stability, 4(3), 147-157.
- KPMG. (2020). Global Banking Outlook 2020: The Digital Bank of the Future. KPMG International.
- Lien, Y. C., & Hsieh, C. H. (2012). The impact of internet banking services on customer satisfaction and loyalty: A study of Taiwanese banks. Journal of Financial Services Marketing, 17(3-4), 179-194.
- McNab, A. J., & Irving, J. A. (2009). Internet banking and the structure of the UK banking industry. Journal of Banking & Finance, 33(10), 1699-1708.
- OECD. (2019). Financial Inclusion Indicators Database. Organisation for Economic Co- operation and Development.
- PwC. (2020). Global Consumer Insights Survey 2020: Banking. PwC Network.
- World Bank. (2021). Financial Inclusion. The World Bank.

THE ROLE OF SUSTAINABILITY AND G-20 IN FINANCE PROMOTION

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ABSTRACT
This study explores the role of financial inclusion in driving economic growth, poverty reduction, sustainability, and financial efficiency within the context of G20 nations. Through an extensive literature review, it investigates the relationships between inclusive finance and various dimensions of development, drawing insights from empirical studies conducted in diverse economies. Despite the growing recognition of financial inclusion's potential, its impact on G20 nations remains underexplored. By addressing this gap, the study aims to provide valuable insights into the implications of inclusive finance for sustainable development strategies within the world's leading economies. Through a comprehensive analysis, it seeks to inform policy discussions and initiatives aimed at fostering inclusive and equitable economic growth across G20 member states.

Keywords: Economic growth, poverty alleviation, sustainability, G20 countries, development dimensions.

INTRODUCTION
Issues related to environmental damage, poverty, and unequal income distribution have become the focus of policies oriented toward sustainable development. Among various policies, trade policies remain a focal point for direct and indirect links with sustainable development. This is because international trade activities have the potential to expand the economic space needed to create new jobs, efficient utilization of resources and human resource skills needed for economic growth and development. Open or free trading activities are believed to influence sustainable development by incentivizing production and creating demand as well as enabling increased capital formation for a country (Fitriani et al. 2021).

The G20, the world's premier forum for global economic governance, has engaged itself in development issues since its inception. Despite concerns regarding its effectiveness and accountability, the G20 has placed development as a prominent issue on its agenda ever since the Seoul Summit in 2010, largely due to the commitment to global development cooperation by the South Korean Government. Moreover, the G20 has developed its own approach to development and has identified priority areas as set out in the Seoul Development Consensus and the and the Multi-Year Action Plans (MYAP).

Although the G20 has formally involved itself in the post-2015 process following the St. Petersburg Summit in 2013 and emphasized the Sustainable Development Goals (SDGs) as a core priority under Turkey's presidency in 2015, the UN remains the main channel for global negotiations and discussions of the post-2015 development

agenda up to its approval and adoption in September 2015 and will continue to play the leading role in the follow-up implementation and tracking of the SDGs. The SDGs set a clear direction for national development and international development cooperation over the next 15 years. Different from the Millennium Development Goals (MDGs), the SDGs are intended to be universal in nature, applicable for both developing countries and developed countries alike and represent a paradigm shift in terms of its goals and approaches to global development. While assistance from high-income countries to the least developed countries should continue, the post-2015 development agenda needs to be implemented by all countries (regardless of the level of development) and requires a transformative and inclusive partnership for international cooperation. Different from the G7's development agenda, which still primarily focuses on aid–recipient relationships as dynamically defined by the OECD through the Development Assistance Committee (DAC), the G20, consisting of major developed countries and emerging economies on a more equal standing, may be better placed to facilitate the implementation of the SDGs. The G20 can especially contribute more in terms of development knowledge-sharing and shifting of global development architecture and paradigm as its members have different development experiences and lessons as well as approaches to international development cooperation. In so doing, however, it also faces mounting challenges.

New Concept of Sustainable Development

With the adoption of universally applicable Sustainable Development Goals (SDGs) by the UN Summit in September 2015, the world will be entering uncharted territory. The 2030 Agenda for Global Action ("Transforming Our World"; UN 2015a) claims unprecedented scope and significance. Addressing people, planet and prosperity as well as peace, the SDGs cover all dimensions of sustainable development and all the world's countries. As such, they require all countries to fundamentally realign their development pathways from 2015. A country like Germany will also have to find new solutions for its own future development, which makes it a developing country as well under the new paradigm (SDSN Germany, 2014).

The new agenda stands for nothing less than a sort of Copernican turn in the thinking and acting about development and cooperation. The old, pre-2015 poverty- and aid-centric system represented inter alia by the Millennium Development Goals (MDGs) and the Aid Effectiveness debate3 is to be replaced by a system organized around the concepts of sustainable development and international cooperation. The turn called for is not an easy task at all because there are three dimensions to it that are undergoing fundamental change at the same time:

The purpose: The sustainable development agenda is broader and more complex than the development agenda of old. The eradication of poverty becomes part and parcel of sustainable development. In the future there will be no point in giving the term development a meaning other than sustainable development. In this context one should also recall the often neglected fact that development – even under its

accustomed notion – only really begins when extreme poverty is eradicated. The term middle-income-trap has been another hint in this regard.

The "target groups": As the SDGs are addressing all countries and the world / earth as a whole instead of only addressing specific groups of countries, all countries will be struggling to achieve truly sustainable development. Country groupings such as developed/developing/emerging, although still being a political reality, will become less helpful in the future and should rather be replaced by those referring to per-capita-income levels (low-, middle-, high-income), specific conditions (e.g. vulnerable, (post-) conflict, small island or landlocked) or specific problems (e.g. highly polluting, ecological footprint).

The means: For all countries and stakeholders the implementation of the new agenda will require domestic as well as international means, non-financial as well as financial, concessional as well as non-concessional, and political as well as technical. The success of the new agenda on the one hand hinges on the strengthened support for the poorest and most vulnerable. On the other hand, without the domestic implementation of the agenda in and by high- and middle-income countries and the respective transformation of international cooperation between all types of countries, its success would also be severely endangered.

