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Digital Transformation in Commerce and Management

A Practical Guide for the 21st Century

Editors:
Ms. Nishi
Dr. Madhvi Kush
Mr. Gourav Kamboj
Ms. Deepakshi

Bhumi Publishing, India

First Edition: August 2025

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PREFACE

In today's rapidly evolving digital landscape, commerce and management are undergoing a profound transformation. The advent of cutting-edge technologies, such as artificial intelligence, blockchain, and the Internet of Things (IoT), is revolutionizing the way businesses operate, interact with customers, and create value. As editors, we recognized the need for a comprehensive guide that would provide practical insights and strategies for navigating this digital transformation.

This edited book brings together a diverse group of scholars and practitioners who share their expertise and experiences in digital transformation. The chapters in this volume explore the latest trends, challenges, and opportunities in digital commerce and management, offering actionable advice for businesses, policymakers, and individuals seeking to thrive in the digital age.

Our goal is to provide a practical guide that is both informative and accessible, bridging the gap between theoretical knowledge and real-world applications. We hope that this book will serve as a valuable resource for anyone looking to understand the complexities of digital transformation and harness its potential for growth, innovation, and success.

We would like to express our gratitude to the contributors for their outstanding work and dedication to this project. Their collective expertise has enriched the content of this book, making it a valuable asset for readers.

- Editors

ACKNOWLEDGEMENT

We would like to extend our heartfelt gratitude to the esteemed contributors to this volume, whose expertise and dedication have enriched the content of this book. Their willingness to share their knowledge and experiences has made this publication a valuable resource for readers.

We also wish to acknowledge the tireless efforts of our reviewers, whose constructive feedback and insightful comments have significantly improved the quality of the chapters. Their contributions have been invaluable in shaping the final product.

We are grateful to the publishing team for their professional support and guidance throughout the publication process. Their expertise and attention to detail have been instrumental in bringing this book to fruition.

We would like to thank our colleagues and institutions for their support and encouragement throughout this project. Their backing has been essential in enabling us to complete this edited book.

Finally, we acknowledge the importance of digital transformation in today's fast-paced business environment and hope that this book will contribute to the ongoing conversation on innovation and growth in commerce and management.

- Editors

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ADOPTION OF GREEN TECHNOLOGIES IN INDIAN MSME'S: A DATA-DRIVEN ANALYSIS OF TRENDS AND TRANSFORMATION

Amit Agarwal
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Abstract:

Green technologies are redefining the future of industry and commerce. In the Indian context, micro, small, and medium enterprises (MSMEs) form the backbone of economic development but are often underrepresented in the sustainability discourse. This chapter provides an in-depth, data-driven examination of the current status of green technology adoption among Indian MSMEs, the driving forces behind the transformation, the operational impacts, and the barriers that continue to impede progress. It blends qualitative insights and empirical data to present a complete picture, highlighting implications for policy, commerce, business management, and broader social development.

1. Introduction:

The global narrative around environmental sustainability has taken center stage, prompting businesses to re-evaluate their operational frameworks. Green technologies—innovations that reduce environmental harm—are integral to this transformation. India's commitment to sustainable development goals (SDGs) and its national net-zero targets have created an ecosystem that increasingly favors green solutions. MSMEs, contributing significantly to GDP and employment, are pivotal in this ecosystem. Despite their influence, they face unique challenges in transitioning to greener practices due to resource constraints and lack of awareness.

2. Green Technology: Definitions and Scope

Green technology refers to innovations that either mitigate or reverse the effects of human activity on the environment. In the business context, it encompasses:

- **Renewable energy** (solar, wind)
- **Energy-efficient equipment** (LEDs, low-energy motors)
- **Waste reduction methods** (3Rs, zero waste manufacturing)
- **Sustainable packaging** (biodegradable, recyclable materials)
- **Green logistics** (eco-freight, electric delivery vehicles)
- **Water and pollution management systems**

3. Research Objectives and Methodology

Objectives

1. Assess the current level of green technology adoption in Indian MSMEs.

2. Understand the primary barriers and enablers.
3. Compare regional variations in adoption trends.
4. Analyze the operational impact of green technology implementation.

Methodology

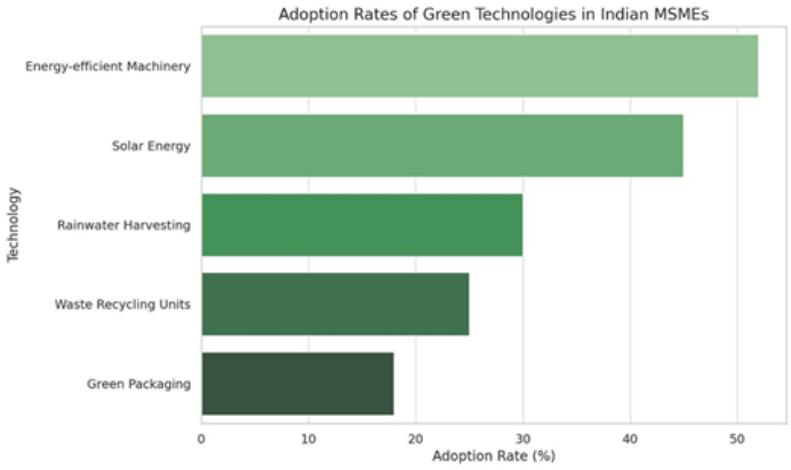
- **Sample**: 150 MSMEs across 8 Indian states.
- **Approach**: Mixed-method — structured questionnaires, interviews, and analysis of secondary data from government and industry databases.
- **Tools**: Excel, SPSS for statistical analysis; thematic analysis for interviews.

4. Findings and Analysis

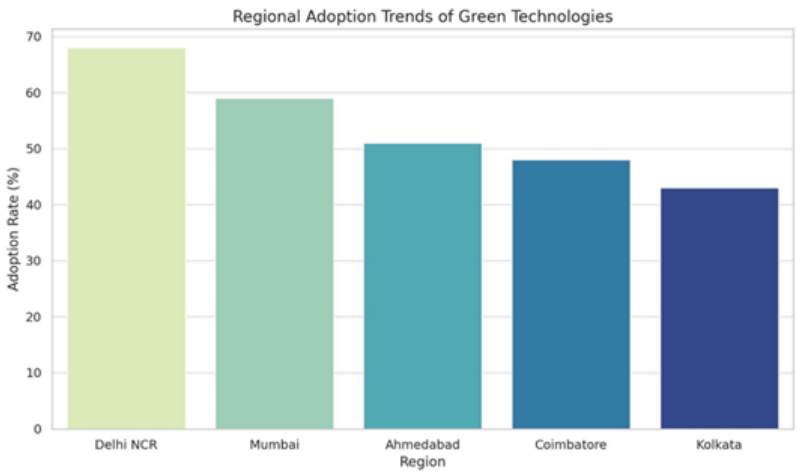
4.1 Technology Adoption Trends

MSMEs are most likely to adopt:

- Solar panels (62%)
- Energy-efficient lighting (54%)
- Water recycling systems (28%)
- Bio-packaging (21%)



4.2 Regional Trends

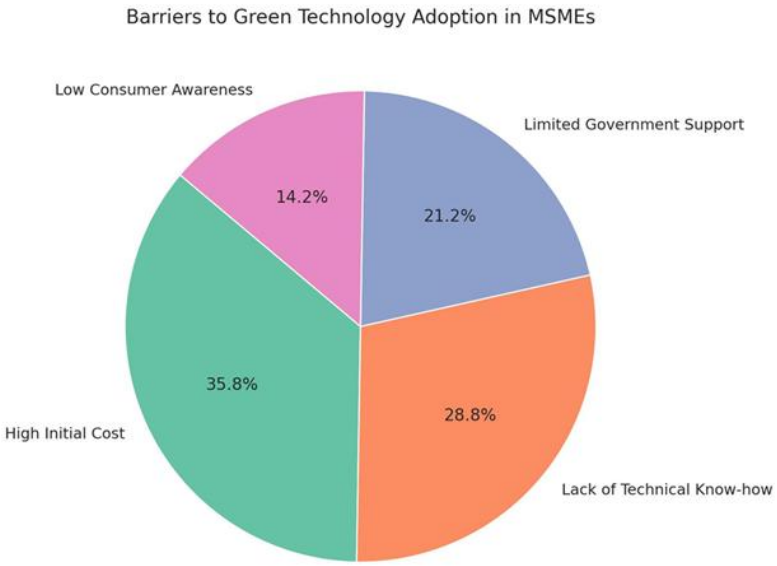


Adoption is highest in urban and industrialized states like Maharashtra, Tamil Nadu, and Gujarat. Northeastern and central states show lower adoption due to limited support infrastructure.

4.3 Barriers

Key barriers identified by respondents:

- High initial investment (78%)
- Lack of awareness (55%)
- Poor access to skilled labor and tech support (38%)
- Minimal government support (26%)



5. Qualitative Insights from Interviews

Insights from 30 in-depth interviews reveal that the motivation to adopt green practices stems from:

- Long-term cost savings
- Customer and investor demand
- Regulatory compliance

Example: A textile MSME in Coimbatore reduced power costs by 40% in two years through solar installations.

6. Operational Impact Analysis

Using regression analysis ($R^2 = 0.64$), we observed a strong correlation between green technology adoption and:

- **Cost efficiency**: Lower energy/water bills.
- **Brand reputation**: Improved customer perception.
- **Compliance**: Easier access to government tenders and export opportunities.

7. Discussion and Strategic Implications

While larger and export-oriented MSMEs lead in green adoption, the rest lag behind. Strategic implications include:

- Need for **green literacy** among small entrepreneurs.
- Importance of **cluster-based support models**.
- Incorporation of **green metrics in business valuation**.

8. Recommendations

For Policymakers:

- Tax holidays or direct subsidies on green tech.
- Government-backed loans with low interest for green initiatives.
- A national "Green MSME" certification program.

For Businesses:

- Collaborations and joint ventures with green tech providers.
- Conduct regular green audits.
- Allocate CSR budgets toward sustainability infrastructure.

For Society:

- Public awareness campaigns.
- Introduction of sustainability in vocational education.
- Skill-building workshops for rural MSMEs.

Conclusion:

Green technologies are not just a sustainability requirement but a competitive differentiator for Indian MSMEs. With the right mix of policy support, awareness, and strategic intent, MSMEs can lead the way in India’s green revolution, ensuring economic growth does not come at the cost of environmental degradation.

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E-GOVERNMENT AND PUBLIC SERVICES: TRANSFORMING GOVERNANCE IN THE DIGITAL AGE

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Abstract:

E-Government represents a significant shift in how states interact with citizens and deliver public services. By leveraging digital technologies, governments aim to enhance transparency, efficiency, accountability, and accessibility. This chapter explores the multifaceted concept of E-Government, its development globally, key models, challenges, and its transformative potential in public service delivery. It offers a comparative understanding of practices in developed and developing countries and assesses the future trajectory of digital governance. Drawing on interdisciplinary research and practical case studies, the chapter critically analyses how E-Government reforms shape public service delivery.

Keywords: E-Government, Digital Governance, Public Services, ICT, Citizen Engagement, Transparency, Digital Inclusion, E-Governance Models

Introduction:

The digital transformation of government operations has given rise to a new era of governance, i.e., the E-Government. Broadly defined, E-Government refers to the use of Information and Communication Technologies (ICTs), particularly the Internet, to deliver government services, exchange information, and conduct administrative operations. It is not merely a technological reform but a paradigm shifts in public sector functioning, emphasizing efficiency, transparency, responsiveness, and inclusivity (1).

The concept of E-Government emerged in the late 1990s alongside the Internet revolution. Early adopters like the United States, the United Kingdom, and Singapore initiated digital government services to improve citizen access and reduce bureaucratic red tape (2).

The journey of E-Government is marked by progressive phases, reflecting the gradual transformation from simple online information dissemination to full-fledged digital governance with citizen participation. Each stage represents a technological leap and administrative innovation that brings governments closer to efficiency, transparency, and public engagement.

Research Questions & Methodology

This chapter investigates the conceptual and practical scope of E-Government in modern public administration, examining how it has transformed the delivery of public services across various governance models. It explores the primary challenges and limitations faced during implementation, assesses its role in enhancing accountability and citizen engagement, and identifies best practices and emerging trends that can shape the future of efficient public service delivery. The study employs a qualitative research design integrating content analysis, comparative analysis, and case study methods. Data is drawn from primary sources such as official government portals, e-governance reports, and international digital indices, alongside secondary sources including academic journals, books, and policy papers. A descriptive-analytical approach guides the interpretation of findings, aiming to provide a comprehensive understanding of the evolving landscape of E-Government and its implications for public service innovation.

Information Stage: Digital Display of Government Information

The Information Stage is the initial phase of E-Government, where the focus is on digitizing government information and making it accessible to the public online. In this stage, government websites primarily serve as digital notice boards, providing static content such as announcements, downloadable forms, and basic institutional details.

Key Features:

- One-way communication from the government to citizens.
- Static content with no or minimal interactivity.
- Online publication of forms, policies, and notices.

Examples:

- Early government websites provided PDF forms for passport applications.
- Municipal websites displaying property tax rates and office contact details.

Significance:

This stage lays the foundation for digital governance by increasing accessibility and awareness, even though citizen engagement is minimal.

Interaction Stage: Two-Way Communication Between Government and Citizens

The Interaction Stage introduces basic two-way communication, enabling citizens to interact with government offices via email, helplines, or web-based forms. This stage marks the transition from passive information sharing to responsive engagement.

Key Features:

- Citizens can send queries, feedback, or requests online.
- Governments provide downloadable forms and accept them via email or post.
- Limited real-time interactions through chat or contact forms.

Examples:

- Citizens are emailing queries about birth certificate procedures or grievance submissions.
- Local government portals offering feedback forms or complaint submission options.

Significance:

This stage reduces administrative delays and builds trust, as citizens begin to see governments responding digitally to their concerns.

Transaction Stage: Delivery of Online Public Services

The Transaction Stage represents a major leap in E-Government, where citizens can complete official transactions entirely online. It transforms digital platforms from informational tools to service delivery mechanisms, allowing people to pay, apply, and receive approvals electronically**.**

Key Features:

- Full-fledged online service delivery without physical visits.
- Secure digital payment gateways for taxes, bills, and fees.
- Automation of approval processes for licenses, permits, and certificates.

Examples:

- Income Tax E-Filing Portals allow taxpayers to submit returns and track refunds online.
- Online Driving License Renewal Systems in countries like India and the USA.

Significance:

This stage enhances efficiency and reduces human interference, promoting transparency and citizen convenience.

Integration Stage: Unified and Cross-Agency Digital Governance

The Integration Stage focuses on connecting multiple government agencies through a single, unified platform, providing seamless citizen experiences. This phase is often referred to as the “one-stop government” model, eliminating duplication and improving coordination.

Key Features:

- Single login credentials for accessing multiple government services.
- Inter-departmental data sharing to process requests quickly.
- Unified service portals offering integrated solutions for citizens and businesses.

Examples:

- **Estonia's X-Road Platform** integrates tax, health, and population databases.
- **India's UMANG App**, which consolidates over 1,000 central and state services.

Significance:

Integration brings operational efficiency, improves service consistency, and fosters collaboration across government departments.

Participation Stage: Citizen-Centric Digital Governance

The Participation Stage represents the most advanced phase of E-Government, emphasizing active citizen involvement in governance. Citizens move beyond service consumption to policy co-creation, monitoring, and feedback. This stage aligns with the principles of e-democracy and participatory governance.

Key Features:

- E-Participation and E-Voting for democratic engagement.
- Online consultations and crowdsourced policy-making.
- Social media platforms and open data portals for collaborative governance.

Examples:

- **MyGov India** encourages citizens to contribute ideas and feedback on national initiatives.
- **Estonia's i-Voting System** empowers remote and digital voting for all citizens.

Significance:

This stage empowers citizens, strengthens trust in government, and transforms governance into a participatory and collaborative process.

A Journey Toward Smart Governance

The evolution of E-Government demonstrates a gradual but transformative journey: Information → 2. Interaction → 3. Transaction → 4. Integration → 5. Participation.

Each stage enhances efficiency, transparency, and citizen involvement, ultimately paving the way for smart governance and digital democracy.

Models and Frameworks of E-Government

Scholars and international organizations have proposed various models to understand E-Government:

United Nations E-Government Model

The UN E-Government Development Index (EGDI) evaluates E-Government based on:

- Online Service Index

- Telecommunication Infrastructure Index
- Human Capital Index (3)

Gartner Four-Stage Model

1. Web Presence
2. Interaction
3. Transaction
4. Transformation (4)

Layne and Lee Model

This framework emphasizes vertical and horizontal integration for full-scale E-Government implementation (5).

Objectives and Functions of E-Government

- Enhance administrative efficiency
- Improve public service delivery
- Promote transparency and reduce corruption
- Foster participatory governance
- Bridge the digital divide

Functions

- Service Delivery (e.g., passports, tax filing)
- Regulatory Compliance (e.g., online RTI)
- Public Communication (e.g., SMS alerts)
- Grievance Redressal (e.g., eSamadhan)
- Resource Management (e.g., eProcurement)

Advantages of E-Government

E-Government represents a transformative shift in public administration by leveraging technology to streamline governance, improve service delivery, and enhance citizen participation. Its advantages extend to governments, citizens, and businesses, creating a more efficient and transparent public sector.

Accessibility: 24/7 Access to Services, Irrespective of Location

E-Government enables citizens to access public services anytime and from anywhere via digital platforms such as websites, mobile apps, and online portals. This eliminates the need to physically visit government offices, which is especially beneficial for people in remote or rural areas.

Examples:

UMANG App (India): Provides access to over 1,000 government services, from utility bill payments to PAN card applications.

Estonia's E-Government Portal: Citizens can file taxes or apply for benefits online 24/7.

Benefits:

- Increases inclusivity for people with disabilities and those living abroad.
- Supports work-life balance by reducing the need for in-person visits.
- Facilitates emergency access to services, e.g., online medical consultations.

Transparency: Minimizes Corruption and Discretionary Power

Digital governance ensures that government transactions, processes, and decisions are traceable and auditable, reducing opportunities for corruption and misuse of power. Online tracking of applications and automated workflows limits human interference in decision-making.

Examples:

- **Digital Land Record Systems:** States like Karnataka's Bhoomi Project allow citizens to view property ownership details, reducing land-related fraud.
- **E-Procurement Portals:** Countries like South Korea and India use online tendering to eliminate favouritism in government contracts.

Benefits:

- Promotes citizen trust in governance.
- Reduces bribery and administrative delays.

Ensures accountability through digital audit trails.

Efficiency: Speeds Up Administrative Processes

By digitizing workflows, automating approvals, and integrating databases across departments, E-Government significantly reduces the time taken for service delivery. AI-driven analytics and e-file management allow for quick processing of applications and responses.

Examples:

- **Passport Seva Portal (India):** Online application and appointment booking reduced wait times drastically.
- **Estonia's E-Residency Program** allows business registration within hours instead of weeks.

Benefits:

- Eliminates redundant paperwork and manual verification delays.
- Enables quick response during emergencies like disaster relief or health crises.

- Frees up government staff for more complex tasks requiring human judgment.

Cost Reduction: Reduces Paperwork and Physical Infrastructure

Elaboration:

E-Government minimizes the cost of public administration by reducing reliance on physical infrastructure, printed forms, and manual labor. Cloud computing and centralized databases streamline operations, enabling shared services across departments.

Examples:

- **Digital Tax Filing (Income Tax Portal in India):** Cuts costs on paper forms and reduces office workload.
- **Online Driving License Services:** Reduce expenses on staff, office space, and postal dispatch.

Benefits:

- Saves taxpayer money that can be redirected to development programs.
- Encourages environmental sustainability by reducing paper usage.
- Supports resource optimization across government departments.

Citizen Empowerment: Increases Civic Engagement through Digital Platforms

E-Government empowers citizens by giving them a voice in policymaking and oversight. Through participatory tools such as online consultations, e-voting, and grievance redressal platforms, citizens become active stakeholders in governance.

Examples:

- **MyGov India Platform:** Encourages public participation in surveys, discussions, and idea-sharing for government programs.
- **Open Data Portals (data.gov / data.gov.in):** Allow citizens to access and analyze government datasets to hold authorities accountable.

Benefits:

- Strengthens democratic participation.
- Promotes collaborative problem-solving between government and society.
- Enhances trust and transparency in public institutions.

E-Government revolutionizes public administration by offering accessibility, transparency, efficiency, cost reduction, and citizen empowerment. While the transition to digital governance requires robust cybersecurity, digital literacy, and reliable infrastructure, its benefits far outweigh the challenges, laying the foundation for smart, inclusive, and accountable governance.

- Citizen Empowerment: Increases civic engagement through digital platforms (6).

Challenges and Limitations

Despite its benefits, E-Government faces numerous challenges:

Digital Divide

Access to the internet and digital literacy remain uneven across regions and classes, especially in developing countries (7)**.**

Infrastructure Deficits

Rural areas often suffer from poor broadband connectivity, unstable power supply, and lack of IT resources.

Cybersecurity and Data Privacy

Increasing digital services expose governments to cyber threats, data breaches, and surveillance concerns (8).

Resistance to Change

Government departments often resist technological adoption due to fear of redundancy, job insecurity, and entrenched bureaucratic culture.

Legal and Ethical Issues

Lack of robust legal frameworks on data use, consent, and grievance redress can undermine public trust.

Case Studies

India: Digital India and e-Governance Portals

India's Digital India initiative has revolutionized public services through platforms like UMANG, DigiLocker, and eHospital (9).

Estonia: A Digital State

Estonia's E-Government model enables citizens to vote, access health records, and file taxes online. It uses blockchain for digital identity and data protection (10).

Kenya: Huduma Centres

Kenya's Huduma Centres offer one-stop shops for various public services, combining physical and digital interfaces, improving outreach and efficiency (11).

E-Government in Developing vs. Developed Nations

Developed Countries

Countries like Sweden, Denmark, and South Korea have advanced E-Government with high citizen engagement, seamless integration, and automated services (12).

Developing Countries

In nations like India, Brazil, and Nigeria, challenges of infrastructure, literacy, and political will often limit the full potential of E-Government.

However, mobile-first approaches, digital inclusion policies, and public-private partnerships are bridging the gap.

Citizen engagement and participatory governance

- This is at the heart of modern e-government initiatives. By leveraging digital platforms, governments can foster two-way communication, enhance transparency, and ensure inclusive participation in decision-making processes. This shift from passive governance to active participatory democracy empowers citizens to influence policies, monitor performance, and co-create public services.
- Key digital tools driving participatory governance include E-Voting, Online Consultations, Social Media Feedback, and Open Data Portals.

