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Bridging Gaps, Building Futures: Supporting Slow Learners in Mainstream Education

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Abstract:

Education is a fundamental right that empowers individuals and shapes societies. In today's inclusive educational landscape, mainstream schools are increasingly welcoming students with diverse learning needs. Among these students are slow learners - children who learn at a pace slower than their peers but do not necessarily have intellectual disabilities. Supporting slow learners effectively is crucial for ensuring equitable educational opportunities and fostering their academic, social and emotional development. Slow learners typically demonstrate below-average cognitive ability, limited attention span, low confidence, and difficulty in grasping abstract concepts. Without timely support, they may experience frustration, low self-esteem and disengagement from school. Inclusive education emphasizes equal learning opportunities for all students, yet slow learners in mainstream classrooms often struggle to meet academic expectations.

By bridging learning gaps and providing appropriate support, educators can help these students build successful futures and become confident, productive members of society. The present study explores the challenges faced by slow learners and identifies effective strategies to enhance their academic performance and overall development. It highlights the importance of early identification, differentiated instruction, remedial teaching, peer tutoring, and continuous assessment. The role of teachers, parents and school administration in creating a supportive and inclusive classroom environment is also emphasized. The study emphasizes with structured guidance, patience and adaptive teaching strategies, slow learners can achieve meaningful academic progress. Supporting them not only improves their performance but also strengthens inclusive education practices and contributes to building confident, capable individuals prepared for future challenges.

Keywords: Inclusive Education, Slow Learners, Bridging Gaps and Building Futures.

Introduction:

In mainstream classrooms, students display diverse learning abilities, backgrounds, and paces of understanding. Among them, slow learners' forms a significant group who require additional time and support to grasp academic concepts. Unlike students with severe intellectual disabilities, slow learners usually possess average to

below-average intelligence but face difficulties in comprehension, retention, application and problem-solving. Their learning pace is comparatively slower than their peers, which often leads to academic underachievement. Slow learners are frequently overlooked, misunderstood, or labelled negatively. This can affect their self-esteem, motivation, and overall personality development.

Factors such as psychological barriers, socio-economic conditions, limited parental support, inappropriate teaching methods and classroom environment further widen the learning gap. Without proper identification and intervention, these students may gradually lose interest in studies and feel isolated within the classroom setting. Therefore, it becomes essential to adopt inclusive and learner-centered approaches that address their specific needs. Bridging the gap for slow learners requires collaborative efforts from teachers, parents, school authorities and policymakers. By implementing supportive strategies and adaptive teaching practices, mainstream education can ensure equal opportunities for growth and success for every learner.

Significance of The Study:

This study holds significant importance in the field of education as it focuses on addressing the learning needs of slow learners within mainstream classrooms. In many schools, slow learners are often misunderstood, neglected or expected to perform at the same pace as their peers without additional support. By highlighting their specific challenges and learning requirements, this study contributes to promoting a more inclusive and equitable education system. The study helps teachers to understand the psychological, socio-economic, environmental and pedagogical factors that influence the academic performance of slow learners. It provides practical strategies such as differentiated instruction, remedial teaching, and individualized attention, which can be implemented in regular classrooms

without segregating students. This supports the development of effective teaching practices that benefit not only slow learners but all students.

Furthermore, the findings of this study can guide teachers, school administrators and policymakers in designing supportive programs, training teachers and developing inclusive policies. It also raises awareness among parents about their role in supporting their children learning at home. Ultimately, the study contributes to bridging learning gaps, improving self-confidence among slow learners, reducing dropout rates and building a stronger foundation for their academic and future success.

Understanding Slow Learners:

Slow learners are students who experience difficulties in grasping academic concepts, retaining information and applying learned skills at the expected rate for their age group. They may require additional time, repeated instruction and tailored teaching methods to achieve learning objectives. Common characteristics include:

- Difficulty understanding complex concepts.
- Limited attention span and concentration.
- Slow processing and response time.
- Challenges with memory retention.
- Lower academic achievement despite regular attendance.
- Reduced confidence and motivation.

It is important to distinguish slow learners from students with learning disabilities. While learning disabilities involve

specific neurological differences affecting certain skills, slow learners generally have below-average cognitive abilities but can achieve success with suitable support and instruction.

Causes of Slow Learning:

Slow learning does not occur due to a single reason; it is usually the result of multiple interrelated factors that affect a student's cognitive, emotional and social development. Understanding these causes helps in bridging gaps and building futures and planning appropriate support strategies.

- **Psychological Factors:** Low intelligence quotient (IQ within below-average range), poor memory, limited concentration and weak problem-solving skills can slow down the learning process. Emotional issues such as anxiety, lack of confidence, fear of failure and low motivation also affect academic performance.
- **Biological Factors:** Poor health, malnutrition, hearing or vision problems and developmental delays may reduce a child's ability to grasp concepts effectively. Frequent illness can also interrupt regular learning.
- **Socio-Economic Factors:** Financial difficulties, low parental education, lack of educational resources at home and a conducive home environment may limit learning opportunities and academic support.
- **Environmental Factors:** Unstable family conditions, lack of encouragement, negative peer influence and inadequate learning atmosphere can hinder intellectual growth.

- **Pedagogical Factors:** Traditional teaching methods, overcrowded classrooms, lack of individual attention and absence of remedial instruction may fail to meet the specific needs of slow learners.

Early identification of these causes is essential to provide timely intervention and create a supportive learning environment that promotes steady academic progress.

Challenges Faced by Slow Learners:

Slow learners in mainstream classrooms encounter multiple academic, emotional, and social challenges that affect their overall development. These difficulties often arise due to differences in learning pace, cognitive processing, and environmental influences.

- **Academic Challenges:** Slow learners often struggle with understanding complex concepts, abstract thinking, problem-solving, and retaining information. They may require more time to complete tasks and frequently experience difficulty in reading, writing, and mathematical skills. Fast-paced teaching methods can make it harder for them to keep up with the syllabus.
- **Psychological Challenges:** Repeated academic failures can lead to low self-esteem, lack of confidence, anxiety, and fear of participating in class activities. They may develop feelings of inferiority when compared to peers, which reduces motivation and interest in studies.
- **Social Challenges:** Slow learners may face peer rejection, teasing, or isolation due to poor academic performance. Limited communication skills and hesitation in

expressing ideas can further affect their social relationships.

➤ **Environmental and Socio-Economic Challenges:** Lack of parental support, low educational background of parents, financial constraints and limited learning resources at home can hinder academic progress.

➤ **Pedagogical Challenges:** Inadequate teaching strategies, lack of individualized attention, overcrowded classrooms and absence of remedial programs can widen the learning gap.

Addressing these challenges through supportive interventions is essential to ensure their academic growth and emotional well-being.

Identification And Assessment of Slow Learners:

Identification and assessment are crucial steps in providing appropriate support to slow learners in mainstream classrooms. Early identification helps prevent academic failure, emotional distress, and long-term learning gaps.

➤ **Observation Method:** Teachers play a key role in identifying slow learners through regular classroom observation. Signs such as difficulty in understanding instructions, slow completion of tasks, poor memory retention, limited participation and repeated academic underperformance may indicate the need for further assessment.

➤ **Academic Assessment:** Performance in class tests, assignments, oral responses and homework can help evaluate learning progress. Continuous and comprehensive

evaluation provides insight into specific subject difficulties and learning patterns.

➤ **Psychological Assessment:** Standardized intelligence tests, aptitude tests and diagnostic assessments conducted by professionals help determine cognitive ability and learning capacity. These tools distinguish slow learners from students with specific learning disabilities.

➤ **Health Examination:** Medical check-ups are important to rule out vision, hearing or health-related issues that may affect learning.

➤ **Parental Interaction:** Communication with parents provides background information about home environment, developmental history and study habits.

Proper identification followed by systematic assessment ensures that suitable remedial measures and individualized teaching strategies can be effectively implemented.

Hurdles in The Identification of Slow Learners:

Identifying slow learners at the right time is essential, yet several challenges make the process difficult in mainstream education.

➤ **Lack of Awareness:** Teachers and parents may not clearly understand the characteristics of slow learners. Academic underperformance is sometimes mistaken for laziness, carelessness or lack of interest rather than a learning difficulty.

➤ **Large Class Sizes:** Overcrowded classrooms limit individual attention. Teachers may find it difficult to closely observe each student's learning pace and specific needs.

- **Inadequate Assessment Tools:** Many schools lack standardized screening and diagnostic tools. Without proper psychological or academic assessment instruments, accurate identification becomes challenging.
- **Fear of Labelling:** Parents and teachers may hesitate to identify a child as a slow learner due to the fear of stigma, negative labelling or reduced expectations.
- **Similarities with Other Learning Problems:** Slow learning may sometimes be confused with specific learning disabilities, emotional disturbances or temporary academic difficulties, making differentiation complex.
- **Limited Professional Support:** Absence of trained counsellors, special educators or psychologists in schools can delay proper evaluation.

Overcoming these hurdles requires awareness programs, teacher training, supportive policies and systematic assessment procedures to ensure early and accurate identification.

Strategies in Bridging Gaps of Slow Learners:

Effective instructional strategies play a vital role in bridging gaps and supporting slow learners within mainstream classrooms. These strategies should focus on simplifying learning, increasing engagement and building confidence.

- **Differentiated Instruction:** Teachers should adapt teaching methods according to the learner's pace and ability. Simplifying content, breaking complex topics into

smaller units, and providing step-by-step explanations help improve understanding.

- **Use of Teaching Aids:** Visual aids, charts, models, audio-visual materials and real-life examples make learning more concrete and interesting. Activity-based and experiential learning methods enhance retention.
- **Remedial Teaching:** Special remedial classes or extra coaching sessions can be arranged to clarify doubts and reinforce basic concepts. Regular revision and practice strengthen foundational skills.
- **Individualized Attention:** Providing personal guidance, monitoring progress closely and offering constructive feedback help learners feel supported and motivated.
- **Peer Tutoring and Group Learning:** Pairing slow learners with supportive peers encourages collaborative learning and improves social interaction.
- **Positive Reinforcement:** Encouragement, appreciation and rewards for small achievements boost self-confidence and reduce fear of failure.
- **Continuous Assessment:** Frequent short assessments help track progress and identify areas needing improvement.

By implementing these learner-centred strategies, teachers can bridge academic gaps and foster steady growth among slow learners.

Role of Teachers, Schools and Policy Makers:

Teachers play a pivotal role in fostering the success of slow learners. Professional development programs can equip teachers with the skills needed to address diverse learning needs effectively. Effective educators:

- Demonstrate patience and empathy

- Create supportive classroom environments
- Use flexible teaching methodologies
- Identify learning difficulties early
- Collaborate with parents and specialists

Schools and policymakers must work together to create inclusive systems that support slow learners. Such measures help create learning environments where all students can thrive.

Key initiatives include:

- Implementing inclusive education policies
- Providing resource rooms and remedial programs
- Offering teacher training in inclusive practices
- Ensuring access to educational technology
- Promoting awareness about learning diversity

Supporting Slow Learners in Mainstream Education:

Slow learners are students who learn academic concepts at a slower pace than their peers and require additional time, practice and support to achieve learning goals. In mainstream education, it is important to provide an inclusive environment where these students can learn alongside others while receiving the assistance they need. Effective support helps improve their academic performance, self-confidence, motivation and social skills.

Teachers play a crucial role by adapting instruction, simplifying learning materials, using multi-sensory teaching methods and providing regular reinforcement

of concepts. Breaking lessons into smaller steps, offering individualized attention and giving constructive feedback can make learning more accessible. Cooperative learning and peer support also help slow learners participate actively in classroom activities and develop positive relationships with classmates.

Parents contribute by maintaining communication with teachers, encouraging learning at home and recognizing small achievements. The use of educational technology and continuous assessment can further support learning progress. Although challenges such as large class sizes and limited resources exist, a collaborative approach involving teachers, parents and schools can help slow learners succeed. By fostering patience, understanding, and inclusive teaching practices, mainstream education can enable slow learners to reach their full potential and become confident, independent learners.

Conclusion:

In conclusion, supporting slow learners in mainstream education is both an educational responsibility and a social imperative. By recognizing their unique learning needs and implementing inclusive, student-centred strategies, educators can help bridge learning gaps and unlock each student's potential. Through collaboration among teachers, parents, schools, and policymakers, slow learners can be empowered to overcome challenges, achieve academic success, and build meaningful futures. Inclusive education is not merely about placing students in the same classroom; it is about ensuring that

every learner has the opportunity, support, and encouragement needed to succeed.

Bridging the learning gap requires collaborative efforts from teachers, parents, school administrators and policymakers. Creating a supportive and encouraging environment can significantly enhance slow learners' confidence, motivation and academic achievement. Ultimately, investing time and effort in addressing the needs of slow learners not only improves their educational outcomes but also contributes to building a more inclusive, compassionate and effective educational system that nurtures every learner's potential and prepares them for a successful future.

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Artificial Intelligence and Future Economy

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Abstract:

Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the twenty-first century. It is reshaping industries, influencing labour markets, enhancing productivity, and redefining economic structures across the globe. AI refers to computer systems capable of performing tasks that normally require human intelligence, including learning, reasoning, decision-making, language understanding, and problem-solving. The rapid development of machine learning, deep learning, robotics, and data analytics has accelerated the adoption of AI in various sectors such as healthcare, agriculture, manufacturing, education, finance, transportation, and public administration. The integration of AI into economic activities offers significant opportunities for economic growth, innovation, and efficiency. At the same time, concerns regarding employment displacement, income inequality, data privacy, and ethical governance have become important policy issues. This paper examines the relationship between artificial intelligence and the future economy by analysing its impact on productivity, labour markets, industrial transformation, economic growth, and public policy. The study highlights both the opportunities and challenges of AI-driven economic development and suggests strategies to ensure inclusive and sustainable growth. The findings indicate that while AI has the potential to improve economic performance and living standards substantially, its benefits can only be fully realised through appropriate regulatory frameworks, investment in human capital, and responsible technological development.

Keywords: *Artificial Intelligence, Future Economy, Economic Growth, Automation, Labour Market, Innovation, Productivity.*

Introduction:

The world is currently experiencing a technological revolution driven by artificial intelligence. AI has evolved from a theoretical concept into a practical technology that influences nearly every aspect of economic and social life. The increasing availability of big data, advanced computing power, cloud infrastructure, and sophisticated algorithms has accelerated AI adoption across industries.

Artificial intelligence refers to machines and software systems capable of mimicking human cognitive functions such as learning, reasoning, perception, and decision-making. Unlike traditional technologies that follow fixed instructions, AI systems can learn from data and improve their performance over time. This capability enables organisations to automate complex processes, improve operational efficiency, and create innovative

products and services. The future economy is expected to be significantly shaped by AI technologies. Governments, businesses, and research institutions are investing heavily in AI to improve competitiveness and economic performance. According to various economic forecasts, AI could contribute trillions of dollars to global economic output over the coming decades. However, the widespread adoption of AI also raises concerns about job displacement, skill gaps, economic inequality, and ethical challenges. This paper explores the role of AI in shaping the future economy and examines its implications for productivity, employment, industrial development, and public policy.

Review of Literature:

Brynjolfsson and McAfee (2017):

Brynjolfsson and McAfee, in their book *Machine, Platform, Crowd*, examined the economic implications of digital technologies and artificial intelligence. The authors argued that AI has the potential to significantly enhance productivity, innovation, and economic growth. They highlighted how intelligent machines can complement human labour rather than completely replace it. The study emphasized that organisations adopting AI technologies are likely to gain competitive advantages through improved efficiency and decision-making processes.

World Economic Forum (2023): The World Economic Forum's Future of Jobs Report highlights the impact of artificial intelligence on employment, noting that while it may displace some routine jobs, it will also create opportunities in fields like data analytics, machine learning, cybersecurity, and digital

technologies. The report emphasizes the necessity of reskilling and upskilling workers to adapt to the changing labour market.

International Monetary Fund (IMF) (2024):

The International Monetary Fund analysed the relationship between artificial intelligence and economic development in its report on AI and the future of work. The study concluded that AI has the potential to increase productivity and economic growth across both developed and developing economies. However, it also warned that unequal access to technology and skills could widen income inequality. The report recommended policy interventions focused on education, workforce development, and social protection measures to ensure inclusive economic growth.

Objectives of The Study:

1. To understand the concept and evolution of artificial intelligence.
2. To examine the role of AI in economic growth and productivity.
3. To analyse the impact of AI on employment and labour markets.
4. To assess the opportunities and challenges associated with AI-driven economic transformation.
5. To suggest policy measures for promoting inclusive and sustainable AI development.

Research Methodology:

The present study is based on secondary data. The secondary data were collected from books, research articles, government reports, international organisations, journals, and online publications. Relevant literature on artificial

intelligence, economic growth, labour economics, and technological innovation has been reviewed to analyse the relationship between AI and the future economy.

Concept of Artificial Intelligence:

Artificial Intelligence is a branch of computer science that focuses on developing systems capable of performing tasks that normally require human intelligence. AI technologies include machine learning, deep learning, natural language processing, computer vision, robotics, and expert systems. The development of AI has progressed through several stages. Early AI systems were based on rule-based programming, while modern AI relies heavily on machine learning algorithms that learn from large datasets. Recent advances in deep learning have significantly improved the capabilities of AI systems, enabling applications such as speech recognition, image analysis, autonomous vehicles, and predictive analytics.

AI can be classified into three categories:

- i. **Narrow AI:** Narrow AI is designed to perform specific tasks, such as voice assistants, recommendation systems, and facial recognition software.
- ii. **General AI:** General AI refers to hypothetical systems capable of performing any intellectual task that a human can perform.
- iii. **Super AI:** Super AI represents a future stage where machines may surpass human intelligence in most cognitive activities.

Artificial Intelligence and Economic Growth:

AI has become a major driver of economic growth. They are;

- a) **Productivity Enhancement:** AI enables businesses to automate repetitive tasks, optimize operations, and reduce production costs. Automated systems can perform tasks faster and more accurately than humans, leading to improved productivity. Manufacturing industries use AI-powered robots to increase production efficiency and maintain product quality. Similarly, service industries utilize AI for customer support, financial analysis, and administrative functions.
- b) **Innovation and New Business Models:** AI fosters innovation by facilitating the creation of new products, services, and business models. It enables the emergence of digital platforms and automated services, generating new markets and revenue streams. Companies leverage AI to analyse consumer behaviour, detect market opportunities, and craft customized solutions, thus stimulating economic activity and enhancing competitiveness.
- c) **Resource Optimisation:** AI helps organisations optimise the use of resources such as labour, energy, and capital. Predictive analytics allows businesses to forecast demand, manage inventories efficiently, and minimize waste. In agriculture, AI assists farmers in monitoring crop conditions, improving irrigation management, and increasing agricultural productivity.

Impact of Artificial Intelligence on Employment:

a) Job Creation: AI creates new employment opportunities in areas such as:

Data science, Cybersecurity, Digital marketing, Data analytics, Machine learning engineering, Robotics maintenance. The growing demand for AI-related skills has generated new professions and expanded career opportunities.

b) Job Displacement: AI automation can replace certain routine and repetitive jobs. Tasks involving data entry, basic accounting, customer service, and manufacturing operations are increasingly being automated. Workers with low skill levels are particularly vulnerable to technological displacement.

c) Changing Nature of Work: Rather than completely replacing human workers, AI is likely to transform job roles. Human workers will increasingly collaborate with intelligent machines to perform tasks more efficiently. Future employment will emphasize creativity, problem-solving, emotional intelligence, leadership, and complex decision-making skills that are difficult to automate.

AI In Key Economic Sectors:

a) Healthcare: AI is revolutionising healthcare through medical diagnosis, drug discovery, patient monitoring, and personalised treatment. AI-powered systems assist doctors in identifying

diseases accurately and improving treatment outcomes.

b) Agriculture: Agriculture benefits from AI through precision farming, crop monitoring, pest detection, and yield prediction. These technologies improve productivity and support food security.

c) Manufacturing: Smart factories utilize AI, robotics, and automation to enhance production efficiency. Predictive maintenance reduces equipment failures and operational costs.

d) Finance: Financial institutions employ AI for fraud detection, risk assessment, algorithmic trading, and customer service. AI improves decision-making and operational efficiency in the financial sector.

e) Education: AI supports personalised learning, intelligent tutoring systems, and educational analytics. It helps educators identify student needs and improve learning outcomes.

f) Transportation: Autonomous vehicles, intelligent traffic management systems, and logistics optimization are transforming transportation and reducing operational costs.

Challenges of AI in The Future Economy:

a) Employment Inequality: Automation may disproportionately affect low-skilled workers, leading to income inequality and social disparities.

b) Skill Gap: The rapid adoption of AI requires workers to acquire new technical and digital skills. Educational systems must adapt to changing labour market requirements.

- c) **Data Privacy and Security:** AI systems rely heavily on data. The collection and processing of large amounts of personal information raise concerns regarding privacy and cybersecurity.
- d) **Ethical Issues:** AI systems may exhibit bias if trained on biased datasets. Ethical concerns include discrimination, transparency, accountability, and fairness in automated decision-making.
- e) **Regulatory Challenges:** Governments face difficulties in developing regulations that encourage innovation while protecting public interests. Effective governance frameworks are essential for responsible AI deployment.

Opportunities for The Future Economy:

- a) **Higher Productivity:** AI-driven automation can significantly increase productivity and efficiency across industries.
- b) **Improved Public Services:** Governments can use AI to improve healthcare, education, transportation, and administrative services.
- c) **Sustainable Development:** AI supports environmental sustainability through energy optimisation, climate monitoring, and resource management.
- d) **Global Competitiveness:** Countries investing in AI research and innovation are likely to achieve greater economic competitiveness and technological leadership.
- e) **Entrepreneurship and Innovation:** AI creates opportunities for startups and entrepreneurs to develop innovative

products and services that address emerging market needs.

Policy Recommendations:

To maximize the benefits of AI while minimizing its risks, the following policy measures are recommended:

- Increase investment in AI research and development.
- Strengthen digital infrastructure and technological capacity.
- Promote education and skill development programs.
- Encourage lifelong learning and workforce reskilling.
- Develop ethical guidelines for AI implementation.
- Establish robust data protection and cybersecurity regulations.
- Support innovation and entrepreneurship in AI-related sectors.
- Promote public-private partnerships for AI development.
- Ensure inclusive access to technological opportunities.
- Create social protection mechanisms for displaced workers.

Conclusion:

Artificial Intelligence is poised to become a defining force in the future economy. Its ability to enhance productivity, stimulate innovation, optimize resource utilisation, and improve decision-making makes it one of the most significant technological developments of modern times. AI has the potential to generate substantial economic benefits across sectors including healthcare, agriculture, manufacturing, finance, education, and

transportation. However, the transition toward an AI-driven economy also presents challenges related to employment displacement, skill shortages, ethical concerns, data privacy, and regulatory governance. The future economic impact of AI will depend largely on how governments, businesses, and educational institutions respond to these challenges. A balanced approach that promotes innovation while ensuring social inclusion is essential. Investment in human capital, digital infrastructure, ethical governance, and workforce development will play a crucial role in determining whether AI contributes to broad-based prosperity. If managed effectively, artificial intelligence can become a powerful catalyst for sustainable economic growth, improved living standards, and enhanced global competitiveness in the decades ahead.

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Social Media Addiction, Causes and Effects

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Introduction:

Social media addiction is the excessive and uncontrollable use of social networking platforms such as Facebook, Instagram, WhatsApp, X (Twitter), Snapchat, and YouTube. While these platforms help people communicate, learn, and entertain themselves, excessive use can negatively affect mental health, physical health, relationships, education, and work. Today, social media addiction has become a major concern, especially among students and young adults. Social media platforms help us stay in touch, build communities, and access information instantly. But for many people, usage crosses a line from habit into addiction. Social Media Addiction means a compulsive pattern of using social platforms that interferes with daily life, mental health, work, studies, and relationships, and feels difficult to control even when you want to stop.

What Exactly Is Social Media Addiction?

Psychologists often describe it using the same framework as other behavioral addictions. The key signs are:

Salience: Thinking about social media all the time. Planning your next post, checking who viewed your story.