The Sustainable Development Goals and the Role of the G20

The 2030 Development Agenda, with 17 goals and 169 targets, is multifaceted, ambitious and challenging. It not only includes traditional livelihood issues, such as poverty alleviation, education, communicable diseases and health, and economic indicators, including finance, infrastructure, trade, energy and industrialization, but also covers environment issues, such as climate change, water scarcity, the depletion of common-pool resources such as fisheries, and disaster relief. Different from the MDGs, the SDGs are universal in nature. They not only require continued and strengthened support for least developed countries, but also for high-income and middle-income countries that could incorporate the goals into domestic implementation. In addition, greater responsibilities are given to the emerging economies as reflected in Goal 17: revitalize the global partnership for sustainable development. Although the SDGs are not mandatory and any follow-up and review will be based on voluntary country-led progress reviews, over the next 15 years they will surely exert a lasting and profound impact on all countries' development and be the Northern Light for global development cooperation.

Against this background, what role should the G20 play in the context of the SDGs? The G20 brings together the world's major advanced and emerging economies, representing more than half of the global poor population, the sources of almost all the global ODA and the largest contributors of both historical and current global CO2 emissions. Arguably, it has the convening power, the legitimacy and the responsibility to assume a leadership role in achieving the SDGs, and, thus, should be the major driving force in implementing them. Indeed, as noted above, the G20 has served as a platform for continuously discussing development issues since 2010 and

has actively participated in the process of deliberating the post-2015 development agenda (G20, 2013). On the surface, there are many synergies between the G20 development agenda and the SDGs. For example, their objectives overlap to a considerable degree. The G20 has called for "inclusive and resilient" as well as "strong, sustainable and balanced" economic growth. Similarly, the 2030 agenda contains a set of development goals that are inclusive, transformative and sustainable. Meanwhile, the priorities of the G20 development agenda fit well with SDGs. For instance, the efforts that the G20 has been making to help developing countries prepare and finance infrastructure projects are a good match for SDG 9 on building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation (Clark, 2015).

Promote in Finance

Financial inclusion refers to the availability to both individuals and companies of relevant and cost-effective financial goods and services that satisfy their wants for purchases, payments, deposits, lending, and coverage that are provided sustainably and responsibly [Yin et al 2019]. Financial inclusion helps develop services that help the development of financial efficiency. Financial inclusion means equal access to financial services arranged by society to all adult members at affordable costs. Moreover, in the advanced stage of financial inclusion, people take financial risks without any hesitation because of the availability of insurance [Liu, et al 2022]. Financial inclusion is a critical and integral part of economic growth and is becoming a burning issue in recent years. Inclusive finance is a part of financial development and it received more attention in research when it is related to resolving the problem of poverty and economic growth [Ali, et al 2022]. Financial inclusion is considered the ninth pillar of the global development agenda when it was discussed at the G20 summit in South Korea and Seoul in November 2010. Inclusive finance is a vital indicator of the whole financial system as it helps households and entrepreneurs access financial services and products at low prices, which is why it contributes to fostering and deepening the financial system. Furthermore, it also helps to attain seven goals at the same time as sustainable development goals (SDGs). Since endogenous growth theory has gained significant attention, more focus is on financial development to accelerate economic growth. Whereas, financial inclusion will helps to enhance the savings, which lead to an increase in household spending and agriculture output as well. Therefore, financial inclusion helps those countries that are living under the poverty line. The activity that improves the performance and number of financial products, which sustains thriving nations, is known as financial inclusion.

Bhattari [2017] has done a detailed analysis on Economic Growth and development in India and other SAARC countries. The momentum of growth has been identified and analyzed by following and studying the trends of the economies fiscal and monetary scenario, trade, income distribution and education respectively. The study puts forward the development and growth criteria's in economies to be systematic and scientific analysis of potential and correct linkage between all the sectors moreover including regions and nations as well. Further he concluded by saying that being

steady, stable and their readiness to march single minded in the path of growth will bring about good level of growth and development in SAARC nations and India as well.

Mukherjee and Ahuja [2017] in their research paper aim to depict the recent initiation to evaluate the efficiency of a nation in converting GDP growth to well being in terms of Sustainable Economic Development Assessment scores (SEDA). A good SEDA progress score backs up India's position in the world as one of the leading Economy and our country has shown a significant improvement in various parameters measured by the BCG to establish sustainable development. The paper also aims to compare the BRICS nations in terms of their sustainable development scores and also affirms Russia and Brazil to top the list. However India and China top in terms of progress scores giving a huge hope of amendment in converting wealth into well being so far.

1. Financial Inclusion and Economic Growth

Theoretically, there are two types of economic growth models, i.e., the exogenous growth model and the endogenous growth model. The exogenous growth model is associated with technology, capital formation, and labor productivity with economic growth in addition to the enhancement of human capital. Many economic growth models have emphasized the latest technology, where new technology means financial technology with digitalization, ATMs, and online banking [Bal, et al 1998]. Access to finance has been a heated topic on the international policy platform since the early 2000s. Many countries employ financial inclusion as a way to promote more evenly distributed economic expansion [Collard, 2007]. Financial inclusion is vital for constructing a solid foundation for a world's financial infrastructure, which will promote economic development and prosperity [Sharma, 2016]. Plentiful pieces of literature are available on the connection between inclusive finance and economic expansion in different developed and developing countries left with limited literature in this field and inclusive finance in developed and emerging economies is still in the infant stage [Sulong, and Bakar 2018]. However, there are still contradictory results based on the previous literature, some researchers have found a positive association between inclusive finance and economic expansion. For example, Sharma [2016] had investigated the association between inclusive finance and the economic development of the emerging economy of India from 2004 to 2013. The Granger test and the VAR technique's findings revealed a strong and favorable correlation between inclusive finance and growth. Additionally, Sethi, and Acharya, [2108] has described that 31 developing and developed countries for the period from 2004 to 2010, scrutinized the association between inclusive finance and economic expansion by employing the fixed, random effect, and panel co-integration on the panel dataset. The outcomes revealed the positive and significant connection and bidirectional causality between inclusive finance and economic expansion. Likewise, ref. [Kim, et al 2018] for 55 (OIC) nations from 1990 to 2013, scrutinized the link between inclusive finance and economic expansion. Based on the outcomes of VAR, inclusive finance has a positive connection with economic expansion. Another study by, Van et al [2018], analyzed the emerging markets data to scrutinize the link between inclusive finance and