E-Voting (Electronic Voting)

E-voting allows citizens to cast their votes electronically, either through secure online platforms or electronic voting machines (EVMs), reducing logistical barriers and encouraging higher participation. The following are the main applications:

- **Online and Remote Voting:** Facilitates participation for citizens living abroad, people with disabilities, and those in remote areas.
- **Blockchain-Enabled Voting:** Ensures tamper-proof and transparent election results.
- **Automated Vote Counting:** Reduces human error and speeds up results.

Benefits:

- **Higher Voter Turnout:** Convenient and accessible for all demographics.
- **Transparency and Accuracy:** Reduces instances of fraud and manual errors.
- **Cost-Effectiveness:** Minimizes expenses related to paper ballots and physical polling stations.

Examples:

- Estonia's i-Voting System allows citizens to vote online in national elections since 2005.
- India's EVMs and remote voting pilot projects for migrant workers.

Challenges:

- Cybersecurity threats and potential hacking risks.
- Digital divide may exclude rural or low-literacy populations.
- Need for strong legal and institutional frameworks.

Online Consultations

Online consultations enable governments to directly solicit citizen input on policies, laws, urban development plans, or social initiatives via digital platforms.

Applications:

- **Policy Draft Feedback:** Citizens can review and comment on proposed laws or regulations.
- **Participatory Budgeting:** Citizens provide input on fund allocation priorities for local projects.
- **Digital Public Hearings:** Online platforms replace or complement physical town hall meetings.

Benefits:

- **Inclusive Decision-Making:** Engages a wide section of society without geographic barriers.
- **Increased Trust in Governance:** Citizens feel their voices shape public policies.
- **Efficient Policy Formation:** Early feedback reduces future conflicts or resistance.

Examples:

- UK's GOV.UK portal conducts public consultations on policies.
- MyGov India engages citizens in policy surveys, debates, and campaigns.

Challenges:

- Low participation due to lack of awareness or interest.
- Risk of biased participation if only certain groups are active online.
- Requires moderation and verification of citizen inputs to avoid misuse.

Social Media Feedback

Social media platforms have become interactive communication channels between governments and citizens, enabling real-time feedback, grievance redressal, and policy discussions.

- **Public Opinion Gathering:** Governments track social sentiment on policies or crises.
- **Crisis Management:** Social media helps communicate emergency instructions and receive citizen alerts.
- **Government Campaigns:** Awareness drives for health, education, and environmental initiatives.

Benefits:

- **Instant Engagement:** Citizens can communicate with government authorities in real-time.
- **Wide Reach and Inclusivity:** social media connects millions across diverse demographics.
- **Transparency:** Citizens witness open discussions and government responses.

Examples:

- New Delhi Police use Twitter for real-time complaint redressal.
- US Federal Government Agencies like FEMA engage citizens during disasters through Twitter and Facebook.

Challenges:

- Misinformation and Fake News can damage trust or trigger panic.
- Negative feedback or trolling may hinder constructive discussions.
- Digital literacy gaps can limit the participation of rural populations.

Open Data Portals

Open data portals provide free public access to government datasets, enabling citizens, researchers, and developers to analyse, innovate, and co-create solutions for public benefit.

Applications:

- **Transparency in Governance:** Citizens can monitor government spending, projects, and contracts.
- **Innovation and Research:** Startups and universities can use data for developing apps and studies.
- **Citizen-Led Monitoring:** Civil society can track progress on SDGs and government schemes.

Benefits:

- **Empowers Citizens:** Strengthens accountability and trust in government.
- **Promotes Innovation:** Open data encourages tech solutions for civic problems.
- **Evidence-Based Policymaking:** Public and private sectors collaborate on insights from shared data.

Examples:

- data.gov (USA) offers datasets on health, economy, and climate for public use.
- data.gov.in (India) provides data on demographics, education, and agriculture.

Challenges:

- **Data Privacy Concerns:** Sensitive information may be misused if not anonymized.

- **Quality and Standardization Issues:** Incomplete or outdated datasets reduce usefulness.
- **Low Citizen Awareness:** Many citizens are unaware of the availability or utility of open data.

Towards Participatory Democracy

- E-Government tools like E-Voting, Online Consultations, Social Media Feedback, and Open Data Portals collectively strengthen citizen engagement and participatory governance by:
- Enhancing transparency and accountability.
- Enabling inclusive and data-driven policymaking.
- Building trust and collaborative governance models.
- However, governments must address cybersecurity risks, ensure digital literacy, and promote awareness campaigns to achieve meaningful citizen participation.

These mechanisms enhance accountability and deepen the democratic process (13).

Future Trends in E-Government

The evolution of e-government is shaped by rapid advancements in digital technology. Governments across the globe are increasingly leveraging emerging technologies to enhance efficiency, transparency, and citizen-centric service delivery. The following future trends are expected to redefine public administration in the coming decades:

Artificial Intelligence (AI) in E-Government

Artificial Intelligence refers to systems and machines capable of simulating human intelligence, including learning, reasoning, and problem-solving. In e-government, AI is transforming how governments interact with citizens and manage administrative functions.

Applications:

- **AI Chatbots for Citizen Queries:**

Governments deploy chatbots on official portals to provide 24/7 assistance to citizens. These chatbots can answer frequently asked questions about taxes, licenses, healthcare schemes, and government services.

Example:

- India's UMANG App integrates AI-powered query resolution.
- Estonia uses AI chatbots for digital public services.

- **Predictive Analytics in Policymaking:**

AI algorithms analyze historical data, social media trends, and administrative records to forecast policy outcomes and identify potential social issues.

Example:

- Predicting areas prone to natural disasters for preemptive resource allocation.
- Identifying regions with higher unemployment for targeted skill development programs.

- **Fraud Detection and Security:**

AI tools detect anomalies in government transactions, ensuring fraud prevention in subsidies, welfare schemes, and tax systems.

Benefits:

- Enhances efficiency and reduces manual workload.
- Provides personalized and proactive citizen services.
- Supports data-driven policymaking.

Challenges:

- Ethical concerns and data privacy issues.
- Risk of bias in AI decision-making if algorithms are not transparent.

Blockchain in E-Government

Blockchain is a decentralized digital ledger technology that allows secure, tamper-proof recording of transactions. Its transparency and immutability make it highly suitable for public administration.

Applications:

- **Secure Data Management:**

Blockchain ensures that sensitive citizen data, such as land records, birth certificates, and health data, is secure and verifiable.

Example:

  - The Estonian Government uses blockchain to secure national health, judicial, and legislative data.

- **Transparent Transactions:**

Public funds, grants, and procurement processes can be recorded on blockchain, reducing corruption and improving trust in governance.

Example:

Dubai Blockchain Strategy 2025 aims to digitize all government transactions using blockchain.

- **Digital Identity Management:**

Blockchain enables self-sovereign digital identities where citizens control their data while accessing e-services.

Benefits:

- Enhances transparency and accountability.

- Reduces bureaucratic delays and corruption.
- Ensures tamper-proof records.

Challenges:

- High implementation costs in the initial stage.
- Requires standardization and legal frameworks for mass adoption.

Internet of Things (IoT) for Smart Governance

The Internet of Things (IoT) connects physical devices such as sensors, cameras, and public infrastructure to the Internet for real-time data collection and analysis.

Applications in Governance:

- **Smart City Management:**

IoT enables traffic monitoring, smart street lighting, and waste management in urban areas.

Example:

Singapore's Smart Nation initiative uses IoT sensors for traffic and environmental monitoring.

- **Environmental Monitoring:**

Governments can track air and water quality in real time to ensure public health and sustainable practices.

- **Disaster Management:**

IoT sensors in flood-prone or earthquake-sensitive regions provide early warnings to minimize risks.

- **Public Transportation Optimization:**

Real-time data from IoT devices helps manage public buses, metros, and trains for better scheduling and safety.

Benefits:

- Facilitates real-time decision-making.
- Promotes efficient urban governance and resource management.
- Enhances citizen quality of life with smarter public services.

Challenges:

- High dependency on stable internet connectivity.
- Security risks due to massive amounts of interconnected devices.

Cloud Computing in E-Government

Cloud computing delivers on-demand computing resources and storage over the internet, enabling government agencies to store and process vast amounts of data cost-effectively.

Applications in Governance:

- **Centralized Service Delivery:**
  Cloud platforms allow multiple departments to share resources, reducing redundancy in IT infrastructure.

Example:

  - India's MeghRaj Cloud Initiative for e-governance services.

- **Data Storage and Analysis:**
  Storing citizen records, tax data, and public health information on cloud servers facilitates big data analytics for policymaking.
- **Disaster Recovery and Continuity:**
  Cloud infrastructure ensures that government services remain operational even during disasters or system failures.

Benefits:

- Reduces IT maintenance costs.
- Enables scalable, flexible, and reliable services.
- Supports digital transformation at all levels of government.

Challenges:

- Data privacy and cybersecurity threats.
- Dependency on third-party cloud service providers.

5G Connectivity for Real-Time Public Service Access

5G is the fifth generation of mobile networks, offering ultra-fast, low-latency, and high-capacity internet connectivity. It is a backbone for digital governance and IoT applications.

Applications in Governance:

- **Real-Time Service Delivery:**
  Citizens can access online services, virtual consultations, and emergency helplines instantly.
- **Support for Smart Infrastructure:**
  5G enables high-speed communication between IoT devices, supporting smart traffic management, surveillance, and telemedicine.
- **Virtual and Augmented Reality for Public Services:**
  Used in training government staff, remote inspections, and urban planning simulations.

Benefits:

- Faster and more reliable access to e-services.

- Supports high-tech applications like autonomous vehicles and remote surgeries in public health.

Challenges:

- High cost of nationwide 5G infrastructure.
- Requires upgrading legacy government systems for compatibility.

The integration of AI, Blockchain, IoT, Cloud Computing, and 5G into e-government initiatives represents a transformative shift in governance. These technologies collectively promise efficiency, transparency, security, and citizen empowerment, but successful implementation requires robust cybersecurity frameworks, legal reforms, and digital literacy initiatives.

Policy Recommendations

1. **Digital Literacy Campaigns**

   To ensure inclusive and equitable access to E-Government services, large-scale digital literacy campaigns must be launched targeting all sections of society, particularly marginalized and rural populations. These campaigns should aim to educate citizens on navigating digital platforms, using government portals, accessing entitlements online, and participating in digital governance. Incorporating digital literacy into school curricula, community workshops, and public awareness initiatives will empower citizens to become active participants in the digital public sphere, thereby bridging the digital divide.

2. **Cybersecurity Infrastructure**

   With the expansion of E-Government platforms, the risk of cyber threats, data breaches, and digital espionage has grown significantly. Strengthening cybersecurity infrastructure is crucial to protecting sensitive citizen data, ensuring the integrity of government databases, and maintaining public trust. Governments must invest in modern cybersecurity tools, continuous system audits, AI-based threat detection, and capacity-building programs for IT personnel. A proactive cybersecurity policy framework, coupled with swift incident response mechanisms, can minimize vulnerabilities in public digital systems.

3. **Interdepartmental Coordination**

   The success of E-Government depends on cohesive and integrated service delivery across various government departments. Often, siloed functioning leads to fragmentation, duplication of efforts, and inefficiencies. To address this, there must be a centralized coordination mechanism or a nodal agency responsible for overseeing digital governance projects. Interoperable platforms, shared databases, and standard operating procedures

(SOPs) should be established to facilitate seamless communication and workflow across departments, ensuring citizens receive consistent and unified services.

4. **Legal Frameworks**

   A well-defined legal infrastructure is essential to support the ethical, transparent, and accountable functioning of E-Government systems. Comprehensive laws must be enacted or updated to address issues such as data protection, privacy rights, digital signatures, online grievance redressal, and e-participation. These legal provisions should clearly outline the rights and duties of both service providers and users, along with mechanisms for redressal and accountability. International best practices and human rights standards should guide the formulation of these frameworks to ensure they are both robust and inclusive.

5. **Feedback Loops and Citizen Engagement**

   E-Government should not be a one-way communication channel but a dynamic platform that enables continuous interaction between the government and its citizens. Institutionalizing feedback loops allows citizens to share suggestions, report issues, and participate in decision-making processes. This can be achieved through digital feedback forms, mobile apps, citizen forums, online surveys, and participatory dashboards. Regularly analyzing citizen input and incorporating it into policy and service improvements will enhance transparency, responsiveness, and trust in public administration.

Conclusion:

E-Government is more than a technological reform; it is a transformative governance approach aimed at efficiency, inclusivity, and accountability. By overcoming infrastructural, legal, and cultural challenges, governments can truly harness the potential of digital governance. The future of public service lies in adaptive, people-centered, and resilient E-Government systems that uphold democratic values in a rapidly digitizing world.

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TRANSFORMING INDIAN RETAIL: THE ROLE OF ARTIFICIAL INTELLIGENCE IN E-COMMERCE INNOVATION AND CONSUMER EXPERIENCE

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Abstract:

In recent times, India has experienced a significant transformation in its economic environment, driven by the rapid expansion of the e-commerce industry. The rise of affordable smartphones, greater internet access, and supportive governmental initiatives have all played a role in promoting the uptake of online shopping throughout the country. Once regarded as a luxury for urban shoppers, e-commerce is now extending its reach to even the most remote areas of India, providing rural consumers with access to a wide variety of products and services. Leading companies such as Amazon and Flipkart, along with several indigenous platforms, have customized their strategies to cater to the needs of rural customers, resulting in a more inclusive e-commerce landscape that covers the entire nation.

This paper tries to explore the role of artificial intelligence in E-Commerce, what kind of opportunities and challenges it creates. How AI will help online retailers as well to online customers. Major findings suggest the Data Privacy and Security Concerns, Infrastructure and Technological Limitations, Skill Gap and Workforce Development, and Regulatory Environment and Compliance are the key challenges need to be focused for the real transformation of Indian Retail.

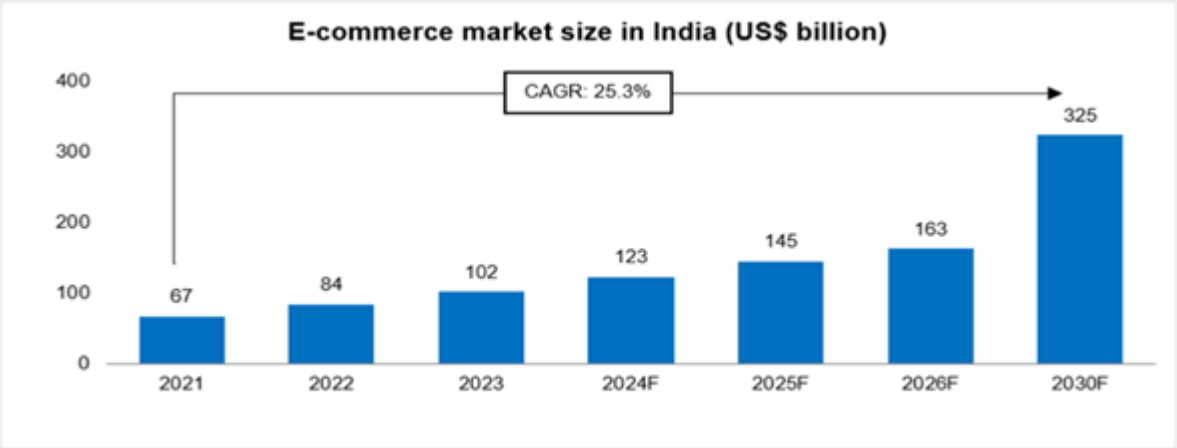
Keywords: Indian Retail, Artificial Intelligence, E-Commerce, AI in E-Commerce.

1. Introduction to E-Commerce in India:

According to Deloitte, India's e-commerce market was valued at approximately US$ 67 billion in 2021 and is expected to reach nearly US$ 123 billion by 2024 and US$ 325 billion by 2030, delivering a CAGR of 25.3%. This growth has been driven by growing mobile and internet penetration and the rising popularity of online shopping across demographic segments.

Key factors driving this growth included: (a) Digital India Initiative, (b) Affordable 4G internet (notably after Jio's 2016 launch), (c) Urbanization and evolving consumer behaviors, (4)

Increase in online payment systems like UPI, Paytm, and PhonePe By 2025, etc. The Indian e-commerce market is projected to surpass $150 billion, with expectations of exceeding $350 billion by 2030. This expansion is driven by the widespread adoption of digital technologies in Tier 2 and Tier 3 cities, with significant contributions from sectors like fashion, electronics, groceries, and pharmaceuticals.



Source: Statista, F- Forecasted

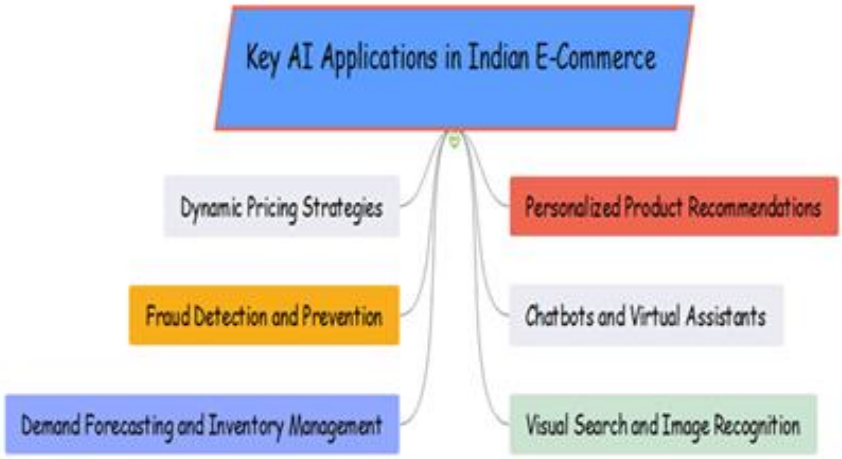
The Role of AI in Transforming E-Commerce:

Artificial Intelligence (AI) is crucial in modernizing e-commerce by enhancing user experiences, enabling automation, and improving decision-making processes. Key AI technologies impacting e-commerce include: (1) Machine Learning (ML), Predicts trends, user behaviour, and automates decisions, (2) Natural Language Processing (NLP): Powers chatbots and facilitates vernacular search and communication, (3) Computer Vision: Supports visual search, automated product tagging, and image recognition, (4) Robotic Process Automation (RPA): Streamlines logistics, warehouse management, and order processing. AI enables platforms to offer personalized, real-time, and scalable experiences, which are essential in a diverse country like India.

Key AI Applications in Indian E-Commerce:

- ✓ Personalized Product Recommendations: AI systems analyse browsing history, purchase behaviour, and demographic data to recommend tailored products. Example: Flipkart and Amazon provide users with daily personalized feeds, boosting click-through and conversion rates.
- ✓ Chatbots and Virtual Assistants: NLP-driven bots manage inquiries, complaints, and product searches around the clock, often in regional languages. Example: JioMart's multilingual chatbot assists users across various states.

- ✓ Visual Search and Image Recognition: Users can upload images to find similar products. Example: Myntra's "Style Snap" helps users discover outfits inspired by Instagram looks or photos.
- ✓ Demand Forecasting and Inventory Management: AI predicts demand using real-time sales, seasonal trends, and historical data. Retailers like BigBasket optimize warehouse stock and logistics routes with AI.
- ✓ Fraud Detection and Prevention: AI identifies suspicious transactions, fake returns, and identity fraud. Example: AI automatically flags unusual login activity and bulk return patterns.
- ✓ Dynamic Pricing Strategies: E-commerce platforms use AI to adjust prices based on demand, competitor pricing, inventory levels, and user behavior. Example: Flash sales and real-time discounting during Flipkart's Big Billion Days are AI-driven.



2. Major Players in AI-Driven E-Commerce in India:

i. Flipkart Utilizes AI for voice-based search, product tagging, and predictive logistics. Flipkart Labs develops AI-first solutions, including deep personalization and automation.

ii. Amazon India Uses global AI tools like Alexa, automated warehouses, and AI-powered recommendation engines.AI also aids in product listings in regional languages.

iii. Myntra Renowned for its AI fashion stylists, trend predictors, and virtual try-on experiences using AR and computer vision. Employs AI to generate weekly fashion recommendations and seasonal trends.

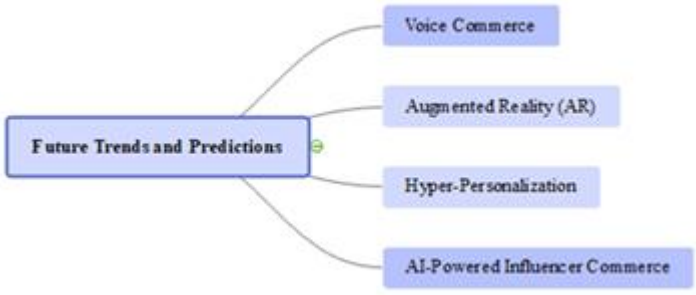
iv. Other companies like Meesho, Nykaa, and Reliance Retail are also incorporating AI to cater to niche audiences and enhance operational efficiency.

3. Challenges and Opportunities:

- ✓ Data Privacy and Security Concerns: With platforms amassing extensive consumer data, safeguarding it against breaches and misuse is a significant issue. Adhering to India's Data Protection Bill is essential.
- ✓ Infrastructure and Technological Limitations: Inadequate internet connectivity in rural regions and subpar smartphone quality can impede AI services. Platforms need to develop lightweight applications that can function offline.
- ✓ Skill Gap and Workforce Development: There is a lack of skilled professionals in AI/ML. It is crucial to enhance workforce skills and incorporate AI education into technology and commerce curricula.
- ✓ Regulatory Environment and Compliance: AI's involvement in pricing and profiling must comply with competition law and consumer protection standards. Government guidelines are still in development.

4. Future Trends and Predictions:

- ✓ Voice Commerce: Integration with voice assistants like Alexa and Google Assistant for shopping in local languages.
- ✓ Augmented Reality (AR): Virtual try-ons for clothing, accessories, and home décor are becoming commonplace, even in mobile applications.
- ✓ Hyper-Personalization: Product pages, advertisements, and search results will be uniquely customized using real-time user data.
- ✓ AI-Powered Influencer Commerce: AI tools will identify and collaborate with micro-influencers to enhance targeted campaigns.