Mood modification: Using apps to feel better when stressed, bored, or lonely.

Tolerance: Needing more time to get the same satisfaction. What was 10 minutes becomes 2 hours.

Withdrawal: Feeling anxious, irritable, or "left out" when you cannot access apps.

Conflict: It creates problems with sleep, work, grades, or relationships.

Relapse: Trying to cut down, then going back to old patterns

Causes of Social Media Addiction:

Addiction never has one single cause. It is usually a mix of brain chemistry, app design, and personal life factors.

A. Brain and Psychology Factors:

- **Dopamine Reward System:** Every like, comment, DM, or new video triggers a small release of dopamine. Dopamine is the "reward" chemical. Apps give unpredictable rewards, which is the most addictive pattern. You never know if the next scroll will be boring or amazing, so you keep scrolling.
- **Need for Validation:** Humans are social. Likes and comments feel like social approval. For teens and young adults especially, this becomes tied to self-worth.
- **Emotional Regulation:** People use social media to cope. Bored? Scroll. Anxious before an exam? Scroll. Lonely

at night? Scroll. Over time the brain learns: "bad feeling = open app = feel better for 5 minutes."

B. Design Factors: How Apps Are Built to Keep You:

- **Infinite Scroll:** There is no natural endpoint. No "last page." Your thumb can keep going forever.
- **Autoplay and Short-form Video:** Reels, Shorts, and TikToks are 15-60 seconds. Your brain gets a new stimulus before it gets bored.
- **Algorithms:** AI learns what keeps you watching and feeds you more of it. If you watch 3 cooking videos, your whole feed becomes cooking. It feels personalized, so it feels harder to leave.
- **Notifications:** Red dots, badges, "someone mentioned you." These are engineered to pull you back in multiple times per day.
- **Social Proof Features:** View counts, streaks on Snapchat, follower counts. They gamify connection.

C. Social and Environmental Factors:

- **FOMO - Fear of Missing Out:** Seeing friends at events, trends going viral, news breaking. The fear that if you are not online, you will miss something important.
- **Loneliness and Isolation:** Ironically, people who feel lonely offline often spend more time online seeking connection. The short-term relief can make long-term loneliness worse.
- **Escapism:** Academic pressure, job stress, family problems. Scrolling is an easy, low-effort escape that does not require facing the problem.

- **Lack of Alternatives:** If there are no hobbies, sports, or offline social plans, the phone fills the empty time by default.

D. Demographic Factors:

- **Age:** Adolescents and young adults 13-24 are most at risk because the brain's impulse control center is still developing and social approval matters a lot.
- **Personality:** People high in neuroticism, low self-esteem, or with anxiety/depression are more vulnerable.
- **Accessibility:** Cheap smartphones and cheap data, especially in places like Bangalore and across India, mean access is 24/7.

E. Other Factors:

1. **Easy Accessibility:** Smartphones and affordable internet services allow people to access social media anytime and anywhere, increasing screen time.
2. **Instant Gratification:** Likes, comments, shares, and notifications provide immediate satisfaction and encourage users to spend more time online.
3. **Fear of Missing Out (FOMO):** People constantly check social media because they fear missing important updates, trends, or events.
4. **Entertainment:** Short videos, memes, online games, and live streaming keep users engaged for long periods.
5. **Peer Pressure:** Many people use social media to fit in with friends, classmates, or colleagues and to maintain their social image.
6. **Loneliness and Stress:** Some individuals use social media to escape feelings of loneliness, anxiety, boredom, or depression.

7. Lack of Self-Control: Poor time management and difficulty controlling screen time can gradually lead to addiction.

8. Personalized Content: Algorithms recommend content based on user interests, making it difficult to stop scrolling.

Effects of Social Media Addiction:

Positive Effects of Social Media:

1. Improved Communication:

- Helps people stay connected with family and friends across the world.
- Enables instant messaging, voice calls, and video calls.

2. Access to Information:

- Provides quick access to news, educational resources, and current events.
- Supports online learning through tutorials, webinars, and educational content.

3. Learning Opportunities:

- Students can join study groups, attend online classes, and access free educational materials.
- Encourages skill development through online courses and expert content.

4. Career and Business Growth:

- Professionals can build networks and explore job opportunities.
- Businesses can promote products, reach customers, and increase sales through digital marketing.

5. Creativity and Self-Expression:

- Users can share photos, videos, artwork, writing, and other creative content.

- Content creators can build audiences and showcase their talents.

6. Community Support:

- People with similar interests or challenges can join online communities for advice and encouragement.
- Support groups can help users feel less isolated.

7. Entertainment and Relaxation:

- Social media offers videos, music, games, and other enjoyable content that can reduce boredom and provide relaxation in moderation.

8. Social Awareness:

- Helps spread awareness about health, education, environmental issues, and social causes.
- Encourages participation in community initiatives and charitable activities.

Negative Effects of Social Media:

A. Poor Mental Health: Can increase anxiety, stress, depression, and loneliness.

1. Anxiety and Depression: Excessive social media use can increase stress, anxiety, and feelings of sadness.

2. Low Self-Esteem: Comparing oneself with others' edited and idealized lives may reduce confidence.

3. Poor Concentration: Constant notifications interrupt attention and reduce the ability to focus.

4. Sleep Disorders: Using social media late at night affects sleep quality and causes fatigue.

- **Reduced Academic or Work Performance:** Excessive use leads to distraction and poor concentration.

- **Sleep Problems:** Late-night scrolling reduces sleep quality.

B. Health Issues: Eye strain, headaches, neck pain, and reduced physical activity.

1. **Eye Strain:** Long screen time causes eye irritation, headaches, and blurred vision.
2. **Neck and Back Pain:** Poor posture while using smartphones leads to muscle pain.
3. **Reduced Physical Activity:** People spend more time sitting and less time exercising, increasing health risks.

C. Academic and Professional Effects: Comparing oneself with others may lead to dissatisfaction and low confidence.

1. **Poor Academic Performance:** Students may spend more time on social media than studying, leading to lower grades.
2. **Reduced Productivity:** Employees and professionals may lose focus and complete less work.
3. **Time Wastage:** Hours spent scrolling reduce time available for learning and skill development.

D. Relationship Problems: Less face-to-face interaction can weaken personal relationships.

1. **Weak Family Relationships:** People may spend less quality time with family members.
2. **Reduced Face-to-Face Communication:** Online interactions may replace meaningful real-life conversations.
3. **Social Isolation:** Ironically, excessive online activity can increase feelings of loneliness.
4. **Cyberbullying:** Negative comments, online harassment, and bullying can harm mental well-being.
5. **Online Harassment:** Can affect emotional well-being.

6. **Privacy and Security Risks:** Oversharing personal information may lead to identity theft or fraud.

Solutions to Social Media Addiction:

1. **Set Time Limits:** Use screen-time monitoring apps and limit daily social media usage.
2. **Turn Off Notifications:** Disabling unnecessary notifications reduces the urge to check social media constantly.
3. **Follow a Daily Schedule:** Allocate specific times for studying, working, exercising, and using social media.
4. **Engage in Offline Activities:** Spend time reading books, exercising, playing sports, learning new skills, or pursuing hobbies.
5. **Keep Devices Away During Study or Sleep:** Avoid using phones during study sessions and at least one hour before bedtime.
6. **Practice Digital Detox:** Take regular breaks from social media, such as one day each week or a few hours each day.
7. **Spend Time with Family and Friends:** Face-to-face conversations help build stronger relationships and reduce dependence on online interactions.
8. **Seek Professional Help:** If addiction becomes severe and affects daily life, consult a psychologist or counselor.
9. **Increase Awareness:** Schools, colleges, and families should educate people about responsible social media use.
10. **Use Social Media Purposefully:** Use social media mainly for education, communication, and useful information instead of endless scrolling.

Conclusion:

Social media is a powerful tool when used wisely, but excessive use can become addictive and negatively affect mental health, physical health, education, work, and relationships. Maintaining a healthy balance by limiting screen time, engaging in offline activities, and using social media responsibly helps people enjoy its benefits while avoiding its harmful effects.

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Role of Technological Innovations in Improving Customer Service in Urban Cooperative Banking: Evidence from Jamkhandi Urban Co-operative Bank

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Abstract:

Technological innovation has become an essential component of modern banking services. Urban cooperative banks are increasingly adopting digital technologies to enhance customer convenience, operational efficiency, and service quality. The present study examines the role of technological innovations in improving customer service in Jamkhandi Urban Co-operative Bank. Primary data were collected from 50 customers using a structured questionnaire. The study employed simple statistical tools such as percentage analysis and mean scores for interpretation. The findings indicate that technological innovations such as ATM services, mobile banking, UPI payments and SMS alerts have significantly improved customer satisfaction and service delivery in the bank.

Keywords: *Technological Innovation, Customer Service, Urban Cooperative Banks, Digital Banking, Customer Satisfaction.*

Introduction:

The banking sector has undergone substantial transformation due to technological advancements. Customers today expect banking services that are fast, secure, convenient, and accessible round the clock. Urban cooperative banks, traditionally known for personalized services, have also adopted various technological innovations to remain competitive in the evolving financial landscape.

Technological innovations such as Automated Teller Machines (ATMs), mobile banking applications, SMS alerts, debit cards, and UPI transactions have considerably improved customer experience. These services

reduce transaction time, minimize paperwork, and increase customer satisfaction.

Objectives of the Study:

1. To identify the technological innovations introduced by the bank.
2. To examine the usage of digital banking services by customers.
3. To assess the impact of technological innovations on customer service.

Research Design: Descriptive research design.

Source of Data: Primary data.

Primary Data: Collected from customers through a structured questionnaire.

Sample Size: 50 customers.

Sampling Technique: Convenience sampling.

Statistical Tools Used: Percentage analysis and mean score analysis.

Technological Innovations Available in the Bank:

The major technological innovations introduced by the bank include:

- ATM and Debit Card Services
- Mobile Banking
- UPI and QR Code Payments
- SMS and Email Alerts
- NEFT, RTGS and IMPS Facilities
- Core Banking Services

Data Analysis and Interpretation:

Table 1: Usage of Technological Banking Services

Service Used	Number of Customers	Percentage
ATM Services	46	92%
UPI Payments	44	88%
Mobile Banking	38	76%
SMS Alerts	42	84%

Interpretation: ATM services were the most widely used technological service among customers, followed by UPI transactions and SMS alerts.

Table 2: Customer Opinion on Technology-Based Services

Statement	Mean Score (Out of 5)
Technology has improved banking convenience	4.52
Digital banking saves time	4.48
Bank staff provide adequate technological support	4.20
Digital services are easy to use	4.14
Overall satisfaction with technological services	4.36

Interpretation: The mean scores indicate a high level of customer satisfaction with the bank's technological services. Customers particularly appreciated the convenience and time-saving aspects of digital banking.

Table 3: Overall Satisfaction Level

Satisfaction Level	Number of Customers	Percentage
Highly Satisfied	18	36%
Satisfied	24	48%
Neutral	6	12%
Dissatisfied	2	4%
Highly Dissatisfied	0	0%

Interpretation: A majority of customers (84%) expressed satisfaction with the bank's technology-enabled customer services.

Findings of the Study:

1. ATM services were used by 92% of customers, making them the most popular technological service.
2. UPI and digital payment systems were widely accepted among customers.
3. More than three-fourths of customers actively used mobile banking facilities.
4. Customers believed that technological innovations significantly reduced waiting time in the bank.
5. The average satisfaction score of customers regarding technological services was above 4 on a 5-point scale.
6. The majority of respondents expressed satisfaction with the support provided by bank employees for digital banking services.

Suggestions:

1. The bank may increase awareness programs regarding E-banking services among senior citizens.
2. Periodic customer training programmes can improve digital literacy.
3. Cyber security awareness should be strengthened to improve customer confidence in online transactions.
4. The bank may continue investing in mobile banking and digital payment infrastructure.

Conclusion:

Technological innovations have emerged as a crucial factor in enhancing customer service in urban cooperative banks. The study reveals that customers perceive technology-based banking services as convenient, time-saving, and efficient. The adoption of digital banking services by Jamkhandi Urban Co-operative Bank has

positively influenced customer satisfaction and service quality. Continued investment in technological infrastructure and customer awareness initiatives will further strengthen the bank's competitive position in the cooperative banking sector.

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Artificial Intelligence in Indian Economy

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Abstract:

Artificial intelligence has become a powerful tool for economic transformation. The indian economy is broadly divided into three major sectors: agriculture, industry, and services. It is a mixed economy, where both the public and private sectors play important roles in economic development. Agriculture remains the primary source of livelihood for millions of people, while industries and services contribute significantly to national income and employment. India has also experienced significant progress in digital transformation. Before the widespread adoption of ai, the indian economy depended largely on traditional methods, manual labour, and human decision-making. where as agriculture relied on farmers' experience rather than scientific data industries operated mainly through labour-intensive production methods and the services sector also depended heavily on manual operations. Overall, the indian economy without ai experienced slower productivity growth, higher operational costs, limited technological innovation, and relatively lower global competitiveness. The adoption of artificial intelligence has significantly transformed the indian economy by making economic activities more efficient, productive, and data-driven. Government administration has also become more efficient with ai. Ai supports digital governance by improving tax administration, traffic management, public health monitoring, disaster response, welfare scheme implementation, and citizen service delivery.

Keywords: Atmanirbhar Bharat, Skill India, Startup India, Make in India, Digital India.

Introduction:

The present indian economy is characterized by rapid technological advancement, digital transformation, infrastructure development, and policy reforms aimed at achieving sustainable and inclusive growth. Growth has been supported by rising domestic consumption, public infrastructure investment, expansion of manufacturing, and the rapid growth of the services sector. The agricultural sector is increasingly adopting modern technologies and the government initiatives such as pm-kisan, e-nam, crop insurance schemes, and irrigation projects have improved farmers'

access to financial assistance. The industrial sector contributes significantly to india's economic development through expansion of industrial corridors, logistics infrastructure and development of small and medium enterprises (msmes). The services sector is the largest contributor to india's gross domestic product (gdp). Innovations have transformed the financial ecosystem and improved financial inclusion across the country. It's also expanded rapidly with the adoption of digital technologies and improved infrastructure healthcare, education, tourism, and logistics. India's foreign trade has expanded significantly over the past decade.

Foreign direct investment (fdi) continues to increase due to policy reforms, ease of doing business, infrastructure improvements, and india's large consumer market. With continued investment in technology, education, infrastructure, and inclusive development, and with the help of ai india is well on its way to becoming one of the world's leading developed economies.

Atmanirbhar Bharat:

The atmanirbhar bharat initiative was officially announced by prime minister narendra modi on 12 may 2020 during the covid-19 pandemic. As the atmanirbhar bharat mission progressed, artificial intelligence began to play an increasingly important role in achieving self-reliance. Ai supported automation, predictive maintenance, quality control, and smart production systems. In recent years, atmanirbhar bharat with ai has evolved into a long-term strategy for building a future-ready india india is also working toward becoming a global hub for digital innovation, semiconductor manufacturing, smart infrastructure, and advanced technology.

Importance of Artificial Intelligence in Atmanirbhar Bharat:

- Building a strong and resilient economy.
- Strengthening domestic demand and supply chains.
- Establishing technology-driven and transparent governance.
- Creating world-class infrastructure.
- Utilizing india's young workforce.
- Developing modern infrastructure.
- Ensuring sustainable and inclusive economic growth.

- Increasing exports and reducing unnecessary imports.
- Supporting micro, small and medium enterprises (msmes).

Skill India:

Skill india covers a wide range of sectors, including manufacturing, agriculture, construction, healthcare, information technology, tourism, hospitality, retail, logistics, electronics, renewable energy, and financial services. The skill india mission was officially launched by prime minister narendra modi on 15 july 2015, which is also celebrated as world youth skills day. The programme also encourages women, rural youth, school dropouts, and economically weaker sections of society to acquire market-oriented skills, thereby promoting inclusive growth and social development. The programme seeks to develop a highly skilled workforce that can meet the demands of modern industries and contribute to india's economic growth. India has one of the world's youngest populations, a significant number of them lacked formal vocational training and industry-specific skills. To address this challenge, the government launched skill india with the vision of creating a skilled workforce capable of supporting industrial development, technological advancement, and economic growth.

Importance of Skill India:

- Increase workforce productivity.
- Reduce unemployment and underemployment.
- Prepare youth for emerging technologies and global employment opportunities.
- Promote entrepreneurship and self-employment.

- Improve employability among youth.
- Enhancing productivity
- Strengthening agriculture
- Improving global competitiveness
- Supporting atmanirbhar bharat
- Promoting entrepreneurship

Startup India:

The startup india initiative was officially launched by prime minister narendra modi on 16 january 2016 at vigyan bhavan, new delhi. The startup india initiative provides financial support, tax benefits, easier regulatory procedures, mentorship, incubation facilities, intellectual property (ip) assistance, and access to funding. A startup is a newly established business that develops innovative products, services, or business models to solve social or commercial problems. It was launched to create a strong ecosystem that supports the establishment and development of new enterprises capable of generating employment, encouraging technological innovation, and contributing to india's economic growth. Government-supported organizations such as startup india seed fund scheme (sisfs), atal innovation mission (aim), and the national startup awards further strengthened the startup ecosystem. India has become one of the world's largest startup ecosystems, with thousands of recognized startups and numerous unicorn companies.

Importance of Startup India:

- Supporting digital transformation.
- Strengthen india's global competitiveness.
- Development of msme's.
- Promote entrepreneurship and innovation.

- To provide financial assistance and tax benefits.
- Attracts domestic investment.
- Develops a strong startup ecosystem.
- Encourages healthcare innovation.
- Reduces dependence on imported technologies.
- Promotes smart city solutions.

Make in India:

Make in india contributes significantly to economic growth and supports india's vision of becoming a self-reliant (atmanirbhar) and developed nation (viksit bharat 2047). The make in india programme was launched by prime minister narendra modi on 25 september 2014 at vigyan bhavan, new delhi. Before the launch of make in india, the manufacturing sector contributed a relatively smaller share to india's gross domestic product (gdp) compared to many developed and emerging economies. These programmes work together to enhance manufacturing capacity, encourage innovation, improve infrastructure, and increase exports.

Importance of Make in India:

- Support sustainable economic growth.
- Attracting foreign direct investment (fdi)
- Strengthen exports.
- Balanced regional development.
- Improves transportation infrastructure.
- Supports electric vehicle (ev) manufacturing.
- Improves the standard of living.
- Encourages skill development.
- Develops rural industries.
- Helps achieve the vision of viksit bharat 2047.

Digital India:

By integrating digital technologies into everyday life, digital india supports economic growth and improves the quality of public service delivery. It encourages the adoption of emerging technologies such as artificial intelligence (ai), cloud computing, blockchain, the internet of things (iot), and big data analytics to improve governance and business operations. The digital india programme was officially launched by prime minister narendra modi on 1 july 2015 at the indira gandhi indoor stadium in new delhi. Recognizing the growing importance of information and communication technology, the government introduced digital india as a comprehensive programme to accelerate digital transformation across the country. The main objective of digital india is to make government services easily accessible to every citizen through digital platforms. It also aims to reduce paperwork, increase transparency, improve efficiency, promote financial inclusion, and encourage innovation and entrepreneurship.

Importance of Digital India:

- Develop india into a global digital leader.
- Supporting startups and innovation.
- Strengthen e-governance and transparency.
- Supporting education.
- Promote digital literacy.
- Improving healthcare.
- Make government services available online.
- Employment generation.
- Improve internet connectivity across urban and rural areas.
- Financial inclusion.

Conclusion:

Artificial intelligence strengthens india's digital economy. Ai supports secure digital transactions, personalized customer experiences, and efficient online platforms. The indian economy has traditionally been driven by agriculture, manufacturing, and services. Comparing the indian economy with ai and without ai clearly demonstrates that ai has the potential to significantly improve the nation's economic performance, while the absence of ai would limit growth, innovation, and competitiveness. Ai accelerates research and development across various scientific and technological fields. Without ai, research activities remain slower, more resource-intensive, and less competitive compared to technologically advanced nations. Artificial intelligence also improves governance and public administration. Artificial intelligence represents a historic opportunity for india's economic transformation.

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The Future Economy in the Age of Artificial Intelligence: Perspectives from Commerce and Management

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Abstract:

Artificial Intelligence (AI) is transforming the global economy by reshaping business operations, commerce, management practices, and workforce dynamics. The future economy is increasingly characterized by automation, data-driven decision-making, digital innovation, and intelligent systems that enhance productivity and efficiency across industries. From manufacturing and finance to retail, healthcare, and logistics, AI technologies are enabling organizations to optimize resources, reduce operational costs, and improve customer experiences. From a commerce perspective, AI facilitates personalized marketing, predictive analytics, digital payments, supply chain optimization, and e-commerce growth. Businesses can better understand consumer behavior and respond quickly to changing market demands. From a management perspective, AI supports strategic planning, human resource management, risk assessment, and organizational decision-making through advanced data analysis and forecasting capabilities. Despite its numerous benefits, the integration of AI also presents challenges such as job displacement, ethical concerns, data privacy issues, cyber security risks, and the need for continuous skill development. Organizations and policymakers must therefore focus on responsible AI adoption, workforce reskilling, and the establishment of appropriate regulatory frameworks.

This paper examines the evolving role of Artificial Intelligence in shaping the future economy from commerce and management perspectives. It highlights the opportunities, challenges, and strategic implications of AI-driven transformation and emphasizes the importance of balancing technological advancement with sustainable economic growth and social well-being. The study concludes that AI will serve as a key driver of innovation, competitiveness, and economic development in the coming decades.

Keywords: Artificial Intelligence, Future Economy, Commerce and Management, Digital Transformation, Sustainable Economic Development.

Introduction:

"The best way to predict the future is to create it." -Peter Ducker.

"Technology is a useful servant but a dangerous master."-Christian Lous Lange

Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the twenty-first century, reshaping economies, businesses, and societies across

the globe. Once confined to research laboratories, AI is now widely integrated into everyday life, influencing sectors such as healthcare, education, finance, commerce, and governance. As countries accelerate digital transformation, AI has become a key driver of the future economy by enabling automation, data analysis, predictive decision-making, and innovation. It represents not only a

technological advancement but also a new economic paradigm centered on knowledge, intelligence, and digital capabilities. Economic development has historically been driven by major technological revolutions, including the Agricultural, Industrial, and Digital Revolutions. Today, the AI Revolution is redefining economic activities by enhancing both physical and cognitive tasks. Unlike previous technological changes, AI supports intelligent decision-making, business innovation, and operational efficiency, transforming the way organizations compete and create value. In commerce and management, AI has become a strategic asset that improves customer relationship management, digital marketing, financial forecasting, supply chain management, fraud detection, and business analytics. These applications help organizations increase productivity, reduce costs, enhance customer satisfaction, and make data-driven decisions. Managers increasingly rely on AI to optimize resources, forecast market trends, strengthen organizational resilience, and improve overall business performance. Despite its numerous benefits, AI also presents significant challenges. The automation of routine tasks may lead to job displacement, changing workforce skill requirements, and income inequality. Additional concerns include cyber security threats, data privacy, algorithmic bias, and ethical issues related to transparency and accountability. These challenges highlight the need for responsible AI governance, ethical leadership, and policies that promote inclusive and sustainable development. Educational institutions, governments, industries, and businesses play a crucial role in preparing

society for an AI-driven future. Commerce and management education should equip learners with digital literacy, analytical thinking, ethical awareness, and adaptability to meet evolving workplace demands. Countries such as India have significant opportunities to leverage AI for financial inclusion, entrepreneurship, smart manufacturing, healthcare, agriculture, and digital governance. However, these opportunities require sustained investment in digital infrastructure, research, innovation, and workforce reskilling.

AI and the Transformation of Commerce:

- **Personalized Marketing:** AI analyzes consumer behavior and preferences to provide customized product recommendations and targeted advertisements.
- **E-Commerce Enhancement:** Chat bots, virtual assistants, and intelligent search systems improve customer service and online shopping experiences.
- **Supply Chain Optimization:** AI predicts demand, manages inventory, and improves logistics efficiency.
- **Fraud Detection:** Advanced AI algorithms identify suspicious transactions and reduce financial fraud.
- **Dynamic Pricing:** Businesses use AI to adjust prices based on market conditions, customer demand, and competitor strategies.