economic expansion. The article utilized a panel data econometric approach, and the results showed that inclusive finance has a favorable impact on economic expansion, with the influence being larger in low-income nations. Surprisingly, over the past several years, the spread of digital financial inclusion drastically boosted the availability and affordability of finance in China. To assess the connection between digital inclusive finance and province economic development from the years 2011 to 2018, a study was carried out in China. The fixed-effect model demonstrated that digital inclusive finance boosted the Chinese province's economic expansion and that the Chinese government should establish supportive systems to expand digital financial inclusion [Ahmad, 2021]. The financial sectors in the MENA region dominate the bank-based financial institution. Similarly, Emara, and El Said, [2021] had explored the association between inclusive finance and economic expansion for 44 emerging markets and MENA countries from 1990 to 2018. The system (GMM) and dynamic panel regression model were utilized to scrutinize the yearly data. The overall findings disclosed that inclusive finance favorably affected the GDP per capita in nominated nations. Even though inclusive finance appears to be a positive predictor of economic expansion, various studies have found a negative relationship between them. Additionally, ref. [Oruo 2013] scrutinized the effect of inclusive finance on economic expansion in Kenya by utilizing secondary data from 2002 to 2013. The results supported that economic growth has a weak negative association with financial inclusion measured by Automated Teller Machines and a strong negative connection with bank lending interest rates. Similarly, Khan, [2011] revealed a negative association between inclusive finance and economic expansion and inclusive finance can diminish loan standards. The findings indicated that financialization had a detrimental effect on economic expansion. The link between inclusive finance and economic expansion has to be further investigated in light of the contradictions in the aforementioned arguments.

2. Financial Inclusion and Poverty

The systems theory of financial inclusion explains that financial inclusion has a positive relationship with the existing system. System financial inclusion affects its expected outcome. For instance, economic agents and suppliers of financial services can align their interest in basic financial services to offer quality financial services that protect users of financial services from price discrimination and exploitation. In this theory, poor communities can be added in financial with financial regulators [Ozili, 2020].

Inclusive finance has been viewed as a dynamic instrument for both developed and developing nations to reduce poverty and achieve sustainable and equitable economic expansion [Omar, and Inaba 2020]. Limited studies showed that financial inclusion has promoted economic growth. However, Beck, 2007 argued that financial inclusion increased economic expansion, but this does not always indicate that poverty decreased [Churchill, 2020].

Studies on the association between financial inclusion and poverty are still inconclusive. For instance, Kelikume, 2007 had discussed for 42 African countries from 1995 to 2017, scrutinized the connection between inclusive finance and poverty mitigation. The outcomes of system GMM revealed that financial inclusion has a favorable influence, which means an increase in financial inclusion increased poverty reduction. Likewise, Lal, 2018 for cooperative banks of India, scrutinized the connection between financial inclusion and poverty by employing SEM, and ANOVA for the analysis of the 540 primary datasets. The results indicated that inclusive finance had a significant impact on poverty alleviation. Similarly, Dogan et al 2022 utilized Turkish household survey data and investigated the link between inclusive finance and poverty mitigation. The study employed a Logit regression model, and outcomes revealed that poverty has decreased due to financial inclusion. Similarly, Wang, 2020 mentioned in their work that the vital factor for diminishing sustainable poverty eradication is access to finance and scrutinized the link between digital inclusive finance and farmers' vulnerability to poverty in 1900 households. Overall, the findings showed that digital financial inclusion has a positive association with the vulnerability of farmers. In addition to this, Polloni-Silva, et al 2021 discussed for 13 Latin American nations, also checked the connection between inclusive finance and poverty. The outcomes of the panel data showed that the use of mobile and inclusive finance decreased poverty.

Contrary to this, some studies have found a negative association between inclusive finance and poverty mitigation. For instance, Erlando, et al 2020 utilized the data from 12 Eastern provinces of Indonesia to show the connection between inclusive finance and poverty. Regression and VAR results showed that inclusive finance has an unfavorable relationship with poverty. Another study by, Inoue 2019, who have scrutinized the link between inclusive finance and poverty in India. The study employed GM Mon panel data from 1973 to 2004. The outcomes indicated a detrimental correlation between poverty and inclusive finance. However, Neaime, and Gaysset, 2018, unveiled that inclusive finance does not influence poverty in the MENA region.

3. Financial Inclusion and Sustainability

Theoretically, Todaro, and Smith, (2020) also explained that economic development helps to improve living standards and self-esteem regarding freedom and oppression. The human development index builds through literacy rate and life expectancy that can impact economic development in the long run. The human development index opens new horizons for education, employment, and the healthcare environment. It helps to increase the income of citizens individually. Moreover, economic development transformed into sustainability when human development is the main factor of development. The link between inclusive finance and sustainability has been the target of numerous types of research. Inclusive finance may, however, have an impact on sustainability both favorably and adversely. Several kinds of research have revealed a favorable association between inclusive finance and financial stability. For instance, Le, et al [2019] utilized the data from 2004 to 2016 for 31 Asian countries,

to show the impact of inclusive finance on sustainability. Inclusive finance has a favorable and significant impact on sustainability, according to the results of the feasible generalized least squares (FGLS) approach. Likewise, Al-Smadi, [2018] also investigated the association between inclusive finance and sustainability in the context of Jordan. The fully modified least squares (FMOLS) technique was utilized in this research, which used time-series data from 2006 to 2017. The outcomes showed a weak significant but favorable connection between inclusive finance and financial sustainability. In addition to this, Neaime, and Gaysset, [2020] employed GMM and GLS on the data set of eight MENA countries to scrutinize the link between inclusive finance on sustainability. The findings supported the previous literature that inclusive finance positively contributed to financial stability. In accordance with, Atellu, and Muriu [2021] also scrutinized the connection between inclusive finance and financial sustainability by utilizing the data set of Kenya. The study employed multivariate regression by using SEM, and findings indicated that inclusive finance enhanced sustainability in Kenya. Similarly, Vo et al. [2021] examined the connection between inclusive finance and sustainability. The study utilized 3071 Asian banks using the period from 2008 to 2017, and employed the GMM method. The results showed that a higher level of inclusive finance provided better access to the banks and hence contributed positively and significantly to the stability of banking sectors. Moreover, Ahamed, [2019] exposed that inclusive finance has a favorable connection with sustainability Contrary to the positive association; some studies have also shown a negative link between inclusive finance and sustainability. According to, Group W.B. [2013] both indicated that inclusive finance harmed financial sustainability. Similarly, Mehrotra, [2015] have also exposed that inclusive finance negatively influences financial sustainability. The inconsistencies in the results provide a path to further explore the connection between inclusive finance and sustainability.

Financial Inclusion and Financial Efficiency

Theoretically, Gupta, [2018] have described that the financial literacy theory of inclusive finance increases the consent of people to invest more in the financial sector, which helps to increase financial efficiency. It helps to educate people to invest more and excel in this field. It means when people get conscious of financial inclusion, then they focus to get more services that help to work efficiently. People go for their formal bank accounts and work for welfare, investment, and mortgage products that bring stability to personal finance. It also helps people know the difference between need and want and helps them to manage their retirement plan. So, it helps to increase the financial efficiency of the country.