5. Socio-Economic Implications:

Job Creation and Displacement AI is anticipated to reduce jobs in warehousing and customer service but increase demand in technology, analytics, and digital marketing. A hybrid workforce (AI + human) is emerging in content moderation and logistics. Digital Divide and Accessibility Issues The transition to AI may marginalize low-income or non-digital populations

unless platforms implement inclusive design. Government and private initiatives must prioritize digital literacy. Changing Retail Landscape AI allows small retailers to participate in online marketplaces like Meesho. Urban areas are shifting towards experiential retail, while rural areas are experiencing a mobile-first commerce surge.

Conclusion:

AI is fundamentally reshaping how e-commerce operates in India—from personalized experiences to efficient back-end processes. Although there are regulatory and infrastructure challenges ahead, the potential is vast. By integrating ethical AI, investing in local innovation, and promoting inclusive access, India can become a global leader in AI-driven digital commerce. The future of Indian e-commerce will not only be digital—it will be intelligent, adaptive, and highly personalized.

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UNDERSTANDING THE CONCEPT OF PSYCHOLOGICAL CONTRACT FOR INNOVATIVE HR PRACTICES

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Abstract:

This chapter is written to understand the concept of psychological contract which is all about the mutual obligations between the employer and employees. There are a number of contracts in the organizations, which are both written and legal in nature, but beyond these there are a number of expectations of both the parties from each other. This concept of psychological contract is getting popularity to study the employment relationship which is anyhow getting impact from the perceptions of expectations related to various promises between both the parties. There are number of conceptions related to its development, understanding and implementation in the organization. This concept is completely subjective and individual characteristics based as people expectations vary from person to person depending upon their attitude and expectation level.

Keywords: Psychological Contract, Organizational contracts, Employment relationship, Individual factors

1. Introduction -Psychological Contract

According to Zagenczyk *et al.* (2009), the psychological contract has grown in importance as a theory that helps explain both the dynamics of the work relationship and human nature. It's crucial to carry out more research because the phenomenon of alterations inside the psychological contract itself hasn't been thoroughly examined yet. As a result, the purpose of this work is to develop, within the context of terminological analysis, a thorough structure for comprehending the underlying architecture of the psychological contract and its determining process. In order to achieve this, we offer a critical analysis of the body of research on the psychological contract, which establish the terms of the work association between an employer and an employee. This study's primary benefit is that it sheds light on the idea of psychological contracts (which is not a very popular concept yet in India).

A thorough endeavor was undertaken to systematize and confine the alterations in the vocabulary of the psychological contract that have taken place throughout time, in line with the purpose of this article. The genesis, emergence, and evolution of the psychological contract idea were the main points of interest. Divergent opinions on different aspects of the contract are

frequently indicated by the set of definitions. The disclosed differences of opinion centre on elements of the contract that include the psychological contract's nature, expectations and commitments, and beliefs. Since the "social contract" plays a significant role in political economics and political philosophy (Guest, 2004), the idea of a contract is not new. In last thirty years, the psychological contract has drawn a lot of interest from academic and practical circles.

2. The Organizational Contracts

Here, we'll be concentrating on contracts in organisational contexts, specifically those involving employees and the company. An exchange agreement between an employer and employee is called a contract. Written terms (such as a union agreement or a job offer letter), verbally communicated terms (such as assurances of training, assistance, and best efforts), and other expressions of commitment and future intent (such as custom, tradition, and culture) may all be included in the contract. Here, we aim to address the organisational, social, and psychological significance of contracts in organisations, moving beyond purely legal interpretations. It has been recognised by critical legal scholars that "all contracts are psychological" (Macneil, 1985). Contracts in organisational contexts can be both organisational and social (shared by the greater society). An aesthetically pleasing and socially acceptable means of characterising work relationships is through contracts. They are also a contentious topic of discussion.

Table 1: Organizational contract (Source: Rousseau, 1995)

		Level	
		Individual	**Group**
Perspective	**Within**	**Psychological** "Beliefs that individuals hold regarding promises made, accepted, and relied on between themselves and another organization (employee, client, manager, United Way)."	**Normative** "The shared psychological contract that emerges when members of a social group (e.g., church group), (e.g., U.S. Army, or work unit (e.g., the organization) trauma team at a community hospital) hold common beliefs."
	Outside	**Implied** "Interpretations that third parties (e.g., witnesses, jurists, potential employees) make regarding contractual terms."	**Social** "Broad beliefs in obligations associated with a society's culture (e.g., reliance on handshakes)."

The "let's make a deal" perspective on contracts views labour as a negotiation process wherein each party has a self-interested desire to get the most for the least amount of money. The

idea of an auction is created by well-publicized sports contracts and the enormous financial deals made by rock stars and movie idols ("to the highest bidder"). This market-driven, transactional, competitive perspective on work views labour and employment as commodities and takes a constrained, short-term view of what employers and employees can provide to one another. The relationship's value is minimised as the emphasis is solely on financial gain. Human lives are governed by a variety of contracts that are required to create enduring, peaceful relationships between the organisation and its employees. Numerous scholars suggest that when an employee and an employer sign an employment contract, they are entering into an unwritten psychological contract (Rousseau 1995; Conway & Briner, 2005). D.M. Rousseau (1995) in his book "Psychological Contracts in Organizations" has explained the four types of contracts which arises in the organizations, table 1 shows the four types of contracts which are existing and out of those four the focus of this chapter is only upon the psychological contract.

Psychological Contract

Individual beliefs about the conditions of an exchange agreement between individuals and their organization—shaped by the latter—are known as the psychological contract (Rousseau,1995). Psychological contracts have the ability to shape the future, much like self-fulfilling prophecies. Individuals who make and maintain commitments are better able to plan ahead because they are more able to specify and predict their actions to themselves and to others. It is more likely that a marketing manager who is hired with the understanding that her job is to turn around that department will suggest and follow a suitable course of action than if she had not made that commitment (Rousseau,1989). When psychological contracts are implemented within a larger framework of objectives, they tend to increase productivity in both individuals and organisations, ceteris paribus (all other things being equal).

When two interdependent individuals, like a worker and a supervisor, agree on the terms of the agreement, both parties should be satisfied with the performance. "I know what you want from me and you know what I want from you." Agreements that are understood by both parties may be founded on past interactions, communications, and customs. Mutual predictability, no matter how it's attained, is a crucial component of planning and effort coordination.

Normative Contracts

It arise when a group of people identify with an organisation and each other in comparable ways, and when these people think they are parties to the same contract. Normative contracts can happen anywhere that insiders to a contract (clients, customers, parents, and school board members) have enough opportunity for interaction with each other to develop common

beliefs about that contract, even though they are most common in the workplace (Rousseau, 2001).

Implied Contracts

The assumptions made by those who are not parties to the contract—that is, outsiders—about its terms, acceptance, and mutuality are known as implied contracts. These interpretations are consistent with the frame of reference commonly used in ethics research, which is the "reasonable third party" who is able to assess the meaning of the contract's terms despite the principals' self-serving bias. The public may view a history of long-term employment as evidence of an organization's stability and dedication (Rousseau and Parks, 1993)

Social Contracts

These are cultural agreements predicated on widely held notions about proper conduct within a community. The reciprocity norm is one such universal norm. There are two basic requirements to this age-old and deeply ingrained cultural belief: one must assist those who have aided them, and one must not harm those who have aided them (Gouldner, 1960). In essence, this norm mandates that the giver be appreciated by the recipient until payment is received. Therefore, prosocial behaviours (giving, supporting, and helping) as well as exchanges can establish duties within organisations or between work groups.

Initial Stages of Psychological Contract

The idea that employee participation at work is contingent upon receiving appropriate benefits from the organisation dates back to Barnard's theory of equilibrium (1938), which prompted the initial attempts to comprehend the nature of mutual relations at work. With their incentive-contribution model (1958), March and Simon expanded on this theory and gave a more thorough explanation of the means that were being traded. These researchers made the case that workers' perceptions of the rewards the company provides for their work determine how much effort and contribution they will continue to make.

Most people agree that Menninger (1958) invented the concept of psychological contract. Menninger simultaneously addressed the written and non-verbalized contract between the patient and the psychotherapist in his definition of human exchanges. But Argyris (1960) was the first researcher to formally use the term "psychological contract," attempting to shed light on the unspoken commitments and expectations that emerge between employers and employees that go beyond formal legal agreements. During his research, Argyris noted an intriguing fact: in order to keep the contract in effect, there are situations when both the employer and the employee willfully choose to overlook the other party's inappropriate behaviour (Argyris, 1960).

Levinson *et al.* (1962) and Schein (1965, 1980) are a couple of the other early theorists affiliated with the psychological contract theory. The fundamental tenet of the theory put forth by Levinson *et al.* (1962) was that interpersonal relationships are formed and grow out of human needs, with each partner acting in a way that satisfies the needs of the other. The psychological contract is based on the expectations that result from this exchange. The emphasis on personal needs most likely altered how the psychological contract was conceptualised in the future. This strategy holds that employees have an obligation to meet the needs of the organisation in return, so long as the organisation provides for their needs.

3. The Chronicle Definitions of Psychological Contract

Argyris (1960: p. 96)

"A psychological contract is an implicit obligation of the parties (foremen and employee) to respect each other's standards of employment and working conditions. Employees are committed to maintaining high productivity and the foremen is to take care of things that are important to the employees, e.g. ensure freedom of action, ensure stability of employment and adequate earnings".

Levinson *et al.* (1962: p.21)

"[...] an effect of mutual expectations, hidden and non-verbalised, that define the relationship between an individual and an organisation. With this framework, it became clear that reciprocity can be understood as a way in which a contract is confirmed, altered or denied overnight on the basis of the professional experience acquired within the organisation".

Kotter (1973: p. 92)

"The psychological contract is an implicit contract between an individual and his organization which specifies what each expect to give and receive from each other in their relationship".

Schein (1980: p. 22)

"The concept of a psychological contract assumes that there is an unwritten set of expectations that operates at all times between each member of the organisation and various managers and other employees in the organisation".

4. Psychological Contract – D.M. Rousseau Contribution

According to Cullinane and Dundon (2006), Denise M. Rousseau is recognised for having had the biggest impact on psychological contract research and for playing a key role in the psychological contract's revival. The landmark paper by Rousseau (1989) in the Employee Responsibilities and Rights Journal, which is credited with sparking a renewed interest in psychological contract research among academics, marks the beginning of the Rousseau period.

The essay made a distinction between implied and psychological contracts within an organisation while accounting for the formation, upkeep, and breach of psychological contracts as well as the ensuing organisational ramifications. Additionally, a conceptual division between relational and transactional contracts was made.

In their book "Understanding Psychological Contracts at Work", Conway and Briner (2005) provided a psychological contract review. This critique, which covers the psychological contract's definitions, history, development, challenges, components, and prospect research directions, is undoubtedly the most thorough to date. A thorough analysis of psychological contract theory and research was given in the book. The shifting, frequently contradictory definitions of psychological contract theory have been traced, starting with a historical overview of the theory and research from its inception in the 1960s to its wider recognition in the 1990s. The ways in which the meanings associated with the psychological contract have evolved over time offer a chance to identify and investigate possible conceptual and methodological problems.

Post Rousseau Period Definitions

Rousseau (1989: p.123)

"The term psychological contract refers to an individual's beliefs regarding the terms and conditions of a reciprocal exchange agreement between that focal person and another party. Key issues here include the belief that a promise has been made and a consideration offered in exchange for it, binding the parties to some set of reciprocal obligations".

Robinson *et al.*, (1994: p.138)

"A psychological contract consists of sets or private beliefs about the perception of mutual obligations".

Roehling (1996: p.202)

"At a general level, the term »psychological contract« is used to refer to a set of beliefs about what employees offer to their employer and what they receive in return".

McLean Parks, Kidder, Gallagher (1998: p.698)

"A psychological contract is an idiosyncratic set of mutual expectations that employees have in terms of their duties (i.e. what they will do for the employer) and their rights (i.e. what they expect in return)".

Guest (2004: p.541–555)

"[...] perception of both parties to the employment relationship – organisations and individual employees – as the resulting implied mutual promises and commitments".

Guest (2007: p. 133)

"The concept of a psychological contract refers to different aspects of employee relations within an organisation, and in particular to the changes they undergo and the consequences of accepting and fulfilling mutual obligations in the form of commitment to the organisation's objectives or staff fluctuations".

Rogozińska-Pawełczyk (2016: p. 63–76)

"[...] the psychological contract is considered in the perspective of the mutual perception of the exchange relationship and means that the behaviour of the employee and the superior is best understood as a dynamic process, subject to constant change. The expectations and offers formulated by both the superior and the employee may be subject to change. During the employment relationship the scope of the psychological contract will change, and the mutual, subjective expectations and commitments will cover a somewhat different part of the employee-employer relationship. As a result of changes, the internal balance of the psychological contract may be upset".

5. The Employment Relationship and Psychological Contract

The term "psychological contract" refers to the unspoken understanding that outlines mutual expectations between an employer and employee. The two parties do not have any written promises. When an employee feels that the organisation and their employer have met their expectations, they feel more satisfied and like they belong to the organisation. Part of the working relationship that is unsaid is called a psychological contract. It represents a series of mutual obligations and opportunities between the employer and the employee. The relationship between an employer and employee in the provision of mutual talents exists as a shared desire to incorporate faith, dedication, and earnings, according to the theory of social exchange (Mullins, 2002). Hence, in order to choose, define, and explain factors related to this social trade relationship, psychological contract is essential. In social or economic terms, service agreements are fundamentally psychological and deeply personal, forming the basis of the work relationship (Millward and Brewerton, 1999). It is difficult to categorise the specifics of the demands and commitments made by each party since they are subject to periodic modification (Huczynski and Buchanan, 2001) and can vary from person to person as well as from organisation to organisation. The existence of a psychological contract between an employee and the company as well as between all employees and the company is a crucial aspect of it (Huczynski & Buchanan, 2001).

6. Development of Psychological Contract

Regarding how much organisations influence psychological contracts, researchers can't seem to agree on much. Certain definitions, especially those derived from previous research, assert that psychological contracts are influenced by an extensive array of factors and don't seem to give precedence to any particular source. Schein (1980, p. 24) affirms that psychological contracts occur from employees 'inner needs, what they have learned from others, traditions and norms which may be operating, their own past experience, and a host of other sources'. On the other hand, more modern definitions that draw heavily from Rousseau place a strong emphasis on the organization's function in forming psychological contracts (Roehling, 1996). This point of view highlights the need for an employee's psychological contract beliefs to be based on the actions of their current employer; beliefs from other sources are not included in the psychological contract.

However, considering that Rousseau and associates employ terminology like "shaping," this implies that beliefs are only partially shaped by the activities of the organisation. As a result, we can draw the conclusion that psychological contracts are very likely subject to a wide range of influences, reflecting their highly subjective nature.

7. Individual factors and Psychological Contract

It is believed that social interactions and peer comparisons play a noteworthy part in the formation of psychological contracts. But there isn't much empirical research in this field, aside from a few studies by Ho and colleagues (Ho, 2005; Ho and Levesque, 2005; Ho, Rousseau and Levesque, 2006). Employees who valued financial rewards, for example, inquired about financial assurances. These studies show that workers keenly form their psychological contracts by seeking out information in a way that is consistent with their personal values. Workers are not just passive recipients of organisational communications concerning psychological contracts. (De.Vos, *et al.,* 2005). An extensive series of detremining factors, including occupational and exchange ideologies (Bunderson, 2001; Coyle-Shapiro and Neuman, 2004), personal and social identities (Hallier and Forbes, 2004), work values (De Vos, *et al.,* 2005), and personality (Raja, Johns and Ntalianis, 2004), are already suggested by the few studies that have looked at the consequences of individual differences on psychological contract contents. Psychological contracts are thought to be shaped by individual differences, which impact the tasks that employees choose as well as how they interpret and carry out the terms of the contract (Raja, Johns, and Ntalianis, 2004).

Conclusion:

According to Rousseau (1989), the main goal of the psychological contract is to comprehend and provide an explanation for the behavioural norms that exist within the employment relationship. This method concentrates on the interactions between specific workers, each of whom signs an informal contract with the company. Rousseau claims that the psychological contract outlines how an employer works to guarantee employee participation in the advancement of organisational goals and how an employee develops a long-term view of job security. This article's primary goals were to provide a chronological overview of the definition of psychological contract, to list the various definitions put forth by academics, and to examine the development of this idea. There are several definitions for many concepts, and researchers use and interpret them in different ways. There are instances when definitions created by various researchers at various points in time are strikingly similar. In other instances, quite distinct conceptualizations of the same idea are used. Furthermore, there are instances in which the definitions diverge enough to mislead inexperienced researchers or lay readers. Because of this, the conversation has only covered the essential ideas and roles found in the definition of a psychological contract. The concept of psychological contract has evolved over time, and its history can be broadly classified into two periods. The first discusses the early development of the psychological contract, which was started by Argyris in 1960. It also explains how the parties to an employment relationship may perceive their respective obligations and expectations of one another. The early definitions mostly described the perceptions of mutual obligations and expectations between the employer and employee, the two parties to an employment relationship.

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CONTRIBUTION OF INDIA'S TRADE IN SUSTAINABLE DEVELOPMENT OF SAARC COUNTRIES

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Abstract:

India, as the largest economy in South Asia, plays a dominant role in shaping trade and promoting sustainable development in the SAARC region. This paper discovers India's contributions to regional economic, social, and environmental outcomes, highlighting its commitment to comprehensive growth, poverty alleviation, and environmental sustainability. By positioning its trade policies with the United Nations Sustainable Development Goals (SDGs), India aims to enhance economic flexibility, enhance social equity, and address environmental challenges. India's trade practices—ranging from renewable energy cooperation to digital infrastructure sharing and support for small and medium-sized enterprises (SMEs)—demonstrate its leadership in advancing sustainable development. However, challenges such as political tensions, infrastructure gaps, and regulatory irregularities hamper the full potential of regional trade. The study demonstrates the significance of India's role in facilitating cross-border trade, fostering green energy solutions, and promoting inclusive digital trade across SAARC nations. India's preferential trade policies, such as zero-duty initiatives for Least Developed Countries (LDCs), showing its commitment to reducing inequalities and promoting regional success. Despite the opportunities, political conflicts, especially between India and Pakistan, continue to disturb trade routes and weaken multilateral agreements. To address these issues, the paper recommends policy actions, including modernizing trade agreements, improving logistics, and advancing digital and green trade initiatives. The findings underline India's strategic potential to lead South Asia toward a future of cooperative growth, where trade not only increases economic growth but also ensures social and environmental sustainability.

Keywords: Sustainable Trade, SAARC, India, Regional Cooperation

Introduction:

India, as the largest economy in the SAARC region, plays a key role in shaping the trade landscape of South Asia. With vast resources, a strong industrial base, and growing global linkages, India is not only a leading trading partner but also a main driver of sustainable development among its South Asian neighbors. The country's trade policies increasingly

replicate an assurance to inclusive growth—prioritizing poverty alleviation, environmental issues, and equitable opportunities. This commitment is apparent in its regional initiatives, such as concessional trade terms for Least Developed Countries (LDCs), technology sharing programs, and support for green energy projects. India's strategic integration of trade and sustainability ensures that economic development does not come at the cost of social equity or environmental deprivation, thereby positioning India as a pivotal force in shaping a sustainable and cooperative SAARC future (Irwin, 2020; Chakraborty & Sengupta, 2021).

Review of Literature:

Different studies emphasized the potential of trade in enhancement of sustainable growth, especially in South Asia. The World Commission on Environment and Development (1987) was one of the first to recommend bringing into line economic growth with sustainability. Irwin (2020) strengthened this by calling for accountable trade practices. In the same way, Hirantha (2004) focused on the restricted trade between member countries, largely due to political barriers and infrastructural gaps. Baysan *et al.* (2006) stated that SAFTA has not reached its potential because of political confrontation. ESCAP and UNCTAD (2019) noted that many SAARC countries, especially the least developed ones like Bhutan and Nepal, lack the structural readiness to fully benefit from trade. In terms of the environmental issues, Jha (2008) and the ILO (2022) warned against countries sinking standards to attract trade. On the positive side, Chakraborty and Sengupta (2021) emphasized on India's role in permitting digital trade and advancing small enterprises across the region.

Objectives of the Study:

A. To study how India contributes to attaining sustainable development in SAARC countries in terms of economic, social, and environmental outcomes.
B. To identify key prospects and challenges in India's trade relations with SAARC countries effecting regional sustainability and inclusivity.

India's Influence in Sustainable Trade in SAARC Region

Sustainable trade states to marketable exchanges that create economic value while confirming social justice and environmental protection. India actively promotes this balance by engaging in trade practices that benefit all three pillars of sustainability—economy, society, and the environment. Different initiatives such as renewable energy trade, SMEs and simple cross border transactions exemplify India's leadership in the region.

Trade and the UN SDGs: India as a Regional Enabler

India's trade policy closely aligns with the Sustainable Development Goals (SDGs):

- SDG 1 (No Poverty): Imports from SAARC partners support livelihoods in neighboring countries.,

- SDG 2 (Zero Hunger): Exporting agricultural products helps ensure food security across borders.
- SDG 3 (Good Health): Supplying affordable medicines aids public health systems in the region.
- SDG 8 (Decent Work): Indian investments create job opportunities across SAARC.
- SDG 9 (Infrastructure & Innovation): India supports industrial capacity through technology and finance.
- SDG 10 (Reduced Inequalities): Preferential trade policies favor least-developed countries like Afghanistan and Nepal.

India's Recent Trade Scene with SAARC Nations

India's trade with SAARC members levels various sectors—from pharmaceuticals and technology to energy and agriculture. While trade ties with most nations are growing, ties with Pakistan remain strained. Through SAFTA and bilateral agreements, India offers preferential access, customs simplification, and development aid. It also promotes exports from LDCs through zero-duty initiatives, helping them integrate into global markets.

Opportunities for advancing Sustainable Trade

India's trade model creates several avenues for progressing sustainable development in South Asia:

a. **Value Addition:** India supports its neighbors in moving up the value chain by helping develop industries such as garment manufacturing, agro-processing, and electronics assembly. This not only increases export revenues but also strengthens domestic industries in SAARC countries.
b. **Employment Generation:** Trade-linked plans and joint ventures directed by Indian firms generate direct and indirect employment. They also encourage entrepreneurship among youth and empower women in rural economies through micro-enterprise development.
c. **Green Energy Cooperation:** India leads regional initiatives in renewable energy. It invests in hydropower in Bhutan, promotes solar infrastructure in Nepal, and shares green technology through partnerships and training. These efforts reduce carbon footprints while enhancing energy security.
d. **Digital Expansion:** India's expertise in digital infrastructure, such as Unified Payments Interface (UPI) and the Open Network for Digital Commerce (ONDC), provides SAARC countries with scalable tools to digitize trade and boost participation from small and medium-sized enterprises (SMEs).