AI and Management Practices:

- **Human Resource Management:** AI-based recruitment systems screen candidates efficiently. Predictive analytics help identify employee

performance and retention risks. Personalized training programs improve workforce development.

- **Financial Management:** AI supports risk assessment, investment analysis, and financial forecasting. Automated accounting systems reduce errors and improve compliance. Real-time data analysis assists managers in making informed financial decisions.
- **Operations Management:** Smart automation increases productivity and reduces operational costs. Predictive maintenance minimizes equipment failures and downtime. AI-driven analytics optimize production processes.
- **Strategic Management:** AI provides insights from large datasets, enabling evidence-based strategic planning. Scenario analysis helps organizations anticipate future market trends and challenges.

Aims and Objectives of the Study:

1. To Analyze the Role of Artificial Intelligence in Driving Innovation
2. To Evaluate the Impact of Artificial Intelligence on Economic Development

Research Methodology and Data Collection:

This study adopts a descriptive and analytical research methodology to examine the role of Artificial Intelligence in innovation and economic development. The research is based on secondary data collected from scholarly journals, research articles, books, government reports, industry publications, and reputable online sources. Relevant literature on AI applications, technological

innovation, productivity, and economic growth has been reviewed systematically. Data from international organizations, technology companies, and economic reports were analyzed to identify trends and patterns. The study employs qualitative analysis to interpret the impact of AI across various sectors. Comparative analysis has been used to evaluate the benefits and challenges of AI adoption. The collected data were organized and examined to draw meaningful conclusions regarding AI's contribution to innovation and economic development. The findings are based on reliable and up-to-date sources.

Research Questions:

1. How does Artificial Intelligence contribute to innovation and technological advancement across different sectors of the economy?
2. What is the impact of Artificial Intelligence on economic development in terms of productivity, employment, business growth, and overall economic performance?

Discussion:

1. To examine the contribution of Artificial Intelligence to innovation and technological advancement across different sectors of the economy.
 - I. **Enhancing Research and Development (R&D):** AI enables faster data analysis and pattern recognition, helping organizations develop innovative products and services. It reduces the time and cost involved in research activities by automating complex processes.

- II. **Improving Operational Efficiency:** AI-powered automation streamlines routine and repetitive tasks. Organizations can optimize resource utilization, reduce errors, and improve productivity through intelligent systems.
- III. **Driving Innovation in Healthcare:** AI assists in disease diagnosis, drug discovery, medical imaging, and personalized treatment plans. Advanced healthcare technologies improve patient outcomes and service delivery.
- IV. **Revolutionizing Financial Services:** AI supports fraud detection, risk assessment, customer service, and investment decision-making. Financial institutions use intelligent algorithms to improve efficiency and customer satisfaction.
- V. **Advancing Education and Learning:** AI facilitates personalized learning experiences, virtual tutoring, and adaptive educational platforms. Educational institutions can improve teaching effectiveness and student engagement.
- VI. **Strengthening Commerce and Business Operations:** Businesses use AI for market analysis, customer relationship management, inventory control, and demand forecasting. AI helps organizations understand

consumer behavior and make data-driven decisions.

- VII. **Promoting Digital Transformation:** AI acts as a catalyst for digital innovation by integrating advanced technologies such as machine learning, robotics, cloud computing, and the Internet of Things. It supports the development of smart cities, intelligent infrastructure, and modern digital ecosystems.

Conclusion:

Artificial Intelligence is rapidly transforming the economic landscape and redefining the way businesses operate, compete, and create value. From the perspective of commerce, AI has enhanced customer engagement, digital transactions, supply chain efficiency, financial services, and market intelligence. From the management perspective, it has revolutionized decision-making, strategic planning, human resource management, and operational efficiency through data-driven insights and automation. The future economy will increasingly be characterized by intelligent systems, digital platforms, and innovation-driven business models. Organizations that effectively integrate AI technologies into their operations will gain significant competitive advantages in terms of productivity, cost reduction, customer satisfaction, and sustainable growth. At the same time, the widespread adoption of AI presents challenges related to employment displacement, ethical concerns, data privacy, cyber security, and regulatory governance.

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Artificial Intelligence and The Digital Economy: Emerging Roles of Libraries

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Abstract:

The digital economy is changing due to artificial intelligence (AI), which is changing research, healthcare, education, governance, and industry. Libraries, which were once thought of as knowledge repositories, are now technologically advanced information hubs that facilitate lifelong learning, research, and innovation. Libraries can now provide individualized, effective, and user-focused services thanks to AI-powered tools including machine learning, natural language processing (NLP), chat bots, recommender systems, and data analytics. The relationship between AI and the digital economy is examined in this essay, which also underlines the new roles that libraries are playing, talks about opportunities and problems, and offers ideas for preparing libraries for the digital world of the future.

Keywords: Artificial Intelligence, Digital Economy, Machine Learning and Transformation.

Introduction:

Economic activity fueled by digital technologies, data, and internet-based platforms is referred to as the "digital economy." Through automation, clever decision-making, and creativity, artificial intelligence (AI) has emerged as one of the most significant technologies promoting economic growth. By incorporating AI into information retrieval, digital preservation, research support, and user services, libraries are adjusting to this change. These days, libraries serve as digital knowledge centers that offer access to e-resources, digital repositories, AI-powered search engines, research support, and information literacy initiatives. Because they provide equitable access to digital resources, encourage creativity, support skill development, and bridge the digital divide, libraries are essential to the digital economy. This essay examines

the new roles that libraries are playing in the AI-driven digital economy, discusses opportunities and challenges, and provides solutions for building libraries that are future-ready.

Artificial Intelligence:

A subfield of computer science called artificial intelligence makes it possible for machines to mimic human intelligence. With little assistance from humans, AI systems are able to learn from data, see patterns, solve issues, comprehend language, and make judgments.

Major AI Technology:

- 1. Machine Learning (ML):** A subfield of artificial intelligence called machine learning allows computers to learn from data and perform better without explicit programming. Based on past data,

machine learning algorithms find trends, forecast outcomes, and assist in making decisions.

2. **Deep Learning (DL):** Deep Learning is a subfield of machine learning that processes vast and complicated datasets using multi-layered artificial neural networks. It is quite good at identifying patterns in text, voice, and images.
3. **Computer Vision:** Through computer vision, visual data from photos and videos may be interpreted and analyzed by machines. It uses AI in conjunction with image processing methods to recognize faces, objects, text, and patterns.
4. **Virtual Assistants and Chatbots:** Chatbots and virtual assistants driven by AI communicate with users via voice or text, offering automated support and prompt responses.

Digital Economy:

All economic activity based on digital technology, the internet, data, and communication networks are referred to as the "digital economy." In order to improve productivity, innovation, and economic growth, it incorporates information and communication technology (ICT) into business, government, education, healthcare, finance, and other areas. The following are some of the main elements of the digital economy:

1. **E- Commerce:** Buying and selling products and services using internet platforms is known as e-commerce. It lowers operating expenses, gives customers easier shopping experiences,

and helps firms reach international markets.

2. **Digital Banking:** The provision of banking services via digital channels, including online banking, mobile applications, and automated systems, is referred to as "digital banking." Financial transactions can be completed by clients without going to bank branches.
3. **Big Data Analytics:** In order to produce insightful information for decision-making, big data analytics entails gathering and evaluating enormous volumes of both structured and unstructured data.
4. **E-Governance or Smart Governance:** Digital technologies are used in smart governance to enhance citizen involvement, accountability, transparency, and government services.

Emerging Role of Libraries in The AI Driven Digital Economy:

Libraries have evolved from being traditional book repositories into intelligent hubs for knowledge and innovation due to the quick development of artificial intelligence (AI) and the digital economy. These days, digital education, research, creativity, entrepreneurship, and lifelong learning are all greatly aided by modern libraries. Libraries are boosting user services, increasing operational efficiency, and supporting the country's digital transformation by incorporating AI technologies including machine learning, natural language processing, chatbots, predictive analytics, and big data.

❖ **Intelligent Information Retrieval:**

Libraries can provide quicker, more accurate, and context-aware information retrieval thanks to AI-powered search tools. AI uses natural language processing and semantic search to comprehend user intent, in contrast to conventional keyword-based searches.

❖ **Personalized Information Services:**

To provide tailored recommendations, AI examines individuals' reading preferences, research interests, and borrowing histories.

❖ **AI-Powered Information Retrieval:**

Libraries use AI-based search engines and natural language processing (NLP) to deliver faster and more accurate information retrieval. Intelligent search systems understand user queries, recommend relevant resources, and improve search precision through semantic analysis.

❖ **Cooperation with Academic and Research Establishments:**

Libraries are working more and more with government agencies, businesses, academic institutions, and research organizations.

Benefits of Artificial Intelligence (AI) In Libraries:

Artificial Intelligence (AI) is transforming library operations by boosting access to information, automating repetitive procedures, and improving service quality. Libraries may become sophisticated, user-centered knowledge centers that support research, education, and lifelong learning

thanks to artificial intelligence. The following are the main advantages of AI in libraries.

1. Improved Information Retrieval:

Natural language processing (NLP) and machine learning are used by AI-powered search systems to comprehend user queries and deliver quicker, more precise search results.

Benefits:

- Quicker library resource searches
 - Increased precision of searches
 - Contextual and semantic search
 - Information retrieval in several languages
1. Enhanced Information Retrieval

2. Personalized User Services:

To deliver personalized recommendations, AI examines users' reading habits, borrowing patterns, and research interests.

Benefits:

- Personalized suggestions for books and journals
- Personalized reading lists
- Suggestions for individual research
- An increase in user pleasure

3. Effective Development of Collections:

AI supports the building of evidence-based collections by analyzing user demand and usage information.

Benefits:

- An improved assortment of books and journals
- Finding out which materials are out of date
- Budget allocation that is optimized

- Enhanced relevance of the collection

4. Better Organization of Knowledge: AI uses intelligent classification techniques to automatically arrange information resources.

Benefits:

- Quicker cataloging
- Regular creation of metadata
- Effective management of knowledge
- Enhanced discoverability of resources

5. Encouragement of AI and Digital Literacy: AI is used by libraries to teach patrons digital skills and emerging technology.

Benefits:

- Increased knowledge about AI
- Improved digital literacy
- Assistance with lifelong learning
- Improved employability abilities

Obstacles:

- ❖ High implementation and upkeep expenses
- ❖ Lack of library staff with AI expertise
- ❖ Cyber security and privacy issue
- ❖ Algorithmic prejudice and ethical concerns
- ❖ Complexities of copyright and licensing
- ❖ Opposition to organizational transformation
- ❖ Inequitable access and the digital divide
- ❖ The necessity of ongoing professional development

Recommendations:

- Invest in digital technology and AI infrastructure.
- Give librarian's ongoing AI training.
- Create moral standards for the use of AI.
- Bolster data protection and cyber security protocols.
- Encourage collaborations with academic institutions and IT companies.
- Increase the scope of AI and digital literacy initiatives.
- Promote responsible AI methods, open science, and open access.
- Evaluate AI systems on a regular basis to make sure they are efficient, transparent, and fair.

Conclusion:

Libraries are evolving into intelligent knowledge centers that promote research, innovation, education, and community development in the AI-driven digital economy. Libraries may provide intelligent services, equip users with digital and AI skills, protect cultural heritage, and promote equitable economic growth by appropriately implementing AI technologies. They now play a crucial role in creating a knowledge-based, sustainable digital society.

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India–European Union Strategic Partnership: Assessing the Roadmap to 2025

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Abstract:

The India–European Union (EU) Strategic Partnership has emerged as one of the most significant bilateral relationships in contemporary international relations. Since the establishment of the Strategic Partnership in 2004, India and the European Union have sought to strengthen cooperation across political, economic, security, technological, and environmental domains. The adoption of the India–EU Strategic Partnership: A Roadmap to 2025 during the 15th India–EU Summit in July 2020 provided a comprehensive framework to deepen collaboration in response to evolving geopolitical, economic, and technological challenges. This paper examines the objectives, major pillars, implementation, achievements, challenges, and future prospects of the Roadmap to 2025. It argues that the Roadmap has significantly enhanced India–EU relations through cooperation in trade, climate action, digital transformation, connectivity, and global governance while also identifying challenges that remain in realizing its full potential.

Keywords: *India, European Union, Strategic Partnership, Roadmap 2025, Trade, Climate Change, Digital Cooperation.*

Introduction:

India and the European Union (EU) share democratic values, respect for international law, and a commitment to promoting sustainable economic development. The formal Strategic Partnership between India and the EU was established in 2004 to strengthen bilateral cooperation beyond trade and economic relations. Since then, the partnership has expanded into areas including security, climate change, digital technology, research and innovation, education, and people-to-people exchanges.

Recognizing the changing international environment characterized by geopolitical

competition, climate change, technological transformation, and global health challenges, India and the EU adopted the *India–EU Strategic Partnership: A Roadmap to 2025* during the 15th India–EU Summit held virtually on 15 July 2020.¹ The Roadmap established concrete goals and action plans designed to strengthen bilateral cooperation over a five-year period.

This paper explores the evolution of the partnership, the objectives of the Roadmap, its major areas of cooperation, achievements, challenges, and future prospects.

1. European Commission (2020) introduced the Roadmap during the 15th India–EU Summit.

Historical Background:

India's relationship with the European Economic Community (EEC), the predecessor of the European Union, began in the early 1960s. Diplomatic relations were formally established in 1962, making India one of the first developing countries to establish official ties with the European Community. The relationship expanded significantly after India's economic liberalization in 1991. In 1994, a Cooperation Agreement strengthened bilateral engagement, followed by the establishment of annual India-EU Summits beginning in 2000. The declaration of the Strategic Partnership in 2004 marked a new phase of cooperation, emphasizing political dialogue, economic integration, scientific collaboration, and security cooperation. The Roadmap to 2025 represented another major milestone by providing detailed objectives and measurable actions to guide bilateral relations.

Objectives of the Roadmap to 2025:

The Roadmap identifies several strategic objectives aimed at strengthening bilateral cooperation.

1. The first objective is to enhance political dialogue and reinforce the rules-based international order. India and the EU reaffirm their commitment to democracy, human rights, multilateralism, and international law.
2. The second objective focuses on expanding trade and investment through renewed negotiations for a comprehensive Free Trade Agreement (FTA), investment protection agreement, and geographical indications agreement.
3. Another objective is promoting sustainable development by implementing the Paris Agreement on climate change and supporting renewable energy, clean energy transitions, and environmental protection.
4. The Roadmap also seeks to deepen cooperation in digital technologies, cyber security, artificial intelligence (AI), data governance, and innovation while strengthening connectivity through sustainable infrastructure development.
5. Finally, the Roadmap aims to improve cooperation in education, health, research, and people-to-people exchanges.

Major Areas of Cooperation:**Political and Security Cooperation:**

Political dialogue remains one of the strongest pillars of India-EU relations. Regular ministerial meetings and annual summits facilitate discussions on regional and global issues including the Indo-Pacific, counter-terrorism, maritime security, cyber threats, and United Nations reforms.

Counter-terrorism cooperation has intensified through intelligence sharing, anti-money laundering measures, and efforts to combat terrorist financing. Maritime cooperation has expanded with joint naval interactions and support for freedom of navigation in accordance with international law.

Trade and Economic Cooperation:

The European Union is among India's largest trading partners and a major source of foreign direct investment (FDI). Bilateral trade has grown substantially over the past decade.²

The Roadmap prioritizes:

- Resumption of Free Trade Agreement negotiations.
- Promotion of investment flows.
- Diversification of supply chains.
- Cooperation in manufacturing and services.
- Support for small and medium enterprises (SMEs).

The establishment of resilient supply chains became particularly important following disruptions caused by the COVID-19 pandemic.

Climate Change and Sustainable Development

Climate cooperation occupies a central position in the Roadmap. India and the EU are committed to implementing the Paris Agreement and achieving sustainable development goals.

Major areas include:

- Renewable energy development.
- Green hydrogen technologies.
- Energy efficiency.
- Circular economy initiatives.
- Sustainable urbanization.
- Biodiversity conservation.
- Clean transportation.

The EU has supported India's renewable energy transition through financial assistance and technical cooperation.³

Digital Transformation and Technology:

Rapid technological advancement has made digital cooperation a priority. The Roadmap encourages collaboration in:

- Artificial Intelligence (AI)
- Cybersecurity
- 5G and 6G technologies
- Data protection
- Digital governance
- Semiconductor development
- Quantum technologies

The establishment of the India-EU Trade and Technology Council (TTC) in 2023 further strengthened collaboration in emerging technologies.

Health Cooperation:

The COVID-19 pandemic demonstrated the importance of international cooperation in public health.

The Roadmap encourages:

- Vaccine research
- Pharmaceutical cooperation
- Pandemic preparedness
- Medical research
- Health infrastructure development

India's pharmaceutical industry and the EU's advanced biotechnology sector provide opportunities for mutually beneficial collaboration.

2. Ministry of External Affairs (2023) identifies the European Union as one of India's largest trading partners.

3. Climate cooperation under the Roadmap supports implementation of the Paris Agreement and the UN Sustainable Development Goals.

Priority sectors include:

- Transport infrastructure
- Digital connectivity
- Energy infrastructure
- Smart cities
- Green infrastructure

The partnership also complements India's connectivity initiatives in the Indo-Pacific region.⁴

Achievements of the Roadmap:

Several important achievements have emerged since the adoption of the Roadmap.

- Trade negotiations between India and the EU resumed after several years of suspension. The establishment of the Trade and Technology Council created an institutional framework for cooperation in strategic technologies.
- Cooperation in renewable energy expanded through joint investments in green hydrogen and solar energy. Collaboration in digital governance, cybersecurity, and semiconductor ecosystems also increased significantly.
- Political dialogue became more frequent, particularly concerning Indo-Pacific security, Ukraine, maritime security, and multilateral governance reforms.

Challenges:

Despite considerable progress, several challenges remain.

- Trade negotiations continue to face differences regarding tariffs, agricultural products, intellectual property rights, digital trade, and labor standards.

- Regulatory differences sometimes create obstacles to market access. Geopolitical uncertainties, including regional conflicts and strategic competition among major powers, also influence bilateral cooperation.
- Human rights discussions occasionally produce diplomatic disagreements. Furthermore, implementation of certain connectivity and climate initiatives requires substantial financial resources and policy coordination.

Future Prospects Beyond 2025:

The partnership is expected to expand significantly beyond 2025.

Emerging areas of cooperation between India and European Union includes:

- Green hydrogen
- Artificial intelligence governance
- Critical minerals
- Semiconductor manufacturing
- Supply chain resilience
- Space cooperation
- Quantum computing
- Digital public infrastructure

The successful conclusion of the India-EU Free Trade Agreement could substantially increase bilateral trade and investment while strengthening economic resilience. The partnership is also likely to play an increasingly important role in addressing global challenges such as climate change, food security, energy security, and sustainable development.

4. The Connectivity Partnership promotes sustainable, transparent, and rules-based infrastructure development.

Conclusion:

The *India–EU Strategic Partnership: A Roadmap to 2025* represents one of the most comprehensive frameworks governing relations between India and the European Union. It reflects shared democratic values, common strategic interests, and a mutual commitment to promoting sustainable development, economic growth, technological innovation, and international peace.

The Roadmap has strengthened bilateral cooperation across multiple sectors, including trade, climate action, digital transformation, health, education, connectivity, and security. While challenges remain regarding trade negotiations and regulatory differences, the overall trajectory of India–EU relations remains positive.

As both partners seek to address emerging global challenges, the Strategic Partnership will continue to evolve beyond 2025, contributing to regional stability, global governance, and sustainable economic development.

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Artificial Intelligence and Employment in India: Risks, Opportunities, and Workforce Readiness

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Abstract:

Artificial Intelligence (AI) is changing the way people work and how businesses operate across the world. In India, where millions of people depend on a diverse job market, AI brings both new possibilities and challenges. This study explores how AI is influencing employment by creating new career opportunities while also raising concerns about job displacement due to automation. Sectors like manufacturing, banking, customer service, and data processing may experience changes as machines take over repetitive tasks. At the same time, AI is opening doors to careers in fields such as data science, machine learning, cybersecurity, healthcare technology, and digital services. For India to fully benefit from AI, it is important to focus on education, skill development, and continuous learning. Collaboration between the government, industries, and educational institutions will help prepare workers for the future and ensure that AI supports inclusive employment growth rather than creating greater inequality in the workforce.

Keywords: Artificial Intelligence; Employment; Workforce Readiness; India

Introduction:

Artificial Intelligence (AI) has become one of the most influential technologies shaping the modern economy. Advances in machine learning, automation, robotics, and data analytics have enabled machines to perform tasks that previously required human intelligence. From healthcare and finance to agriculture and manufacturing, AI applications are expanding rapidly and influencing productivity, decision-making, and employment patterns.

India is experiencing a significant transformation due to the growth of digital technologies. With a large young workforce, a strong information technology sector, and increasing digital infrastructure, India has the potential to become a major global hub for AI

innovation. The adoption of AI can improve economic productivity, encourage entrepreneurship, and create new employment opportunities. However, it also raises concerns about job displacement, skill shortages, and inequality among workers.

The relationship between technology and employment has historically been complex. Previous industrial revolutions replaced certain forms of labour while creating new occupations and industries. Similarly, AI is expected to eliminate some routine jobs while generating demand for new skills and professions. The future impact of AI on employment will depend largely on how effectively countries prepare their workforce for technological change.

In India, this issue is particularly important because millions of individuals enter the labor market every year. A large proportion of workers are employed in sectors vulnerable to automation, while many lack access to advanced digital skills. Therefore, workforce readiness has become a critical factor in determining whether AI will increase economic opportunities or deepen existing employment challenges.

This paper explores the risks and opportunities associated with AI-driven employment transformation in India. It also examines the importance of skill development, education, and policy measures required to prepare Indian workers for the future of work.

Evolution of Artificial Intelligence and Employment Trends in India:

India's relationship with artificial intelligence has developed significantly over the past decade. Initially, AI adoption was concentrated mainly within the information technology sector, where companies used automation tools for software development, data management, and business operations. Today, AI applications have expanded into healthcare, education, agriculture, banking, transportation, and public services.

The growth of India's digital economy has accelerated AI adoption. Government initiatives such as Digital India, Skill India, and programs promoting technological innovation have created an environment supporting digital transformation. Indian businesses increasingly use AI to improve efficiency, reduce costs, and provide personalized services.

The employment structure in India is also undergoing transformation. Traditional occupations based on repetitive tasks are becoming more vulnerable to automation, while technology-oriented roles are experiencing increasing demand. For example, jobs involving manual data processing, routine customer service, and repetitive manufacturing activities may decline as AI systems become more capable.

At the same time, new employment opportunities are emerging in areas related to AI development, data analysis, cybersecurity, robotics, cloud computing, and digital management. These changes indicate that AI is not simply reducing employment but restructuring the nature of work.

However, the benefits of AI adoption are not equally distributed. Urban workers with higher education and digital skills are more likely to benefit from emerging opportunities, while rural and low-skilled workers may face greater difficulties adapting to technological changes. Therefore, workforce preparation is essential for ensuring that AI contributes to inclusive economic growth.

Impact of Artificial Intelligence on Indian Employment:

Artificial Intelligence is influencing employment in India through both job displacement and job creation. The overall impact varies depending on industry, occupation type, and worker skills.

➤ Job Displacement Risks

One of the major concerns associated with AI is the automation of routine tasks. Industries that depend heavily on repetitive processes are more likely to experience

employment changes. In manufacturing, AI-powered robots and automated systems can perform assembly, quality inspection, and production monitoring. While this improves efficiency, it may reduce demand for certain low-skilled manufacturing jobs.

The banking and financial sector is also experiencing automation through AI-based chatbots, fraud detection systems, and automated financial services. Routine administrative tasks that previously required large numbers of employees can now be completed using intelligent systems. Similarly, customer service operations are increasingly adopting AI chatbot's capable of handling basic customer queries. This may reduce demand for some entry-level service positions while increasing demand for professionals who manage and improve AI systems.