During the survey of the literature, we found that there is no good study on the link between inclusive finance and financial efficiency. This may be due to the shortage and freshness of statistics on efficiency. Recent research done in this area by Al-Smadi, [2018], investigated the influence of inclusive finance on financial efficiency in the context of Asia. The study took 31 Asian countries and employed the FGLS procedure. The findings exposed that inclusive finance negatively affects financial

efficiency in all selected countries. Similarly, Banna, [2022] has described for the Asian and Middle Eastern countries, investigated the association between inclusive finance and Islamic banks efficiency. The study employed data from 2011 to 2017 and used the Simar–Wilson boot strapping model. The outcomes showed that inclusive finance had a favorable association with Islamic banks' efficiency. Financial inclusion is also pivotal for green economic efficiency, as disclosed the association between inclusive and green economic efficiency in the context of China based on the city level data from 2011 to 2015. The consequences showed that inclusive finance enhanced green economic efficiency. The aforementioned literature analysis made it abundantly evident that many researchers have observed the relationships between financial inclusion, economic development, poverty, sustainability, and financial efficiency in many economies. However, the G20 nations received no attention in earlier literature. Similarly, financial sustainability and financial efficiency have not gained much attention in past studies. The cumulative influence of inclusive finance on economic expansion, poverty, financial stability, and financial efficiency has not been studied in the context of G20 nations, hence the current study is going to work on it and fills this literature gap.

CONCLUSION

This study underscores the pivotal role of financial inclusion in fostering economic growth, reducing poverty, promoting sustainability, and enhancing financial efficiency within G20 countries. Through a comprehensive review of literature, we have elucidated the multifaceted relationships between inclusive finance and various dimensions of development. Despite the limited focus on G20 nations in existing research, our findings highlight the significant potential of inclusive finance in driving sustainable development strategies across leading economies.

Moving forward, policymakers and stakeholders must prioritize inclusive finance initiatives to harness its transformative impact on economic prosperity and social equity. By leveraging the insights gleaned from this study, G20 member states can craft evidence-based policies and interventions aimed at advancing inclusive economic growth and achieving the Sustainable Development Goals. Through collaborative efforts and strategic investments, we can pave the way for a more inclusive and resilient global economy, ensuring prosperity for all segments of society.

REFERENCES

- Ahamed, M.M.; Mallick, S.K. Is financial inclusion good for bank stability? Int. Evidence. J. Econ. Behav. Organ. 2019, 157, 403–427.
- Ahmad, M.; Majeed, A.; Khan, M.A.; Sohaib, M.; Shehzad, K. Digital financial inclusion and economic growth: Provincial data analysis of China. China Econ. J. 2021, 14, 291–310.

- Ali, M.; Nazir, M.I.; Hashmi, S.H.; Ullah, W. Financial inclusion, institutional quality and financial development: Empirical evidence from OIC countries. Singap. Econ. Rev. 2022, 67, 161–188.
- Al-Smadi, M.O. The role of financial inclusion in financial stability: Lesson from Jordan. Banks Bank Syst. 2018, 13, 31–39.
- Atellu, A.R.; Muriu, P.W. Does financial inclusion enhance financial stability? Evidence from a developing economy. Transnatl. Corp. Rev. 2021, 14, 297–311.
- Bal, F.; Nijkamp, P. Exogenous and endogenous spatial growth models. Ann. Reg. Sci. 1998, 32, 63–89. Collard, S. Toward financial inclusion in the UK: Progress and challenges. Public Money Manag. 2007, 27, 13–20.
- Banna, H.; Alam, M.D.R.; Ahmad, R.; Sari, N.M.A.T. Does financial inclusion drive the Islamic banking efficiency? A post-financial crisis analysis. Singap. Econ. Rev. 2022, 67, 135–160.
- Beck, T.; Demirgüç-Kunt, A.; Levine, R. Finance, inequality and the poor. J. Econ. Growth 2007, 12, 27–49.
- Bhattari (2017), Economic Growth and Development in India and SAARC countries, ASSA Annual Conference.
- Churchill, S.A.; Marisetty, V.B. Financial inclusion and poverty: A tale of forty-five thousand households. Appl. Econ. 2020, 52, 1777–1788.
- Clark, H., 2015, "G20's contribution to implementation of the SDGs," Speech at the High-level Side Event hosted by G20 Turkish Presidency [online; cited April 2016].
- Demirgüç-Kunt, A.; Klapper, L.; Singer, D.; Ansar, S.; Hess, J. The Global Findex Database 2017; World Bank Publications: Washington, DC, USA, 2020.
- Emara, N.; El Said, A. Financial inclusion and economic growth: The role of governance in selected MENA countries. Int. Rev. Econ. Financ. 2021, 75, 34–54.
- Erlando, A.; Riyanto, F.D.; Masakazu, S. Financial inclusion, economic growth, and poverty alleviation: Evidence from eastern Indonesia. Heliyon 2020, 6, e05235.
- Group, W.B. Global Financial Development Report 2014: Financial Inclusion; World Bank Publications: Washington, DC, USA, 2013; Volume 2.
- Gupta, P.; Tham, T.M. Fintech: The New DNA of Financial Services; Walter de Gruyter GmbH & Co KG: Berlin, Germany, 2018.
- Inoue, T. Financial inclusion and poverty reduction in India. J. Financ. Econ. Policy 2019, 11, 21–33.