Challenges to India's Contribution

While India holds the potential to lead SAARC toward sustainable trade, several hurdles persist:

a. **Political Conflicts:** Political and diplomatic tensions, particularly between India and Pakistan, disrupt trade routes and erode trust in multilateral agreements. These tensions weaken SAARC's collective bargaining power.
b. **Infrastructure Weakness:** Despite growth in trade, several SAARC countries lack efficient transportation systems, power grids, and internet connectivity. These infrastructure gaps increase logistics costs and hinder supply chain integration.
c. **Organizational Red Tape:** Varying customs procedures, documentation requirements, and regulatory standards across SAARC countries cause inefficiencies. These barriers discourage private sector participation and slow trade progress.
d. **Ethics Management:** The risk of a controlling "race to the bottom" is a real challenge. In attempts to attract investment, countries may compromise labor rights or environmental regulations, which undermines sustainability and worker welfare.

Policy Actions for India to Enhance Sustainable Regional Trade

India can strengthen its sustainable trade agenda through:

a. **Modernizing SAFTA and Trade Agreements:** Making them more inclusive and enforceable.
b. **Improving Logistics:** Building better roads, ports, and digital links.
c. **Skill Training Programs:** Helping neighboring nations build trade capacity.
d. **Green Trade Promotion:** Incentivizing environmentally friendly products and technologies.
e. **Digital Infrastructure Sharing:** Enabling partners to benefit from India's digital innovations.

Key Findings

a. India's trade significantly supports sustainable development goals across SAARC nations through inclusive, green, and innovation-driven policies.
b. Despite multiple opportunities, intra-SAARC trade remains underutilized due to structural and political challenges.
c. India plays a crucial role in enabling access to technology, finance, and digital trade for its regional partners, with a growing emphasis on clean energy and MSME empowerment.

Conclusion:

India is playing important Role in Shaping a Sustainable SAARC's Future and uniquely positioned to lead SAARC toward a future where trade is not only about growth, but

about shared affluence, inclusion, and sustainability. With harmonized efforts, policy reforms, and regional collaboration, India's trade strategy can create a long-lasting impact that elevates communities and reinforces ties across South Asia.

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CLOUD HORIZONS: GENDERED INSIGHTS INTO CLOUD COMPUTING LITERACY AMONG UNDERGRADUATES

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Abstract:

This study assessed cloud computing awareness of 356 undergraduate students at Delhi University. It investigated gender differences and implications that could be relevant to educational and business settings. The study used a descriptive survey design. Data were collected of participants' awareness, perceived advantages, and perceived disadvantages using a structured questionnaire to interrogate students' knowledge of and views on cloud computing with technology platforms. The findings suggest a substantial gender gap, with male students being more aware and showing much greater confidence than female students according to t-test analysis ($p < 0.05$). The reported benefits of cloud computing platforms included flexibility, cost savings, and teamwork, while the disadvantages included data privacy concerns, losing connection, difficulty with technical support issues, and loss of data. These findings are in concurrence with previous research demonstrating gender gaps in technology adoption and that cloud computing can potentially have an impact in educational settings. Recommendations include gender-sensitive programmes to address the gaps in awareness, particularly for female students, and areas for further research of educational and public policy implications will include moving to other institutions of learning, recruitment strategies targeting other demographic groups and a broader mixed methods contribution to the overall understanding of cloud computing in education.

Keywords: Cloud Computing, Awareness, Survey, Undergraduate students, Gender-based study.

Introduction:

Cloud computing can be defined as “a new style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet.” The advents of cloud-based authorizing tools are relatively effective and emerging trend in e-learning (Siddiqui *et al.,* 2019). Cloud computing revolutionizes education, allowing students and teachers to access & share information, resources, and applications anywhere, anytime. This

technology transforms how educators and learners interact in the classroom and beyond and can potentially revolutionize how we learn. Using cloud computing, students and teachers can access, store, and share information, resources, and applications securely and efficiently.

A distributed computing paradigm known as "cloud computing" makes virtualized resources like computers, networks, storage, development platforms, and applications accessible (Mell & Grance, 2009). With the support of important industry stakeholders like Google, Amazon or Microsoft, cloud computing is being widely adopted in different domains (Martínez *et al.,* 2015). Thanks to this technology, anyone with an internet connection may utilize gear and software whenever they choose. In its description for cloud characteristics, The US National Institute of Standards and Technology (NIST) defines as cloud characteristics as following: On-demand self-service, Ubiquitous network access, Resource pooling, Rapid elasticity (resources can be scaled up and down easily), Metered service (resources' usage is measured) and Pay-as-you-Consume business models (Mell & Grance, 2011).

The absence of infrastructure, or the difficulty of maintaining what is there, is one of the fundamental problems the government has in delivering education. A significant amount of continuous funding is needed, as well as the expertise to support it, to acquire and maintain a broad variety of hardware and software. The cloud makes it possible for educators, staff members, parents, and students to have anytime, anywhere, device access to vital information. Both public and private institutions can use the cloud to deliver better services, even as they work with fewer resources (Yadav, 2014).

The delivery and accessibility of educational resources have been completely transformed by cloud computing, which has given students access to previously unheard-of levels of cost-effectiveness, accessibility, and cooperation (Armbrust *et al.,* 2010). Cloud-based platforms are being increasingly adopted by educational institutions, and for successful integration and support, it is imperative to understand how students perceive and utilize these technologies. The purpose of this study, which focuses on undergraduates at the University of Delhi, is to investigate how gender differences in terms of knowledge and attitudes regarding cloud computing, as well as the difficulties that arise when utilizing these platforms, are observed.

Gender can impact the adoption and usage patterns of technology, as evidenced by the different degrees of confidence and involvement stated by male and female students in earlier studies (Venkatesh & Morris, 2000). While a varied and vibrant student body at Delhi University uses cloud-based learning resources, little study has been done on how gender affects their perceptions and use of these resources. Addressing such gaps and guaranteeing equitable access to educational technologies require an understanding of these variances. This research uses a

structured questionnaire to collect information from 178 undergraduate students in a stratified random sample that is equally divided by gender in order to look at their knowledge of cloud computing, their perceptions of its advantages, and the challenges they have faced. This study adds to the expanding body of research on the adoption of technology in education by offering insightful information to educators and policymakers who are working to improve the efficient integration of cloud computing in higher education.

Significance of Research

In the current educational environment, research on the use of cloud computing-based technologies in education is extremely important, especially when it comes to raising awareness of its advantages. This research is crucial for a number of reasons.

Furthermore, studies on cloud computing in education are important even in terms of cost-effectiveness. Since budgetary restrictions are a common occurrence in educational institutions, realizing the cost advantages of cloud-based technology may significantly alter operations. Through smart resource allocation made possible by this study, institutions may maximize their investments in infrastructure and technology.

- The study helps us to understand the extent of awareness about cloud-computing platforms among students.
- The study helps to aware us about the benefits associated with the usage of cloud-computing based platforms for educational purposes.
- The study helps to understand about the challenges and barriers encountered by the students while using cloud-computing platforms.
- The results of the study may have an impact on educational policies, which may make it easier for educational institutions to integrate and support cloud computing platforms for the future benefits of students.

Objectives of Research

- To assess the level of awareness among undergraduate students of Delhi University.
- Explore the perceived benefits that undergraduate students associate with the use of cloud computing educational platforms.
- Investigate the challenges and barriers faced by undergraduate students while using cloud computing educational platforms.

Hypotheses of Research

H0: There is no significant difference in cloud-computing awareness between male and female undergraduate students.

H1: There is a significant difference in cloud-computing awareness between male and female undergraduate students.

Cloud Computing Platforms in Education

Cloud computing has revolutionized the way businesses operate by giving the end-user scalable and on-demand resources that improve efficiencies and cut costs. The utilization of cloud-based technologies in education has evolved significantly over the years. Initially, cloud computing primarily facilitated data storage and backup. However, with advancements in technology, its applications in education have become more sophisticated, contributing to a more efficient and responsive educational ecosystem. Some of the most prominent platforms in cloud computing include:

- **Google Platforms –Classroom**: The Google Cloud Platform was started in 2011 (Challita *et al.,* 2018). Due to its cloud-based architecture, Google Classroom may be accessed from any device with an internet connection, allowing for more flexible learning. It makes managing student rosters, class scheduling, and progress monitoring easier for teachers and streamlines the administrative side of education.
- **Amazon Web Services**: Amazon provides a comprehensive and extensively used cloud computing platform called Amazon Web Services (AWS). AWS offers a wide range of cloud services, including solutions for machine learning, storage, content distribution, processing power, and more. The Amazon web services have been operating since 2006 providing services in the fields such as: Computer, Storage and content delivery, database, Networking (Hyseni & Ibrahimi, 2017).
- **Microsoft Teams:** Microsoft Teams is a cloud app digital hub that brings conversations, meetings, files and apps together in a single Learning Management System (Martin & Tapp, 2019). Within the cloud computing space, Microsoft Teams is a platform for collaboration that provides an adaptable and comprehensive communication and teamwork solution. Microsoft Teams leverages cloud-based technology to improve productivity and expedite cooperation by combining a variety of tools and capabilities.
- **Coursera:** Cloud computing is used by premier online learning platform Coursera to provide students all around the world with a dynamic and scalable learning environment. Coursera is a Massive Open Online Course (MOOC) platform that uses cloud-based technology to go over traditional educational barriers and offer high-quality, easily accessible learning opportunities (Shafiq *et al.,* 2017).

- **edX:** Harvard and MIT launched edX as an experiment to provide everyone with access to the greatest education accessible worldwide. As a component of 2U, edX now provides online education that advances nearly every job field, from public health and sustainability to robotics and artificial intelligence, to over 81 million people globally. Thousands of career-relevant programs are available through edX, partnership with leading universities and organizations, to provide every aspirational learner with a clear route to success (Bîzoi, Suduc & Gorghiu, 2017).
- **LinkedIn Learning:** An excellent one-stop shop for improving all forms of education is LinkedIn Learning. Any academic program can benefit from taking a course in soft skills or software (Agazzi, 2020). The best part is that teachers may store your courses for later use and combine resources with LinkedIn Learning, which is beneficial to both educators and students.
- **Udemy:** Students worldwide can access both paid and free courses on the online learning platform Udemy. Students can learn web programming, machine learning, and data analytics from a computer or mobile device. Excellent curricula are offered by both paid and free courses (Cetina, Goldbach & Manea, 2018). Many people enroll in these courses to expand their skill and learn a new one. At Udemy, you may learn online without having to finish a conventional four-year degree program.
- **Udacity:** Programming, data science, cloud computing, artificial intelligence, and other subjects are among the many courses and programs offered by Udacity, an online learning platform (Anyatasia, Santoso & Junus, 2020). In 2011, Sebastian Thrun, David Stavens, and Mike Sokolsky established the for-profit company. Making education more affordable, accessible, and relevant for all is Udacity's objective to democratize education.

Literature Review

Cloud computing has served as a great example of educational change, where flexibility, scalability, and utility automatically delivered scare resources at low cost for internal users. Buyya *et al.* (2009) describes it as a utility that can be allocated similar to the energy market, making suggestions for better Quality of Service mechanisms. Sultan (2010) explains that cloud computing, as an educational service, can reduce costs for resource-limited institutions and access educational supports where currently there are none, because of its similarities to electrification. Wang and Xing (2011) describe cloud computing as a means to take education into the digital landscape, enabling virtualization, networking, and storage that provide cheap

services to educational organisations. González-Martínez *et al.* (2015) have identified real and perceived advantages: cost savings, the ability to scale up, and advantages specifically related to education, such as collaborative learning, however, they point out there is limited research on pedagogical practices beyond traditional research.

Sabi *et al.* (2016) argue there are benefits to advancing in cloud technology, where cloud adoption in educational technology in developing countries has to do with context. Fagbohun and Adetimirin (2016) examined a possible relationship ICT skills have with cloud use of educational undergraduates in Nigeria, and find evidence of positive association between cloud use at an institution where institutional support and culture focuses more positively on embracing technology. Changchit *et al.* (2022) note the evidence of the need to move to cloud computing in education because of the increase in data, and access consumers are expecting, although their study is limited to one university. Muhisn *et al.* (2023) explored implications of cloud computing in e-learning, specifically in terms of accessibility aligned with increased strategic funding, however, they note security issues. Nodira *et al.* (2023) discuss benefits with cloud computing improving efficiency in time management and better co-ordination of resources and systems in educational systems.

Gender differences in technology acceptance have been demonstrated. Venkatesh and Morris (2000) identify differences between male and female students in confidence and engagement, which are factors related to awareness of cloud computing. According to Armbrust *et al.* (2010) and Shafiq *et al.* (2017), cloud platforms can enable scalable and open learning experiences, such as MOOCs. Asghar (2020) and Khalid *et al.* (2022) have identified security and connectivity issues as two barriers that need consideration. This review has highlighted the baggage associated with cloud computing benefits (collaborative opportunities, cost-effective), issues (security issues, digital divide) and gendered differences, all provide the groundwork for a study examining how cloud computing is adopted among undergraduate students at Delhi University.

Methodology

Research Design

The study used a descriptive survey research approach to evaluate Delhi University undergraduate students' awareness of, attitudes about, and experiences with cloud computing and its business applications. Because it enables the collection of quantifiable data to characterize patterns, attitudes, and opinions among the target population, this design was selected.

Sample Selection

The purpose of the study was to determine Delhi University undergraduate students' awareness of cloud computing platforms in education. Using a convenient sampling technique, 356 students were chosen in total to guarantee representation from different departments and faculties. 178 male and 178 female students made up the sample, which was evenly divided by gender to allow for a comparative comparison of awareness levels depending on gender. This selection strategy was used to improve the reliability and generalizability of the results by offering a thorough grasp of the awareness levels across various academic disciplines while preserving gender balance.

Tools and Tool Development

A systematic questionnaire created especially for this study was used to gather data. There were three sections on the questionnaire:

Details about the study year, field of specialization, age, and gender are included in the demographic section. Questions designed to gauge students' knowledge of cloud computing and its business applications and their perceptions of their advantages. To get in-depth comments, this section comprised both open-ended and closed-ended questions (such as Likert scale items). Difficulties with Cloud Computing: Questions to help students discover challenges with cloud computing platforms. There were both open-ended and closed-ended questions in this section as well.

Data Collection Method

Two weeks were dedicated to the collection of data. To make the questionnaire easier for the students to access, it was circulated online via social media and email. Prior to data collection, informed consent was acquired from each participant, stressing the voluntary nature of participation and the confidentiality of their answers.

Data Analysis Technique

A combination of quantitative and qualitative techniques was used to analyze the data gathered through a systematic questionnaire that was divided into three sections: demographics, knowledge and perceptions of cloud computing platforms and its business applications, and challenges with cloud computing. This allowed for a thorough understanding of the research objectives. Measures of central tendency (mean), measures of dispersion (standard deviation) and t-test were computed for the closed-ended questions, which included Likert scale items pertaining to students' knowledge and impressions about cloud computing platforms. This gave an overview of the general patterns and variance in the respondents' views and awareness levels.

Thematic analysis was used to examine the open-ended answers from the two sections (knowledge and perceptions, and problems with cloud computing).

Results:

Presentation of Findings

Table 1: Statistical analysis of Data

STATEMENTS	N	Mean (M)	Mean (F)	SD (M)	SD (F)	DF	T-Test
I am familiar with cloud computing platforms used in education (e.g., Google Classroom, Microsoft Azure, Moodle, Coursera, Udemy etc.)	356	4.52	2.64	1.07	1.86	354	3.30562E-14 (0.0000)
I understand the functions of different cloud computing platforms used in educational settings.	356	4.55	2.64	0.98	1.77	354	8.90524E-16 (0.0000)
I am aware of how cloud computing platforms can be used to enhance learning and academic performance.	356	4.51	2.71	1.00	1.82	354	7.03598E-14 (0.0000)
I have used cloud-computing educational platforms (e.g.- Google Classroom, Blackboard, Microsoft teams, Moodle, Coursera, Udemy, Udacity etc.) in my studies.	356	4.42	2.85	1.11	1.84	354	9.83543E-11 (0.0000)
I can identify the advantages of using cloud-computing platforms in education (e.g., Accessibility, Collaboration, Resource management etc.)	356	4.40	2.59	1.09	1.80	354	1.01478E-13 (0.0000)

I can explain the potential challenges or limitations of using cloud computing platforms in education (e.g., Data privacy, connectivity issues etc.).	356	4.49	2.70	1.01	1.84	354	1.42699E-13 (0.0000)
Cloud computing platforms have improved my ability to collaborate with peers on academic projects.	356	4.50	2.52	1.02	1.80	354	3.67228E-16 (0.0000)
I believe that cloud computing platforms are essential for modern education.	356	4.61	2.61	0.94	1.84	354	2.19E-16 (0.0000)
I feel confident in my ability to use cloud computing platforms effectively in my studies.	356	4.51	2.53	1.02	1.82	354	5.66E-16 (0.0000)
I am aware of the opportunities provided by cloud computing platforms for remote and flexible learning.	356	4.61	2.42	0.91	1.77	354	6.44E-20 (0.0000)

Data Interpretation

The frequencies and percentages of responses for both male and female students were computed for each item (a Likert scale-based set of questions). An overview of the differences between male and female respondents' awareness and attitudes about cloud computing platforms was given by this analysis. To evaluate the central tendency (mean) and variability (standard deviation) of responses among male and female students, mean scores and standard deviations were calculated for each item. Higher standard deviation values showed the distribution of answers, and higher mean scores suggested higher degrees of awareness or agreement with the claims. To determine if there was a statistically significant difference in the awareness levels of each item between male and female students, an independent samples t-test was used. The results of the t-test revealed very significant p-values ($p < 0.05$) for every question, demonstrating a significant difference in the awareness levels of male and female respondents.

Male students' mean scores are much higher than female students', indicating that male students are generally more knowledgeable about the cloud computing platforms utilized in educational settings (chart has been showing the distinction clearly).

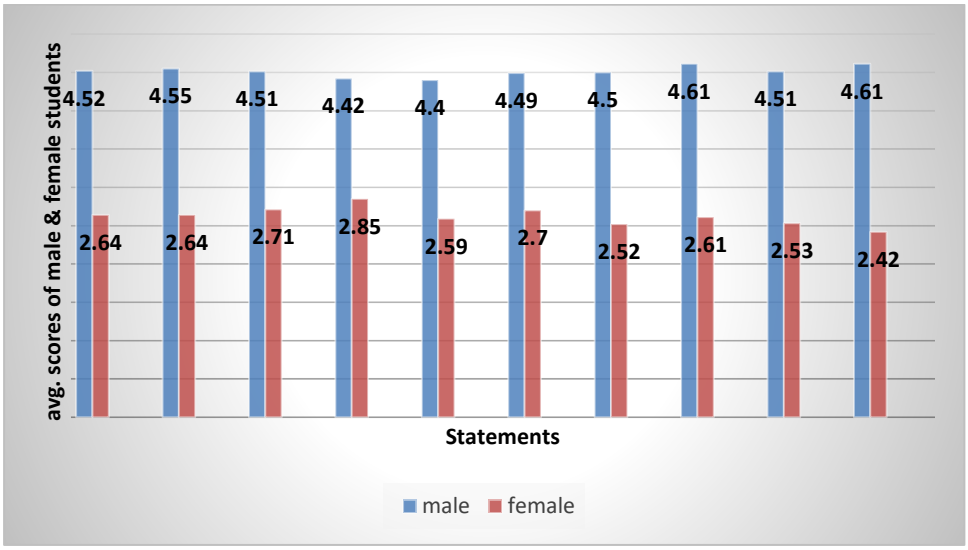

Chart 1: Mean scores of male and female students' responses

(Note: 1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree)

Male students' responses are more consistently clustered around the mean, according to the lower standard deviation than those of female students, whereas female students' knowledge levels are more variable. The results of the t-test also show that the awareness levels of male and female students differ significantly ($p < 0.05$). This implies that, in comparison to their female peers, male students are noticeably more conversant with cloud computing platforms utilized in educational settings (Table 1).

Support for the research hypotheses

H0: There is no significant difference in cloud-computing awareness between male and female undergraduate students.

H1: There is a significant difference in cloud-computing awareness between male and female undergraduate students.

The mean awareness levels of male and female students were compared using a t-test in order to examine these hypotheses. The t-test has 354 degrees of freedom (df), and 1.960 was found to be the critical value for a two-tailed t-test with a 95% confidence level. This hypothesis testing used a decision rule that stated that the null hypothesis would be rejected if the computed t-value was less than or equal to 1.960 ($p<0.05$).

Every item's t-test results repeatedly demonstrated that the computed t-values were much lower than the 1.960 critical value. For instance, the t-values that were computed for each of the

elements were incredibly low: 1. Item: 3.30562E-14; 2. Item: 8.90524E-16; 3. Item: 7.03598E-14; 4. Item: 9.83543E-11; 5. Item: 1.01478E-13; 6. Item: 1.42699E-13; 7. Item: 3.67228E-16; 8. Item: 2.19E-16; 9. Item: 5.66E-16; 10. Item: 6.44E-20 (TABLE 1). The p-values were given in all cases well below the standard significance level of 0.05. These findings suggest that there is a statistically significant difference in the awareness of cloud computing platforms between male and female students.

We reject the null hypothesis (H0) and accept the alternative hypothesis (H1) because all of the computed t-values are significantly lower than the critical value of 1.960 at df 354 ($p<0.05$). This finding implies that there is, in fact, a notable disparity in undergraduate students' awareness of cloud computing between male and female students at Delhi University. Based on the data, it can be inferred that male students are generally more aware of, understand, and confident when utilizing cloud computing platforms than female students. This is evident from the higher mean scores they receive on all topics.

Support for the Research Questions

Benefits associated with cloud computing-based applications or platforms in education:

Regarding the benefits and difficulties cloud computing-based educational platforms, there was also an open-ended question area in the questionnaire. The following is a description of the responses that respondents submitted.