➤ **Job Creation Opportunities**

Although AI creates concerns about automation, it also generates new employment opportunities. The development and implementation of AI systems require skilled professionals such as:

- Artificial Intelligence engineers
- Data scientists
- Machine learning specialists
- Cybersecurity professionals
- Robotics engineers
- Cloud computing experts
- AI ethics specialists

Beyond technology sectors, AI creates opportunities in healthcare, education, agriculture, and business services. For example, AI-based healthcare solutions require professionals who can combine medical knowledge with technological expertise.

The impact of AI on employment is therefore not simply a matter of jobs disappearing; rather, it represents a transition toward new forms of work requiring different skills and capabilities.

Opportunities Created by Artificial Intelligence in India:

Artificial Intelligence provides significant opportunities for India's economic development and employment generation. Although automation may replace certain routine tasks, AI-driven innovation can create new industries, occupations, and business models.

1. Growth of New Technology-Based Employment:

The expansion of AI has increased demand for specialized professionals in emerging fields. India's technology sector is expected to experience continued growth due to increasing investments in artificial intelligence, cloud computing, data analytics, and automation.

New career opportunities are developing in areas such as:

- Artificial Intelligence and Machine Learning Development
- Data Science and Analytics
- Robotics and Automation
- Cybersecurity
- Cloud Infrastructure Management
- AI System Management
- Digital Product Development

These occupations require advanced technical knowledge, creating opportunities for educated and skilled workers.

2. AI Applications in Healthcare and Education:

Healthcare is one of the sectors where AI can create substantial employment opportunities. AI-based diagnostic systems, medical research platforms, and digital healthcare services require professionals who understand both technology and healthcare processes. Medical data analysts, healthcare technology specialists, and AI-supported medical professionals are expected to become increasingly important.

In education, AI-powered learning platforms can improve access to quality education and create new roles for digital educators, instructional designers, and educational technology specialists. AI can assist teachers by reducing administrative responsibilities and enabling personalized learning experiences.

3. Opportunities for Entrepreneurship and Small Businesses:

AI also provides opportunities for entrepreneurship in India. Start-ups can develop AI-based solutions for agriculture, finance, healthcare, transportation, and retail. Small businesses can use AI tools to improve customer service, marketing, inventory management, and decision-making. The growth of AI-based entrepreneurship can generate employment beyond traditional industries and support India's transition toward a knowledge-based economy.

Risks and Challenges of Artificial Intelligence Adoption:

Despite its potential benefits, AI adoption presents several challenges for India's employment system.

1. Skill Gap and Workforce Inequality:

The most significant challenge is the shortage of workers with relevant digital skills. Many employees, particularly those in traditional sectors, may lack the technical knowledge required to work with AI technologies.

India has a large workforce, but skill development remains uneven. Workers in urban areas often have better access to digital education and training compared to individuals in rural and economically disadvantaged regions. This digital divide may increase employment inequality if appropriate measures are not implemented.

2. Impact on Low-Skilled Employment:

Workers engaged in repetitive and manual occupations face a higher risk of job disruption. Industries such as manufacturing, data processing, and basic administrative services may experience significant changes due to automation. Low-skilled workers may find it difficult to transition into technology-oriented occupations without proper training and support. Therefore, employment policies must focus not only on creating new jobs but also on helping existing workers adapt to technological change.

3. Ethical and Social Concerns:

AI adoption also creates concerns related to privacy, cybersecurity, algorithmic bias, and responsible decision-making. Automated systems used in recruitment, finance, and public services must be carefully monitored to prevent unfair outcomes. Additionally, organizations need ethical guidelines to ensure that AI complements human workers rather than creating unnecessary social and economic inequalities.

4. Workforce Readiness and Skill Development:

The future employment scenario in India will largely depend on workforce readiness. Developing appropriate skills is essential for enabling workers to benefit from AI-driven economic transformation.

5. Importance of Digital Education:

Educational institutions must update their curricula to include emerging technologies such as artificial intelligence, machine learning, data analytics, and cybersecurity. Students should develop both technical knowledge and problem-solving abilities.

AI education should not be limited to computer science students. Professionals from fields such as healthcare, agriculture, management, and social sciences also require basic understanding of AI applications within their sectors.

6. Reskilling and Upskilling of Workers:

Continuous learning has become essential in the AI era. Existing employees need opportunities to acquire new skills and adapt to changing workplace requirements. Government agencies, companies, and educational institutions should collaborate to provide:

- Professional AI training programs
- Online learning platforms
- Industry-based skill development courses
- Vocational training programs
- Digital literacy initiatives

Reskilling programs can help workers transition from declining occupations to emerging employment opportunities.

Role of Government and Industry Collaboration:

Government policies play a crucial role in preparing India's workforce for AI adoption. Initiatives such as Skill India, Digital India, and AI-focused education programs provide a foundation for developing digital capabilities. However, successful workforce transformation requires stronger cooperation between government institutions, universities, technology companies, and industry organizations. Employers should actively participate in designing training programs that match future labour market requirements.

Policy Recommendations:

To maximize the benefits of AI while reducing employment risks, India should focus on the following policy measures:

1. Strengthening Digital Education

Educational institutions should integrate AI, coding, data analysis, and digital skills into academic and vocational programs.

2. Expanding Reskilling Programs

Large-scale training initiatives should be developed for workers affected by automation, particularly in manufacturing, services, and informal employment sectors.

3. Promoting Inclusive AI Adoption

AI development should consider the needs of rural communities, small businesses, and disadvantaged groups to ensure equal access to opportunities.

4. Encouraging Industry-Academia Collaboration

Universities and industries should work together to develop practical training

programs aligned with employment requirements.

5. Developing Ethical AI Regulations

India should establish responsible AI frameworks addressing data protection, transparency, fairness, and accountability.

Conclusion:

Artificial Intelligence represents both a challenge and an opportunity for India's employment future. While AI-driven automation may reduce certain routine jobs, it also has the potential to generate new employment opportunities, increase productivity, and support economic growth.

The impact of AI will depend largely on India's ability to prepare its workforce. A skilled, adaptable, and digitally capable workforce will be better positioned to benefit from technological transformation. Education reform, reskilling initiatives, and inclusive policies are essential to ensure that AI becomes a tool for employment growth rather than a source of inequality.

India's future employment landscape will not be determined by whether machines replace humans, but by how effectively humans and intelligent technologies can work together. By investing in human capital and responsible AI adoption, India can transform technological change into a pathway for sustainable economic development.

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The Impact of Artificial Intelligence on Employment and Labour Market

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Abstract:

Artificial intelligence (AI) is revolutionizing the world economy by increasing productivity, generating new jobs, and automating repetitive labor. Manufacturing, healthcare, education, finance, agriculture, transportation, and public administration are all using AI more and more. AI increases productivity and creativity, but it also raises questions about workforce reorganization, shifting skill needs, job displacement, and income inequality. This essay looks at how AI affects employment and labor markets, both positively and negatively, and offers policy solutions to guarantee inclusive and long-term labor market growth.

Keywords: *Artificial Intelligence, Employment, Labour Market, Digital Economy & Skill Development.*

Introduction:

Artificial intelligence is the ability of computer systems to carry out tasks like learning, reasoning, problem-solving, speech recognition, and decision-making that often need human intelligence. The nature of employment has been profoundly altered by recent advancements in machine learning, robotics, natural language processing, and generative AI. AI is now a crucial part of the digital economy and Industry 4.0. Businesses and governments are spending more money on AI technologies in an effort to boost competitiveness and efficiency. But AI also raises questions about labor market dynamics and job security.

2. To examine how AI affects the structure of the labor market.
3. To determine which industries are most impacted by AI.
4. To investigate prospects brought about by AI.
5. To recommend legislative actions for workforce adaption

Need of The Study:

Global labor demand has shifted due to the quick uptake of AI technologies. Continuous skill improvement is necessary for workers to stay employable. To create suitable employment policies, policymakers must comprehend how AI affects the labor market.

Objectives of The Study:

1. To investigate how employment is affected by artificial intelligence.

Research Methodology:

For purpose of the present study the researcher have been selected secondary

source as the method of collecting data. Secondary sources were collected by using published census reports, books, research papers, articles and websites.

Positive and Negative Effects of Artificial Intelligence (AI) on Employment:

By altering how businesses function, how workers complete tasks, and the kinds of skills needed in the job market, artificial intelligence (AI) is revolutionizing the workplace. AI has several advantages, like higher productivity and the development of jobs in developing industries, but it also has drawbacks, such as skill shortages and job displacement.

Positive Impact of AI on Employment:

1. Creation of New Job Opportunities: Ten years ago, there was no such demand for new vocations due to artificial intelligence. AI engineers, machine learning experts, data scientists, robotics engineers, prompt engineers, cybersecurity specialists, cloud computing experts, and AI ethical advisors are among them. Organizations need qualified personnel to design, install, manage, and enhance AI systems as the use of AI grows.

2. Increased Productivity and Efficiency: AI frees up workers to concentrate on strategic, creative, and decision-making work by automating time-consuming and repetitive chores. This raises organizational performance, lowers operating expenses, and increases productivity.

3. Improved Workplace: AI-powered robots reduce workplace accidents and shield workers from hazardous conditions by performing hazardous tasks in the mining,

construction, chemical, and disaster management industries.

4. Higher Demand for Skill Workers:

Employers are looking for workers with experience in digital technologies; cloud computing, AI development, data analytics, and programming. This promotes lifelong learning and professional growth.

5. Innovation and Entrepreneurship:

AI makes it possible for business owners and startups to create cutting-edge goods and services that boost jobs and the economy.

Negative Impact of AI on Employment:

1. Job Displacement Due to Automation:

Workers doing predictable, repetitive, and routine tasks are replaced by AI. Workers in customer service, manufacturing, and clerical positions are more likely to lose their jobs.

- Low-skilled workers have a higher unemployment rate.
- A decrease in the need for regular jobs.
- A rise in the financial instability of displaced workers.

2. Skill Gap: Workers must constantly improve their abilities due to the rapid growth of technology. Employment may be difficult for those without technological and digital skills.

- Structural unemployment owing to skill mismatch.
- Greater demand for continual learning and reskilling.
- Older and less-educated workers are often more vulnerable.

3. Income Inequality: AI tends to favor highly trained professionals while diminishing opportunities for low-skilled labor. This deepens income inequality.

- Higher wages for AI specialists and technology professionals.

- Lower wages or unemployment for routine workers.
- Increasing wealth concentration among technology firms and skilled workers.

4. Reduction in Human Interaction: In many industries, direct human communication is replaced by AI-based solutions.

- Less communication between people.
- In difficult circumstances, consumer satisfaction is lower.
- Relationship-based service jobs are declining.

5. Digital Divide: Not all workers have equal access to digital infrastructure, training, or technology.

- Rural and economically disadvantaged populations may be left behind.
- Unequal access to employment opportunities.
- Regional disparities in labour market outcomes.

Impact on Different Sectors:

Sl. No.	Sectors	Impact of AI
1.	Manufacturing	Industrial Robots Increase Productivity but Reduce Routine Jobs
2.	Banking	AI Chatbots and Fraud Detection Reduce Manual Work.
3.	Healthcare	AI Supports Diagnosis, Surgery and Patient Monitoring.
4.	Agriculture	Precision Farming and Smart Irrigation Improve Productivity.

5.	Education	Personalized Learning and AI Tutors Enhance Education
6.	Retail	Automated Billing, Inventory Management and Recommendation Systems.
7.	Transport	Autonomous Vehicles and Route Optimization
8.	Government	Smart Government and Digital Public Service.

Changes in The Labor Market:

AI is altering the labor market through:

- The need for digital skills is growing.
- Decreasing the need for repetitious work.
- Promoting working remotely.
- Increasing gig and freelance work.
- Establishing human-AI hybrid roles.
- The need for lifelong learning is growing.

Challenges:

- Growing unemployment in low-skilled jobs.
- The necessity of ongoing re skilling.
- The digital divide.
- High implementation expenses.
- Risks to cyber security.
- Legal and ethical issues.
- Inequitable access to AI technology.

Policy Recommendations:

- Encourage digital literacy and AI education.
- Invest in programs for skill development and employment.

- Promote re skilling and lifelong learning.
- Bolster labor laws.
- Encourage entrepreneurship and innovation.
- Create frameworks for ethical AI governance.
- Promote public-private collaborations for the transition of the workforce.
- Boost social security benefits for workers who are displaced.
- Make an investment in digital infrastructure.
- Encourage the adoption of AI across all sectors.

Conclusion:

By automating repetitive work, increasing efficiency, and generating new career options, artificial intelligence is transforming employment and labor markets. Although AI has the potential to replace some occupations, it also creates a need for highly qualified personnel and fosters innovation in a variety of sectors. The overall effect relies on how firms, governments, educational institutions, and employees react by making investments in re skilling, education, ethical AI governance, and inclusive labor market laws. A balanced strategy that integrates the development of human capital with technology advances will guarantee that AI

supports both respectable jobs and sustainable economic growth.

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The Digital Economy and its impact on Economic Development in India

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"Data is the new oil, and the digital economy is the engine of twenty-first-century growth"

- Clive Humby's

Abstract:

The rapid expansion of digital technologies has significantly transformed the structure and functioning of modern economies. In India, the emergence of the digital economy has played a crucial role in accelerating economic growth, enhancing productivity, and promoting inclusive development. This paper examines the concept of the digital economy and analyses its impact on economic growth and development in India. It highlights the contribution of digitalization through sectors such as digital payments, e-commerce, financial technology, information and communication technology (ICT), and digital platforms. Using secondary data sourced from government reports, Reserve Bank of India publications, and other official statistical sources, the study evaluates the growing share of the digital economy in India's Gross Domestic Product (GDP), employment generation, and financial inclusion. The findings indicate that the digital economy has become one of the fastest-growing segments of the Indian economy, contributing significantly to GDP growth, improving access to financial services, and supporting the expansion of MSMEs. However, challenges such as the digital divide, infrastructure gaps, and digital literacy remain significant constraints. The paper concludes that while the digital economy has immense potential to drive sustainable and inclusive growth in India, effective policy interventions are necessary to address existing challenges and ensure equitable digital development.

Keywords: Digital Economy, Economic Growth, Digital India, Financial Inclusion, Digital Payments, Economic Development, ICT, India.

Introduction:

Economics in the digital domain refers to the study of how digital technologies influence economic activities such as production, distribution, consumption, employment, and growth. It examines the economic implications of digital tools, platforms, and infrastructures including the internet, mobile technologies, digital payments, data analytics, artificial intelligence, and online platforms on markets and

economic systems. In this domain, data and digital networks act as key economic resources, transforming traditional economic models into technology-driven and knowledge-based systems.

The digital revolution has emerged as one of the most significant forces shaping contemporary economies across the world. Rapid advancements in information and communication technologies (ICT), widespread internet connectivity, mobile

penetration, digital platforms, and data-driven services have given rise to a new economic system commonly referred to as the digital economy. The digital economy encompasses economic activities enabled by digital technologies such as e-commerce, digital payments, fintech, cloud computing, artificial intelligence, and platform-based services.

In India, the digital economy has gained substantial momentum over the past decade, particularly with the launch of flagship initiatives such as Digital India, Aadhaar, Unified Payments Interface (UPI), and the expansion of broadband and mobile networks. These initiatives have transformed traditional economic activities by improving efficiency, reducing transaction costs, expanding market access, and enhancing transparency. The digital economy has also played a crucial role in fostering financial inclusion, supporting MSMEs, and generating new employment opportunities. With its rapidly growing population, expanding internet user base, and increasing adoption of digital technologies, India has emerged as one of the fastest-growing digital economies in the world. The contribution of the digital economy to India's Gross Domestic Product (GDP) has increased significantly, making it an important driver of economic growth and development. However, despite its potential benefits, challenges such as the digital divide, inadequate infrastructure, cyber security risks, and low digital literacy continue to limit its inclusive impact. In this context, the present paper seeks to analyze the growth of the digital economy in India and examine its impact on economic growth and overall development.

Literature Review:

The concept of the digital economy has gained considerable attention due to its transformative impact on economic systems. Early studies emphasized the role of information and communication technology (ICT) in enhancing productivity, reducing transaction costs, and improving market efficiency. Tapscott (1996) defined the digital economy as one driven by digital technologies that fundamentally reshape business models and economic interactions.

International literature highlights a strong link between digitalisation and economic growth. The World Bank (2016) noted that digital technologies promote growth by improving efficiency, expanding markets, and fostering innovation. Countries with higher levels of digital adoption tend to experience faster growth and better service delivery. Similarly, OECD studies have found that digital transformation enhances productivity and competitiveness across sectors. In the Indian context, research increasingly focuses on digital initiatives as key drivers of economic development. The Economic Survey of India (various years) identifies digitalisation—particularly through digital payments, e-commerce, and e-governance—as a major contributor to growth. Studies by the Reserve Bank of India (RBI) highlight that digital payment systems such as the Unified Payments Interface (UPI) have strengthened financial inclusion, reduced transaction costs, and supported overall economic activity.

ICRIER (2023) analysed the size and scope of India's digital economy and found that it contributes significantly to GDP and

employment, with productivity levels higher than traditional sectors. NITI Aayog reports further emphasise the role of digital platforms in empowering MSMEs by improving access to markets, finance, and supply chains. The literature also examines the social dimensions of the digital economy. Studies suggest that digital technologies enhance access to education, healthcare, and government services, promoting inclusive development. However, research by TRAI and other institutions points to challenges such as the digital divide, low digital literacy, and inadequate infrastructure, especially in rural areas. Overall, existing studies indicate that the digital economy has a positive impact on India's economic growth and development, while highlighting the need for inclusive policies to address emerging challenges.

Objectives of the Study:

The present study is undertaken with the following objectives:

1. To analyse the role of the digital economy in promoting economic growth in India.
2. To suggest policy measures for strengthening digital-led inclusive and sustainable economic development.

Research Methodology:

The study is based on secondary data collected from reliable and authentic sources. The required data have been gathered from government publications, reports of the Reserve Bank of India (RBI), Ministry of Electronics and Information Technology (MeitY), Digital India reports, Economic Survey of India, NITI Aayog publications,

World Bank reports, and research articles published in national and international journals. In addition, data from reputed newspapers, magazines, and official websites have been used wherever necessary. The collected data have been analysed using descriptive and analytical methods to understand the role and impact of the digital economy on economic growth and development in India.

Importance of Economics in the Digital Domain:

The digital domain has become central to modern economic analysis due to its growing influence on national and global economies.

1. Driver of Economic Growth: Digitalisation increases productivity, efficiency, and innovation, leading to higher economic growth.

2. Transformation of Markets: Digital platforms reduce transaction costs, improve price transparency, and enable direct interaction between producers and consumers.

3. Promotion of Financial Inclusion: Digital payments and fintech services bring banking and financial services to previously excluded populations.

4. Employment and New Forms of Work: The digital economy creates new jobs in IT services, e-commerce, platform-based services, and the gig economy.

5. Support to MSMEs and Entrepreneurship: Digital tools help small businesses access wider markets, reduce operational costs, and improve competitiveness.

The digital domain plays a vital role in economic development by improving productivity, efficiency, and market access across sectors. Digital technologies reduce transaction costs, promote innovation, and support entrepreneurship, especially for small and medium enterprises. They enhance financial inclusion through digital payments and fintech services, while e-governance improves transparency and efficiency in public service delivery. The digital domain also supports human capital development through online education and digital health services. Overall, it accelerates inclusive growth, employment generation, and strengthens long-term economic sustainability.

The following tables are shows the impact of digital economy on India economic development

Table 1: Contribution of the Digital Economy to India's GDP

Year	Contribution to GDP (%)
2014–15	4.5*
2018–19	7.7*
2020–21	8.5*
2022–23	11.7
2023–24	12.0 (Estimated)
2029–30	20.0 (Projected)

Note: Figures for 2014–15, 2018–19, and 2020–21 are compiled from various government reports and industry estimates. The 2022–23 estimate and the 2029–30 projection are based on the State of India's Digital Economy Report (ICRIER, 2024).

Source: Indian Council for Research on International Economic Relations (ICRIER), *State of India's Digital Economy Report 2024*; Ministry of Electronics and Information Technology (MeitY); Reserve Bank of India (RBI); Economic Survey of India.

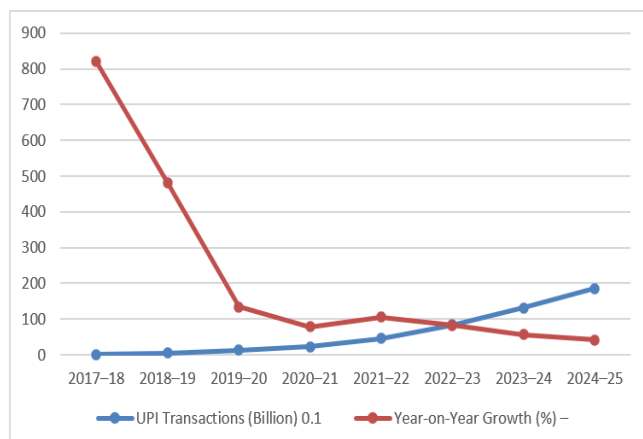
Table 1 shows a steady increase in the contribution of the digital economy to India's GDP over the years. Its share increased from 4.5% in 2014–15 to 7.7% in 2018–19 and 8.5% in 2020–21, reflecting the rapid expansion of digital technologies and government initiatives such as Digital India. The contribution further rose to 11.7% in 2022–23 and is estimated at 12.0% in 2023–24, highlighting the growing importance of digital payments, e-commerce, fintech, and digital public infrastructure. It is projected to reach 20.0% by 2029–30, indicating that the digital economy will continue to play a significant role in promoting India's economic growth, innovation, employment, and productivity.

Table 2: Growth of UPI & Digital Payment Transactions in India

Financial Year	UPI Transactions (Billion)	Year-on-Year Growth (%)
2016–17	0.10	–
2017–18	0.92	820.0
2018–19	5.35	481.5
2019–20	12.52	133.8
2020–21	22.33	78.3
2021–22	45.97	105.9
2022–23	83.76	82.2
2023–24	131.16	56.6
2024–25	185.84	41.7

Source: National Payments Corporation of India (NPCI), *UPI Product Statistics*; Reserve Bank of India (RBI), *Annual Report 2024–25*.

Growth of UPI & Digital Payment Transactions in India



Source: Table 2 Growth of UPI & Digital Payment Transactions in India

This highlights the rapid growth of UPI transactions in India from 0.10 billion in 2016–17 to 185.84 billion in 2024–25, highlighting the widespread adoption of digital payments. The highest year-on-year growth (820.0%) was recorded in 2017–18, followed by 481.5% in 2018–19, reflecting the initial expansion of the UPI platform. Although the annual growth rate gradually declined in later years, the total number of transactions continued to increase steadily, reaching 185.84 billion in 2024–25. This indicates the growing acceptance and maturity of India's digital payment ecosystem, supported by government initiatives, smartphone penetration, and improved digital infrastructure.

Employment in India's Digital Economy:

From the source of RBI, ICRIER Reports, Government of India, the India's digital economy has generated around 14–15 million jobs, reflecting its growing importance as a source of employment. Although it

currently accounts for about 2.5% of the total workforce, its impact is significant due to high value creation. Productivity in digital sectors is nearly 4–5 times higher than in non-digital sectors, indicating greater efficiency and skill intensity. Employment is concentrated in areas such as IT-ITeS, FinTech, e-commerce, and digital platforms. Overall, the digital economy is emerging as a high-productivity, employment-generating segment of India's workforce.

Policy Recommendations:

Based on the analysis of the digital economy and its impact on economic growth and development in India, the following policy recommendations are suggested:

- 1. Strengthening Digital Infrastructure:** The government should continue to invest in robust digital infrastructure, especially in rural and remote areas. Expansion of broadband connectivity, 5G networks, and reliable power supply is essential to ensure inclusive digital growth.
- 2. Bridging the Digital Divide:** Special policy focus is required to reduce the digital gap between urban and rural areas and across socio-economic groups. Affordable internet access and digital devices should be promoted through subsidies and public-private partnerships.
- 3. Enhancing Digital Literacy and Skills:** Digital literacy programs must be strengthened at school, college, and community levels. Skill development initiatives should focus on emerging technologies such as artificial intelligence, data analytics, and cyber security to prepare the workforce for the digital economy.