- Kelikume, I. Digital financial inclusion, informal economy and poverty reduction in Africa. J. Enterprising Communities People Places Glob. Econ. 2021, 15, 626–640.
- Khan, H.R. Financial inclusion and financial stability: Are they two sides of the same coin. Address by Shri HR Khan, Deputy Governor of the Reserve Bank of India, at BANCON. 2011, pp. 1–12.
- Kim, D.-W.; Yu, J.-S.; Hassan, M.K. Financial inclusion and economic growth in OIC countries. Res. Int. Bus. Financ. 2018, 43, 1–14.
- Lal, T. Impact of financial inclusion on poverty alleviation through cooperative banks. Int. J. Soc. Econ. 2018, 45, 808–828.
- Le, T.-H.; Chuc, A.T.; Taghizadeh-Hesary, F. Financial inclusion and its impact on financial efficiency and sustainability: Empirical evidence from Asia. Borsa Istanb. Rev. 2019, 19, 310–322.
- Liu, C.; Dong, T.; Meng, L. The Prevention of Financial Legal Risks of B2B E-commerce Supply Chain. Wirel. Commun. Mob. Comput. 2022, 2022, 6154011.
- Mehrotra, A.N.; Yetman, J. Financial inclusion-issues for central banks. BIS Q. Rev. March 2015.
- Mukherjee and Ahuja "Wealth to well being-a comparative study of brics peers with reference to seda framework" Asian Journal of Social Science and Humanities, ISSN No.2249-7315, Vol.7, No. 9, September 2017.
- Neaime, S.; Gaysset, I. Financial inclusion and stability in MENA: Evidence from poverty and inequality. Financ. Res. Lett. 2018, 24, 230–237.
- Omar, M.A.; Inaba, K. Does financial inclusion reduce poverty and income inequality in developing countries? A panel data analysis. J. Econ. Struct. 2020, 9, 37.
- Oruo, J. The Relationship between Financial Inclusion and GDP Growth in Kenya. Ph.D. Thesis, University of Nairobi, Nairobi, Kenya, 2013.
- Ozili, P.K. Theories of financial inclusion. In Uncertainty and Challenges in Contemporary Economic Behaviour; Emerald Publishing Limited: Bingley, UK, 2020.
- Park, C.-Y.; Mercado, R., Jr. Financial inclusion, poverty, and income inequality. Singap. Econ. Rev. 2018, 63, 185–206.
- Pham, M.H.; Doan, T.P.L. The impact of financial inclusion on financial stability in Asian countries. J. Asian Financ. Econ. Bus. 2020, 7, 47–59.

- Polloni-Silva, E.; da Costa, N.; Moralles, H.F.; Sacomano Neto, M. Does financial inclusion diminish poverty and inequality? A panel data analysis for Latin American countries. Soc. Indic. Res. 2021, 158, 889–925.
- Ratnawati, K. Financial inclusion and its impact on performance of MSMEs with efficiency and financial flexibility as mediation: Empirical evidence from Malang City. In Contemporary Research on Business and Management; CRC Press: Boca Raton, FL, USA, 2021; pp. 29–33.
- Sahay, R.; Cˇ ihák, M.; N'Diaye, P.; Barajas, A. Rethinking financial deepening: Stability and growth in emerging markets. Rev. Econ. Inst. 2015, 17, 73–107.
- Sharma, D. Nexus between financial inclusion and economic growth: Evidence from the emerging Indian economy. J. Financ. Econ. Policy 2016, 8, 13–36.
- Sulong, Z.; Bakar, H.O. The role of financial inclusion on economic growth: Theoretical and empirical literature review analysis. J. Bus. Fin. Aff. 2018, 7, 234–2167.
- Todaro, M.P.; Smith, S.C. Economic Development; Pearson UK: London, UK, 2020.
- Van, L.T.-H.; Vo, A.T.; Nguyen, N.T.; Vo, D.H. Financial inclusion and economic growth: An international evidence. Emerg. Mark. Financ. Trade 2021, 57, 239–263.
- Vo, D.H.; Nguyen, N.T.; Van, L.T.-H. Financial inclusion and stability in the Asian region using bank-level data. Borsa Istanb. Rev. 2021, 21, 36–43.
- Wang, X.; He, G. Digital financial inclusion and farmers' vulnerability to poverty: Evidence from rural China. Sustainability 2020, 12, 1668
- Yin, X.; Xu, X.; Chen, Q.; Peng, J. The sustainable development of financial inclusion: How can monetary policy and economic fundamental interact with it effectively? Sustainability 2019, 11, 2524.

THE IMPACT OF FINTECH IN TRADITIONAL BANKING SYSTEMS

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ABSTRACT

The world is rapidly shifting towards digitalization, and the financial industry is no exception. Fintech, which combines finance and technology, has changed how we handle money. Millions of transactions can be completed with just a click, and a wide range of financial products and investments can be made online. Fintech provides an alternative to traditional banking and non-banking finance services, offering secure and convenient transactions for users while reducing operational costs. India has emerged as a leader in the fintech industry, with its large population embracing the new technology. This study examines India's progress in adopting Fintech and its opportunities and challenges for the Indian financial sector. As digitization becomes more prevalent, Fintech is poised to transform the financial landscape, opening up new possibilities for growth and innovation. The aim was to determine the impact of fintech and digital financial services on financial inclusion in India. According to the results, fintech businesses have significantly aided financial inclusion in this nation, especially for the middle class. These findings will be helpful for policy-makers working hard to bring every individual in this country into an organized financial system.

Keywords: Fintech, online banking, financial services, social influence, digitalization

INTRODUCTION

The primary goal of this research is to understand the shift of fintech in traditional banking system to online banking system.

The rise of financial technology, commonly known as fintech. This seismic shift has left an indelible mark on the financial landscape, fundamentally altering the way financial activities are conducted and experienced (Lerong, 2017).

Fintech can be defined as the novel processes and products that become available for financial services thanks to digital technological advancements (Vijai, 2019).

The last decade has seen a remarkable shift from traditional banking systems to fintech. The year 1967 witnessed a pivotal shift in the banking landscape with the installation of the very first Automated Teller Machine (ATM) by Barclays. This revolutionary invention, ushering in the era of self-service banking, was soon followed by the establishment of NASDAQ, the world's first fully digital stock exchange, in 1971. This marked the dawn of a new era in securities trading, characterized by increased speed, transparency, and efficiency. Furthermore, the Society for Worldwide Interbank

Financial Telecommunication (SWIFT) network was established in 1973, revolutionizing cross-border transactions by streamlining and securing international payments.

The 1990s saw the seeds of digital banking blossom, fuelled by the burgeoning internet revolution. Consumers, now equipped with personal computers and dial-up modems, began to embrace online banking, venturing beyond the brick-and-mortar confines of traditional financial institutions. The dot-com boom of 1995 further accelerated this digital transformation, paving the way for innovative online financial services like PayPal, launched in 1998. PayPal's introduction of a secure and convenient online payment system marked a significant leap forward in the field of digital transactions.

However, the 2008 financial crisis cast a long shadow, eroding trust in traditional financial institutions and prompting calls for stricter regulations. In the midst of this upheaval, a new wave of innovation emerged with the birth of Bitcoin in 2009. This digital currency, powered by the revolutionary blockchain technology, challenged the very foundations of the existing financial system by introducing a decentralized, peer-to-peer model for digital transactions.