- **Increased Flexibility and Accessibility:** As long as there is an internet connection, cloud computing systems provide anytime, anywhere access to educational materials and apps. Because of this flexibility, instructors and students can access assignments, lecture materials, and coursework from any device, including a laptop, tablet, or smartphone. This is especially helpful for distance learning, remote teaching, and other scenarios where instructors and students are unable to attend classes in person.
- **Cost Efficiency:** By using cloud-based solutions, educational institutions can spend less on servers and data storage facilities and other physical IT equipment. The "pay-as-you-go" infrastructure of cloud service providers can be utilized by them instead. In particular for schools with tight resources, this drastically reduces maintenance and upgrade expenses, making technology more affordable.
- **Collaboration and Communication:** Platforms for cloud computing provide smooth communication and cooperation between educators, administrators, and students. Collaborative document editing services, Microsoft Teams, Google Classroom, and other tools enable many users to work together in real-time, improving peer reviews, project-

based learning, and group projects. This facilitates dialogue and makes interactive, team-based learning settings possible.

- **Scalable Resources:** Depending on the requirements of the organization, cloud platforms offer resources that are adaptable. It is not necessary to buy new hardware when extra computing resources are dynamically allocated during peak times, like exams or admissions. This scalability guarantees uninterrupted and downtime-free availability of instructional resources at all times.
- **Support for Massive Open Online Courses (MOOCs) and E-Learning:** The expansion of MOOCs and E-Learning has been made possible in large part by cloud platforms. Cloud technology is used by platforms like Coursera, edX, and Udemy to create flexible and scalable learning environments that are accessible to millions of students globally. Because of this, education has become more inclusive since anyone with an internet connection may now access top-notch educational resources.
- **Personalized Learning:** Cloud computing facilitates adaptive learning systems that offer tailored educational experiences according to each student's development and performance. By providing individualized exercises, information, and evaluations based on each student's learning style and pace, these systems leverage data analytics to improve overall academic results.

Challenges encountered by students while using cloud computing applications or platforms for educational purposes:

- **Data Privacy and Security Issues:** One of the biggest obstacles facing students utilizing cloud computing platforms is the worry over data security and privacy. Academic records, private student information, and other sensitive data are kept on cloud servers, which are open to hackers, breaches, and illegal access. Students may be deterred from utilizing cloud-based learning resources to their full potential by concerns about data breaches or misuse.
- **Internet Connectivity and Reliability**: In order to operate efficiently, cloud computing platforms need a reliable internet connection. Students in areas with spotty or inconsistent internet service may find it challenging to use cloud-based materials, engage in virtual learning, or work with classmates. Inequality in access to education is a result of the digital divide, especially in rural or impoverished areas.
- **Technical Problems and Platform Usability:** When utilizing cloud computing apps, students may run into technical difficulties such software bugs, compatibility concerns, slow loading times, and glitches. Furthermore, some platforms can have complicated user

interfaces that are difficult for less tech-savvy students to understand, which would irritate them and lower their engagement levels.

- **Restricted Device and Resource Access:** A number of students lack personal devices, including laptops, tablets, or smartphones, which are frequently needed to make efficient use of cloud-based platforms. In addition, some students might not be able to purchase cutting-edge devices or high-speed internet, which would hinder their ability to participate and learn.
- **Learning Curve and Lack of Training:** Utilizing cloud-based apps frequently necessitates a certain degree of technological proficiency. A high learning curve may cause fear or unwillingness to use cloud platforms in students who are not used to these technologies. This problem is made worse by educational institutions' inadequate support and training.
- **Limitations on Data Management and Storage:** Although cloud platforms provide options for data storage, students may still encounter difficulties with data management and organization. Regarding the location of data storage, data access, and data recovery, confusion may occur. Furthermore, storage constraints on some cloud services may prevent students from saving all required data or resources.

Conclusion:

The investigation showed that male and female undergraduate students had significantly different degrees of platform awareness when it came to cloud computing. When it comes to cloud computing platforms, their features, and their potential educational benefits, male students consistently reported being more aware of and familiar with them than female students. Male students were more likely than female students to select "Strongly Agree" or "Agree" for the majority of items, while female students were more likely to select "Strongly Disagree" or "Disagree" This suggests a gender disparity in perception and understanding, which may have consequences for focused initiatives aimed at raising awareness among female students. These results offer educators and policymakers important information to help them create policies that support equal awareness of and use of cloud computing platforms in the classroom for both male and female students.

Comparison with Existing Literature

The presented study reveals a substantial disparity between male and female students' awareness and confidence in cloud computing, with male students exhibiting greater platform familiarity and utilization. This is consistent with earlier research conducted by Venkatesh &

Morris (2000), which also found that there are gender variations in the adoption and use of technology.

The study's reported benefits, which include improved collaboration, cost efficiency, and higher flexibility, align with the conclusions drawn by Armbrust *et al.* (2010) and Gonzalez-Martinez *et al.* (2015). These studies demonstrate how cloud computing supports collaborative learning, resource scalability, and cost savings. Research on the function of cloud technology in platforms such as Coursera and Udacity by Shafiq *et al.* (2017) and Anyatasia *et al.* (2020) further highlighted the benefit of cloud platforms in enabling MOOCs and personalized learning environments.

Previous studies have repeated the obstacles described in this research, such as technical limitations, internet connectivity issues, and data privacy concerns. Asghar (2020) and Khalid *et al.* (2022), for instance, talked about the serious security risks that come with cloud computing, especially for educational organizations. This research support your conclusions that the digital divide (with regard to internet access) and worries about data breaches are the main barriers to using cloud technologies.

The results of this study add to the expanding body of knowledge on cloud computing in education by offering a gender-based analysis that emphasizes the advantages as well as the difficulties. Although the results support many of the findings of previous studies, including the advantages of increased collaboration and cost-effectiveness, they also bring a fresh perspective by examining gender-specific experiences and views. Because of this, the study adds much to the body of knowledge on educational technology and provides educators and policymakers with fresh perspectives to take into account when incorporating cloud computing resources into higher education.

Implications of the Research

The study on Delhi University undergraduates' awareness of cloud computing reveals gender-based disparities, enabling targeted interventions to address gaps, particularly for female students. It informs educational programs to enhance understanding and engagement. The findings contribute to educational research by illuminating gender influences on awareness, refining learning theories, and guiding future studies. The study serves as a benchmark for evaluating strategies to close awareness gaps, aiding institutions in improving outreach, support services, and curricula for equitable learning environments. Overall, it advances understanding of gender dynamics and offers practical insights for boosting student involvement.

Delimitations of the Research

The investigation of awareness cloud computing among undergraduates students of Delhi University is limited to only undergraduates, excluding postgraduates, diploma students and students from other institutions. It is focusing on gender differences, have not considered other demographic variables such as age, or socioeconomic background or academic discipline variables. Due to the Delhi University context, these results cannot be generalized to other colleges or other geographical areas. The survey methods are used in the current research cannot measure all dimensions of awareness and the respondents are also likely to provide biased information, and this further reduces the study.

Recommendations for Future Research

Future investigations into cloud computing awareness among undergraduates should expand, first beyond Delhi University, by all investigation establishments and educational spaces to indicate whether gender patterns were idiosyncratic to the study sample. Future instruments should include demographics about socioeconomic status, culture, and study area of focus in furtherance of establishing what influences awareness. Longitudinal studies could observe shifts over time, while mixed-method approaches that use surveys along with interviews or focus groups could elicit more nuanced perspectives of students. Evaluating these studies in the context of specific interventions to remedy awareness gaps should improve educational strategy and policies for technology adoption.

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REIMAGINING HEALTHCARE THROUGH DIGITAL INNOVATION: A COMPREHENSIVE ANALYSIS OF OPPORTUNITIES AND BARRIERS

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Abstract:

A fundamental change in the way medical services are provided, accessed, and managed is represented by the digital revolution of healthcare. With the help of advancements like wearable technology, telemedicine, artificial intelligence (AI), electronic health records (EHRs), and big data analytics, healthcare systems around the world are changing. It offers better patient outcomes, increased operational effectiveness, and easier access to care, especially for underserved and remote populations. Government initiatives, evolving patient expectations, technological improvements, and the need for cost-effective care are some of the main motivators.

A growing digital divide, ethical issues, compatibility problems, and data protection difficulties are just a few of the major obstacles that come with the quick adoption of digital tools. In order to guarantee fair and long-lasting change, this abstract examines the main trends, motivating factors, advantages, and new difficulties in digital healthcare. It emphasizes the necessity of inclusive laws, moral standards, and funding for digital literacy. The present study offers a thorough examination of the ways in which digital innovation is changing healthcare delivery through a multidisciplinary survey of international case studies, policy frameworks, and academic literature. Additionally, it provides stakeholders with strategic insights to encourage fair access, close the digital divide, and create robust, future-ready healthcare systems. In the end, the study highlights that although digital transformation has a lot of potential; its success depends on careful integration, strong governance, and an inclusive approach to the deployment of health technology.

Objectives of the Research

1. To explore the key technological trends driving digital transformation in the healthcare sector, including telemedicine, AI, IoT, EHRs, and robotics.
2. To identify and analyze the major drivers influencing the adoption of digital technologies in healthcare systems globally and in the Indian context.

3. To assess the impact of digital transformation on healthcare delivery, patient outcomes, operational efficiency, and healthcare accessibility.
4. To investigate the emerging challenges related to data privacy, ethical concerns, digital literacy, interoperability, and health inequity in digital healthcare systems.
5. To evaluate the role of government policies, public-private partnerships, and institutional frameworks in shaping and regulating digital health ecosystems.
6. To provide recommendations for sustainable, inclusive, and ethical implementation of digital technologies in healthcare for improved service delivery and public health outcomes.

Review of Literature

1. **Electronic Health Records (EHRs) and Health Information Systems**: Over the past two decades, the idea of digital transformation in healthcare has gained popularity due to the quick development of new technologies and the increased focus on patient-centered care. The way that digital technologies are changing healthcare systems, delivery models, and stakeholder roles has been studied by a number of academics and organizations. The foundation of digital health infrastructure is made up of electronic health records, or EHRs. Adoption of EHRs improves patient outcomes, increases operational efficiency, and lowers medical errors, claim Buntin, *et. al.* (2011). But Adler-Milstein and Jha (2014) pointed out that interoperability and system usability issues might cause clinician annoyance and add to the workload associated with documentation.
2. **Virtual Care and Telemedicine:** One of the biggest developments in digital health has been the emergence of telemedicine. According to Kruse *et. al.,* (2017), telemedicine improves healthcare delivery in underprivileged and rural areas by cutting down on wait times and travel time. During the COVID-19 pandemic, Wosik *et al.* (2020) saw a dramatic increase in the usage of telehealth, highlighting both its usefulness in emergency situations and limitations in technological preparedness.
3. **Predictive Analytics and Artificial Intelligence (AI):** According to Topol (2019), AI is transforming genetics, imaging, and diagnostics to provide more accurate and individualized healthcare. After reviewing clinical applications of AI, Jiang *et. al.,* (2017) came to the conclusion that while clinical validation and ethical regulation are still lacking, AI-supported tools have a great deal of promise to improve decision-making.
4. **IoMT (Internet of Medical Things) with Wearable Technology:** Patient engagement is being redefined by wearables like as biosensors and fitness trackers. Patel *et. al.,* (2015) investigated the role of these gadgets play in monitoring chronic illnesses and changing

behavior. In their discussion of the expanding role of IoMT, Islam *et. al.,* (2015) pointed out that while it can offer real-time data, it also raises serious cybersecurity risks.

5. **Data Security and Blockchain:** Blockchain has become a viable option for safe data exchange. According to Agbo *et. al.,* (2019), blockchain improves patient consent procedures, transparency, and immutability. Widespread adoption is still hampered by issues with high computing costs and unclear regulations, though.
6. **Digital Divide and Equity in Digital Health:** If digital health is not applied universally, health disparities may worsen. Latulippe *et. al.,* (2017) emphasized that low-income and older individuals frequently encounter obstacles while attempting to use digital technologies. Shachar, *et. al.,* (2020) promoted policy frameworks that guarantee digital inclusivity by means of literacy initiatives and infrastructure assistance.
7. **National Strategies, Governance and Policy:** The significance of robust governance frameworks and national digital health policies was emphasized by the World Health Organization (2019). As part of a move toward systemic digital transformation, India launched the National Digital Health Mission (NDHM) in 2020 with the goal of integrating digital infrastructure and giving each citizen a digital health ID.

Introduction

The deliberate use of digital technologies to improve patient outcomes, streamline system efficiency, and improve healthcare delivery is known as "digital transformation" in the healthcare industry. Electronic health records (EHRs), telemedicine, artificial intelligence (AI), the Internet of Medical Things (IoMT), mobile health (mHealth) apps, and blockchain technology are just a few of the many advancements that are part of this shift (Agarwal *et al.,* 2010; Topol, 2019).

Digital technologies have evolved over the last ten years from supporting to essential parts of the healthcare system. The World Health Organization (WHO, 2019) highlights that by facilitating prompt, equitable, and patient-centered care, digital health helps close systemic and geographic divides. For example, telemedicine has increased access to care in underserved and remote locations (Kruse ***et al.,*** 2017), and electronic health records have enhanced information exchange and decreased prescription errors (Buntin *et al.,* 2011).

In order to handle patient loads and ensure continuity of care, health systems around the world were forced to implement teleconsultations, remote monitoring, and AI-based triage systems as a result of the COVID-19 pandemic, which further expedited the adoption of digital technology (Wosik *et al.,* 2020). The National Digital Health Mission (NDHM), which aims to integrate digital health IDs, records, and service platforms for all residents, is one of the major digital health efforts that countries like India have initiated in response (NITI Aayog, 2020).

Digital transformation has several obstacles, despite its potential. Concerns including data privacy, system incompatibilities, user digital illiteracy, and unequal access to technology continue to be major issues (Latulippe *et al.,* 2017; Agbo *et al.,* 2019). Additionally, there is an increasing need to strike a balance between inclusivity, ethics, and technological efficiency.

By examining its main trends, motivating factors, effects on stakeholders, and new difficulties, this study seeks to investigate the continuous digital transformation in healthcare. Additionally, it aims to offer suggestions for the ethical, fair, and sustainable integration of digital tools into health systems, particularly in the context of developing nations.

Despite its potential, digital transformation comes with difficulties. Data privacy, incompatibility between systems, user digital illiteracy, and unequal access to technology are still major challenges (Latulippe *et al.,* 2017; Agbo *et al.,* 2019). Furthermore, it's becoming more and more important to strike a balance between inclusivity, ethics, and technological efficiency.

In order to better understand the continuing digital transformation in healthcare, this study will examine its main trends, motivating factors, effects on stakeholders, and new issues. Additionally, particularly in the context of developing nations, it aims to offer suggestions for the ethical, inclusive, and sustainable integration of digital tools in health systems.

Methodology

Based on a thorough analysis of scholarly publications, government and WHO reports, policy papers, and case studies published between 2010 and 2024, this study combines qualitative and secondary research methods. Global data is included in the analysis, with a particular emphasis on developing nations like India, where digital penetration and healthcare infrastructure are increasing at the same time.

Opportunities in Digital Healthcare Innovation

1. Better Healthcare Access: Patients in underserved or rural locations can receive follow-ups, diagnostics, and consultations remotely thanks to telemedicine and mobile health platforms. Reduces physical and geographic obstacles to care, particularly in places with a paucity of providers or during pandemics.

2. Improved Care Quality: AI-powered diagnostics can accurately and early identify diseases (e.g., cancer, diabetic retinopathy). At the point of care, clinical decision support systems assist medical professionals by providing evidence-based recommendations.

3. Healthcare Digital Innovation: Important Prospects:

3.1 Virtual consultations and Telemedicine: Access to care has been redefined by telemedicine, particularly in underserved and distant places. Through video and mobile

consultations, it eases the strain on urban hospitals and permits continuity of care (Kruse *et al.,* 2017).

3.2 EHRs, or Electronic Health Records: They provide centralized access to patient histories and enhance care coordination across healthcare teams, electronic health records (EHRs) have supplanted paper-based documentation (Buntin *et al.,* 2011).

3.3 Machine Learning and Artificial Intelligence (AI): AI tools are utilized in robotic surgery, virtual health aides, disease prediction, and radiological image interpretation. Research indicates that in specific limited sectors, AI can do better than human diagnosis (Jiang *et al.,* 2017; Topol, 2019).

3.4 Wearables and the Internet of Medical Things (IoMT): Real-time data is provided by gadgets like smartwatches, glucose monitors, and ECG patches, which make preventive care and ongoing monitoring easier.

3.5 mHealth Apps: Users are able to keep track of their symptoms, make appointments, get medicine reminders, and get health information through mobile applications.

3.6 Using Blockchain to Protect Health Information: According to Agbo *et al.* (2019), block chain guarantees the security and integrity of medical records, especially in situations involving multiple providers or cross-border transactions.

4. Efficiency in Operations

Errors and expenses are decreased when administrative functions including inventory management, billing, and appointment scheduling are automated. EHRs improve coordination by streamlining the exchange of patient data across departments and providers.

5. Empowerment of Patients

Through applications and online portals, patients have more control over their health information. As people keep track of their health objectives, prescription drug use, and medical records, their health literacy and participation increase.

6. Planning for Public Health Based on Data

Policy planning, resource allocation, and epidemic surveillance are all aided by aggregated digital data.

Major Obstacles to the Transformation of Digital Health

1. The Digital Gap: Low-income communities, the elderly and rural residents are disproportionately impacted by unequal access to technology and internet services (Latulippe *et al.,* 2017). This obstacle could make health disparities worse.

2. Cybersecurity and Data Privacy: Data in healthcare is extremely sensitive. Unauthorized data sharing, breaches, and cyberattacks erode confidence in digital systems. This issue is made worse in many nations by lax enforcement of regulations.

3. Problems with Interoperability: Digital systems used by healthcare providers are frequently disjointed and ineffective at communicating with one another. Data sharing and integrated care are hampered by the absence of standardized formats and protocols.

4. Legal and Regulatory Obstacles: In many places, digital health exists without well-defined legal frameworks. AI liability, data ownership, telemedicine licensing, and cross-border care regulations continue to be issues.

5. India's National Digital Health Mission (NDHM) Case Study: Launched in 2020, India's NDHM is a historic attempt to digitize healthcare by giving each person access to an EHR, a unified health registry, and a unique health ID (NITI Aayog, 2020). Even though there are still implementation issues including digital literacy, interoperability, and privacy, it shows how digital innovation may be scaled at the national level.

Role of Government Policies in Regulating Digital Health Ecosystems

Digital health ecosystems are shaped and regulated in large part by institutional frameworks, public-private partnerships (PPPs), and government laws. The legal, regulatory, and strategic underpinnings required for the implementation of digital technology in healthcare are provided by government regulations. The goals of policies like India's Ayushman Bharat Digital Mission (ABDM) are to promote telemedicine, standardize digital health data, and provide fair access for both urban and rural people. By utilizing the private sector's infrastructure and technology know-how, public-private partnerships also speed up innovation and scalability. These partnerships promote the deployment of digital tools including AI-driven diagnostics, mobile health apps, and electronic health records while also fostering capacity-building via digital literacy initiatives. Institutional frameworks, such as regulatory agencies, research organizations, and national health authorities, guarantee the ethical, secure, and effective integration of digital health technologies. They monitor adherence to data protection regulations, encourage interoperability, and direct moral AI application. A strong and inclusive digital health ecosystem is produced by these three pillars working together to strike a balance between innovation and regulation, access and accountability, and technology and patient-centered care.

Recommendations for Sustainable, Inclusive, and Ethical Implementation of Digital Technologies in Healthcare

Accessibility, equity, and transparency must be given top priority in a multifaceted strategy to guarantee the ethical, inclusive, and sustainable use of digital technology in

healthcare. Governments and healthcare organizations must make investments in scalable, reliable digital infrastructure, including telemedicine platforms, data-sharing networks, and electronic health records, while also implementing ecologically friendly procedures. It's critical to close the digital divide, which entails increasing internet access in underprivileged areas, creating multilingual and user-friendly platforms, and raising digital literacy among the general public and healthcare professionals. With robust legal frameworks in place to control data protection, informed consent, algorithmic transparency, and the appropriate use of AI in healthcare decision-making, ethical issues ought to be at the forefront of implementation. Few recommendations are:

1. Invest in underserved and rural communities' digital infrastructure.
2. For smooth data sharing, make sure interoperability standards are met.
3. Strengthen cybersecurity frameworks with strong data protection legislation.
4. Encourage patients and healthcare professionals to be digitally literate.
5. Encourage the use of AI, EHRs, and mHealth tools by offering subsidies and training.
6. Provide legal and ethical guidelines for data ownership and AI-driven decision-making.

Discussion:

Healthcare systems could become more patient-centric, data-driven, and outcome-oriented models because to digital innovation. But invention isn't enough on its own. It is crucial to have a comprehensive ecosystem that includes ethics, infrastructure development, training, and policy reform. In order to meet the requirements of underserved communities and guarantee that digital health serves as a link rather than a roadblock to universal healthcare, the integration must be inclusive.

Conclusion:

Digital innovation in healthcare reimagining is a modern necessity, not a utopian dream. Digital technologies provide scalable and sustainable solutions to health systems that are under increasing strain from pandemics, chronic diseases, and resource constraints. But in order to realize their full potential, nations must remove current obstacles with investments, inclusive policies, and moral foresight. Healthcare's future is at the nexus of equity, human empathy, and technology.

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EMPLOYEE WELL BEING:
AN EMERGING STRATEGY FOR HUMAN CAPITAL MANAGEMENT

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Abstract:

This study examines the impact of employee well-being on organizational performance, highlighting its significance as an emerging strategy in human capital management. By fostering a positive work environment and promoting employee well-being, organizations can enhance productivity, job satisfaction, and employee retention. The findings suggest that prioritizing employee well-being leads to improved financial performance, increased resilience, and better talent attraction and retention. In this research we have studied elements of Employee Well-being, factors affecting employee well being in the organisation, innovative Employee Well-being Strategies. This research contributes to the growing body of evidence supporting the importance of employee well-being in driving business success and long-term sustainability.

Keywords: Employee Well-Being, Organizational Performance, Human Capital Management, Productivity, Job Satisfaction, Employee Retention, Workplace Health Promotion

Introduction:

The impact of employee well-being on organizational performance has become a crucial area of focus in human capital management. As organizations strive to optimize their workforce and drive business success, recognizing the importance of employee well-being has emerged as a key strategy. Employee well-being encompasses various aspects, including physical health, mental well-being, job satisfaction, and work-life balance. Research has consistently shown that employees who experience high levels of well-being are more productive, engaged, and committed to their organizations, ultimately contributing to improved organizational performance. Conversely, neglecting employee well-being can lead to decreased productivity, increased absenteeism, and turnover, ultimately affecting the organization's bottom line. This study aims to explore the relationship between employee well-being and organizational performance, highlighting the benefits of prioritizing employee well-being as a strategic imperative in human capital management. By examining the impact of employee well-being on

organizational outcomes, this research seeks to provide insights for organizations looking to optimize their workforce and drive business success.