4. Support for MSMEs and Start-ups:

Targeted support should be provided to MSMEs to adopt digital technologies. Easy access to digital finance, training in e-commerce, and simplified digital compliance systems can improve productivity and competitiveness.

5. Strengthening Cyber security and Data Protection:

With the rapid growth of digital activities, strong data protection laws and cyber security frameworks are essential. Ensuring privacy, secure digital transactions, and trust in digital systems will encourage wider adoption.

6. Inclusive Digital Governance: Digital governance initiatives should focus on transparency, accountability, and citizen-centric service delivery. Integration of digital platforms with social welfare schemes can enhance efficiency and reduce leakages.

Conclusion:

The digital economy has emerged as a powerful driver of economic growth and development in India. Rapid advancements in digital technologies, increased internet penetration, and the widespread adoption of digital platforms have transformed traditional economic activities and contributed significantly to GDP growth, financial inclusion, and employment generation. Initiatives such as Digital India, UPI, and e-governance have strengthened the foundations of India's digital transformation. The study highlights that the digital economy not only enhances productivity and efficiency but also promotes inclusive development by integrating MSMEs, rural populations, and marginalized groups into the formal economic

system. However, challenges such as the digital divide, inadequate infrastructure, low digital literacy, and cyber security concerns continue to limit the full potential of the digital domain.

In conclusion, while the digital economy holds immense promise for accelerating India's economic growth and development, sustained policy efforts, institutional support, and inclusive strategies are essential to ensure that the benefits of digitalisation are equitably distributed. A balanced and inclusive digital policy framework will enable India to harness the digital economy as a key pillar of sustainable and long-term economic development.

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Artificial Intelligence and the Future Economy: Opportunities, Challenges, and the Path Forward

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Abstract:

Artificial Intelligence (AI) has rapidly evolved from a niche area of computer science into one of the most influential technologies shaping the global economy. Its applications now extend across industries such as healthcare, finance, education, agriculture, manufacturing, transportation, and retail. AI-driven automation, predictive analytics, and intelligent decision-making are transforming traditional business models while creating new opportunities for innovation and economic growth. However, these advancements also raise concerns regarding employment, inequality, privacy, cybersecurity, and ethical governance. This research article examines the relationship between artificial intelligence and the future economy by exploring its economic benefits, potential risks, and long-term implications. It also discusses how governments, businesses, and educational institutions can prepare for an AI-powered future. The study concludes that while AI has the potential to significantly enhance productivity and improve living standards, its successful integration into the economy requires responsible regulation, investment in human capital, and inclusive policies that ensure technological progress benefits society as a whole.

Keywords: Artificial Intelligence, Future Economy, Automation, Employment, Economic Growth, Digital Transformation, Innovation.

Introduction:

Artificial Intelligence has become one of the defining technologies of the twenty-first century. Once limited to academic research and experimental computing, AI now powers everyday applications such as virtual assistants, recommendation systems, autonomous vehicles, fraud detection, and medical diagnostics. The rapid increase in computing power, availability of big data, and advances in machine learning have accelerated AI adoption across the world.

Economies have historically evolved through technological revolutions. The

Industrial Revolution mechanized production, the Information Age digitized communication, and the AI revolution is now reshaping decision-making and productivity. Unlike previous technologies that primarily automated physical tasks, AI increasingly performs cognitive functions traditionally associated with human intelligence. This shift has profound implications for employment, business competitiveness, and economic development.

As governments and industries invest billions of dollars in AI research and development, understanding its influence on

the future economy has become increasingly important. This paper explores how AI contributes to economic growth while examining the challenges that accompany widespread adoption.

Research Objectives:

The primary objectives of this research are:

1. To understand the role of Artificial Intelligence in the future economy.
2. To examine the economic benefits of AI across various industries.
3. To identify the challenges associated with AI-driven economic transformation.
4. To analyze AI's impact on employment and workforce development.
5. To suggest policy recommendations for sustainable and inclusive AI adoption.

Research Methodology:

This study follows a **descriptive and analytical research approach** based entirely on secondary data. Information has been collected from published research papers, government reports, books, industry publications, and international organizations. The collected information has been critically analyzed to understand current trends and future economic implications of Artificial Intelligence.

Artificial Intelligence: An Overview:

Artificial Intelligence refers to computer systems capable of performing tasks that typically require human intelligence, including learning, reasoning, problem-solving, language understanding, and decision-making.

Major branches of AI include:

- Machine Learning
- Deep Learning
- Natural Language Processing (NLP)
- Computer Vision
- Robotics
- Expert Systems

Modern AI systems continuously improve by learning from large datasets rather than relying solely on predefined programming instructions.

AI as a Driver of Economic Growth:

Artificial Intelligence contributes to economic growth in several significant ways.

1. Increased Productivity:

AI automates repetitive tasks, allowing organizations to complete work faster with fewer errors. Businesses can allocate employees to more creative and strategic responsibilities, improving overall productivity.

2. Innovation:

AI encourages innovation by enabling companies to develop smarter products and personalized services. Industries such as healthcare, finance, and manufacturing are increasingly relying on AI-driven innovation to remain competitive.

3. Cost Reduction:

Automation reduces labor costs, minimizes operational errors, and improves supply chain management. Predictive maintenance in manufacturing also reduces equipment downtime.

4. Better Decision-Making:

AI analyzes enormous volumes of data within seconds, providing organizations with insights that support informed business decisions.

Table 1: Economic Benefits of Artificial Intelligence

Economic Area	AI Contribution	Expected Outcome
Manufacturing	Automation and predictive maintenance	Higher productivity
Healthcare	Disease diagnosis and medical imaging	Better patient outcomes
Finance	Fraud detection and risk analysis	Improved financial security
Agriculture	Precision farming	Increased crop yield
Retail	Personalized recommendations	Higher customer satisfaction
Transportation	Route optimization	Lower operational costs

AI Across Different Economic Sectors:**1. Healthcare:**

Artificial Intelligence assists doctors by detecting diseases, analyzing medical images, predicting patient risks, and supporting personalized treatment plans. Hospitals increasingly use AI to improve operational efficiency and patient care.

2. Manufacturing:

Smart factories integrate AI with robotics to automate production, improve quality control, and reduce maintenance costs.

3. Agriculture:

Farmers use AI-powered sensors, drones, and weather prediction systems to optimize irrigation, fertilizer application, and pest management.

4. Banking and Finance:

Financial institutions use AI for fraud detection, algorithmic trading, credit assessment, customer service chatbots, and cybersecurity.

5. Education:

Educational platforms use AI to personalize learning experiences, automate grading, and identify students who require additional academic support.

Artificial Intelligence and Employment:

The relationship between AI and employment remains one of the most debated topics in economics.

While AI automates repetitive tasks, it also creates entirely new occupations requiring advanced technical and analytical skills.

Jobs Most Vulnerable to Automation:

- Data entry
- Basic bookkeeping
- Routine manufacturing
- Telemarketing
- Repetitive administrative work

Emerging AI-Related Jobs:

- AI Engineers
- Machine Learning Specialists
- Data Scientists
- AI Ethics Consultants
- Robotics Engineers
- Cybersecurity Analysts

Rather than eliminating all jobs, AI is expected to transform job roles by emphasizing creativity, critical thinking, communication, and problem-solving.

Table 2: AI Impact on Employment

Positive Effects	Negative Effects
Creation of high-skilled jobs	Automation of routine jobs
Increased workplace efficiency	Short-term unemployment
Higher productivity	Need for continuous reskilling
Better workplace safety	Growing income inequality
New entrepreneurial opportunities	Digital divide

Challenges of AI in the Future Economy:

Despite its enormous potential, AI presents several challenges.

1. Job Displacement:

Automation may reduce demand for low-skilled labor, requiring governments to invest in workforce retraining.

2. Ethical Concerns:

Bias in AI algorithms may produce unfair outcomes in hiring, healthcare, and criminal justice.

3. Privacy Issues:

AI relies heavily on personal data, increasing concerns regarding surveillance and data misuse.

4. Cyber security Risks:

AI technologies can both strengthen and threaten cybersecurity. Sophisticated cyberattacks increasingly employ AI-based techniques.

5. Income Inequality:

Economic gains from AI may concentrate among large technology companies and highly skilled workers unless inclusive policies are implemented.

Government Policies and Regulation:

Governments play a critical role in ensuring responsible AI adoption.

Key policy priorities include:

- Developing ethical AI guidelines.
- Protecting consumer privacy.
- Promoting transparent AI systems.
- Encouraging research and innovation.
- Supporting workforce reskilling.
- Investing in digital infrastructure.
- Encouraging collaboration between academia and industry.

Balanced regulation can promote innovation while minimizing social and economic risks.

AI and Small Businesses:

Artificial Intelligence is no longer limited to multinational corporations. Small and medium-sized enterprises (SMEs) increasingly use affordable AI tools for:

- Customer relationship management
- Digital marketing
- Inventory management
- Financial forecasting
- Customer support chatbots

Cloud computing has significantly reduced the cost of AI adoption, allowing startups to compete with larger organizations.

The Future Economic Landscape:

Over the next two decades, AI is expected to reshape nearly every sector of the economy.

Future trends include:

- Intelligent automation across industries.
- Growth of digital entrepreneurship.

- Expansion of autonomous transportation.
- Personalized healthcare.
- AI-powered financial services.
- Smart cities and infrastructure.
- Human-AI collaboration in workplaces.

Rather than replacing humans entirely, AI will increasingly function as an intelligent assistant that enhances human productivity.

Organizations that invest in employee training and digital transformation are likely to gain significant competitive advantages.

Table 3: Opportunities and Challenges of AI

Opportunities	Challenges
Increased innovation	Job displacement
Economic growth	Ethical concerns
Better healthcare	Privacy risks
Higher productivity	Cybersecurity threats
Improved education	Digital inequality
Smarter public services	Regulatory complexity

Recommendations:

To maximize AI's economic benefits, the following measures are recommended:

1. Governments should establish comprehensive AI governance frameworks.
2. Educational institutions should integrate AI literacy into curricula.
3. Businesses should prioritize employee reskilling and lifelong learning.
4. AI developers should ensure transparency, fairness, and accountability in algorithm design.
5. Public-private partnerships should promote AI innovation while protecting societal interests.

6. Investments in digital infrastructure should be expanded, particularly in developing economies.
7. Ethical standards should guide AI deployment to ensure public trust.

Conclusion:

Artificial Intelligence represents one of the most transformative forces shaping the future global economy. Its ability to improve productivity, accelerate innovation, reduce operational costs, and support informed decision-making offers enormous opportunities for sustainable economic development. At the same time, AI introduces complex challenges related to employment, ethics, privacy, cybersecurity, and inequality.

The future economy will not simply be driven by machines replacing humans but by effective collaboration between human intelligence and artificial intelligence. Countries that invest in education, digital infrastructure, responsible governance, and workforce development will be better positioned to harness AI's full economic potential.

Ultimately, the success of AI in the future economy depends not only on technological advancement but also on the collective ability of governments, businesses, educators, and society to ensure that innovation remains inclusive, ethical, and beneficial for all.

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Artificial Intelligence and the Future of Entrepreneurship in India: An Economic Perspective

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Abstract:

Artificial Intelligence (AI) has emerged as a transformative technology that is reshaping business models, enhancing productivity, and driving entrepreneurial innovation across the globe. In India, AI is playing a crucial role in strengthening the startup ecosystem, improving the competitiveness of Micro, Small and Medium Enterprises (MSMEs), and accelerating digital economic growth. AI-powered technologies such as machine learning, natural language processing, predictive analytics, and computer vision enable entrepreneurs to automate business processes, optimize resource utilization, improve customer experience, and make data-driven decisions. Government initiatives such as the IndiaAI Mission, Startup India, Digital India, and the Atal Innovation Mission have further encouraged AI adoption by supporting innovation, digital infrastructure, and entrepreneurial development. Despite these opportunities, challenges such as high implementation costs, shortage of skilled professionals, cybersecurity risks, data privacy concerns, and ethical issues continue to limit widespread AI adoption. This study examines the role of Artificial Intelligence in shaping the future of entrepreneurship in India from an economic perspective. Using secondary data from books, peer-reviewed journals, government reports, and publications of international organizations, the study analyses the opportunities, challenges, and policy implications of AI-driven entrepreneurship. The study concludes that AI can significantly enhance productivity, innovation, and competitiveness while contributing to sustainable economic growth. However, achieving these benefits requires supportive public policies, investment in digital infrastructure, AI skill development, ethical governance, and stronger collaboration among government, academia, industry, and entrepreneurs.

Keywords: *Artificial Intelligence, Entrepreneurship, Innovation, Startups, MSMEs, Digital Economy, Economic Growth.*

Introduction:

Entrepreneurship is widely regarded as a major engine of economic growth, employment generation, innovation, and social transformation. Entrepreneurs contribute to economic development by introducing new products, improving production methods, creating employment opportunities, and responding to changing market demands. In recent years, rapid technological advancement

has transformed the entrepreneurial landscape, with Artificial Intelligence (AI) emerging as one of the most influential technologies of the digital era.

Artificial Intelligence refers to the ability of computer systems to perform tasks that normally require human intelligence, including learning, reasoning, language processing, problem-solving, and decision-making. AI technologies such as machine

learning, natural language processing, robotics, and predictive analytics have become essential tools for entrepreneurs seeking to improve productivity, reduce costs, and enhance customer satisfaction. These technologies help businesses analyse consumer behaviour, automate routine operations, optimize supply chains, detect fraud, and forecast market trends.

India has emerged as one of the world's leading startup ecosystems due to rapid digitalization, expanding internet connectivity, affordable smartphones, digital payment systems, and supportive government policies. AI-driven startups are increasingly contributing to sectors such as healthcare, agriculture, financial services, education, manufacturing, logistics, and retail. The Government of India has also recognized AI as a strategic technology for national development through initiatives such as **Digital India, Startup India, Skill India**, and the **India AI Mission**. These programmes encourage innovation, research, startup incubation, digital infrastructure, and entrepreneurship.

The growing integration of AI into business activities has created new economic opportunities while also raising concerns regarding employment, ethics, data security, and digital inequality. Therefore, understanding the economic implications of AI for entrepreneurship is essential for designing policies that promote sustainable and inclusive development.

Review of Literature:

Artificial Intelligence (AI) has attracted considerable attention among researchers

because of its growing influence on entrepreneurship, innovation, and economic development. Early theories of entrepreneurship emphasized innovation as the foundation of economic progress, while recent studies identify AI as a key technology that enables entrepreneurs to improve productivity, competitiveness, and decision-making.

Schumpeter (1934) argued that innovation is the driving force of entrepreneurship and economic development. His theory of "creative destruction" explains how new technologies replace traditional business practices and create new market opportunities. AI represents one of the most significant technological innovations of the digital era, enabling entrepreneurs to introduce innovative products, services, and business models.

Brynjolfsson and McAfee (2014) observed that digital technologies, including AI, are transforming industries by increasing productivity, reducing costs, and enhancing organizational efficiency. Their study suggests that firms adopting AI gain a competitive advantage through automation and data-driven decision-making.

According to **Agrawal, Gans, and Goldfarb (2018)**, AI reduces the cost of prediction and improves business decisions by analysing large datasets quickly and accurately. Entrepreneurs can use AI to understand consumer preferences, forecast market demand, optimize pricing strategies, and improve resource allocation.

The **National Strategy for Artificial Intelligence (NITI Aayog, 2018)** identified AI as a strategic technology capable of

transforming sectors such as healthcare, agriculture, education, manufacturing, and financial services. The report recommended investment in AI research, digital infrastructure, and skill development to strengthen India's innovation ecosystem.

The **OECD Digital Economy Outlook (2023)** highlighted AI as an important contributor to productivity growth and economic competitiveness while emphasizing the need for responsible AI governance, transparency, and ethical implementation. Similarly, the **World Economic Forum (2025)** emphasized that AI will reshape labour markets by creating demand for advanced digital skills and encouraging innovation-led entrepreneurship.

Overall, the literature suggests that AI has become an important catalyst for entrepreneurial growth. However, there is a continuing need to examine its economic implications within the Indian context.

Research Gap:

Although several studies have analysed AI from technological and managerial perspectives, limited research has focused on its economic impact on entrepreneurship in India. Existing studies often examine individual sectors such as banking or healthcare without providing a comprehensive analysis of AI's influence on startups, MSMEs, employment, innovation, and economic growth. Moreover, recent government initiatives such as the India AI Mission require further academic evaluation. This study addresses these gaps by examining AI-driven entrepreneurship from an economic perspective.

Statement of the Problem:

Artificial Intelligence has created new opportunities for entrepreneurs by improving productivity, innovation, and business competitiveness. However, many Indian startups and MSMEs face challenges such as limited digital infrastructure, shortage of skilled professionals, financial constraints, cybersecurity threats, and ethical concerns. These barriers reduce the effective adoption of AI technologies. Therefore, there is a need to examine both the opportunities and challenges of AI-driven entrepreneurship and identify policy measures for promoting sustainable entrepreneurial development.

Objectives of the Study:

The objectives of the study are:

1. To examine the role of Artificial Intelligence in promoting entrepreneurship in India.
2. To analyse the economic opportunities created by AI for startups and MSMEs.
3. To identify the major challenges affecting AI adoption among entrepreneurs.
4. To evaluate government initiatives supporting AI-driven entrepreneurship.
5. To suggest policy measures for strengthening AI-enabled entrepreneurial development.

Research Methodology:

The present study is **descriptive and analytical** in nature and is based on **secondary data**. Information has been collected from books, peer-reviewed journal articles, government reports, publications of NITI Aayog, the Ministry of Electronics and

Information Technology (MeitY), OECD, the World Bank, the World Economic Forum, and other authentic sources. The collected data have been analysed qualitatively to understand the economic role of Artificial Intelligence in entrepreneurship. The study focuses on opportunities, challenges, government initiatives, and policy implications related to AI-driven entrepreneurship in India.

Results and Discussion:

1. Artificial Intelligence and Entrepreneurship in India:

Artificial Intelligence has emerged as a powerful catalyst for entrepreneurial development in India. It enables entrepreneurs to develop innovative products, improve operational efficiency, reduce costs, and make informed business decisions using real-time data. AI technologies such as machine learning, natural language processing (NLP), predictive analytics, and computer vision are helping businesses automate repetitive tasks, improve customer engagement, and optimize resource utilization. As a result, entrepreneurs can focus more on innovation, strategic planning, and market expansion.

India's entrepreneurial ecosystem has expanded rapidly due to increasing internet penetration, digital payment systems, cloud computing, and government support. AI has further accelerated this growth by enabling startups to scale their operations with relatively lower costs. Businesses can analyse customer preferences, predict market demand, personalize services, and improve decision-making through AI-powered tools.

Consequently, AI has become an essential component of modern entrepreneurship and digital transformation.

2. AI and Startup Development:

India is currently one of the world's largest startup ecosystems, and AI has become a major source of innovation within it. AI-based startups operate across healthcare, financial technology (FinTech), agriculture, education, logistics, manufacturing, and retail. In healthcare, AI supports disease diagnosis, medical imaging, telemedicine, and personalized treatment. FinTech companies use AI for fraud detection, digital lending, credit assessment, and customer service through intelligent chatbots. Agricultural startups employ AI for crop monitoring, weather forecasting, precision farming, and pest management, while educational technology companies use AI to provide adaptive learning and personalized educational content.

AI also improves business competitiveness by reducing operational costs and increasing productivity. Cloud-based AI solutions have lowered entry barriers for entrepreneurs, allowing even small startups to access advanced technologies without substantial investment in physical infrastructure.

3. AI and MSMEs:

Micro, Small, and Medium Enterprises (MSMEs) are the backbone of the Indian economy, contributing significantly to GDP, employment, exports, and industrial production. AI offers MSMEs opportunities to improve efficiency through inventory management, demand forecasting, predictive maintenance, customer relationship

management, and digital marketing. AI-powered analytics help businesses understand consumer behaviour, optimize production, and improve financial management.

Despite these advantages, many MSMEs face barriers such as high implementation costs, lack of technical expertise, inadequate digital infrastructure, and limited awareness about AI applications. Providing affordable AI solutions, financial support, and technical training can significantly enhance AI adoption among MSMEs.

4. Government Initiatives and Economic Implications:

Recognizing AI as a strategic technology, the Government of India has introduced several initiatives, including the **India AI Mission, Startup India, Digital India, Skill India**, and the **Atal Innovation Mission**. These programmes encourage innovation, digital infrastructure development, startup incubation, entrepreneurship education, and research. They also strengthen India's competitiveness in the global digital economy.

From an economic perspective, AI contributes to higher productivity, innovation, investment, and employment in high-skilled sectors. It improves resource allocation, reduces transaction costs, enhances export competitiveness, and supports the growth of the digital economy. However, challenges such as cybersecurity threats, data privacy concerns, ethical issues, algorithmic bias, and possible job displacement require effective regulation and continuous skill development. A balanced policy framework that promotes innovation while ensuring responsible AI use

is essential for sustainable entrepreneurial growth.

Findings of the Study:

The analysis reveals that Artificial Intelligence has become an important driver of entrepreneurship and economic transformation in India. AI enables entrepreneurs to improve productivity, reduce operational costs, enhance customer experience, and make better business decisions through data analytics. The technology has strengthened startup innovation in sectors such as healthcare, agriculture, finance, education, manufacturing, and e-commerce.

The study further finds that government initiatives such as the **India AI Mission, Startup India, Digital India**, and the **Atal Innovation Mission** have significantly contributed to the development of an AI-enabled entrepreneurial ecosystem. These programmes have encouraged innovation, improved digital infrastructure, and increased access to incubation and financial support. However, the adoption of AI is not uniform across enterprises. MSMEs continue to face challenges such as limited financial resources, shortage of AI-skilled professionals, inadequate digital infrastructure, cybersecurity threats, and concerns regarding data privacy and ethical use of AI. Without appropriate policy interventions, these barriers may widen the digital divide between technologically advanced firms and smaller enterprises.

Policy Recommendations:

To promote AI-driven entrepreneurship and maximize its contribution to economic development, the following measures are recommended:

1. **Strengthen Digital Infrastructure:** Expand broadband connectivity and cloud computing facilities, particularly in rural and semi-urban areas.
2. **Promote AI Education and Skill Development:** Universities and higher education institutions should introduce interdisciplinary courses in Artificial Intelligence, data science, machine learning, and digital entrepreneurship to prepare a future-ready workforce.
3. **Support MSMEs and Startups:** The Government should provide financial incentives, subsidized AI tools, tax concessions, and easier access to credit for AI adoption.
4. **Increase Research and Development:** Greater investment in AI research, innovation hubs, incubation centres, and public-private partnerships will accelerate technological advancement.
5. **Ensure Ethical AI Governance:** Regulatory frameworks should promote transparency, accountability, fairness, and protection of personal data while encouraging responsible AI innovation.
6. **Promote Industry-Academia Collaboration:** Collaboration between universities, research institutions, industries, and government agencies can bridge the gap between research and commercialization.

Conclusion:

Artificial Intelligence is transforming the future of entrepreneurship by enabling innovation, improving productivity, and enhancing business competitiveness. In India, AI has become a key enabler of startup growth and digital transformation across diverse sectors. Its ability to automate business processes, improve decision-making, and create customer-centric solutions has increased the efficiency and global competitiveness of Indian enterprises.

Although AI offers enormous opportunities for entrepreneurs, several challenges—including implementation costs, shortage of skilled professionals, cybersecurity risks, ethical concerns, and uneven digital infrastructure—must be addressed to ensure inclusive growth. Government initiatives have created a favourable environment for AI adoption, but continued investment in digital infrastructure, research, education, and policy reforms remains essential.

From an economic perspective, AI has the potential to enhance productivity, foster innovation, create high-skilled employment, and contribute significantly to India's vision of **Viksit Bharat 2047**. A balanced approach that combines technological innovation with responsible governance and inclusive policies will enable India to harness the full potential of AI for sustainable entrepreneurial development and long-term economic prosperity.