Finally, the ubiquitous rise of smartphones in the late 2000s and early 2010s further propelled the financial world into the digital age. Mobile banking apps became mainstream, enabling users to access their accounts, make payments, and manage their finances with just a few taps on their screens. This seamless integration of financial services into everyday life redefined the meaning of convenience and accessibility, marking a new chapter in the ongoing saga of financial evolution. Many individuals have shifted from traditional banking to online banking as per their convenience, needs, values and preferences.

In recent years, due to the nationwide lockdown and UPI payments boom have encouraged people to shift to online banking services as its more convenient especially for the urban population. People’s behavioural intention is driven by trust, usability, and social influence.

The idea of Fintech has been around for a long time, despite the fact that it may appear to be a recent technological invention. The first credit cards issued in the 1950s are widely acknowledged as the first fintech products made available to the general public since they eliminated the need for users to carry actual currency in their daily lives.

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REVIEW OF LITERATURE

The rise of financial technology (fintech) has sparked a revolution in the financial landscape, significantly impacting traditional banking systems. This literature review explores the multifaceted impact of fintech, examining both its disruptive and collaborative potential.

DISRUPTION:

Customer experience: Fintech companies emphasize user-friendly interfaces, mobile accessibility, and faster service, raising customer expectations and forcing traditional banks to invest in digital infrastructure and streamline processes. (Li et al., 2020; Datavision Software Solution, 2023)

Innovation: Fintech startups drive innovation through agility and focus on specific problems, offering solutions in areas like mobile payments, peer-to-peer lending, and alternative credit scoring. This disrupts traditional banks' product monopolies and challenges their entrenched models. (McKinsey & Company, 2017; LinkedIn, 2023)

Financial inclusion: Fintech platforms connect borrowers and investors directly, bypassing traditional bank gatekeepers and offering access to credit for underserved populations. This challenges traditional lending practices and expands financial services reach. (World Bank, 2020; LinkedIn, 2023)

Competition: Fintech injects significant competition into the financial sector, pressuring traditional banks to offer lower fees, competitive interest rates, and new service offerings to retain customers. (Datavision Software Solution, 2023; LinkedIn, 2022)

COLLABORATION:

Partnerships: Recognizing the value of fintech agility and innovation, traditional banks increasingly partner with fintech firms to leverage their capabilities and develop new products and services. This allows banks to remain competitive and offer a wider range of solutions. (PWC, 2021; LinkedIn, 2023)

Acquisitions: Some banks acquire promising fintech startups to gain access to their technology and talent, accelerating their own digital transformation and innovation efforts. (Deloitte, 2020; Forbes, 2023)

Internal innovation: Fintech's influence inspires traditional banks to invest in their own technology and innovation labs, aiming to develop in-house solutions and remain competitive in the digital age. (McKinsey & Company, 2017; The Financial Brand, 2023)

CHALLENGES AND CONSIDERATIONS:

Regulation: Rapid fintech growth outpaces regulatory frameworks, raising concerns about consumer protection, data privacy, and financial stability. Governments and regulators grapple with balancing innovation with responsible oversight. (World Bank, 2020; LinkedIn, 2023)

Cybersecurity: Fintech's reliance on digital technologies exposes it to cyberattacks, requiring robust security measures and increased customer awareness to protect financial data and transactions. (PwC, 2021; Forbes, 2023)

Talent and skills: Traditional banks face challenges in attracting and retaining talent with the necessary skills to navigate the digital transformation and compete with agile fintech startups. (Deloitte, 2020; The Financial Brand, 2023

RESEARCH METHODOLOGY DATA COLLECTED:

Secondary Data:

The hypothesis were done with the help of secondary data collected from reliable sources like McKinsey & company, KPMG, Deloitte, Statista, PWC and EY reports for analysing and finding the market research and need how fintech grow vast in coming year. As numerous companies adopt and adapt their strategies and methods in response to the increasing inclination of customers and individuals towards using fintech in their personal and professional lives, the landscape of the financial technology sector continues to evolve dynamically.

The findings show that factors that create social influence have a positive impact on behavioural intention to use technology in India's rural sector. End users are more likely to complete their stated goal if they are accustomed to using financial tech services and systems.

Data Analysis:

Quantitative Data Analysis: Utilized statistical tools for survey response analysis, incorporating measures like percentages, averages, and correlations. The gathered data was analyzed using basic statistical tools and procedures in accordance with the study's goals.

Limitations:

Acknowledged limitations such as potential survey response bias, the dynamic nature of the fintech landscape, and the evolving regulatory environment.

Objective

To comprehensively analyse the impact of fintech on traditional banking systems, exploring its disruptive potential, the resulting adaptations and challenges for banks, and ultimately, the implications for the future of finance.

This objective encompasses several key elements:

Understanding the core components of fintech: This includes examining various fintech innovations like digital payments, peer-to-peer lending, robo- advisors, and blockchain, and how they are changing the financial landscape.

Assessing the impact on traditional banking: Analyse how banks are adapting to fintech's disruption, including their technological integration, collaborations, and regulatory challenges.

Evaluating the effects of fintech services: Investigate the impact of mobile banking, digital wallets, cryptocurrency, and crowdfunding platforms on democratizing access to financial tools and services.

Balancing benefits and risks: Weigh the convenience and accessibility of fintech against potential cybersecurity threats, regulatory hurdles, and data privacy concerns.

Predicting the future of finance: Explore emerging trends like DeFi, CBDCs, and the continued convergence of technology and finance, envisioning their potential impact on the future of banking systems.

By addressing these elements, the research paper will deliver a comprehensive understanding of the complex relationship between fintech and traditional banking, offering valuable insights into the evolving financial landscape and its implications for various stakeholders

Data Analysis & Findings:

Over the past decade, fintech companies have drastically transformed finance by offering unique, customer-focused services, collaborating with diverse businesses, and building adaptable teams. By July 2023, publicly traded Fintech's were valued at $550 billion, doubling their worth from 2019. There were also over 272 fintech unicorns valued at $936 billion, a significant rise from just 39 valued at $1 billion or more five years prior.

However, a market correction in 2022 slowed down this rapid growth. This has led to a decline in funding, deals, IPOs, and the creation of new unicorns. The financial landscape remains uncertain, prompting fintech's to transition into a new phase of value creation. Previously, it was all about taking risks and pursuing growth aggressively. Now, with funding challenges, fintech's need to adopt a more measured and consistent approach to stay competitive.