Objectives of the Study:

- To examine the relationship between employee well-being and organizational performance.
- To investigate the impact of employee well-being on productivity, job satisfaction, and employee retention.
- To identify the key drivers of employee well-being and their effect on organizational outcomes.
- To explore the role of human capital management strategies in promoting employee well-being and enhancing organizational performance.
- To provide insights and recommendations for organizations to prioritize employee well-being as a strategic imperative in human capital management.

Research Methodology:

As it is an exploratory study, the research paper is primarily dependent on secondary data that was gathered from many Journals, periodicals, and publications. The needs of the study's objectives are taken into consideration when using a descriptive study. The study made considerable use of secondary data.

Employee Well Being:

Employee well-being encompasses the physical, mental, and emotional health of employees in the workplace. It is a multifaceted concept that includes aspects such as job satisfaction, work-life balance, stress management, and overall quality of life. When employees feel supported and valued, they are more likely to experience high levels of well-being, leading to increased productivity, job satisfaction, and engagement. Conversely, neglecting employee well-being can result in decreased motivation, absenteeism, and turnover. Organizations that prioritize employee well-being often see numerous benefits, including improved performance, reduced healthcare costs, and enhanced employee retention. By fostering a positive work environment and implementing initiatives that support employee well-being, organizations can create a culture that values and supports the health and happiness of their employees, ultimately driving business success.

Conceptual framework of Human Capital Management and Employee Well-being:

The conceptual framework of Human Capital Management (HCM) and employee well-being explores the intricate relationship between organizational practices and employee

outcomes. HCM practices, including talent acquisition, performance management, learning and development, and compensation and benefits, significantly influence employee well-being. Employee well-being, encompassing physical, mental, and emotional aspects, is crucial for driving job satisfaction, productivity, and retention. When HCM practices prioritize employee well-being, organizations can foster a positive work environment, enhance employee engagement, and ultimately improve organizational performance. Conversely, neglecting employee well-being can lead to decreased motivation, increased turnover, and reduced productivity. By understanding the interplay between HCM practices and employee well-being, organizations can develop strategic initiatives that support the health, happiness, and success of their employees, driving business outcomes and long-term sustainability. This framework highlights the importance of integrating employee well-being into HCM strategies to create a holistic approach that benefits both employees and the organization.

Elements of Employee Well-being:

Employee well-being encompasses various aspects that contribute to an individual's overall quality of life and job satisfaction. Key elements include:

1. Physical Well-being

- Health and wellness initiatives
- Access to fitness programs or facilities
- Healthy work environment

2. Mental Well-being

- Stress management techniques
- Mental health support resources
- Work-life balance

3. Emotional Well-being

- Job satisfaction and engagement
- Positive work environment and culture
- Supportive relationships with colleagues and supervisors

4. Social Well-being

- Sense of community and belonging
- Opportunities for social interaction and connection
- Team-building activities

5. Financial Well-being

- Fair compensation and benefits

- Financial planning and education resources
- Job security

6. Professional Well-being

- Opportunities for growth and development
- Career advancement and recognition
- Autonomy and control over work

By addressing these elements, organizations can create a supportive work environment that promotes employee well-being, engagement, and productivity.

Factors Affecting Employee Well-being in the Organisation:

Employee well-being is influenced by a variety of factors within the organization. These factors can be broadly categorized into several key areas:

1. Work Environment

- Physical Workspace: Comfort, safety, and ergonomics of the workspace.
- Workload and Work Pressure: Manageable workload, realistic deadlines, and support for managing stress.

2. Organizational Culture

- Supportive Leadership: Encouragement, recognition, and support from managers and leaders.
- Inclusive and Respectful Culture: A workplace that values diversity, promotes equality, and fosters positive relationships.

3. Work-Life Balance

- Flexible Working Arrangements: Options for flexible hours, remote work, or compressed workweeks.
- Time Off and Leave Policies: Adequate vacation time, personal days, and parental leave.

4. Job Design and Autonomy

- Job Clarity and Expectations: Clear roles, responsibilities, and expectations.
- Autonomy and Control: The degree of control employees have over their work and decision-making processes.

5. Health and Wellness Programs

- Wellness Initiatives: Programs and resources for physical and mental health, such as fitness programs, health screenings, and counseling services.
- Health Benefits: Access to health insurance, wellness programs, and preventive care.

6. Career Development and Growth

- Professional Development Opportunities: Training, skill development, and career advancement opportunities.
- Feedback and Recognition: Regular feedback, performance reviews, and recognition of achievements.

7. Interpersonal Relationships

- Colleague Support: Positive relationships and support from coworkers.
- Conflict Resolution: Effective management of conflicts and a supportive environment for resolving issues.

8. Organizational Policies and Practices

- Fairness and Transparency: Fair treatment, transparent policies, and consistent application of rules and procedures.
- Workplace Safety: A safe and secure work environment, free from hazards and risks.

9. Technology and Tools

- Effective Use of Technology: Access to appropriate tools and technology that enhance productivity and reduce frustration.
- Training and Support: Adequate training and support for using technology and tools effectively.

10. Personal and Professional Recognition

- Acknowledgment of Contributions: Regular recognition and appreciation for employees' efforts and contributions.
- Rewards and Incentives: Fair and motivating rewards and incentives for performance and achievements.

By understanding and addressing these factors, organizations can create a supportive and positive work environment that enhances employee well-being and contributes to overall organizational success.

Impact of Employee Well-being on Organisational Outcomes:

The impact of employee well-being on organizational outcomes is profound and multifaceted. When employees experience high levels of well-being, they are more likely to be engaged, motivated, and productive, leading to improved job performance and overall organizational success. Employee well-being has a direct impact on productivity, as happy and healthy employees are more efficient, effective, and innovative in their work. This, in turn, can

lead to increased customer satisfaction, improved product quality, and enhanced business outcomes.

Moreover, prioritizing employee well-being can lead to reduced absenteeism and turnover rates, as employees are more likely to be present and committed to their work when they feel supported and valued. This can result in significant cost savings for organizations, as recruitment and training costs are minimized. Furthermore, a positive Work environment that prioritizes employee well-being can foster a strong organizational culture, attract top talent and enhance the organization's reputation.

Employee well-being also has a significant impact on creativity and innovation, as happy and engaged employees are more likely to think outside the box and generate new ideas. This can lead to improved problem-solving, increased competitiveness, and enhanced business growth. Additionally, when employees feel supported and valued, they are more likely to provide excellent customer service, leading to increased customer loyalty and retention.

In contrast, poor employee well-being can have severe consequences for organizations, including decreased productivity, increased absenteeism and turnover, and reduced job satisfaction. Neglecting employee well-being can also lead to increased healthcare costs, workers' compensation claims, and legal liabilities. Moreover, a negative work environment can damage an organization's reputation, making it harder to attract and retain top talent.

Overall, prioritizing employee well-being is essential for driving business success and creating a positive work environment. By investing in employee well-being, organizations can reap numerous benefits, including improved productivity, reduced turnover, and enhanced creativity and innovation. As such, employee well-being should be a top priority for organizations seeking to achieve long-term success and sustainability.

Innovative Employee Well-being Strategies:

Innovative employee well-being strategies are crucial for fostering a healthy, productive, and engaged workforce. One approach is to offer mental health support, such as providing access to counseling services, mental health days, and training managers to recognize signs of stress and offer support. Flexible work arrangements, including remote work options and flexible hours, can also promote work-life balance and reduce commute-related stress. Additionally, organizations can invest in physical health initiatives, such as gym memberships, on-site fitness facilities, and health screenings, to encourage employees to prioritize their physical well-being.

Recognition and rewards programs can also play a significant role in promoting employee well-being. By acknowledging and celebrating employee achievements, organizations can boost morale, motivation, and job satisfaction. Furthermore, team-building activities and

social responsibility initiatives can help foster a sense of community and connection among employees, leading to improved collaboration, creativity, and overall well-being.

Technology can also be leveraged to support employee well-being. For example, AI-powered wellness plans can provide personalized recommendations for improving physical and mental health. Virtual wellness resources, such as meditation classes and fitness subscriptions, can also be offered to support employees' well-being. By investing in these innovative strategies, organizations can demonstrate their commitment to employee well-being, drive business success, and create a positive work environment that attracts and retains top talent. Ultimately, prioritizing employee well-being is essential for building a resilient, productive, and successful organization.

Innovative employee well-being strategies include:

i. Flexible work arrangements (remote work, flexible hours)
ii. Mental health support (counseling, mental health days)
iii. Wellness programs (fitness classes, health screenings)
iv. Recognition and rewards programs
v. Team-building activities and social events
vi. Professional development opportunities
vii. Employee assistance programs (EAPs)
viii. Healthy workplace initiatives (healthy snacks, ergonomic workspaces)
ix. Mindfulness and stress management training
x. Virtual wellness resources (meditation, fitness apps)

These strategies can help promote employee physical, mental, and emotional well-being, leading to increased productivity, job satisfaction, and retention.

Conclusion and Suggestions:

The impact of employee well-being on organizational performance is profound, and it has emerged as a crucial strategy in human capital management. By prioritizing employee well-being, organizations can reap numerous benefits, including improved productivity, reduced absenteeism and turnover, and enhanced creativity and innovation. Employee well-being is no longer a peripheral concern but a central aspect of organizational success. As the modern workplace continues to evolve, it is essential for organizations to recognize the importance of employee well-being and invest in strategies that promote physical, mental, and emotional health.

To leverage the benefits of employee well-being, organizations should consider implementing comprehensive well-being programs that address the diverse needs of their

employees. This can include flexible work arrangements, mental health support, wellness initiatives, and recognition and rewards programs. Organizations should also strive to create a culture that values and supports employee well-being, encouraging open discussions about mental health and promoting work-life balance. By doing so, organizations can create a positive work environment that attracts, retains, and engages top talent, ultimately driving business success and long-term sustainability. Regular feedback and assessment of employee well-being initiatives can also help organizations tailor their strategies to meet the evolving needs of their workforce.

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USER EXPERIENCE AS A STRATEGIC DRIVER OF CONSUMER BEHAVIOR IN DIGITAL COMMERCE

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Abstract:

Consumers have always played a crucial role in the marketplace, and in today's era of digital commerce, understanding consumer behavior is not only essential for growth but also for maintaining a competitive edge. This paper explores the key drivers that influence consumer behavior in online environments, with a particular focus on the role of user experience (UX). Drawing from recent academic literature and industry reports (Cyr *et al.,* 2009; Jongmans *et al.,* 2022; Saw, 2022), the study examines factors such as website usability, personalization, trust and security, and mobile responsiveness, which significantly impact consumer engagement and purchasing decisions. It further analyzes how well-designed UX components enhance satisfaction, interaction, and conversion rates in digital marketplaces (Lindgaard *et al.,* 2006; Nielsen, 2017). To understand the interdependence between consumer psychology and digital interfaces, the study integrates behavioral theories with practical UX strategies (Shaouf & Lu, 2022; Voigt *et al.,* 2021). Findings demonstrate that businesses investing in optimized UX not only attract but also retain customers more effectively (Jongmans *et al.,* 2022; Saw, 2022). This research provides valuable insights for marketers and e-commerce professionals aiming to align their platforms with evolving consumer expectations.

Introduction:

In the rapidly evolving digital landscape, consumer behavior has undergone a fundamental transformation, driven by the widespread adoption of internet technologies and the rise of e-commerce platforms (Rohrer, 2022). As more consumers turn to online channels for shopping, entertainment, and services, understanding the factors that shape their decision-making in digital contexts has become vital for businesses, marketers, and researchers. Among these, user experience (UX) has emerged as a key determinant of satisfaction, trust, engagement, and ultimately, purchasing behavior (Cyr *et al.,* 2009; Nielsen, 2019).

Online consumer behavior refers to the process individuals follow when searching for, evaluating, purchasing, and reviewing products or services using internet-connected devices. Unlike traditional behavior shaped by physical interactions and store ambiance, online behavior is influenced by intangible elements such as digital design, content layout, interactivity, usability, personalization, and technical performance (Jongmans *et al.,* 2022; Lindgaard *et al.,* 2006). This

shift from physical to digital consumption introduces new psychological, technological, and behavioral complexities that must be understood to foster deeper engagement.

User experience (UX) encompasses all aspects of a user's interaction with a digital platform, including websites and mobile applications. It involves components like visual design, responsiveness, usability, accessibility, content clarity, and emotional resonance (Shaouf & Lu, 2022; Saw, 2022). A strong UX ensures users can navigate platforms easily, find desired information or products, and complete tasks efficiently. Conversely, poor UX can lead to frustration, higher bounce rates, abandoned shopping carts, and lost sales opportunities (Voigt *et al.,* 2021). In a competitive e-commerce environment, where consumer attention is fleeting and switching costs are minimal, UX has evolved from an optional enhancement to a strategic necessity (Rohrer, 2022; Nielsen, 2017).

Technological advancements such as artificial intelligence (AI), machine learning, big data analytics, and mobile-first design have enhanced the ability of businesses to deliver personalized and seamless digital experiences. Features such as smart search, personalized recommendations, chatbots, and predictive analytics improve usability and influence consumer perceptions of value and trust (Jongmans *et al.,* 2022; Saw, 2022). Studies consistently show that consumers are more likely to engage with platforms that offer relevant, intuitive, and secure experiences (Shaouf & Lu, 2022; Cyr *et al.,* 2009).

Moreover, consumer expectations have evolved significantly. Today's digital consumers seek not just products or services but meaningful, efficient, and enjoyable experiences. They demand fast-loading pages, responsive mobile interfaces, clear navigation, transparent policies, secure payment systems, and instant customer support (Nielsen, 2019; Lindgaard *et al.,* 2006). Platforms like Amazon, Flipkart, and Netflix have raised the bar for digital interactions, compelling even smaller e-commerce businesses to prioritize UX to remain competitive.

This study is based on the premise that understanding UX and its impact on online consumer behavior is crucial for crafting digital experiences that drive engagement and loyalty. By conducting a thorough review of secondary data—including peer-reviewed journals, academic studies, and industry insights (Voigt *et al.,* 2021; Jongmans *et al.,* 2022)—this research identifies key UX elements that influence consumer behavior across online platforms. It also examines theoretical frameworks like the Technology Acceptance Model (TAM), the Stimulus-Organism-Response (S-O-R) model, and the Theory of Planned Behavior (TPB) to understand consumer responses in digital settings (Saw, 2022; Shaouf & Lu, 2022).

Literature Review

Research into online consumer behavior and user experience (UX) has expanded significantly over the past two decades, spurred by the rapid proliferation of digital technologies and the widespread accessibility of the internet (Cyr *et al.,* 2009; Rohrer, 2022). As consumers

increasingly interact with brands and platforms in virtual environments, scholars and practitioners alike have intensified their focus on how digital interfaces shape consumer perceptions, decisions, satisfaction, trust, loyalty, and post-purchase behavior (Voigt *et al.,* 2021; Jongmans *et al.,* 2022).

A prevailing consensus in the literature underscores the centrality of UX in influencing online consumer behavior. UX is not merely about aesthetics or visual appeal; it encompasses a holistic framework that includes website design, content relevance, interactivity, navigational clarity, system usability, personalization, and emotional resonance (Shaouf & Lu, 2022; Saw, 2022). These elements collectively shape the user's journey, determining whether a visitor converts into a customer—or leaves the platform altogether.

Theoretical Frameworks Guiding UX Understanding

Several behavioral theories have provided valuable lenses through which consumer interaction with digital platforms is understood. The Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and the Stimulus-Organism-Response (S-O-R) framework are particularly prominent.

- **TAM** emphasizes perceived ease of use and perceived usefulness as the primary predictors of technology adoption. A platform that offers intuitive navigation, fast load times, and streamlined checkout processes increase the likelihood of user engagement (Cyr *et al.,* 2009; Jongmans *et al.,* 2022).
- **TPB** adds further nuance by including subjective norms (influence of others), perceived behavioral control (self-efficacy in using the platform), and attitude toward behavior as key determinants of intention and action (Shaouf & Lu, 2022).
- **The S-O-R model** explains behavior through stimulus (interface design or feature), organism (user's emotional/cognitive state), and response (behavioral outcome). It helps explain reactions to stimuli like visuals, animation, personalization, and interactive features (Voigt *et al.,* 2021).

UX Beyond Aesthetics: Technical and Emotional Dimensions

UX extends into technical and emotional domains. Functional aspects like loading speed, mobile responsiveness, recommendation algorithms, and AI-enabled support systems critically influence the user's sense of efficiency, trust, and satisfaction. A delay of even a few seconds in page load time can increase abandonment rates. Conversely, platforms that are optimized for mobile devices, offer one-click checkouts, and provide secure payment gateways enhance user trust and reduce cognitive friction.

Personalization—driven by AI and machine learning—has become a powerful tool for engagement. Platforms that tailor recommendations based on browsing history, location, or

purchase patterns tend to experience higher conversion rates. However, excessive targeting may backfire by raising concerns about surveillance and data privacy.

Another crucial component is user-generated content, such as ratings, reviews, and testimonials. These serve as social proof, helping consumers make informed decisions and reinforcing platform credibility. The literature consistently finds that consumers trust peer reviews more than brand-generated content, especially in markets where information asymmetry is high.

Demographic & Psychographic Considerations

Consumers do not interact with UX in a uniform way. Digital-native users, often younger and more technologically adept, prefer interactive, gamified, and visually dynamic platforms. In contrast, older users or individuals with lower digital literacy often prioritize simplicity, clarity, and structured layouts. These differences underscore the need for inclusive design that accommodates varied user competencies and preferences.

Cross-cultural research further indicates significant variability in UX expectations. For example, consumers from high-context cultures (e.g., India, Japan) may prefer more detailed and visually rich designs, while those from low-context cultures (e.g., Germany, U.S.) lean toward minimalistic and functional layouts. Culturally adaptive design has therefore emerged as a growing imperative in global digital strategies.

Table 1: Mapping UX Components to Behavioral Models

UX Component	Technology Acceptance Model (TAM)	Theory of Planned Behavior (TPB)	Stimulus-Organism-Response (S-O-R)
Navigation & Usability	Perceived Ease of Use	Perceived Behavioral Control	Stimulus (Interface Design)
Personalization	Perceived Usefulness	Attitude Toward Behavior	Organism (Emotional Reaction)
Trust & Security	Trust in Technology	Subjective Norms	Organism (Perceived Risk)
Mobile Responsiveness	Compatibility	Behavioral Intention	Stimulus (Device Experience)
Page Speed	Ease of Use	Perceived Control	Stimulus → Organism → Response
Reviews & Ratings	Social Influence	Subjective Norms	Stimulus (Social Proof)

Table 2: UX Elements and Their Impact on Consumer Behavior

UX Element	Consumer Response	Behavioral Outcome
Fast Load Time	Reduced Frustration, Increased Trust	Lower Bounce Rate, Higher Engagement
Clear Navigation	Cognitive Ease, Confidence	Higher Conversion Rates
Mobile Optimization	Accessibility & Convenience	Improved Retention on Mobile
Secure Checkout	Trust and Perceived Risk Reduction	Completion of Transactions
Personal Recommendations	Sense of Relevance	Increased Basket Size
Customer Support Chat	Real-Time Assistance & Emotional Relief	Higher Satisfaction & Loyalty

The expansion of technologies such as voice commerce, augmented reality (AR), and virtual try-on tools is also reshaping what constitutes effective UX. These tools create immersive environments, helping bridge the sensory gap in online shopping. As a result, the definition and scope of UX are continuously evolving.

In synthesis, the literature affirms that UX is a multidimensional construct encompassing technical, cognitive, emotional, and social factors. Effective UX design is not accidental; it must be research-informed, user-centered, and adaptive to technological and cultural shifts. Platforms that achieve a harmonious balance between functionality, personalization, and ethical responsibility stand to gain in terms of customer engagement, loyalty, and long-term profitability.

Research Methodology

This study employs a secondary research methodology, synthesizing insights from previously published academic and industry sources. This approach is effective for examining established theories and tracing recurring patterns across a large body of work (Rohrer, 2022; Voigt *et al.,* 2021). Unlike primary research, which relies on direct data collection methods such as surveys or interviews, secondary research offers a broader exploration of existing findings related to UX and consumer behavior in digital commerce (Cyr *et al.,* 2009; Saw, 2022).

The research process began with a structured literature review, leveraging databases such as Google Scholar, JSTOR, ScienceDirect, Emerald Insight, and SpringerLink for peer-reviewed academic work, and Statista, Deloitte, McKinsey & Company, and Think with Google for recent industry insights (Jongmans *et al.,* 2022; Nielsen, 2017). Publications from 2014 to 2024 were selected to ensure contemporaneity with current digital trends (Shaouf & Lu, 2022).

Search terms like *"online consumer behavior," "UX in e-commerce," "digital shopping trends," "website usability,"* and *"customer trust"* were applied with Boolean operators to refine results (Voigt *et al.,* 2021). From an initial list of ~100 sources, approximately 30–40 met selection criteria based on relevance, scholarly rigor, and timeliness (Cyr *et al.,* 2009).

Data were analyzed using qualitative content analysis, with frameworks such as TAM, S–O–R, and TPB guiding the examination of how UX design impacts cognitive and emotional user states like satisfaction, trust, purchase intent, and loyalty (Saw, 2022; Shaouf & Lu, 2022).