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Artificial Intelligence and Digital Preservation of India's Culture Heritage

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Abstract:

Indian process with its historic monuments, temples, manuscripts, paintings, sculptures, folk traditions, languages, music, dance, and oral histories, India has one of the finest cultural legacies in the world. Rapid urbanization, pollution, natural catastrophes, climate change, and the degradation of historical items, however, pose a threat to this priceless legacy. In order to preserve, record, restore, and promote India's cultural heritage, artificial intelligence (AI) has become a game-changing technology. Artificial intelligence (AI)-driven technologies including machine learning, computer vision, natural language processing (NLP), 3D scanning, and digital archiving are helping government agencies, museums, libraries, and universities better preserve cultural assets. This article explores AI's role in the digital preservation of India's cultural legacy, emphasizing its uses, advantages, difficulties, and potential.

Keywords: *Machine Learning, Computer Vision, Digital Archives, Indian Culture, Digital Preservation, Museums, Manuscripts, And Artificial Intelligence.*

Introduction:

Archaeological sites, historical records, classical literature, traditional arts, architecture, music, dance, and indigenous knowledge systems are all part of India's cultural legacy, which reflects thousands of years of civilization. Due to poor preservation methods, human carelessness, and environmental factors, many of these treasures are susceptible to physical degradation. Innovative ways to digitally preserve these cultural resources are provided by artificial intelligence. Institutions can produce precise digital copies, repair damaged objects, interpret old manuscripts, and make cultural treasures available globally by integrating AI with digitalization technology.

Objectives of The Study:

1. To comprehend the idea of artificial intelligence in the preservation of cultural heritage.
2. To investigate the use of AI technology in India's cultural heritage preservation.
3. To determine the advantages of digital preservation using AI.
4. To examine the difficulties in implementing AI.
5. To make policy suggestions for the preservation of digital heritage in a sustainable manner.

Need For Digital Preservation:

The following reasons make digital preservation essential:

- Manuscripts from antiquity are progressively degrading.

- Environmental deterioration affects historical monuments.
- Conventional forms of art are vanishing.
- Oral traditions are disappearing.
- Documentation is necessary for regional languages.
- Long-term preservation is guaranteed by digital archives.
- Heritage resources must be easily accessible to researchers.
- Cultural artifacts that have been conserved can teach future generations.

AI Technology Used in Cultural Heritage Preservation:

By facilitating quicker documenting, precise repair, intelligent analysis, and worldwide accessibility of historical resources, artificial intelligence (AI) has revolutionized the management and protection of cultural heritage. AI technologies are being employed more and more in India to preserve historical documents, monuments, manuscripts, sculptures, paintings, traditional art forms, and folk culture. Below is an explanation of the main AI technologies utilized in cultural heritage preservation.

Role of Artificial Intelligence in Digital Preservaion of India's Cultureal Heritage:

Artificial Intelligence (AI) has emerged as a potent instrument for safeguarding India's rich cultural legacy. It facilitates the effective documentation, restoration, monitoring, and sharing of cultural assets by historians, archaeologists, museums, libraries, and conservation specialists. Traditional preservation techniques are being replaced by intelligent, data-driven procedures thanks to

AI technologies like machine learning, computer vision, robotics, natural language processing (NLP), and 3D imaging.

1. Digital Documentation of Cultural Heritage:

AI aids in the creation of precise digital recordings of historical places, monuments, relics, texts, paintings, and sculptures.

Benefits:

- Minimizes the need for manual documentation.
- Produces digital documents that are lasting.
- Increases accessibility and accuracy.
- Makes it possible to quickly retrieve historical data.

2. Restoration of Damaged Heritage:

AI helps conservators by repairing damaged documents, sculptures, paintings, and monuments. Deep learning algorithms enable specialists restore cultural items while preserving their historical authenticity by analyzing old photos and accurately predicting missing parts.

Benefits:

- Shortens the time needed for restoration
- Increases the accuracy of restoration
- Maintains the integrity of history

3. Computer Vision for Heritage Monitoring:

AI systems can use computer vision to examine photos and videos of monuments in order to identify weather-related deterioration, biological development, erosion, fissures, and structural damage. Before significant harm is done, conservation needs can be identified with the aid of ongoing monitoring.

Benefits:

- Early degradation detection
- Conservation through prevention
- Lower maintenance expenses

4. Preservation of Ancient Manuscripts and Languages:

Millions of manuscripts in Sanskrit, Kannada, Tamil, Telugu, Pali, Persian, and other regional languages can be found in India. These manuscripts are digitized, translated, transcribed, and restored by AI-based Natural Language Processing (NLP) and OCR technologies, which aid in the preservation of linguistic diversity and historical knowledge.

Benefits:

- Safeguards endangered languages
- Makes manuscripts available everywhere.
- Encourages scholarly research

5. Virtual Museums and Digital Exhibitions:

AI makes it possible for museums to use augmented reality (AR), virtual reality (VR), and intelligent recommendation systems to produce immersive virtual experiences. Interactive digital platforms allow visitors to virtually experience museums and historical sites.

Benefits:

- Boosts participation from the public
- Increases accessibility worldwide
- Encourages cultural travel

6. Predictive Conservation:

To forecast future deterioration of heritage buildings, AI examines previous conservation data, environmental factors, temperature, humidity, pollution, and tourist activity. Authorities can schedule maintenance

before serious damage happens with the use of predictive algorithms.

Benefits:

- Lowers the cost of rehabilitation
- Increases the effectiveness of conservation
- Increases the longevity of historical sites

7. Archaeological Discovery:

To find buried archeological sites and old settlements, artificial intelligence (AI) analyzes satellite pictures, drone photos, LIDAR data, and remote sensing data. This method reduces the expense of excavation while greatly enhancing archeological exploration.

- Faster archaeological surveys
- Reduced excavation Risks
- Improved heritage documents

8. AI in Culture Tourism:

At heritage sites, artificial intelligence improves tourist experiences with intelligent navigation systems, smart guides, multilingual virtual assistants, and tailored recommendations.

Benefits:

- Increased pleasure among visitors
- Increased income from tourism
- Enhanced accessibility for foreign tourists

AI's Principal Benefits for Digital Preservation:

1. Quick digitization of cultural materials.
2. Increased precision in conservation and restoration.
3. Early identification of structural damage.

4. Long-term conservation via digital archives.
5. Access to India's cultural legacy on a global scale.
6. Improved scholarly cooperation and research.
7. Preservation of manuscripts and endangered languages.
8. Increased public participation and cultural tourism.
9. Economical upkeep and monitoring.
10. Improved readiness for and recovery from disasters.

Challenges:

- High costs for upkeep and installation.
- AI and heritage conservation specialists are scarce.
- Inadequate or subpar historical data.
- Dangers to digital archives' cybersecurity.
- AI-generated reconstructions raise ethical questions.
- Limitations in digital infrastructure, especially in rural places.
- Standardized procedures for digitization and preservation are required.

Conclusion:

By facilitating effective documenting, repair, monitoring, and international distribution of cultural assets, artificial intelligence is revolutionizing the preservation of India's cultural legacy. Machine learning, computer vision, natural language processing, robotics, and 3D modeling are examples of AI technologies that contribute to preserving both tangible and intangible cultural legacy for future generations. AI's potential can be

maximized with strategic investments, qualified human resources, and supportive governmental policies, even though issues with cost, ethics, data quality, and infrastructure still exist. India can maintain its rich cultural past while making it more approachable, interesting, and robust in the digital era by fusing AI with conventional conservation techniques.

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Artificial Intelligence's Effects on Social Media Marketing

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Abstract:

A key component of any digital marketing strategy is social media. By 2025, there will be 4.41 billion social media users worldwide, a number that is expected to rise quickly. This is the most effective way to interact with brands, exchange ideas, communicate, and get ideas for new purchases. AI software and social media applications are expanding rapidly because to the need to have a competitive edge on social media. Over the next five years, the social media market's AI is predicted to grow at a CARG of 28.77%, reaching a value of USD 3,714.89 million by 2026. When your customers choose to interact with your business, artificial intelligence (AI) is essential for understanding the data generated by social media and providing the appropriate messaging and content.

Introduction:

Artificial intelligence (AI) is the term used to describe how machines mimic human cognitive processes including learning, self-correction, and reasoning. AI is changing a number of industries, including social media marketing. The use of social media platforms to promote a company, good, or service is implied by the phrase "social media marketing" (SMM). It involves creating content for social media sites, posting it there, communicating with followers, and looking at social media analytics.

At the moment, SMM makes considerable use of AI. Social media data is analyzed by AI algorithms to produce insights that may be utilized to improve SMM tactics. While AI-generated content is being used to create personalized material for social media users, chatbots powered by AI are being used to offer customer care on social media platforms. AI is also being used by social media companies to enhance user experience.

Facebook, for example, employs AI to recommend friends to interact with and curate users' news feeds. Instagram recommends content and accounts for users to follow using artificial intelligence.

AI is also being utilized to enhance social media advertising. Ad placement is optimized and advertising are targeted to particular demographics using AI algorithms. Additionally, it is utilized to evaluate social media data and produce reports that can be utilized to enhance social media advertising tactics. AI is significantly influencing SMM. Social media marketers may examine enormous volumes of data and obtain insightful information that can be utilized to improve marketing tactics by utilizing the power of artificial intelligence. Additionally, it is utilized to enhance user experience, offer customer support, and produce tailored content for social media users.

Objectives of The Paper:

1. To ascertain social media marketing awareness of AI.
2. To examine how AI affects people's lives.
3. To determine which social media platforms are most crucial for marketers globally.
4. To comprehend the advantages and difficulties of using AI in social media marketing.

The Study's Hypothesis:

H1: The success of social media marketing depends on artificial intelligence.

H0: The success of social media marketing does not depend on artificial intelligence.

Research Methodology:

Primary Data: Using Google Forms, a questionnaire was distributed to various

social media users in order to gather primary data.

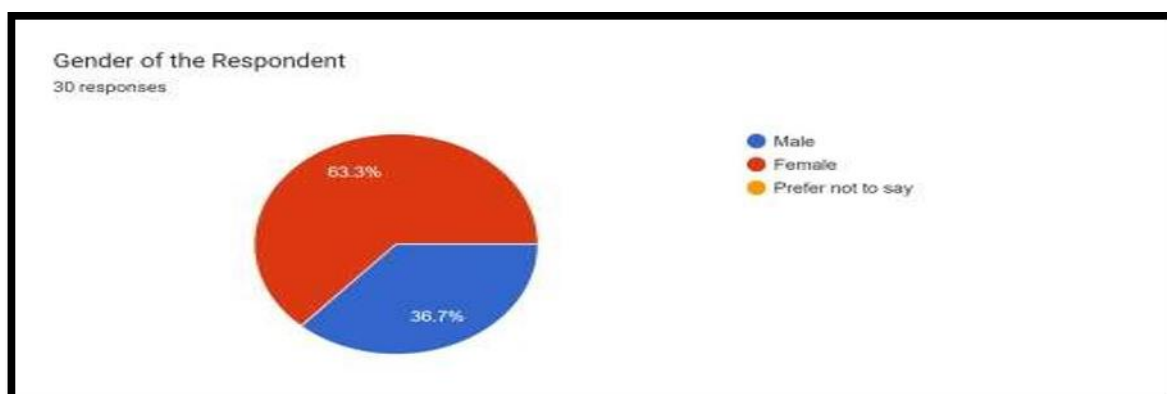
Secondary Data: A variety of case studies, websites, and interviews were consulted in order to gather the secondary data.

Population and Sampling Strategy: Thirty viewers will make up the study's population. Random sampling is the technique used.

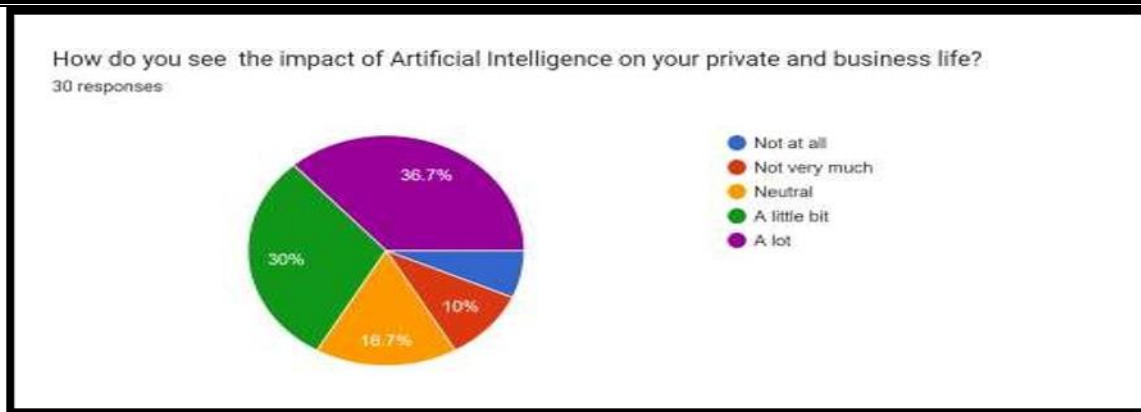
Research Design: The study is descriptive and analytical in character. With the use of appropriate graphics, data is evaluated as a descriptive study.

Analysis of The Study:

Analysis of the Study is the process of examining, interpreting, and evaluating the data collected during research to answer the research questions, test hypotheses, and draw meaningful conclusions. It converts raw data into useful information that supports the objectives of the study.



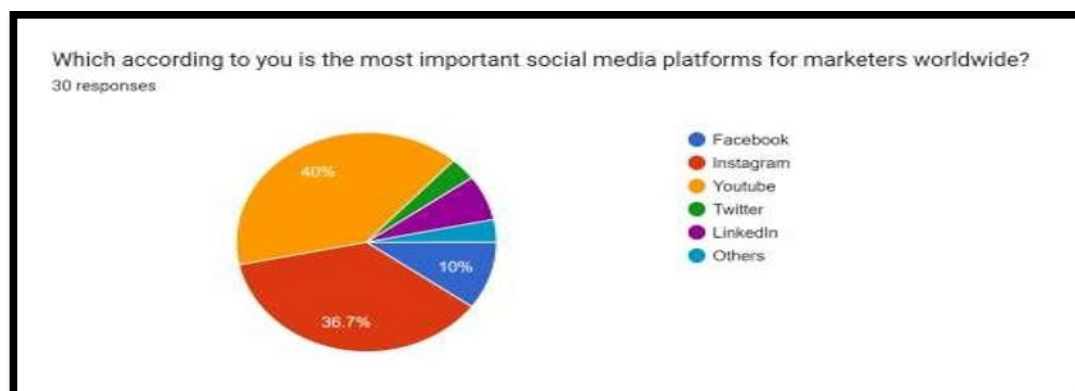
The demographic statistics show that 36.7% of respondents are men and 63.3% of respondents are women.



36.7% of respondents strongly felt that AI had a significant impact on their personal and professional lives, compared to 16.7% who were neutral and 6.7% who said AI had no effect at all.

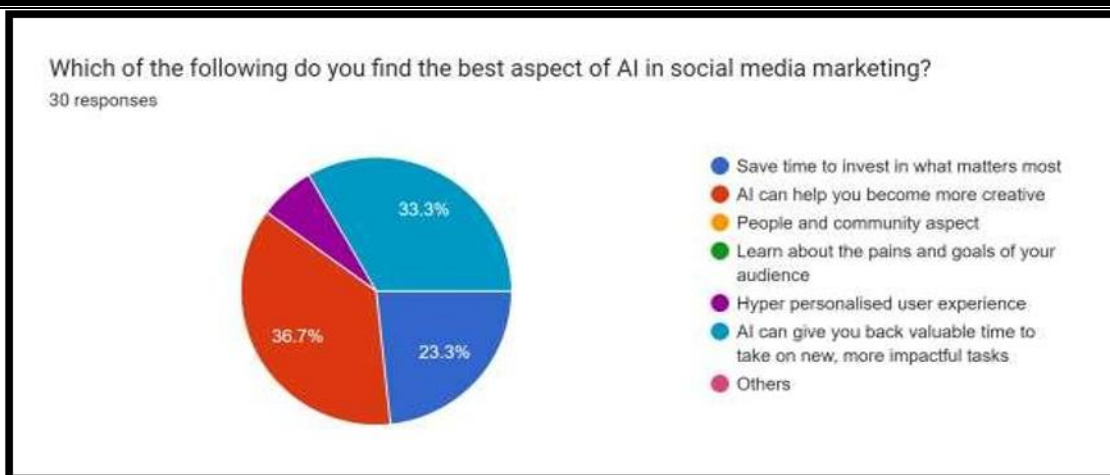
This pie chart unequivocally demonstrates how AI is affecting people's life, both personally and professionally.

According to the respondents, the majority of marketers globally utilize a variety of social media platforms for marketing, with YouTube (40%) being the most popular, followed by Instagram.



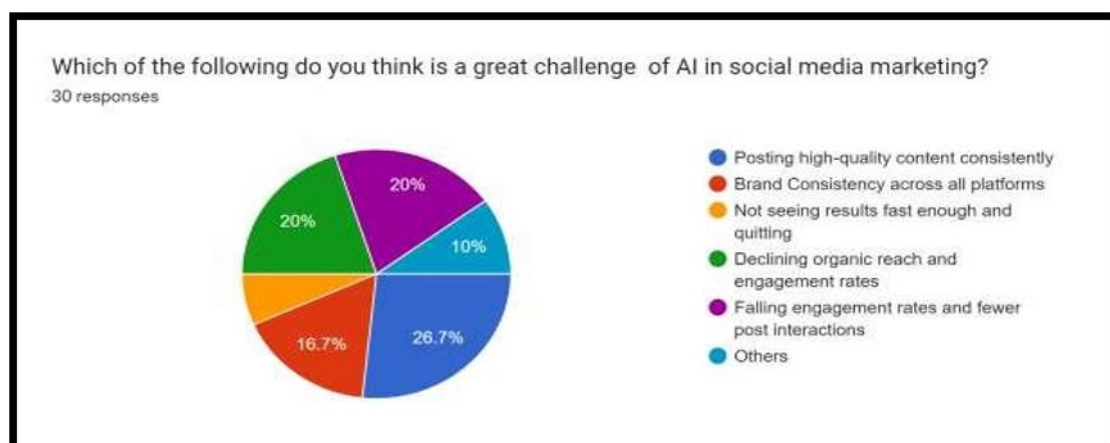
This indicates that marketers ought to concentrate more on social media sites like Facebook, Instagram, and YouTube. Since

social media is used by everyone these days, it's the ideal platform for brand promotion.



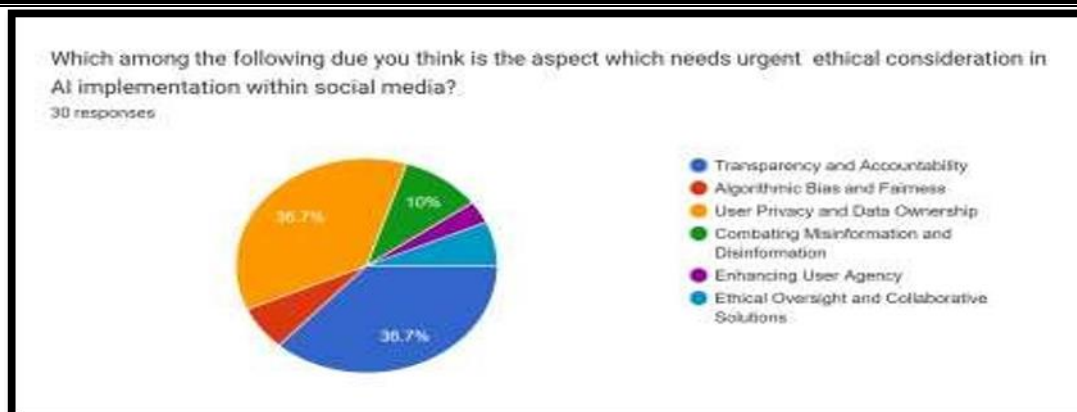
It is evident that people think AI can help marketers become more creative; 33.3% think AI can free up valuable time to take on new, more impactful tasks; and 6.7% think the best thing about AI in social media marketing

is the hyper-personalized user experience. Additionally, AI would help users save time so they could focus on the things that really matter (23.3%).



One of the major obstacles of AI in social media marketing, according to 26.7% of respondents, is regularly publishing high-quality material, as shown in the pie chart above. However, 20% of respondents thought

that AI in social media marketing also faced difficulties due to decreased engagement rates. Another issue that users face is maintaining brand consistency across all platforms.



As the pie chart above illustrates, the respondents The component of AI adoption in social media that requires immediate ethical attention is transparency and accountability (36.7%), while user privacy and data ownership are viewed equally (36.7%). Numerous aspects of AI in social media require immediate ethical scrutiny.

Challenges And Limitations:

Although AI has improved social media user experiences, it still has a number of drawbacks. One of the main problems is the potential for algorithmic bias, which could lead to the unfair treatment of specific groups of people.

Furthermore, due to the speed at which technology is developing, ethical standards and regulatory frameworks will eventually need to catch up, leaving AI developers and social media businesses to handle difficult moral and legal dilemmas on their own. The impact of AI on future employment in social media is another major worry. As AI advances, many tasks currently performed by humans may be automated, changing the nature of labor.

In order to address these issues, it will be necessary to take proactive steps to develop new training programs and assistance

for employees in impacted industries, as well as legislation to ensure that the advantages of AI are shared more widely throughout society.

Conclusion:

The present and future of social media is artificial intelligence. Marketers use machine learning, automation, and AI-powered analytics to make sense of the massive amounts of data generated by social media and use those insights to drive company performance.

Brands must use AI to be there with the appropriate messaging at the right time and on the right platform because consumers have higher expectations than ever before. The insights gleaned from customer data can be used by marketers to guide strategy and promptly respond to consumer behavior trends.

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Artificial Intelligence and Historical Memory: Opportunity and Challenges

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Abstract:

Artificial Intelligence (AI) is revolutionizing the preservation, study, interpretation, and dissemination of history. The collective awareness of historical events, cultures, customs, and identities that are passed down from one generation to the next is referred to as historical memory. Artificial intelligence (AI) technologies, such as machine learning, natural language processing, computer vision, and generative AI, are assisting archives, museums, libraries, and historians in digitizing historical records, repairing damaged documents, and increasing the accessibility of historical knowledge. But AI also brings up issues with false information, algorithmic bias, authenticity, digital preservation, privacy, and the moral use of historical data. This essay explores the possibilities and difficulties of using AI to preserve historical memory and makes suggestions for its responsible application.

Keywords: *Artificial Intelligence, Historical Memory, Digital Archives, Cultural Heritage, Machine Learning, Museums and Ethics.*

Objectives of The Paper:

This paper has made an attempt

1. To understand the role of AI in preserving historical memory.
2. To determine the prospects AI has offered for historical study.
3. To investigate the difficulties of AI-based historical preservation.
4. To make policy suggestions for the application of AI in an ethical manner.

Research Methodology:

The paper is solely based on secondary information collected from different source like research journals, UNESCO reports, Government publications, books, digital archives, museum database, research articles and websites.

Artificial Indigence Technologies Used in Historical Memory:

In order to preserve, analyze, and share historical memory, artificial intelligence (AI) has emerged as a crucial tool. It makes it possible for libraries, museums, archivists, and historians to effectively handle vast amounts of historical data while preserving cultural material for future generations. Below is an explanation of the main AI technologies utilized in historical memory.

1. Machine Learning (ML):

A subfield of artificial intelligence called machine learning allows computers to learn from past data without explicit programming. It recognizes trends, categorizes data, and forecasts using historical data.

Historical Memory Applications:

- Categorizing documents from the past.

- Determining who wrote old writings.
- Identifying trends in past occurrences.
- Automatically arranging digital archives.

Advantages:

- Saves time for researchers.
- Enhances the organizing of documents.
- Facilitates historical analysis based on data.

2. Deep Learning (DL):

Deep Learning is a sophisticated type of machine learning that processes complicated data, including handwritten documents, sounds, and photographs, using artificial neural networks.