In this report, we examine how fintech can continue to grow in strength and relevance for customers, the overall financial ecosystem, and the world economy, even in disruptive times. To help fintech's capitalize on these themes, we also provide a framework for sustainable growth, based on an analysis of the strategies used by long- established public companies that have weathered previous economic cycles. Cite: (Fintechs: A New Paradigm of Growth, n.d.)

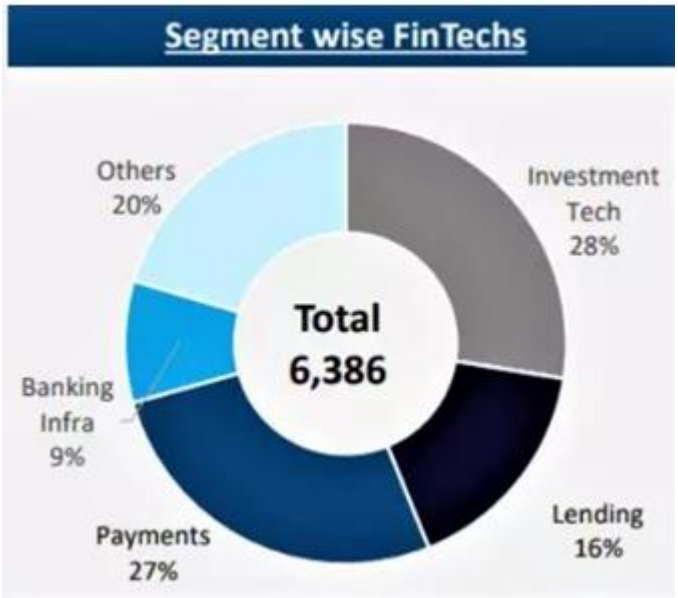
The payments industry, which has attracted the interest of both corporations and authorities, accounts for about 20% of all domestic FinTech companies (Statista, 2022).

The allocation of capital in the Indian Fintech industry in 2021, as to BLinC & Report's report. $6,386 was invested in the Fintech sector overall.

With 27% of the entire investment, the largest segment is Payments. Lending comes in second at16%, Tech comes in third at 28%, Banking Infrastructure at 9%, and Others at 20%.

The survey claims that, behind China and the United States, India has the third-largest Fintech market globally.

Figure 1: Sources – BlinC & Report's



Fintech Industry in India Size & Share Analysis - Growth Trends & Forecasts (2024 - 2029)

Source- https: //www.mordorintelligence.com/industry-reports/india-fintech-market

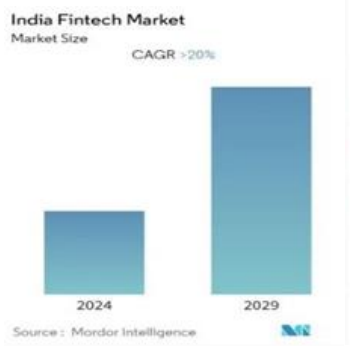
By 2023, the market is expected to be worth over $200 billion, according to Mordor Intelligence. Compared to the previous year, when the market was projected to be worth $50 billion, this is a huge gain. Over the course of the forecast period, the CAGR (Compound Annual Growth Rate) is anticipated to be higher than 20%.

The application of technology to enhance and automate financial services is known as fintech, or financial technology. Numerous activities, including wealth management, online banking, and mobile payments, can fall under this category.

A multitude of causes are propelling the expansion of the fintech industry in India, including:

A sizable and expanding population that has more discretionary income an increasing percentage of people using smartphones a campaign by the government for financial inclusion an environment with favourable regulations

These factors are anticipated to fuel the continued rapid growth of the Indian fintech market in the upcoming years.



Study Period	2020- 2029
Base Year For Estimation	2023
Forecast Data Period	2024 - 2029
Historical Data Period	2020 - 2022
CAGR (2024 - 2029)	> 20.00 %
Market Concentration	Low

Figure 1 & 3: Source - Mordor Intelligence Research & Advisory. (2024, February)

RESEARCH FINDINGS

Tech-Driven Evolution:
Fintech has totally revamped how we handle money stuff, making it quicker, cheaper, and easier to get what we need. At first, lots of fintech startups focused on things like lending among regular folks, crowdfunding, and mobile payments. Companies like Upstart, Funding Circle, Indiegogo, and Venmo completely changed the game for how we use and access financial services.

Branch Transformation:
Even with all the digital buzz, one out of every four banking customers still prefers talking face-to-face. Branches are still super important for tricky transactions, getting personal advice, and making sure everything follows the rules. It's surprising, but even the tech-savvy millennial crowd sometimes prefers swinging by a branch to open accounts or understand things like mortgages.

Customer Preferences:
More and more people are going all-digital for banking—like, over 46% were only using digital channels in 2017, a huge jump from 27% in 2014. Millennials, who are known for having high standards, want services made just for them and often switch banks pretty often looking for a better deal.

Challenges and Opportunities:
Fintech is pushing regular banks to be way more customer-focused, asking for services that are super fast and personalized. The crazy amount of money (like,

$97.7 billion) pumped into fintech companies between 2010 and 2017, especially from places like the US, UK, and India, shows just how serious the push for high-tech finance is.

Adaptive Strategies:
Banks are trying to keep up with fintech by teaming up with, investing in, or straight-up buying fintech companies. They’re mostly eyeing areas like managing wealth and

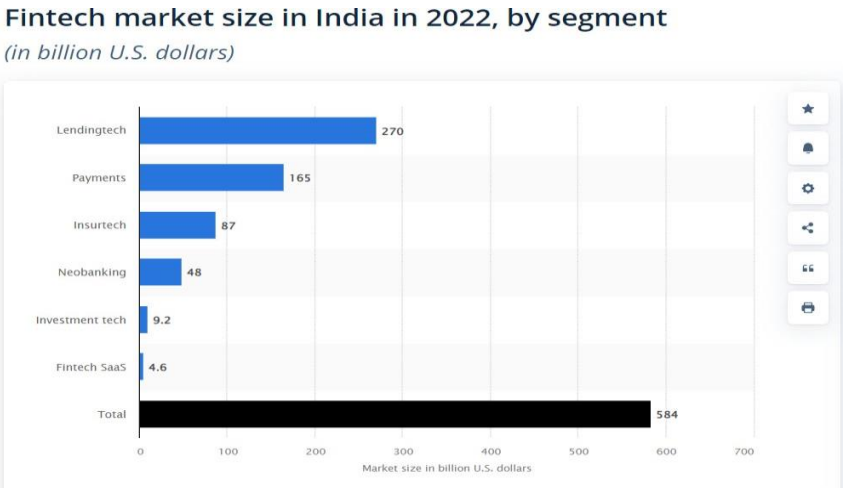
business-to-business fintech, looking for ways to improve the services they already offer.