Findings

The analysis revealed several critical UX factors that significantly influence online consumer behavior. These factors are interrelated and impact both the cognitive and emotional dimensions of user interaction:

1. **Website Usability and Navigation**- Clear, intuitive navigation enhances user satisfaction and directly contributes to higher conversion rates. Users are more likely to remain on, explore, and transact through platforms that offer seamless site architecture and accessible interfaces (Cyr *et al.,* 2009; Jongmans *et al.,* 2022).
2. **Visual Design and Aesthetics-** Aesthetically pleasing websites foster trust and emotional engagement. Elements such as color schemes, font choices, layout symmetry, and imagery significantly affect first impressions and perceived platform credibility (Lindgaard *et al.,* 2006; Saw, 2022).
3. **Mobile Responsiveness-** With the increasing dominance of mobile commerce, responsive design is no longer optional. Poor mobile UX leads to elevated bounce rates and lost revenue, while well-optimized mobile platforms improve accessibility, retention, and satisfaction (Nielsen, 2019; Jongmans *et al.,* 2022).
4. **Page Load Speed-** Fast-loading pages are directly associated with higher engagement and sales. Research shows that even a one-second delay in load time can drastically reduce user interaction, especially during peak shopping moments (Nielsen, 2019; Voigt *et al.,* 2021).
5. **Personalization-** Personalized content and recommendations based on browsing or purchase history increase engagement, relevance, and emotional connection. However, overly aggressive personalization may lead to privacy concerns and a perceived lack of autonomy (Saw, 2022; Shaouf & Lu, 2022).
6. **Trust and Security-** Consumers value transparency and security. Features like SSL encryption, trusted payment gateways, detailed return policies, and verified reviews increase users' sense of safety, thereby influencing purchase confidence and satisfaction (Cyr *et al.,* 2009; Shaouf & Lu, 2022)

7. **Interactive Features and Feedback**- Real-time assistance tools—such as live chat, AI-driven support bots, product zoom, and augmented reality try-ons—enhance decision confidence. They are especially influential in high-involvement purchases (e.g., electronics, fashion, or cosmetics) (Jongmans *et al.,* 2022; Voigt *et al.,* 2021).
8. **Social Proof and Community Dynamics-** User reviews, influencer testimonials, Q&A forums, and active community spaces serve as trust-building mechanisms. These features reduce uncertainty and add a communal dimension to individual shopping experiences (Voigt *et al.,* 2021; Saw, 2022).
9. **Demographic and Cultural Variations-** Preferences regarding UX vary significantly across demographic variables such as age, gender, and digital literacy, as well as across cultural contexts. This suggests the need for flexible, adaptive, and inclusive design strategies that can cater to diverse audiences (Shaouf & Lu, 2022; Lindgaard *et al.,* 2006).
10. **Post-Purchase Experience:** UX extends beyond the point of purchase to include return processes, order tracking, customer feedback collection, and post-sale engagement. These factors contribute to long-term satisfaction, customer retention, and brand loyalty (Saw, 2022; Jongmans *et al.,* 2022).

Case Study: Amazon

Amazon exemplifies how strategic UX design shapes consumer behavior. The platform offers intuitive navigation, powerful search filters, and AI-driven personalization based on user data. Personalized recommendations account for a significant portion of its sales. Trust is reinforced through secure transactions, transparent policies, and authentic user reviews. Its mobile app replicates the desktop experience while optimizing for mobile interactions. Features like one-click purchasing and Alexa voice search enhance convenience and engagement. Amazon also integrates social proof through extensive ratings and Q&A sections. These UX strategies align with the TAM and S-O-R models by enhancing perceived usefulness and triggering positive emotional responses, ultimately influencing behavioral outcomes like repeat purchases and brand loyalty.

In summary, Amazon's success illustrates how a well-designed, data-informed UX approach can drive customer acquisition, retention, and satisfaction in a highly competitive digital environment.

Conclusion:

As digital commerce continues to reshape consumer-business interactions, the role of user experience (UX) in influencing online consumer behavior has become both pivotal and multidimensional. This paper demonstrates that UX elements—ranging from usability and personalization to trust and accessibility—are not merely aesthetic enhancements but core drivers of consumer engagement, decision-making, and loyalty.

Drawing from behavioral models such as TAM, S-O-R, and TPB, we find that consumers form judgments not only based on product attributes but also on the quality of their digital interactions. Positive user experiences—marked by ease, clarity, security, and personalization—stimulate favorable emotional responses, which in turn promote conversions and repeat visits. Conversely, friction within digital environments erodes trust and leads to abandonment.

Importantly, this study also highlights that UX design must consider diversity in user demographics, cultural expectations, and emotional needs. A one-size-fits-all approach is no longer viable in today's personalized economy. Businesses that leverage technology to provide context-sensitive, seamless, and emotionally resonant experiences are better positioned to attract and retain consumers in highly competitive online spaces.

Ultimately, the integration of behavioral science with UX design principles offers powerful pathways to understand and shape consumer behavior. Marketers and digital strategists must thus invest in UX not just as a design function, but as a strategic imperative rooted in psychological insight and user empathy.

Future Research & Limitations

While this study provides comprehensive insights into the relationship between user experience (UX) and consumer behavior in digital environments, it is not without its limitations. The research relies primarily on secondary data, including academic literature and industry reports, which, while credible, may not capture the most recent consumer trends or the dynamic nature of digital user behavior. Real-time, primary data such as in-depth interviews, surveys, or ethnographic studies could further validate the theoretical insights presented here and provide more granular understandings of user experiences across varied contexts.

Additionally, cultural, geographic, and demographic variability can influence consumer expectations and interactions with UX elements. This study takes a broad view and does not delve into regional UX differences, which may affect the generalizability of the findings. Future research could explore how specific user segments—such as older adults, rural users, or consumers with limited digital literacy—interact with UX components and what design adaptations might be necessary to serve these populations better.

Moreover, as emerging technologies such as augmented reality (AR), virtual reality (VR), voice interfaces, and generative AI begin to influence the digital landscape, their impact on user behavior remains underexplored. Future studies should investigate how these technologies reshape consumer decision-making and emotional engagement. Similarly, the ethical implications of hyper-personalization, data privacy, and algorithmic transparency in UX design offer fertile ground for further inquiry.

In conclusion, while this paper lays a strong foundation for understanding how UX shapes consumer behavior, there is significant scope for expanding this research through

empirical studies, cultural segmentation, and examination of emerging technologies. These future directions will not only enrich academic discourse but also guide practical strategies for inclusive and adaptive UX design in a rapidly changing digital world.

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TECHNOLOGY ADOPTION AND INNOVATION: A CASE STUDY OF PANIPAT TEXTILE INDUSTRY

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Abstract:

Technology can broadly be described as both the science and the art of accomplishing tasks by utilising skills and knowledge. This concept encompasses a nuanced combination of expertise, methods, and tools. Similarly, technological change refers to a transformation in expertise, methods, and tools used to carry out tasks. As noted by Nelson and Rosenberg (1993:4), innovation in technology, in its most traditional and strict sense, can be defined as a process through which companies acquire and implement product designs and manufacturing techniques that are unfamiliar to them. This distinction highlights two types of technological innovation: process innovation and product innovation. Additionally, the introduction of new raw materials can also be classified as a form of technological innovation. The degree of technology adoption in a firm takes into account both the implementation status of different technologies and how extensively the industrial firm utilises each installed technology. Changes or innovations in processes can occur due to significant alterations in equipment, minor modifications in machinery, or adjustments in the skill set of the workforce. Product innovation is arguably the most crucial element of technological advancement in today's global environment. Both the development of new products and gradual enhancements to existing ones fall under the umbrella of product innovation, which can be viewed as an ongoing process rather than a singular event. The various stages involved in launching product innovation include gathering market insights, brainstorming new products, specifying product features, and creating designs, sketches, and blueprints, followed by product development, production, and marketing activities. Product innovation can result from changes in the types of raw materials, modifications to production processes by altering the use of current equipment or making slight adjustments to existing equipment, or from the application of new skills and significant upgrades to the capital goods profile. Consequently, such innovations may be particularly challenging for smaller firms in the industry to replicate. As the global economy increasingly shifts towards a knowledge-driven approach, the implementation of ICT has become critical for sustaining and enhancing competitiveness across all commodities and services in worldwide markets. Achieving both improved outcomes and increased efficiency necessitates a significant reliance

on ICT. The development of innovative concepts, advanced designs, new processes, and methods, as well as the gathering of market insights, all depend on the utilisation of ICT in every sector of the economy. The purpose of this chapter is to examine the current landscape of technology adoption and innovation (TA) in the Panipat textile sector, with a specific focus on product innovation, process innovation, IT-based innovation, and market innovation. This case study also examines the trends, obstacles, and results of technology implementation in the textile industry of Panipat, with an emphasis on modernization and competitiveness.

Keywords: Technology Adoption, Process Innovation, Product Innovation, Product Development.

Introduction:

The medieval city of Panipat is located in the northern Indian state of Haryana. This historical town of the district is the administrative headquarters of the district. The district is located between 29°09'30" and 29°30'00" North Latitude and 76°30'00" and 77°11'00" East Longitude. The Panipat district is 90 kilometers from Delhi and 244 meters above sea level. It is located on National Highway-1, Sher Shah Suri Marg. It shares the boundaries with district Jind in the West, Karnal in the North, and Sonipat in the South. Its eastern side shares a border with the State of Uttar Pradesh. With a famous history of textile weaving, Panipat is a place of tremendous antiquity. Panipat, which once implied three great battles, now represents the 'City of Weavers" and has earned a position in the global market for 'Handloom Production.' The city is one of the country's most crucial shoddy yarn production Centres. The Panipat district has two subdivisions: Panipat and Samalkha, which are further comprised of five tehsils, namely Panipat, Samalkha, Israna, Bapoli and Madlauda. Panipat has carved out a niche by producing and exporting handloom products in the international market. The handloom products like woollen carpets, cotton durries, made-ups, throws and mats, bedcovers, and other products are exported to foreign markets (DIC, Departmental activities, Panipat; 2015).

Panipat has long been well-known for its important blanket-weaving center. Up until 1942, when woolen yarn spinning power-operated units were established in Panipat, hand-spun yarn was used for blanket weaving. After that, machine-produced spun yarn took its place. At the time of Partition in 1947, this industry suffered a setback with the migration of Muslim weavers from Panipat to West Punjab (present Pakistan). However, slowly it recovered through the work of displaced non-Muslim wool merchants from West Punjab, Pakistan, who established themselves at Panipat (District Census Handbook Panipat;2011:17). Financial aid and factory accommodations were made available to these wool merchants to set up factories in the industrial area at Panipat (Karnal District Gazetteer; 1976:171-173).

Research Methodology:

A total sample of 240 respondents has been selected for the study, including unit owners, manufacturers, traders, yarn dealers, retailers, exporters, and businessmen of the local host society. For the present study, the "snowball" sampling method was used to select the units. The "snowball "sampling technique was used. Along with these respondents, other stakeholders (08) who were directly or indirectly related to the textile manufacturing profession were also included. Thus, a complete network of people engaged in textile manufacturing was built up. Intensive fieldwork was conducted in Panipat to collect primary data. For the analysis of this study, both qualitative and quantitative data were gathered. Both primary and secondary data were gathered during the current research. Primary data has been collected through first-hand information during fieldwork using observation and in-depth interviews in the Panipat textile industry. In research, primary and secondary sources were used to gather data. Secondary data collection was collected from various books and national and international journal papers.

Markers of the Panipat Textile Industry and Its Development:

In 1947, weavers used a frame loom with two treadles at the beginning to produce Khes and Durries of coarse hand-spun cotton yarn. The Jacquard was first used in the Panipat industry in 1948 when it was purchased from Joan Harlekar by the National Textiles and General Company of Panipat.In 1960-70, Mr Amit Lal Batra and Mrs D.C. Bhatia, master-weavers at Panipat, created new designs for exports, but it was only with the efforts of Sh. Jaipuriya from Jaipur, the handloom products of Panipat, began to enter the export market in 1970. At the same time, hand-knotted carpet manufacturing began for the domestic market and later for the international export market. Curtain production started during 1975-80. The designs were imitated from the Delhi Cloth Mills. In 1980, the master weaver, Mr D.C Bhatia, introduced table mats inspired by Mrs B. K Nehru, from Hungry. Under the supervision of Mr D.C. Bhatia, M/s. Mahajan Overseas made Chindi Durries in 1985. She was a consultant at M/S Central Cottage Industries Corporation of India (Boruah, 2001:1). During 1985-86, machine producers of handlooms used old second-hand power looms for producing bed coverings, drapes, and other upholstery garments. During 1984-90, the shoddy industry began blanket production in Panipat (Boruah, 2001:1). During 1990-91, the throws with diverse designs were manufactured on power looms. In due course, the hand-tufted carpets and handloom carpets were started. The credit for introducing the shuttle-less loom goes to Paliwal Export, then to Mr Kaluram of Liberty Velvets and Mr Om Bhatia of Loom Drape to manufacture upholstery fabric. In 1999, New types of Made-ups were of embroidery and decorations. This resulted in the development of newer products still in use today (Boruah, 2001:1-2).

Industrial Sector Overview:

The Panipat textile cluster stands out among Indian textile hubs for being a complete ecosystem. Unlike most other textile clusters that focus on one or two manufacturing stages, Panipat encompasses a wide range of both upstream and downstream activities in the textile sector, including the production of textile machinery and the creation of textile made-ups. This cluster specialises in home textiles, which include products such as made-ups, carpets, and blankets. Its downstream operations comprise the manufacturing of textile machinery, as well as spinning, weaving, dyeing yarns and fabrics, and finishing processes. In the Haryana Urban Development Authority (HUDA) areas, most of the textile units are in industrial regions in Sector 25 Part I and Part II, and also in Sector 29 Part I and II, and Panipat Industrial Area. The other industries, such as job work units, were primarily concentrated in and around Panipat Town. In the Panipat textile cluster, there were around 3,095 micro-, small-, and medium-sized companies (MSMEs), with home furnishing accounting for 60% of the industry. About 65 percent of the units were categorised as micro. The cluster has around 200 textile machinery units (TERI, 2016:1-2).

According to the Haryana District Gazetteer Panipat (2015:165-167), the Panipat textile industry comprises seven segments: handloom power loom industry, carpet industry, shoddy yarn spinning, wet processing, and hosiery woollen yarn industry. The products manufactured on power looms without/ with Jacquard attachments were bedsheets, bedcovers, acrylic blankets, shoddy tapestry, upholstery fabrics, made-ups, etc. These products are mainly produced for the domestic market. The woollen carpet industry is one of Panipat's oldest (about 33 years old). There are more than 450 shoddy yarn and woollen industries in Panipat, which supply yarn to weaving units of Panipat, Amritsar, Bhadoi, and Bikaner. Panipat is in the international handloom market. There are about 100 industrial units which are involved in the export of a wide variety of handloom products, such as durries, mats, table covers, bed sheets, curtains, carpets, etc., to various countries, including the U.S.A., U.K., Canada, Japan, Germany, Australia, etc. The Government of India has set up an inland container depot at Baborpur mandi to assist exporters in transporting their finished goods. Handloom Export Promotion Council (HEPC) has its liaison officer in Panipat, working for the profit of the weaving and export community of the Panipat Handloom Industry (hepcindia.com).

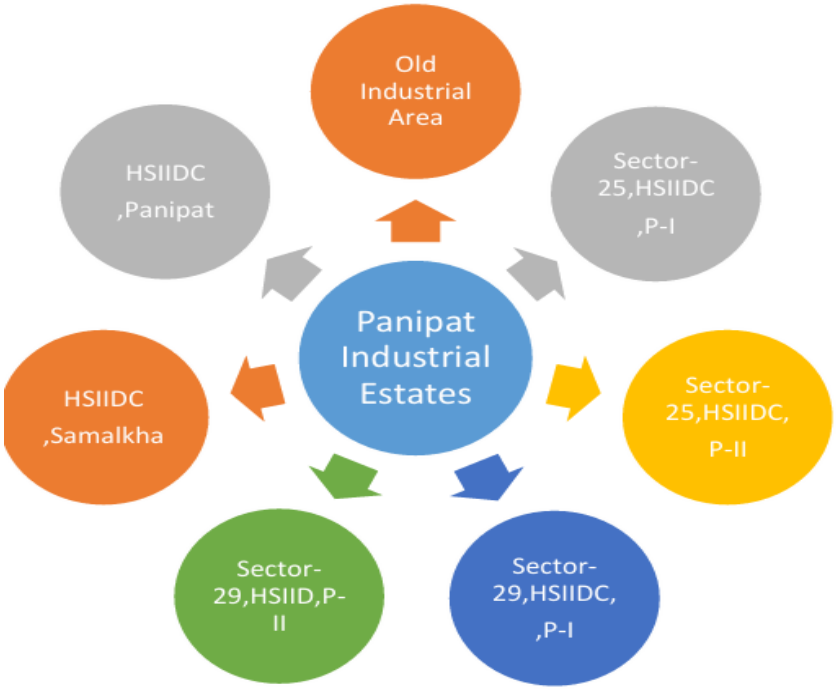

Figure 1: Key Industrial Estates of Panipat.

Technological Adoption and Innovation in the Panipat Textile Industry:

The chapter provides a comprehensive overview of the modifications to the processes, products, and raw materials that have occurred within the Panipat textile industry. In Panipat, there are two clusters at various levels of development: the Textile machinery cluster is part of the Government of India's Cluster Development Scheme (MSE-CDP). In contrast, the home furnishing cluster is part of the Haryana State Mini Cluster Development Scheme. Home furnishings, including handloom goods, upholstery fabrics, terry towels, and blankets, are all well-known in Panipat. The State's top export-oriented sector is textiles and ready-to-wear, including handlooms (Industry and Commerce Department, Haryana). Panipat Home Furnishing cluster contains roughly 7,000 units, of which over 5,000 are micro units. These factories manufacture, dye, print, embroider, and finish home furnishing products – woven and knitwear like bedsheets, carpets, cushions, cushion coverings, durries, curtains, floor covering, throws, and more. Most businesses market their goods locally and overseas, including Canada, Poland, Hong Kong, and the United States. (Panipat Home Furnishing Cluster Report; 2019).

The finished items known as home textiles, which include multifunctional products like blankets, bed linens, bath mats, carpets, curtains, cushion covers, durries, rugs, table coverings, table mats, table runners, velvet, and makeups, are the specialty of Panipat's handloom and power loom clusters.

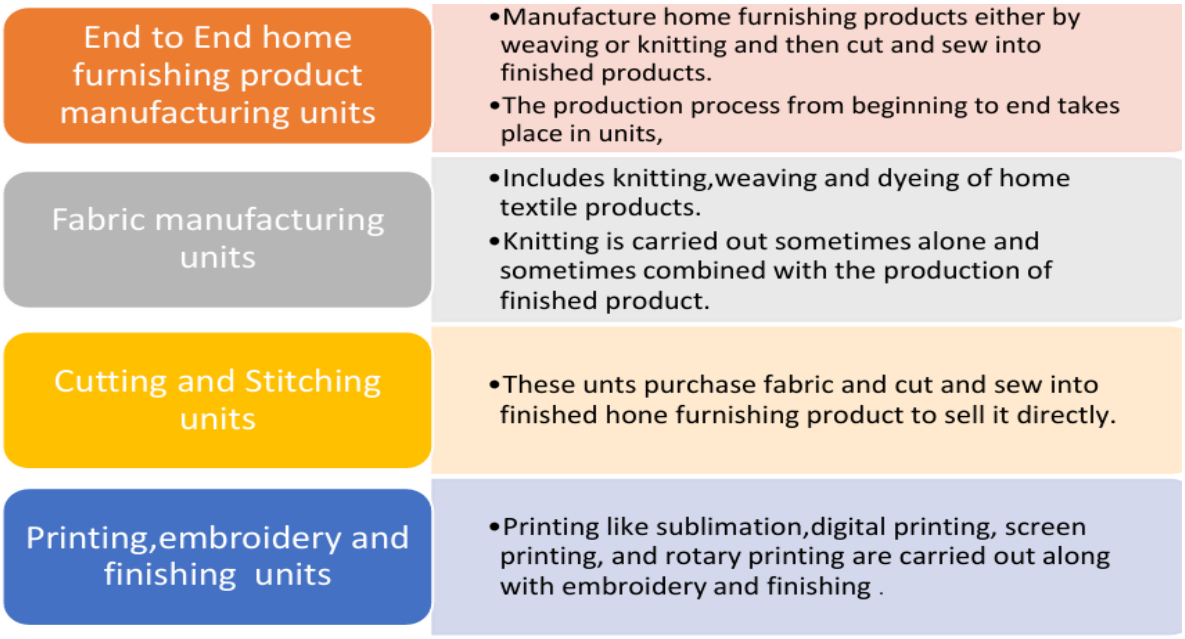

Figure 2: Four Types of Home Furnishing Units Based on the Production Process in Panipat

1. Manufacturing Process Technologies:

Findings from the Panipat case study challenge the assumption that groups of SMEs (Small and Medium Enterprises) in traditional sectors are solely capable of product innovations, while experiencing minimal changes in process technologies. The most significant technological transformation occurring in Panipat is related to changes in process technologies and machinery. Despite the industry not being at the leading edge of technology, there has been notable evolution in the process technologies employed throughout different stages of production. In the Panipat textile industry, firms were engaged in upstream and downstream processes such as spinning, weaving, dyeing yarn and fabric, finishing, producing, and selling home furnishings, made-ups and floor coverings. Alongside advancements in process technologies within the fundamental manufacturing operations of the Panipat textile sector, there have been numerous incremental improvements in machinery and equipment, driven by innovations in products and raw materials within the cluster. These advancements feature modifications in loom designs to accommodate new products and raw materials. Several firms have also created locally manufactured machines for tufting and producing chenille yarn. This section provides an overview of the technologies currently utilised and the transformations that have occurred in the primary activities involved in the production of home textiles in Panipat since the post-reform period. The main manufacturing processes related to home textiles encompass: spinning, yarn dyeing, designing, weaving, fabric dyeing, finishing, testing, stitching, and packing. Tufting is performed for particular products.

i. Weaving of Home Textiles:

Weaving constitutes a fundamental aspect of the home textiles production process and is particularly crucial for items like carpets, rugs, bathmats, throws and durries. The application of various weaving technologies has undergone significant transformations over the years. Currently, Panipat employs a diverse array of weaving methods, ranging from basic pit looms, framelooms, handlooms, to advanced automatic shuttle-less looms, and also waterjet looms and airjet looms. In Panipat, power looms with or without dobby and jacquard attachments are used by most units to produce products mainly for the domestic market. In Panipat, exporter units employ pit loom, frame loom, special panja loom and handloom with jacquard and dobby attachments to produce plain or striped fabrics and other handmade products with different designs for the export market. Initially, these units used second-hand Shuttleless looms imported from China, Germany, and Italy. Local textile machinery manufacturers also produce shuttleless looms for these exporters. In Panipat, floor coverings are manufactured by hand-tufting and machine-weaving operations. A few exporter units have stitching machines, Braided machines, and electronic bathmat tufting machines with different needles to produce made-ups for the export market.