Historical Memory Applications:

- Repairing manuscripts that are damaged.
- Enhancing ancient photos.
- Restoring faded artwork.
- Recognizing objects from archaeology.

Advantages:

- High precision.
- Improved restoration of images.
- Conservation of delicate historical artifacts.

3. Natural Language Processing (NLP):

Computers can comprehend, interpret, and produce human language thanks to natural language processing.

Applications:

- Translating old languages.
- Summarizing records from the past.
- Extracting dates, locations, and names.
- Sentiment analysis of historical texts.

Advantages:

- Quicker translation.
- Simpler search for documents.
- Increased accessibility.

4. Optical Character Recognition (OCR):

OCR creates editable digital text from handwritten or printed historical documents.

Applications:

- Digitizing books.
- Transforming newspapers into text that can be searched.
- Keeping manuscripts intact.
- Establishing online libraries.

Advantages:

- Simple storage.
- Fast search.
- Long-term conservation.

5. Big Data Analytics:

AI can process enormous sets of historical records from many sources thanks to big data analytics.

Applications:

- Examining census data.
- Examining patterns in the population.
- studying the history of the economy.
- Recognizing long-term historical trends.

Advantages:

- Quicker analysis.
- Improved judgment.
- Uncovering hidden historical patterns.

6. Digital Twin Technology:

AI can process enormous sets of historical records from many sources thanks to big data analytics.

Applications:

- Examining census data.
- Examining patterns in the population.
- Studying the history of the economy.
- Recognizing long-term historical trends.

Advantages:

- Quicker analysis.
- Improved judgment.
- Uncovering hidden historical patterns.

Opportunities Of Artificial Intelligence (AI):

In the areas of historical memory retention, interpretation, and distribution, artificial intelligence (AI) has become a game-changing technology. The collective recall of historical occurrences, customs, cultures, and experiences that have shaped societies and civilizations is referred to as historical memory. The preservation, analysis, and sharing of historical data are being completely transformed by AI technologies including machine learning, natural language processing (NLP), computer vision, optical character recognition (OCR), and generative AI. The next section discusses the main prospects of AI in historical memory.

1. Digital Preservation of Historical Records:

The digital preservation of priceless historical materials is one of AI's biggest accomplishments. Due to aging, environmental factors, natural disasters, or careless handling, many old manuscripts, government documents, books, maps, paintings, and pictures deteriorate over time. These physical records are transformed into high-quality digital versions through AI-powered digitization, guaranteeing their long-term preservation.

2. Restoration of Damaged Historical Documents and Artifacts:

Fire, floods, insects, fading ink, and physical deterioration all contribute to the partial destruction of many historical records. AI, especially Deep Learning and Computer Vision, can mend broken inscriptions, restore faded photos, reconstruct damaged fonts, and enhance image quality.

3. Automatic Translation of Ancient Languages:

Many historical records are written in languages that are difficult for contemporary scholars to comprehend. Natural language processing, driven by artificial intelligence, translates old languages into modern ones while preserving contextual meaning.

4. Faster Historical Research:

Historians have historically spent years manually reviewing archives. By locating, categorizing, and analyzing millions of historical records in a matter of minutes, AI significantly speeds up this process.

5. Preservation of Oral History:

Important memories of communities, independence fighters, indigenous groups, and senior citizens can be found in oral histories. These oral narratives are recorded, transcribed, translated, and preserved by AI.

6. Cultural Heritage Conservation:

AI uses drones, sensors, satellite imagery, and computer vision to monitor historical monuments, archeological sites, temples, forts, museums, and heritage buildings.

7. Virtual Museums and Historical Experiences:

AI makes it possible for museums to use interactive exhibitions, virtual reality (VR), and augmented reality (AR) to create immersive digital experiences.

Challenges of Artificial Intelligence (AI):

Adoption of artificial intelligence (AI) presents a number of important issues, but it also presents amazing prospects for the preservation and analysis of historical memory. In order to guarantee historical

accuracy and responsible use of AI, these challenges encompass technical, ethical, social, legal, and cultural issues that need to be carefully considered.

1. Historical Bias and Algorithmic Bias: AI systems pick up knowledge from past data. AI may replicate or even magnify biases in historical records pertaining to gender, racism, ethnicity, religion, politics, or colonial viewpoints.

Challenges:

- Inaccurate accounts of history
- Marginalized communities' exclusion
- Stereotype reinforcement
- Diminished objectivity in the past

2. Authenticity and Reliability of AI Generated Content: AI can repair damaged documents, produce historical imagery, and develop narratives. However, these outputs may not accurately represent historical reality.

Challenges:

- Difficulty differentiating authentic items from AI-generated reconstructions
- False instructional materials
- Decreased faith in historical data

3. Deep fakes and Historical Misinformation: Historical figures can be digitally reconstructed saying or doing things that never occurred, deceiving audiences and influencing popular perception of history.

Challenges:

- Spread of incorrect historical information
- Confusion among the public
- Manipulation of political or cultural narratives
- Harm to the legitimacy of history

4. Loss of Human Interpretation: History is more than just a set of facts; it also calls for

contextual analysis, cultural comprehension, and interpretation. AI can process large volumes of information but cannot fully understand human emotions, cultural significance, or historical context.

Challenges:

- Historical tales that are too simplistic
- Disregarding emotional and cultural contexts
- A decline in the examination of critical history

6. Data Privacy and Confidentiality:

Sensitive information about people, families, or communities may be found in historical archives. Concerns about privacy may arise when such documents are digitized and published via AI systems.

Challenges:

- Violations of privacy
- Abuse of private data
- Conflicts of ethics

Role of AI In Museums and Archives:

AI helps archives and museums by:

- Digitizing collections
- Making a catalog of artifacts
- Increasing tourist involvement
- Making virtual displays possible
- Estimating the need for conservation
- Improving accessibility by providing multilingual assistance

Recommendations:

Develop ethical guidelines for AI use in historical research.

- Ensure transparency in AI-generated historical interpretations.

- Combine AI analysis with expert review by historians, archivists, and archaeologists.
- Invest in digitization projects, especially in developing countries.
- Strengthen cybersecurity for digital archives.
- Promote international collaboration in cultural heritage preservation.
- Train historians and heritage professionals in AI and digital humanities.

Conclusion:

By digitizing archives, repairing broken objects, translating historical writings, and increasing public access to cultural property, artificial intelligence has enormous potential to preserve historical memory. However, issues including bias, false information, authenticity, cyber security, and moral dilemmas necessitate cautious governance. AI should be seen as a potent instrument that enhances rather than replaces the knowledge of cultural institutions, archivists, and historians. The accuracy, inclusivity, and accessibility of historical memory can be preserved for future generations through the responsible and open application of AI.

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Artificial Intelligence and The Future of Global English

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Abstract:

Globally, artificial intelligence (AI) is changing how people learn, teach, translate, write, and communicate in English. AI-powered technologies are altering English's role in the digital age, even as it remains the most widely used language in commerce, education, science, technology, and international diplomacy. Millions of individuals now have easier access to English thanks to tools like machine translation, intelligent teaching programs, speech recognition software, grammatical correction software, and generative AI models. Concerns like linguistic variety, cultural identity, academic integrity, and an excessive reliance on automated systems are also brought up by AI. This article examines how AI will affect global English in the future, emphasizing its potential, difficulties, and ramifications for communication, education, and language variety.

Keywords: *Artificial Intelligence, Global English, Language Learning, Machine Translation, Digital Communication and Education.*

Introduction:

English is now the most frequently used international language in the world, bringing individuals from all nations, professions, and cultures together. International trade, higher education, scientific research, travel, and internet communication all use it as their primary language. Artificial intelligence's quick development has sped up English's evolution by producing intelligent language technologies that can comprehend, produce, translate, and teach the language with previously unheard-of accuracy.

Language communication has been transformed by AI-powered programs like ChatGPT, Grammarly, Google Translate, Microsoft Copilot, Duolingo, and speech recognition systems. With the help of these

technologies, students can enhance their writing, grammar, vocabulary, and pronunciation while receiving immediate feedback. As a result, AI is changing both how English is learned and how it develops as a universal language.

Understanding Artificial Intelligence Language:

Computer systems that are able to carry out tasks that typically need human intelligence are referred to as artificial intelligence. In language studies, artificial intelligence (AI) analyzes, interprets, and produces human language using Natural Language Processing (NLP), Machine Learning (ML), and Deep Learning algorithms.

Key AI language technologies consist of:

- NLP, or natural language processing

- Translation by Machine
- Recognition of Speech
- Generation of Text Virtual assistants and chat bots
- Systems for Intelligent Tutoring
- Writing and Grammar Helpers Voice Synthesis Technology

The basis of contemporary English communication is these technologies.

Benefits of Artificial Intelligence for The Future of Global English:

Globally, artificial intelligence (AI) is transforming English usage, instruction, learning, and communication. AI-powered solutions are improving English's accessibility, efficiency, and inclusivity as it continues to be the most widely used language in business, education, science, technology, and international communication. The main advantages of AI for Global English's future are listed below.

1. Improved English Learning Accessibility:

AI's ability to make learning English accessible to everyone, regardless of geography, socioeconomic status, or educational attainment, is one of its biggest benefits. High-quality English training is available at any time and from any location through AI-powered apps, online learning environments, and virtual tutors.

Advantages consist of:

- Access to educational materials around-the-clock.
- Free or reasonably priced English instruction.
- Opportunities for learning for those living in remote places.
- Equal access to learning resources.

- Assistance with learning at your own pace.

Millions of students can now advance their English language proficiency without going to regular classes.

2. Customized Education:

AI systems assess each learner's performance, learning pace, and areas of strength and weakness. They develop individualized learning routes that meet each person's needs based on this study.

Among the features are:

- Personalized vocabulary tests.
- Practice grammar based on errors.
- Materials for adaptive reading.
- Pronunciation instruction on an individual basis.
- Individualized progress reports.

This customized strategy boosts student enthusiasm and enhances language proficiency in general.

3. Quick Writing and Grammar Help:

By identifying grammatical, spelling, punctuation, sentence structure, and vocabulary usage flaws, AI-powered writing aides assist users in improving the quality of their English writing.

Benefits consist of:

- Grammatical correction in real time.
- Sentence clarity has improved.
- Improved scholarly writing.
- Expert business correspondence.
- Improved vocabulary recommendations.
- Enhancement of tone and style.

Producing more precise and polished English texts benefits professionals, educators, researchers, and students.

4. Personalized English Language Learning:

In order to produce individualized lessons, AI-powered learning platforms assess the strengths, limitations, and learning pace of their students. AI offers individualized training in contrast to traditional classes, assisting students in concentrating on topics like writing, grammar, vocabulary, and pronunciation.

Benefits consist of:

- Tailored study schedules
- Adaptive educational opportunities
- Quicker language proficiency improvement
- Enhanced motivation among learners
- Monitoring progress continuously

5. Enhanced Pronunciation and Speaking Skill:

Pronunciation, fluency, intonation, and speaking correctness are all assessed by AI-based voice recognition systems. Instant feedback enables learners to practice on their own.

Benefits consist of:

- Improved pronunciation
- Enhanced fluency
- Decreased anxiousness when speaking
- Enhanced confidence in communication
- Enhancement of accents

6. Global Communication and Collaboration:

AI makes it possible for individuals from various nations to communicate easily using English as a common language. It encourages cross-border collaboration in business, education, healthcare, and research.

Benefits consist of:

- Bolsters international alliances
- Improves networking for professionals
- Makes foreign education easier
- Encourages cross-cultural interaction
- Aids international organizations

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Benefits consist of:

- Bolsters international alliances
- Improves networking for professionals
- Makes foreign education easier
- Encourages cross-cultural interaction
- Aids international organizations

7. Promotes Lifelong Learning:

AI promotes lifelong learning by offering tailored suggestions, progress monitoring, and interactive educational opportunities.

Benefits consist of:

- Ongoing skill improvement
- Adaptable educational opportunities
- Professional development
- Self-directed learning
- Improvement of digital literacy

Challenges of Artificial Intelligence in The Future of Global English:

Globally, artificial intelligence (AI) is changing how English is taught, learned, and used. AI has many advantages, such intelligent writing support, real-time translation, and individualized learning, but it also poses serious difficulties. Education, communication,

ethics, privacy, culture, and language diversity are all impacted by these issues. In order to make sure that AI promotes rather than threatens Global English's future, it is crucial to comprehend these concerns.

1. Overdependence on AI Tools:

One of the main worries is that students might rely too much on AI programs for speaking, writing, and solving problems. Users may depend on AI to translate content, write essays, and fix grammar rather than learning language skills on their own.

2. Loss of Human Interaction:

Learning a language is a social activity that requires communication with peers and teachers. Over-reliance on chat bots and AI instructors could diminish meaningful human interaction.

3. Job Displacement in Language Related Professions:

Some jobs that have historically been filled by people, such translators, proofreaders, and simple content editors, may become less in demand due to automation.

4. Dependence on Technology Infrastructure:

AI systems depend on digital gadgets, electricity, cloud services, and reliable internet access. Communication and education might be hampered by technical issues.

5. Reduced Creativity and Original Thinking:

Learners may become discouraged from expressing their own thoughts and writing styles if AI-generated suggestions are used frequently.

Future Prospects:

AI developments like these will progressively influence Global English in the future.

1. Knowledgeable online instructors
2. AI-driven immersive education
3. Multilingual communication in real time
4. Language learning with augmented reality (AR)
5. English courses using virtual reality (VR)
6. Conversational AI that is sensitive to emotions
7. Systems for adaptive assessment
8. Tailored lifetime education

By offering tailored assistance and increasing access to high-quality English instruction, AI will enhance rather than replace human educators.

Suggestions:

1. Encourage the responsible use of AI in teaching English.
2. Educate educators in digital pedagogy and AI literacy.
3. In addition to AI-assisted learning, promote critical thinking.
4. Preserve the privacy of students' data.
5. Make sure AI technologies are accessible to all.
6. Encourage multilingualism while improving English language skills.
7. Create moral guidelines for integrating AI into the classroom.
8. Continue to assess AI tools for fairness and accuracy.

Conclusion:

By making language learning more individualized, effective, and accessible, artificial intelligence is reshaping the future of global English. AI-powered technologies are revolutionizing professional contacts, education, communication, and research, making it possible for people all over the world to utilize English more successfully. But optimizing these advantages necessitates resolving moral issues, preserving language diversity, guaranteeing fair access, and upholding the vital function of human instructors. English will have a more inventive, inclusive, and globally linked future with a balanced strategy that uses AI to supplement human expertise.

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Performance of Micro, Small and Medium Enterprises in Karnataka State

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Introduction:

The degree of industrial expansion has a direct bearing on a nation's economic development. Increased use of natural resources, production of goods and services, the creation of job opportunities, and an improvement in the overall level of living are all results of the industrial sector's growth. Since gaining independence, India has also worked to expand its industrial base. It has developed a number of measures to promote the growth of both public and private industries. With its benefits of minimal investment, significant potential for job creation, diversification of the industrial base, and diffusion of enterprises to rural and semi-urban areas, SSI has received particular attention as a crucial component of planned development.

Taking into consideration all of these considerations, the definition of small-scale sector is expanded from small-scale industries to small-scale firms, which comprise all businesses in the services sector that offer services to the industrial sector. The Reserve Bank of India currently employs a broader definition of small-scale industries, which includes small-scale industrial enterprises involved in the production, processing, and preservation of goods with a plant and machinery investment of no more than Rs. 5

crore. These would include mining or quarrying facilities that service and repair machinery. These small businesses shouldn't spend more than Rs. 25 lakhs on plant and machinery. Traditional industries, which demand excellent craftsmanship and methods, as well as village and domestic industries that mostly use basic instruments to produce common commodities for consumption. Additionally, it includes informal, dispersed industries like handicrafts and handlooms. A significant portion of India's small-scale industries are those in the food and agricultural sectors, software, and services and business companies.

The government is giving the growth of SSI the attention it deserves in order to provide more job opportunities, mobilize capital and resources, distribute national revenue fairly, and encourage industry. Without a question, the dynamic, adaptable, and creative SSIs in India are concentrating more on enhanced production techniques, effective marketing tactics, and managerial skills to maintain and grow their businesses.

Economic Problem:

In India, economic issues constitute a key barrier to the expansion of entrepreneurship; in fact, the vast majority of issues are economic in nature.

Shortage of Capital:

The most crucial prerequisite for launching a business is capital. The primary cause of entrepreneurship's sluggish growth is a lack of starting capital. The bulk of people still live in poverty today. As a result, people are less able to save. Insufficient capital formation results from lower saving. Savings are ultimately necessary for capital formation and investment. Entrepreneurs aren't coming forward to start businesses since there isn't enough seed money. Increasing capital investment raises profit by improving the capital output ratio. The number of entrepreneurs rises in tandem with the capital availability.

Lack of Institutional Support and Counseling:

All phases of the growth of entrepreneurship are not receiving enough attention from institutions and organizations. As a result, either the program fails to foster the area's entrepreneurial potential or the entrepreneurs may not receive the assistance and guidance they may require to launch their business.

Non Availability of Resources:

It is an additional obstacle to entrepreneurship. Entrepreneurs should have easy access to a variety of inputs. The primary reason for the delayed development of entrepreneurship is the lack of resources, such as raw materials, skilled labor, machinery and equipment, etc. The lack of resources is impeding the development of entrepreneurs.

Lack of Infrastructure Facilities:

Infrastructure facilities are essential to the growth of industry and entrepreneurship. Infrastructure facilities are the fundamental amenities needed by industries. Electricity, water, transportation options, adequate roads, warehouses, and a banking network are examples of basic amenities. Industries should always have access to infrastructure facilities in sufficient quantities and at lower costs. Unfortunately, India does not supply entrepreneurs with adequate infrastructure amenities.

Marketing Problems:

Indian business owners constantly struggle with marketing issues; small businesses face competition from large, multinational corporations as well as from other small businesses; middlemen take advantage of entrepreneurs in the marketing of goods and services; in fact, middlemen take a significant share of the profit; and average entrepreneurs have less negotiating power than large corporations.

Objectives:

Following are the specific Objectives of the study:

1. To study the development of MSMEs in India and Karnataka.
2. To calculate production efficiency of output by MSMEs in study area.
3. To analyse the marketing of output by MSMEs.
4. To study the financial performance of MSMEs in study area.
5. To examine the problems faced by MSMEs in study area.

6. To analyse the use of Government Programme for the development of MSMEs in study area.

Research Design and Methodology:

The study was based on the information and statistics obtained from the primary and secondary sources.

Primary Sources: In the Belagavi district's Athani Taluka, a variety of MSM entrepreneurs and businessmen from a range of socioeconomic backgrounds provided the primary data. To gather primary data in the study area, two hundred (200) micro, small, and medium-sized business owners were chosen and interviewed.

Secondary Sources: The Directorate of Economics and Statistics, Government of Karnataka, District Statistical Office, District Industrial Center, Belagavi, Economic Survey of Karnataka, Government of India Reports, and even unpublished documents provided secondary data for the study.

The Schedule: The primary data was gathered using a structured interview schedule. Information on socioeconomic background, production efficiency, marketing, finance, problems/constraints, and government programs are all included in the interview schedule.

Selection of the study Area: The current study was carried out at the Belagavi district's Athani taluka. Athani Taluka is well-known for its smaller or micro businesses, minor industries, and leather goods. Stories of micro, small, and medium-sized businesses abound. Nevertheless, no thorough research has been done on the growth and performance of MSMEs in the Belagavi district at the taluka

level. Therefore, our study focuses on MSMEs in the Belagavi district's Athani taluka.

Data Processing and Analysis: Following the fieldwork, interview schedules were thoroughly examined for completeness in every way, consistency of responses, correctness of factual information to the greatest extent possible, and uniformity in response recording. Following the completion of the scrutiny operation, the data was classified and analyzed using SPSS. Following this, final tables were created for additional analysis. To make comparisons and interpretation easier, cross tables and percentages were created.

Profile of the Study Area: It is crucial to have a good understanding of the subject field. Only with a thorough grasp of the region's natural features, physical attributes, and socioeconomic situation can any development activity be evaluated. Hence, an attempt has been made to define the physical, environmental and socio-economic elements of Karnataka state.

Karnataka State:

The Indian peninsula's West Central region is home to the state of Karnataka. It is made up of a 400-kilometer stretch of enhanced coastline and a thin, extended belt between the Arabian Sea and the Western Ghats. Situated between latitudes 11° 19' North and longitudes 74° 78' East, the state of Karnataka spans 1,19, 257 square kilometers. Goa and the Arabian Sea border it on the west, while Maharashtra borders it on the north. It shares borders with Tamil Nadu and Kerala to the south and Telangana to the east. The state receives 1,139 mm of rain on average. Both

the northeast and southwest monsoons provide rain to the province. The average temperature is between 21.5°C and 31.7°C. According to the 2011 census, the state of Karnataka had a population of 6,10,95,297 and a literacy rate of 75.04 percent, with 82.50 percent of men and 68.01 percent of women.

During 55 lakh people have been employed by more than 8.5 lakh Micro, Small, and Medium-Sized Enterprises (MSMEs) in Karnataka during the past five years. Approximately Rs. 4 lakh crore has been invested, and the state is ranked fifth in the nation for industrial growth. MSMEs contribute significantly to economic growth by encouraging entrepreneurship and creating a huge number of job opportunities. MSMEs contribute to industrial development by supporting major businesses as suppliers of input goods and services. To support MSMEs, numerous policies, initiatives, incentives, and concessions have been put in place.

Lockdowns and stalled exports brought on by the Covid-19 outbreak two years ago have hurt the state's industry today. Certain industries have vanished. The federal and state governments have offered some support in the interim. It will take some time for these industries to return to their previous level, though. The following actions can help MSMEs overcome the numerous obstacles they face: enhancing the ease of doing business, increasing access to capital, infusing equity capital, and increasing productivity through managerial techniques.

Karnataka is renowned for being a perfect location for industries. Today there are more than 8.5 lakh Micro, Small and Medium Enterprises (MSMEs) in Karnataka which

employ over 55 lakh people. The main industries are foundries, automobiles, chemical plants, food processing facilities, engineering facilities, ready-made clothing manufacturing facilities, handicrafts facilities, etc. Additionally, Karnataka has small-scale industries like khadi, handicrafts, and rural industries, as well as lineage industries like handicrafts.

- India's apparel and silk hub, as well as its aerospace capital
- India's Automobile Hub
- India's biotech capital and the East's Silicon Valley

Approximately Rs. 4 lakh crore has been invested in Karnataka during the past five years, and the state now ranks fifth in the nation for industrial growth. MSMEs play a significant part in the state's economic growth. The MSME sector is the second largest employment after agriculture and contributes almost 40% of the nation's GDP.

Over the years, the state has prioritized industrial and economic growth while keeping an eye on evolving demands. Entrepreneurial skills, credit, technological adoption, quality manufacturing, and market competitiveness will be the hurdles in today's globalized world to start and thrive in a competitive market.

The Department of Industry and Commerce offers several programs that teach jobless graduates how to begin working for themselves. The "Be an employer-provide employment program" stands out among them. Through the Karnataka Industrial Area Development Board (KIADB) and Karnataka State Small Industrial Development Corporation Ltd (KSSIDC), the Karnataka government has established and dispersed

locations and shops to help business owners establish industries.

Karnataka is the state that has shaped industrial policy the most. In the 1990s, the Karnataka government introduced an industrial policy to use state resources to generate jobs and economic expansion. Other states establish their own industrial policies using this as a model. The "New Industrial Policy - 2020-25" was put into effect by the Karnataka government on August 13, 2020, with a focus on comprehensive industrial development in Tier II and Tier III cities. There

are numerous incentives and concessions available for this.

Performance of MSMEs:

A significant and expanding portion of Karnataka's industrial sector is made up of Micro, Small, and Medium-Sized Enterprises (MSMEs). Micro, Small, and Medium-Sized Enterprises (MSMEs) are categorized under the amended Act based on two factors: investment and annual turnover, as indicated in Table: The definition of MSME has been modified since July 1, 2020.