Technological Adoption:
Banks are getting smarter with AI, using it for things like customer help and making the approval process way smoother. They're also looking into blockchain and cryptocurrencies, not just for money stuff but also to shake up other industries and challenge how traditional banking works.

Shift in Consumer Behaviour:
Everybody's glued to their smartphones—like, over 80% of folks have one! And around 60% were using their phones for banking in 2017. This change shows that more people are ditching the old ways in favour of banking that's super easy and right at their fingertips.

Global Expansion and Innovation:
Countries like China, Russia, and the Middle East are putting lots of money into making fintech even bigger. Things like payments, lending, and business-to- business fintech are expanding and getting way more creative, showing how flexible and adaptable these fintech solutions are.

Regulatory Adaptation:
Rules say that for some transactions, like making sure people aren't up to anything fishy with their money, there still needs to be some face-to-face action at physical branches. Cite: (osganalytics, Akhila Sriram, August 16, 2021)



The fintech scene in India is buzzing with activity, showcasing a real dynamism. It's not just about the impressive market size but also the promising projections for growth that make it stand out. One big player stealing the spotlight is lending tech, boasting a hefty $270 billion market share. This surge isn't surprising given India's large population of folks either not in the banking game or not fully immersed in it. And small to medium-sized businesses are really hungry for credit, driving this

sector's rapid expansion. Factors like more people using smartphones, hopping onto the internet bandwagon, and government initiatives for financial inclusion are all pushing this growth forward.

Following closely behind is the payments sector, raking in a solid $165 billion. It's riding high on the wave of digital payments and the rise of mobile wallets. And then there's insurtech, the underdog in this scenario with an $87 billion value but with huge potential thanks to more people buying insurance online.

Sure, big players like Paytm, Phone Pe, and Razorpay are leading the show in Indian fintech. But there's a whole bunch of startups eagerly diving in, making the market pretty diverse. Though as things progress, it's likely we'll see some of these players teaming up or getting absorbed by the bigger fish.

But it's not all rainbows and unicorns. There are hurdles to jump over. Things like people not really knowing much about financial products, high costs for data, and some confusion around regulations are all roadblocks. But hey, where there are challenges, there are opportunities for bright minds in fintech to come up with tailor-made solutions for Indian consumers.

Despite these bumps in the road, the Indian fintech game is set for some serious growth. With the government backing it up and more folks getting tech- savvy, the potential here is huge. There's plenty of room for new ideas and innovations, making this a super exciting space to keep an eye on as it grows and gets even more interesting in the coming years.

CONCLUSION

The evolution of fintech has truly shaken up the traditional banking scene, completely changing how we access and think about financial services. From the start of digital payment systems to the rise of blockchain and cryptocurrencies, fintech has been a non-stop force driving innovation in finance.

India is a standout example of how fintech has transformed the financial sector. The country's wholehearted adoption of digital financial services, thanks to things like widespread smartphone use and government initiatives, has led to massive growth. Fintech's impact on financial inclusion, especially for the growing middle class, has been huge, bringing in segments of the population that were previously left out and setting up more organized financial systems.

However, while we're headed towards a future that's all about digital finance, there are hurdles. Things like rules and regulations, making sure people are aware of their financial options, managing data costs, and beefing up cybersecurity are all big challenges. But, these challenges aren't roadblocks; they're chances to come up with smart, customized solutions that fit the unique needs of the Indian market.

We're seeing a stronger partnership forming between fintech and traditional banking. Banks are responding to the changes brought by fintech by teaming up, integrating new technology, and making sure they're super focused on what customers need. This

mix of traditional banking knowledge and fintech innovation could really make the financial world better, offering folks smoother, more efficient, and personalized financial services.

Looking ahead, fintech in India seems set for some serious growth. There's a mix of startups, big players, and support from the government that's creating a hotbed for new ideas and big changes in the financial world.

In short, fintech's impact on traditional banking goes beyond just new tech; it's about creating a more open, accessible, and lively financial world. This shift, powered by new ideas and shaped by what people want, promises a future where finance isn't just a service but a way to open doors for everyone in the digital age. As everyone navigates this changing landscape, working together, coming up with new stuff, and staying flexible will be key to building a strong and prosperous financial future.

REFERENCES

- https://osganalytics.com/blog/fintech-and-its-impact-on-traditional- banking/
- https://thepaymentsassociation.org/article/fintech-the-history-and-future-of-financial-technology/
- https://www.statista.com/statistics/1372780/india-fintech-market-size-by-segment/
- https://www.mckinsey.com/industries/financial-services/our-insights/fintechs-a-new-paradigm-of-growth
- https://www.rsm.global/uae/insights/future-banking-how-fintech-disrupting-traditional-financial-services
- https://pdfs.semanticscholar.org/ae63/3464db96fc65df3690c160471195cb70cd9d.pdf
- (PDF) Fintech Innovations And Their Impact On Traditional Financial Institutions, Payment Systems, And Financial Inclusion -A Review Of Case Studies (researchgate.net)
- Zhiyun Gong (2023). Research on the Impact and Development of Fintech on Banks. School of Economics, Shanghai University, Shanghai, China
- Dr. Vijay Singh Neg (2023). Fintech Disruption in Traditional Banking: Implications for Banks and Consumers. Associate Professor/ Govt. Degree College, New Tehri
- Mohammad Asif 1,*, Mohd Naved Khan 1, Sadhana Tiwari 2, Showkat K. Wani 1 and Firoz Alam. The Impact of Fintech and Digital Financial Services on Financial Inclusion in India. School of Business Studies, Sharda University, Greater Noida 201310, Uttar Pradesh, India

- Priya Patel1 and Sonal Patil2 (2023). Embracing Fintech: India's progress in the digitalization of the financial industry. PRAYUKTI Journal of Management Applications
- Mr. Pankaj Kumar Jhariya, Ms. Neetu Kushwaha, Prof. G. L. Puntambekar (2023). AN ANALYSIS OF CREDIT GROWTH THROUGH TRADITIONAL BANKS AND FINTECH COMPANIES IN INDIA. Department of Commerce, Dr. Harisingh Gour Vishwavidyalaya, Sagar, M. P.
- https://www.statista.com/topics/5666/fintech-in-india/#topicOverview
- https://www.mordorintelligence.com/industry-reports/india-fintech- market

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