Table 1: Classification of MSMEs

	Manufacturing and Service	
Category	Investment on Plant and Machinery	Annual Turnover
Micro	Up to Rs. 1.00 Crore	Up to Rs. 5 Crore
Small	Up to Rs.10.00 Crore	Up to Rs. 50 Crore
Medium	Up to Rs. 50.00 Crore	Up to Rs. 250 Crore

According to the Gol circular, all industrial units must convert to Udyam registration by December 31, 2021. In 2021-2022, all industries will be registered using the Government of India's recently launched Udyam registration portal, which replaced the previous data that was extracted through the Udyogadhar portal. As a result, the new data

extracted from the Udyam Registration portal will be authentic going forward.

There are 7.93 lakh Micro, Small-Scale enterprises in the State, according to previous registration records. During 2019-20, these units invested Rs. 8.44 lakh crores and employed 54.78 lakh people.

Table2: Registration of Small Scale Industrial units/MSMEs in Karnataka.

Item	No. of SSI units	Investment (Rs. In lakh)	Employment in ('000s)
2005-06	334386	735616	1888
2006-07	346966	7821548	1946
2007-08	361950	894817	2069
2008-09	377655	996434	2174
2009-10	394850	1119250	2285
2010-11	413284	1239873	2396

2011-12	434305	1399514	2524
2012-13	458511	1616365	2680
2013-14	484549	1901082	2846
2014-15	513291	2080373	3022
2015-16	538947	2674965	3243
2016-17	578117	3941379	3752
2017-18	626599	5099954	4193
2018-19	695877	6587652	4776
2019-20	793109	8447379	5478

Source: Directorate of Industries and Commerce

Initiatives of The Central and State Government for Promoting MSMEs:

Prime Minister's Employment Generation Programme (PMEGP):

The Prime Minister's Employment Generation Programme (PMEGP) was put into effect in 2008-2009. By establishing businesses in rural and urban locations under the Manufacturing and Service Sectors based on local resources, the program aims to give educated youngsters without jobs a job. This

plan covers demand-oriented industries including packaged drinking water, food processing facilities, and business owners using cutting-edge technology to produce high-quality goods and take on auto repairs. This initiative provides financial support in the form of loans from different banks up to Rs. 25 lakh for the manufacturing sector and up to Rs. 10 lakh for the service sector. The following are the specifics of the subsidy offered under the program:

Table 3: Progress made under PM self-employment schemes from 2018-19 to 2021-22

Achievement				
Programme Scheme	Unit	2018-19	2019-20	2020-21
	No	3366	3560	4384
a) Persons trained	No	2670	2847	4886
b) Employed generated	No	26928	28480	35072
c) Total amount spent (Margin Money released from Khadi and Village industries commission GoI.	Rs Lakh	10156.70	10378.06	12367.00

Source: Rural Industries section, Industries and Commerce Department

Micro, Small enterprises - Cluster Development Programme (MSE-CDP):

The Government of India's (GoI) Ministry of Micro, Small, and Medium Enterprises (MSME) has embraced the Cluster

Development approach as a crucial tactic for boosting the nation's MSEs' and their collectives' capacity building, productivity, and competitiveness. A cluster is a collection of businesses that are situated in a recognizable

and, to the greatest extent possible, contiguous area or a value chain that extends beyond a specific geographic area and produces the same, similar, or complementary goods and services. These businesses can be connected by shared physical infrastructure facilities that aid in addressing their shared challenges.

Major Industrial Policy Initiatives

Industrial Policy 2020-2026:

1. To draw in INR 5 lakh crore in investments
2. To provide 20 lakh individuals with job possibilities.
3. To finish third in the next five years in terms of merchandise exports
4. To keep the industrial growth rate at 10% annually.
5. To create a supportive environment for the adoption and innovation of technology
6. Pay attention to the growth and advancement of the MSME sector.
7. Make industrial land more accessible.
8. The state's distant tier II and III cities are the engines of economic expansion.

9. Put Karnataka in the forefront of India's global commerce.
10. Present Karnataka as the industry 4.0 "Factory of the Future."
11. Establish a setting that makes doing business in the state easier.
12. Encourage technological advancement and research and development.

Findings:

A diverse viewpoint is provided by a suitable definition of Micro, Small, and Medium-Sized Enterprises and their appropriate classification in a national or international context. Small businesses or industries in the private sector are typically referred to as MSMEs. MSMEs have been categorized in various ways depending on the type of assets they possess, the size of their production, etc. Others, however, have characterized those units in terms of the creation of jobs, shareholder cash, the size of investments or product sales, etc. According to the World Bank, a company is considered an MSME if it satisfies two of the three requirements: annual sales, asset size, or staff strength.



Artificial Intelligence and the Future Economy: Transforming Language, Communication, and Employment in the Digital Age

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Abstract:

Artificial Intelligence (AI) has emerged as one of the most transformative forces of the twenty-first century, reshaping economies, industries, education, and communication systems across the world. Within the field of languages, AI has significantly influenced translation, content generation, communication practices, language learning, publishing, and employment patterns. This paper examines the relationship between artificial intelligence and the future economy from the perspective of language studies. It explores how AI-driven tools such as machine translation, chatbots, voice assistants, automated writing platforms, and natural language processing systems are redefining linguistic practices and creating new opportunities as well as challenges. The study argues that language is no longer only a medium of expression but also a key economic resource in the digital era, where data, communication, and content production determine market value. AI is increasing productivity in language-related industries such as translation, customer service, media, education, digital marketing, and publishing, while simultaneously threatening routine linguistic jobs through automation. The paper also discusses ethical concerns such as loss of originality, cultural bias, linguistic inequality, and dependence on machines. By analyzing the growing intersection of AI, language, and economy, the article concludes that the future economy will require language professionals to adapt by combining human creativity, critical thinking, and emotional intelligence with AI-based technological competence. The paper highlights the need for a balanced approach where AI supports human language work rather than replacing the human voice and cultural depth embedded in language.

Keywords: *Artificial Intelligence, Future Economy, Language, Communication, Translation, Employment, Digital Economy, Natural Language Processing.*

Introduction:

Artificial Intelligence has become a defining feature of the modern world. From education and healthcare to banking, governance, and business, AI is influencing how societies function and how economies grow. In simple terms, artificial intelligence refers to the capacity of machines or computer systems to perform tasks that normally require human intelligence, such as learning, reasoning, problem-solving, decision-making,

and language processing. While AI was once considered a futuristic concept, it is now deeply embedded in everyday life through digital assistants, recommendation systems, automated writing tools, translation software, and customer service chatbots.

The impact of AI on the economy is immense. It improves efficiency, reduces costs, accelerates production, and creates new markets. Most discussions on AI and the economy focus on engineering, robotics,

finance, or data science. However, the role of language in the AI-driven economy is equally important. Language is central to communication, knowledge sharing, education, trade, diplomacy, advertising, media, and culture. In the digital economy, language has become data, and data has become power. AI systems are trained on language, process language, and produce language. Therefore, the study of AI and the future economy must include a close examination of how language itself is being transformed.

The language discipline provides a unique lens to understand AI because language is not merely a technical tool; it is also a cultural, emotional, social, and intellectual practice. AI-generated text, machine translation, speech recognition, automated summaries, and digital writing assistants are changing how language is used in professional and academic spaces. These changes have direct economic consequences because communication-based work is expanding in the global digital market. At the same time, routine language tasks are increasingly being automated, which raises concerns about employment, creativity, and authenticity.

This paper explores how AI is shaping the future economy through language-related transformations. It discusses the impact of AI on translation, content creation, language learning, employment, communication industries, and cultural expression. It also evaluates the opportunities and risks associated with AI in the field of languages.

Objectives of the Study:

The present paper has the following objectives:

1. To examine the role of Artificial Intelligence in the transformation of language-related economic activities.
2. To analyze the impact of AI on communication, translation, writing, and language learning.
3. To study how AI influences employment opportunities in language-based professions.
4. To identify the challenges and ethical concerns created by AI in the field of languages.
5. To understand how language professionals can adapt to the future AI-driven economy.

AI and Language: A New Relationship:

Language has always been central to human civilization. It is through language that people exchange ideas, preserve culture, build institutions, and conduct business. In the age of AI, language has gained a new technological and economic dimension. Machines are now trained to recognize speech, translate texts, answer questions, write essays, summarize documents, and interact with users in natural language. This field is commonly known as Natural Language Processing (NLP), which enables computers to understand and generate human language.

The relationship between AI and language is revolutionary because it changes the status of language from a human-only skill to a machine-assisted resource. AI tools such as Google Translate, Grammarly, ChatGPT, Siri, Alexa, and automated customer support

systems show how language has become integrated with technology. Businesses increasingly depend on AI-based language tools to communicate with customers, manage information, market products, and expand globally. As a result, language has become a significant part of the digital economy.

AI does not merely store language; it actively processes and reproduces it. It predicts words, suggests grammar, adapts tone, translates meaning, and even imitates writing styles. This has opened new possibilities for multilingual communication, content creation, and educational accessibility. At the same time, it has raised concerns about originality, authorship, and the replacement of human language workers.

AI in Translation and the Global Economy:

One of the most visible impacts of AI in the language field is in translation. In a globalized economy, translation is essential for trade, diplomacy, tourism, education, e-commerce, and international communication. Earlier, translation depended entirely on human expertise, and it was often expensive and time-consuming. Today, AI-powered translation tools can translate texts, websites, subtitles, and business documents within seconds.

This transformation has major economic consequences:

Expanding Global Markets:

AI translation allows companies to reach customers in different linguistic regions quickly and at low cost. E-commerce platforms, educational websites, and multinational companies use machine translation to communicate across borders.

This increases market access and boosts international trade.

Reducing Communication Costs:

Businesses no longer need to depend solely on manual translation for routine tasks. AI helps reduce expenses in customer support, product descriptions, emails, and basic documentation.

Creating New Hybrid Jobs:

Although AI automates basic translation, it also creates new roles such as:

- AI-assisted translators
- Localization specialists
- Post-editing experts
- Multilingual content reviewers
- Language data annotators

Threat to Traditional Translation Work:

Routine translation jobs may decline because machines can now handle basic texts efficiently. Human translators may increasingly be required only for literary translation, legal documents, cultural texts, academic writing, and sensitive communication where nuance matters deeply.

Thus, AI in translation demonstrates both the promise and the anxiety of the future economy: greater efficiency and global reach on one side, and job insecurity on the other.

AI and Content Creation in the Digital Economy:

The digital economy depends heavily on content. Websites, advertisements, blogs, news articles, product descriptions, social media posts, emails, academic materials, and scripts all require language production. AI has transformed this sector by introducing

automated writing tools capable of generating large volumes of text quickly.

Speed and Productivity:

AI can draft emails, summarize reports, generate captions, suggest headlines, and prepare marketing content within seconds. This increases productivity in businesses, publishing, and education.

Economic Value of Language Data:

In the digital marketplace, attention is money. Companies need constant communication with users, and AI helps produce scalable content. Language has therefore become an economic asset, and those who control linguistic data and AI platforms gain commercial power.

Democratization of Writing:

AI tools assist non-native speakers, students, small entrepreneurs, and content creators by improving grammar, style, and vocabulary. This broadens participation in the knowledge economy.

Risk of Homogenization:

If everyone depends on similar AI systems, writing may become repetitive, predictable, and lacking in individuality. Human voice, literary quality, and emotional nuance may weaken.

Academic and Ethical Concerns:

AI-generated writing also raises concerns about plagiarism, false information, fabricated references, and the decline of independent thinking. In academic spaces,

overdependence on AI may damage originality and critical writing skills.

Therefore, while AI expands content production and creates economic efficiency, it also challenges the human foundations of writing and authorship.

AI in Language Learning and Educational Economy:

Education is a major component of the future economy, and language learning is central to education. AI has transformed language teaching and learning through personalized platforms, grammar correction tools, pronunciation software, virtual tutors, and adaptive learning systems.

Personalized Learning:

AI can identify learner weaknesses and provide customized exercises. Students can practice pronunciation, grammar, vocabulary, listening, and writing according to their level.

24/7 Access to Language Support:

AI-based tools are available anytime, which helps learners in remote areas or those without regular access to trained language teachers.

Growth of the EdTech Industry:

AI has created a large educational technology market. Language learning apps, digital courses, and AI tutoring platforms generate employment and investment opportunities.

Teacher's Role is Changing:

AI does not eliminate teachers, but it changes their role. Teachers increasingly act

as facilitators, mentors, evaluators, and critical guides rather than only information providers.

Risks in Education:

Heavy dependence on AI may weaken students' ability to think independently, write creatively, and engage deeply with literature and language. Language learning is not only about correctness; it is also about culture, imagination, emotion, and human interaction.

Thus, AI supports educational access and efficiency, but it should not replace the human relationship at the heart of language teaching.

AI, Employment, and the Future of Language Professions:

The future economy will be shaped not only by technological growth but also by changes in employment. AI is already transforming the labor market, and language-based professions are among those affected.

Jobs Likely to Be Automated:

Certain routine tasks in language professions may be automated:

- Basic translation
- Proofreading of simple texts
- Customer support responses
- Data entry involving text
- Standardized report writing
- Captioning and summarization

Jobs Likely to Expand:

At the same time, new opportunities are emerging:

- AI content editor
- Prompt writer / prompt designer
- Language trainer for AI models

- Conversation designer for chatbots
- Digital communication strategist
- Localization manager
- AI ethics reviewer
- Academic editor and originality reviewer

Human Skills that Remain Valuable:

Despite automation, certain human language skills remain difficult to replace:

- Creativity
- Literary expression
- Cultural sensitivity
- Emotional intelligence
- Persuasion
- Critical interpretation
- Ethical judgment
- Contextual understanding

This suggests that the future economy will not completely remove language professionals, but it will demand reskilling and technological adaptation.

AI and the Commercialization of Communication:

Communication itself has become a marketable commodity in the digital economy. Businesses compete through branding, storytelling, customer engagement, and social media presence. AI plays a major role in this commercialization of language.

Customer Service and Chatbots:

AI chatbots now answer customer questions, solve complaints, and guide users through services. This reduces staffing costs and offers quick responses.

Advertising and Consumer Psychology:

AI studies user behavior and generates personalized advertisements using persuasive language. It can tailor messages to specific audiences based on data analysis.

Social Media Economy:

Influencers, brands, and digital businesses use AI tools to produce posts, captions, scripts, and responses, increasing their online visibility and revenue potential.

Language as Market Strategy:

In the AI economy, effective communication is no longer optional; it is a competitive advantage. Companies that master multilingual, personalized, and rapid communication are better positioned in the global market.

However, commercialization of communication can also lead to manipulation, emotional targeting, and erosion of authentic human interaction.

Challenges and Ethical Concerns:

The expansion of AI in the language economy is not free from problems. Several serious concerns must be addressed.

Loss of Originality:

AI can generate grammatically correct and polished content, but excessive dependence may reduce individual voice and creative effort.

Bias in Language Models:

AI systems are trained on existing data, which may contain cultural, racial, gender, or

linguistic biases. As a result, AI-generated language may reproduce inequality.

Threat to Linguistic Diversity:

Most AI systems are stronger in dominant languages such as English. Smaller regional languages may receive less technological support, increasing digital inequality.

Privacy and Data Concerns:

Language data often includes personal messages, voice recordings, and sensitive information. The use of such data by AI systems raises questions of consent and surveillance.

Dependence on Technology:

If language users become too dependent on AI, they may lose confidence in their own thinking, writing, and interpretive skills.

Academic Integrity:

Students and researchers may misuse AI to produce assignments, papers, and reports without genuine learning. This threatens the integrity of education and scholarship.

These concerns show that the future economy must be guided not only by efficiency but also by ethics, inclusiveness, and human dignity.

The Role of Language Teachers and Scholars in the AI Economy:

Language teachers, writers, researchers, and scholars have a crucial role in shaping the AI future. Rather than resisting

technology completely, they must engage with it critically and responsibly.

They can contribute in the following ways:

- Teach critical AI literacy so that students understand both the benefits and risks of AI tools.
- Promote ethical writing practices and originality in academic work.
- Encourage multilingual and culturally sensitive AI development.
- Use AI as an assistant, not a replacement, in language teaching and research.
- Train students in communication, interpretation, creativity, and critical thinking, which remain deeply human strengths.
- The language classroom of the future must therefore combine literature, communication skills, digital literacy, and AI awareness.

Suggestions for the Future:

To ensure that AI contributes positively to the future economy in the field of languages, the following measures are important:

- AI should be used to assist human communication, not to erase human creativity.
- Language education must include digital literacy and AI literacy.
- Governments and institutions should support regional languages in AI development.
- Ethical guidelines must be developed for AI-generated writing, translation, and academic use.

- Language professionals should be trained in editing, AI collaboration, cultural interpretation, and communication design.
- Research should focus on inclusive AI, ensuring that language technologies serve diverse communities rather than only dominant markets.

Conclusion:

Artificial Intelligence is transforming the future economy in powerful and complex ways, and language stands at the center of this transformation. In the digital age, language is no longer only a cultural or literary medium; it is also an economic resource, a technological input, and a tool of global connectivity. AI has revolutionized translation, writing, education, publishing, customer communication, and content creation. It has increased speed, productivity, and accessibility while also generating new forms of employment and commercial opportunity.

At the same time, AI poses serious challenges to language-based professions and to the human values embedded in communication. Issues such as job displacement, loss of originality, bias, cultural flattening, and academic misuse cannot be ignored. The future economy will not simply be determined by how advanced AI becomes, but by how wisely society chooses to use it.

From the perspective of language studies, the ideal future is not one where machines replace human expression, but one where AI supports human creativity, expands multilingual access, strengthens education, and enhances communication without destroying authenticity. The future belongs

not to technology alone, but to the partnership between human intelligence and artificial intelligence. In that partnership, language will remain one of the most powerful and valuable human resources.

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Skill Development in India: Challenges and Opportunities

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Abstract:

The Indian Government's "Make in India" campaign and the accelerated growth in the economy has highlighted the demand for skilled manpower in the country. The changing economic environment, it is essential to focus on imparting and promoting the skill sets of the young population of India as the countries with advanced and improved levels of skills adjust more effectively to the opportunities and challenges of world of work. The main objectives of this paper to know the challenges with respect to the of skill development in India and to assess the opportunities available for skill development in India. The present paper primarily based on secondary data sources. Secondary data have been collected from various sources like Various Reports, Research journal, Text books, Websites ect.

Keywords: Challenges, India, Opportunities and Skill Development.

Introduction:

In the globalized economy, with the rise in competition, workers are required to have higher levels of skills and knowledge which will enable them to complete their tasks efficiently so as to meet the required quality standards and increase the efficiency of the value chain process as a whole. Due to the rapid technological changes, and rising complexity of economic activity, jobs are increasingly becoming skill-intensive leading to skill shortages and thus unemployment. Skills and knowledge are the driving forces of economic and social development for any nation. Economies with higher and better levels of skills respond more effectively to the opportunities & challenges of the world of work. Skills may be broadly classified into hard skills and soft skills. Hard skills are the technical abilities related to an organization's

core business e.g. operating machinery, computer protocols, financial procedures, safety standards, and sales administration. Such skills are typically easy to observe, quantify & measure and can be methodically taught. According to National Skill Development Corporation (NSDC) – India, skills can be classified into four levels based on the degree and duration of training required.

Objectives of The Study:

Following are the important objectives of the present paper:

1. To know the challenges with respect to the of skill development in India.
2. To assess the opportunities available for skill development in India.

Research Methodology:

The present paper primarily based on secondary data sources. Secondary data have been collected from various sources like Various Reports, Research journal, Text books, Websites ect.

Challenges:

1. Industry and Private Sector

Collaboration: Creating possibilities for private sector engagement has been one of the crucial strategic pillars for skill development in India. The skilling landscape faces an acute gap in terms of sector need and availability, competency required by an employer and those possessed by a trainee, and so on. Basically, there is an issue of information asymmetry in multiple fronts. Recognition of Prior Learning or RPL is one promising way to counter the same.

2. Encouraging International Mobility: India is firm at its stance on becoming the "Skill Capital" of the world, and the commitment is made evident through its structured efforts, including the India International Skill Centre (IISC) program. For the purpose of counseling and guidance to the potential emigrants, with special focus on skills tests, up skilling, language and pre-departure orientation, a proposal for a new and market-driven IISC network has also been initiated.

3. Inadequate Infrastructure: NSDC has predicted an incremental requirement of 347 million skilled personnel in India by 2022 but the country is faced with a significant skill development challenge as over the next decade, every year approximately 12 million people are expected to join the workforce. In contrast, the country has a total training

capacity of around 4.3 million, thus depriving every year around 64% newcomers of the opportunity of the skill development training. It is a major challenge of devising such huge infrastructure setup to bridge this gap.

4. Insufficient capacity: Current infrastructure facilities available in the educational institutions throughout the country are inadequate considering the huge demand for skilled labour. There are not many trained and highly skilled trainers available. The faculty needs to be motivated and skilled to take up higher responsibilities.

5. Low industry interface: Industry-interface is very essential for any education/training institute as it helps in the assessment of demand for skills in the local area/region and thus updating of course content, Industry linkages have an important role in helping an educational/ training institute to build a strong image in the minds of the students as it ensures them that the course curriculum is in relevance with the practical industry requirements. Most of the training institutes have low industry interface as a result of which the performance of the skill development sector is poor in terms of placement records and salaries offered.

6. Mobilisation: The outlook of people associated with skill development is still very traditional. The enrolment of the students for vocational education and training has become an extremely challenging task.

7. Direct Admission without Assessment:

One of the major causes for low quality of training is the low frequency of pre-assessment or entrance tests before admitting students to the skill training institutes. Randomly choosing training courses may lead

to a mismatch between the interests and the abilities of the students as a result of which students are unable to cope with the course requirements and thus drop-outs occur.

8. Lack of Standardization: There is no standardization of the course curriculum or training delivery systems due to which it is not possible to compare courses across different training institutes which also creates ambiguity among the student about skills which will be imparted under a particular course at some training institute. There is a lack of standardized approach for measuring and evaluating the competence outcomes.

9. Skills Relevance: The course curriculum of some of the courses of skill institutes do not provide training that matches the industry requirements due to which they have poor placement records. Thus such outdated and inflexible curriculum makes some training programs completely redundant leading to supply of specific skills exceeding their demand.

Regularly updating the course curriculum and accordingly upgrading training infrastructure is complex and expensive.

10. Career Counseling: There is a lack of proper career guidance to the students due to the inadequate placement statistics and weak industry linkages of the training institutes. The institutes are often set up in rural areas but the jobs offered to the trainees are in urban areas. The absence of information on the nature and location of the job leads to uninformed skill acquisition choices.

11. High Cost: The cost of the training is high which is not affordable by many of the students aspiring for training. According to the estimates of Planning Commission, around

80% of the individuals who enter the workforce don't have the opportunity for training. Moreover, due to unsatisfactory placement records and low salary offers after the training completion, high training cost does not appeal the target population.

Opportunities:

Job markets all across the world including India are undergoing a tectonic shift. The future of work in India: Inclusion, Growth and Transformation Report by the Observer Research Foundation and the World Economic Forum sheds light on the future of transformative technology and its impacts on work in India. Some key insights from this report are that companies expect technological change to lead to job creation, not job loss. They recognize the potential of new technologies in the coming years. The whole focus is expected to be on automation of repetitive tasks, time optimization, maximizing productivity, creation of digital platforms for online access to job opportunities and formalizing informal operations. It is critical for people to keep picking up new tricks of their trade and keep themselves updated with new technological changes in their sphere of work.

Conclusion:

In India, educational qualification is generally preferred over vocational training as former is associated with better employment opportunities, in terms of pay as well as quality of work. Additionally, there is limited mobility between formal education and vocational training in India due to lack of equivalent recognition for the latter; a student

enrolled in vocational training often cannot migrate to institutes of higher education due to eligibility restrictions. Skill development is the most important aspect for the development of our country. India has a huge 'demographic dividend' which means that it has very high scope of providing skilled manpower to the labour market. This needs a coordinated effort from all stakeholders including: Government agencies such as Ministry of Skill Development and Entrepreneurship, National Skill Development

Corporation etc, Industries, Educational and training institutes and Students, trainees and job seekers.

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Executive Editor

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