Plate 1: Weaving of Fabric on Water-Jet Looms, knitting on Raschel Warp Knitting Machine, Handloom and Dobby loom

The industry has not followed the typical progression from manual to electro-mechanical to electronic technologies. In Panipat, most firms had replaced handlooms with power and shuttleless looms to avail the benefits of the technology upgradation fund scheme (TUFS). The recent emergence of a niche market for handmade goods globally has led to a revival and rapid spread of handloom technology, which is situated at the lower end of the technological spectrum. In contrast, the pursuit of higher-quality alternatives has expedited the use of shuttle-less looms. In response to the increasing need for better quality, several large units have begun utilising shuttle-less looms equipped with electronic controls. There are nearly distinct and non-overlapping domains for the three weaving technologies: handlooms, powerlooms, and shuttle-less looms. Recently, many businessmen have introduced shuttleless rapier and waterjet looms to produce a grey fabric for 3D bedsheets. In producing mink blankets, a double raschel warp knitting machine knits fabric by forming loops with warp yarns running as a parallel sheet from the beam.

Plate 2: Weaving of Fabric on Power Loom with Jacquard Attachment

In Panipat, shuttle-less looms are utilised not primarily for their cost efficiency, but rather for the superior quality of the fabrics they produce. Although the productivity of shuttle-less looms is significantly greater compared to both power looms and hand looms, the high initial investment in these machines results in a higher cost. Exporters and firms targeting the premium segment of the domestic market are the ones employing shuttle-less looms. Improved export prospects, along with increasing worldwide interest in handmade products, have revived the handloom industry in Panipat. Handlooms with jacquard attachments are used to produce elaborate designs on thick fabrics. Nearly all the shuttle-less looms utilised in Panipat are pre-owned and imported. Many businesses have chosen to use second-hand looms, which are more readily available as a result of the textile industry's major move from developed to developing nations, even though a few larger units in the sector have purchased new looms. In the past five years, the majority of shuttle-less looms in the industry have been electro-mechanical; several

larger firms have acquired looms featuring electronic controls. Nevertheless, shuttle-less looms equipped with electronic controls, which can be costly, are beyond the financial reach of smaller units in the industry producing for the domestic market.

ii. Dyeing of Yarn and Fabric:

In recent years, Panipat has experienced advancements in the yarn dyeing process. Currently, cabinet dyeing is the predominant method applied in the industry. Previously, tankie dyeing, which is now considered outdated and environmentally harmful, was the most frequently used technique. Due to the enforcement of regulations and the establishment of several modern dyeing facilities, the practice of tankie dyeing is gradually declining within the cluster. It is now primarily utilised by small firms trying to become exporters, or by short-term exporters looking for quick profits. Cone dyeing, which is the most sophisticated of the three yarn dyeing methods employed in Panipat, was recently adopted in the area. Its usage is rapidly spreading, with several larger units incorporating in-house cone dyeing facilities. Most fabric dyeing in Panipat is carried out using intermediary technology such as semi-automatic jiggers, although some companies utilise automatic jiggers. However, the spread of these automatic machines is slow. High-pressure, high-temperature precision dyeing with high-quality jiggers is quite uncommon in Panipat. While there are a significant number of both automatic and semi-automatic jiggers in the industry, many firms across various sizes and market segments continue to rely on basic manually operated jiggers.

Plate 3: Cabinet Dyeing of Yarns in Units with Dyeing in-house Facility or Separate Dyeing Units

Tankie and cabinet dyeing machines, jigger dyeing, and cotton and wool manual hank dyeing are mainly used in Processing units in Panipat. These dyeing units provide all types of dyeing services to manufacturers to dye cotton, woollen, synthetic fabric or yarn in hank form and package (cheese) form. Eco-friendly dyes and chemicals were used to dye textile products for the export market to meet the global eco-sustainable textile standards in the dyeing field. A

very few exporters had in-house integrated dyeing and printing facilities in their units. It was a significant cost area in the production process. Although some jiggers utilised in the cluster are locally manufactured, the majority of the companies prefer semi-automatic non-branded jiggers sourced from places like Ludhiana. A handful of firms have also invested in advanced soft flow technology for dyeing fabric. The diverse fabric and yarn dyeing capabilities available at the dyeing centres enable even smaller companies to produce high-quality products at competitive prices. However, as the technology in yarn and fabric dyeing has transitioned from primitive to intermediate methods, the colour fastness of products from Panipat has seen significant improvement over time.

iii. Finishing of Home Textiles:

In recent years, numerous fabric finishing processes such as mercerisation, decolourising, and sanforization have been introduced within the cluster, either as in-house operations or as specialised services. Various finishes, including fire-resistant, waterproof, non-skid, and wrinkle-free, have also been launched by certain companies. To enhance the overall appearance of made-up, several units have added higher-end services for dry cleaning and ironing. Panipat has also developed unique finishing capabilities not found in other clusters, such as tumbler washing, which is essential to maintain the locks of tufted fabrics. However, overall, the areas of chemical processing and finishing have not experienced sufficient upgrades.

iv. Testing of home textiles:

Another significant technological gap that prevents the cluster from reaching the technological frontier is the absence of a testing culture in Panipat. Testing is primarily conducted to meet buyers' specifications rather than as a means for process optimisation or quality control. In a few instances, companies have invested in equipment such as computer colour matching and electronic inspection machines to ensure quality; however, their adoption remains quite limited.

2. Product Change:

The industry provides firms with the ability to quickly introduce new products or product ranges in response to shifts in global demand and to remain in the global market. Each firm produces and sells two or more products in the domestic and export markets simultaneously from each significant item category. These products are customised and decorated through value-added techniques like embroidery, quilting and knotting. Major Home textiles produce and sell in the domestic market, including printed bedcovers, blankets, curtains with jacquard designs and upholstery items. At the same time, textile products produced and sold in the international market had durries, rugs, throws, bed covers, blankets, door mats, table linen, kitchen linen,

curtains, terry towels and bedsheets. Most units in the industry produce and sell sofa fabrics, curtain material, sofa panels, 3D bedsheets, bedsheets, and bedcovers for the domestic market in Panipat. Very few units are found to produce Quilts and cushion covers. Bath mats made their debut in the market within the last decade. At first, the number of orders for bath mats is minimal, and only a handful of companies offer them. Currently, the demand for this product in the export market has significantly increased.

Durries, rugs, Hand-tufted, shaggy, and broadloom carpets on handlooms are produced mainly by exporter units for foreign customers. Designer bedsheets of different sizes, like king size and double king size, with different designs, colour combinations and patterns are produced for export purposes. Customisation has been one of the reasons for their success in global markets. Exporters produce the latest innovation through made-ups and decorative items like throws, pouffes, Chair covers and pads, bathmats, rugs, wall hangings and similar products. Made-ups are currently the fastest-growing category among export products. Numerous companies that previously did not manufacture made-ups have diversified their offerings and started producing them in recent years.

The Panipat Handloom and Home Furnishing industry, which previously focused on exporting mostly individual items, such as bed covers, has transitioned to exporting coordinated collections, including bedroom sets, dining table sets, and bathroom collections, which have been embraced by many exporters for added value. There has been a significant shift in the industry's product mix over the past ten years. The proportion of items produced for the export market has increased markedly. Producers are not only experimenting with new materials like silk and jute but are also incorporating traditional techniques such as embroidery, tie-dye, and patchwork to enhance value. The textile industry has experienced significant advancements and enhancements in carpet production. In Panipat, the primary types of carpets manufactured are tufted and woven carpets. The production of high-quality blankets woven on shuttle-less looms is another innovative product introduced in the cluster, which is arguably the largest centre for shoddy wool and blankets made from shoddy wool globally. Additionally, the cluster has introduced the production of terry towels aimed at the export market, a venture that began within the last five years. The variety of products produced in Panipat is entirely driven by market demand and fluctuates considerably from year to year. The ability to adapt to these changes at a low cost is likely Panipat's foremost strength, providing it with a competitive advantage over other Textile industries.

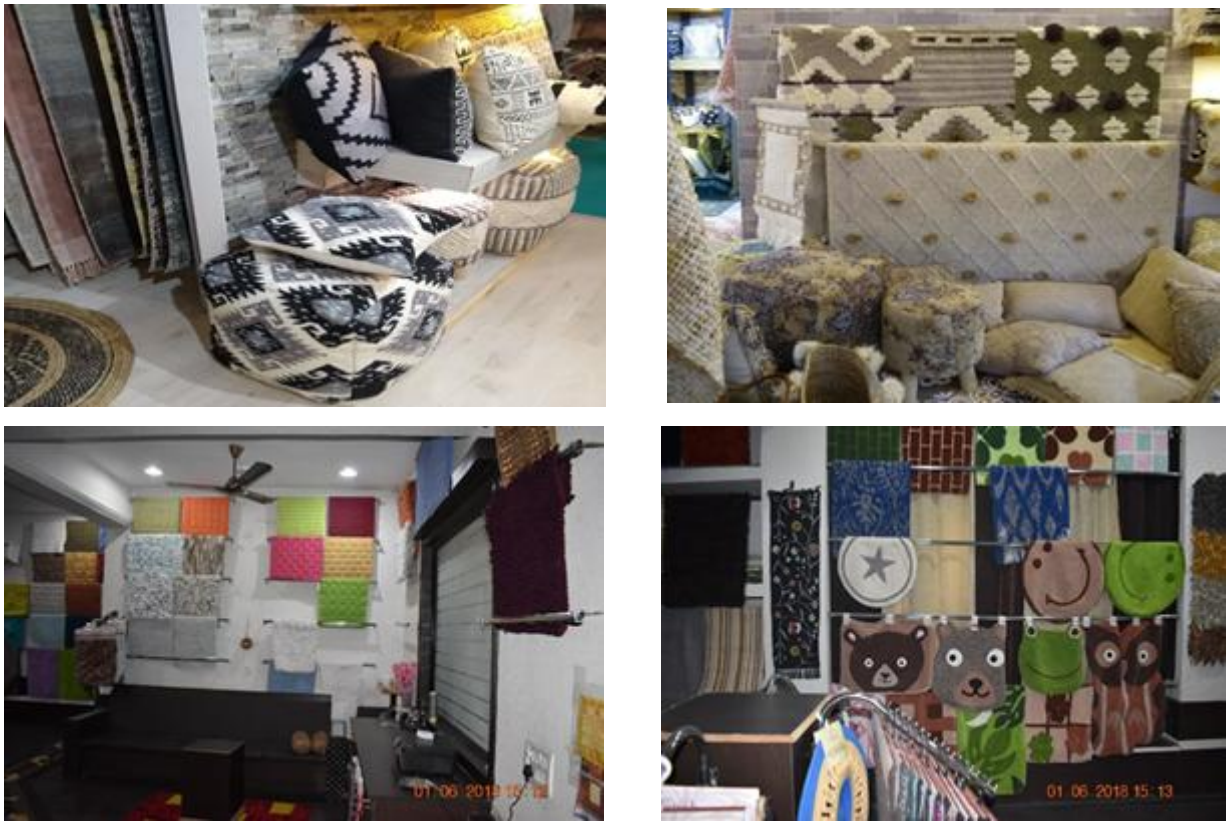

Plate 4: Major Export Products like Cushion Covers, Pouffs, Durries, Rugs and Bathmats

3. The Raw Materials Used:

In the textile and apparel industry, the primary raw materials used to produce textiles include yarns and dyes. Yarn is the number of fibres twisted lengthwise to form a continuous strand used for weaving and knitting (Bhatia and Arora, 1999:14). Panipat district has a thriving cotton spinning industry, supplying spun cotton yarn to textile business units in and near Panipat. There were 300- 400 yarn dealers from Surat, Bikaner, Ahmedabad, and Bombay. Manufacturers sourced the raw materials from local spinning mills in Panipat, including shoddy yarn, polyester yarn, woollen yarn, cotton yarn, viscose, and many others. Initially, a hundred percent cotton (hand spun) was used for Export home textile products, especially cotton yarn with counts of 2/10s, 2/20s, and 2/6s. Cotton yarn with yarn count 2/4s, 2/6s, 6s, 4s, 10s, 2/10s, 2/20s, 2/30s, and 2/40s was used by export manufacturers to produce products for the export market. Exporters used the shoddy recycled yarn to produce cotton durries, throws and rugs for the export market. A few units procured wool yarn from Bikaner, Surat, and Jodhpur, New Zealand (exporters only), with the help of agents and dealers in Panipat. Most units used polyester yarn, acrylic, wool, or wool blends for carpet production. Cotton open-end spun yarn was used for bathmats.

Carpets, rugs, bathmats, and upholstery with a soft, fluffy feel are all made from polyester chenille yarn. Chenille yarn, which has rapidly become popular, is now being spun in Panipat. Recently, zero-twist yarn produced without spinning was commonly used for towels by a few units. Polyester fully drawn yarn called FDY was widely used to manufacture curtains, home furnishing fabrics, terry towels and carpets in Panipat. Some units had begun to use bamboo yarn, viscose yarn, modal yarn, tencel yarn, and Jute yarn to produce made-ups and other products for the export market. Typically, the variation in raw materials in Panipat is directly associated with alterations in the product.

Plate 5: Yarn Packaged in Cheese, Cones, and Hanks

Dyes: Most processing units and exporters with in-house dyeing facilities used azo-free reactive dyes in dyeing and other processes in Panipat. These dyes produced bright colours, outstanding colour fastness and were easy to apply to fabrics. The primary change observed in the ancillary raw materials is the transition from direct dyes to Azo-free reactive dyes. This shift has been initiated by exporters to meet the environmentally friendly standards required by international customers. Previously, the cluster utilised direct dyes extensively, but these were replaced due to foreign demand for eco-friendly alternatives. However, direct dyes, which are more affordable than reactive dyes, are still widely employed for products aimed at the domestic market. Azo-free reactive dyes were eco-friendly and low-impact dyes. These dyes supplement the delicate skin without causing any harm to the skin. Toxic and harmful compounds are not present in these

dyes to liberate amines, which are detrimental to the environment and physical health. These dyes were more expensive than direct dyes. It was informed that earlier dyes were imported from China and were expensive. However, these dyes are now purchased from Gujarat and Ahmedabad manufacturers. Manufacturers who produced products for the domestic market used direct dyes for the dyeing of products.

4. Use of ICT in Units:

The maximum number of units have adopted ICT in their units for storing information, marketing, and management. They designed websites and prepared PowerPoint presentations of their products and production process for foreign buyers. Almost all unit owners had their business email addresses to establish communication with their employees, customers, suppliers, agents, and other members. Less than fifty percent of exporter firms utilise CAD and CAM software in their units. Many units have appointed accountants in their units to take care of their accounts by using Tally software to store information. In Panipat large number of units do not use computers due to lack of computer knowledge. It can be deduced that small-scale units may either be unable to afford computers or may lack the skills to operate them, or possibly both. It can also be concluded that the use of IT for tasks such as data storage and market research is relatively high among firms in Panipat. Most firms could not use standardised ERP (Enterprise resource planning) software to manage their daily business activities like accounting, procurement, sales and order dispatch for maximum performance and operation of units. Less number of units have their firms' websites, allowing them to showcase general information about their firms and products to prospective clients, especially foreign ones. Few exporter units search for new customers and markets on the internet on Facebook, WhatsApp groups, LinkedIn, and Instagram.

5. Marketing of Home Textile Products:

A substantial part of Panipat's production continues to be sold within India, and the industry is exporting to countries in Western Europe, where it was the primary destination until recently; the USA has emerged as the largest market for the cluster in recent years, along with several new destinations in Europe. Secondly, the buying agents are inserting a large number of cluster firms into the global value chain. As a result, a fundamental shift is occurring in the structure of marketing. Manufacturers only sold home textile products in the domestic market through agents and wholesalers. They also sold their manufactured products directly to the customers as they were on their waiting list and old ones. They had been registered on India Mart, Just Dial, and Trade India as manufacturers, wholesalers, and traders. Manufacturers contacted buyers through these online platforms. The supply chain includes all people, resources,

activities, and technology necessary to manufacture and sell final products. The firms have solid linkages with their customer in domestic and export markets, either through agents or directly. Similarly, the backwards connections with businesspeople of spinning, printing, dyeing, processing units, and yarn dealers were consistently firm and significant. The units do not have practical linkages with local supporting institutions like NITRA, DIC and WSC, as these institutions could still not meet the textile industry's standards. So, it is necessary to reinforce the linkages between available supporting institutions and manufacturers. The state government must update services, programmes, and machines for the capacity development of supporting institutions in Panipat. As a member of HEPC and EPC, Exporter units export their handmade textile products to the United States, United Arab Emirates, Japan, Brazil, Europe, America, Australia, the U.K., Canada, and the rest. The firms have well-established domestic markets, mainly Uttar Pradesh, Punjab, Delhi and the NCR region, Calcutta, Assam, Mumbai, Rajasthan, Gujarat, Chandigarh, and many others. Few units are selling their products to international buyers /brands like Bahamas, US Polo, Gap, Walmart, and other big companies in the USA and Europe. The more prominent exporter units have an extensive internet presence, primarily for B2B (e-commerce) exports, where they can demonstrate their work and get orders from global clients.

Exporter units participate in various National and International textile fairs and exhibitions to demonstrate their skills and learnt about market competition and trends. The unit owners also attend many trade shows held in Panipat, Delhi, Chandigarh, and Noida. The major Fairs and exhibitions held in India are the IHGF Delhi fair at India Expo Centre and Mart, Greater Noida, Delhi-NCR, Interior and exterior Décor and design at Chandigarh, Home Tex Expo at Panipat and Yarn, Fabric and Accessories Trade show at Panipat. International Fairs and Exhibitions in which exporters install their stalls are Magic World, Las Vegas in the United States, Giftex World Tokyo in Japan, Domotex in Germany, Indian Handwoven and Home Textiles Sourcing in Germany, and Heimtextil Frankfurt in Germany.

6. Changes Adopted in the Last Few Years:

Most units have started the production of grey fabric for 3D bedsheets, mink blankets and polar blankets in their firms instead of importing from China. Designing is one production-chain activity where the widespread use of CAD/CAM -micro-electronic tools is observed. The existence of market-based specialist service providers has made this feasible. Many small businesses use the services of design centres, even though many medium-sized and large businesses have their own in-house CAD-CAM facilities.

Numerous units that do not engage in technological change are focused solely on the domestic market. There are only a few firms without any change that tend to be very small in size. However, most firms have made minor adjustments to their products or raw materials, such as launching new types of durries, utilising finer count yarn, or implementing azofree dyes. Many units had adopted the significant change in raw material in the count of yarns and the use of chenille yarns to produce made-up for export markets as per the specifications of overseas buyers in their units. The ability to swiftly change products is one of the key strengths of the textile industry in Panipat. A majority of firms, including those that export, have made significant product modifications, such as expanding into new product categories or launching a coordinated range. A small number of units have expanded their production to include terry towels and mink blankets, which required substantial technological expertise to implement important technological advancements.

A major shift embraced by most units involves an alteration in the production method or the acquisition of a different kind of machinery. The most frequently acquired equipment was Shuttle-less looms, which are essential for weaving higher quality fabrics. The apparent absence of technological innovation appears to be a cause rather than a consequence of their limited size, as well as their struggle to penetrate the global market. It can be concluded that a significant change was observed in the production process and machinery, but still, there is a need to adopt international best practices. Still, some units were employing outmoded and outdated technology, ultimately resulting in extra wastage and increased rejection of orders. More than half of the units have not adopted any significant change in their machinery, new products, and raw materials due to risks in developing production capabilities for value-added products. Manufacturers have undertaken technological changes in their units mainly due to tough competition, reductions in unit cost and the installation of imported machinery, leading to fewer labour-related problems. The delivery schedule is reduced as an advantage of implementing new factory changes. Machines with electronic controls utilised by several firms in the cluster consist of automatic shuttle-less looms, computerised embroidery machines, computerised fabric inspection machines, and computer colour matching tools. However, only medium to large firms possess some equipment with electronic controls. Not all the technological innovation and advancement in the industry is export led, while small firms are introducing technological changes that enable them to enter the export market, several technological advanced units in the industry began exporting only after they had acquired substantial technological capabilities by serving in the premium segment of the domestic market for decades, even these units continued to cater to the premium segment of the domestic market while entering the export market.

Conclusion:

The industry's impressive growth over the last 15 years may be ascribed to this aspect of its capabilities and innovations, even though the majority of its firms have low intra-firm technological capabilities and weaknesses in their knowledge system. Despite the existence of numerous trade associations, they play a very small part in fostering innovation. According to a firm-level analysis, local raw material and machinery suppliers are the most crucial players in assisting businesses in adapting to technological change. Subcontractors play an important role as well. The absence of testing facilities and culture in Panipat is another significant technological barrier that prevents the industry from reaching the limit of technology. Due to inadequate technology, businessmen could not diversify their products and create fabrics and other items for direct sale. One of the obstacles to the cluster's technological advancement may be its inadequate physical infrastructure. It should come as no surprise that power outages are indicated as the largest obstacle to technological advancement. Government organisations currently play a limited role in fostering innovation and technological advancement within the clusters. Panipat offers compelling proof of process technology change.

Along with some changes in products and raw materials, Panipat has witnessed significant changes in process technologies. At every stage of production, there is proof that new technologies are being introduced and spreading quickly, like CAD-CAM for design, shuttle-less loom for weaving, open-end spinning technique, yam cone dyeing, and soft flow dyeing. There is some indication of value addition through technological advancement in Panipat, even though the city's businesses also serve the lower end of the global market. The industry has expanded into the more valuable cut and stitch segment of manufactured goods. The fact that "HomeTextiles" is currently the fastest-growing segment of the global textile market helps the cluster survive and grow in the short term. Businesses in the Panipat cluster have been able to support and encourage a number of technological advancements over the past ten and a half years, such as the introduction of new production processes, diversification into new product lines, assimilation of new machinery and techniques, and various organisational mechanisms for implementing new manufacturing processes.

Although the Panipat textile cluster is generally regarded as technologically dynamic, it is still far from meeting international standards and practices. A significant disparity still exists between Panipat's adopted best practices and those used globally. With technological constraints, businessmen could not increase their market share because of low productivity and poor product quality. The Panipat textile industry has been expanding steadily. However, expansion can be sped up by addressing some of its significant problems, including many small-scale firms

employing obsolete shuttle power looms, a lack of adequate infrastructure, such as industrial land in industrial areas, irregular electricity supply, high levels of noise pollution, and waste. The most critical intervention of the Government is to enhance product finishing, increase overall production efficiency, and decrease waste by converting simple power looms to high-speed shuttle-less looms. A common facility centre should be established in Panipat to develop a research and design lab under HEEP 2020 and provide the latest advanced technology. The Government should initiate e-commerce, online portals, marketing consortia, GEM portal, marketing awareness campaigns and a yarn bank for wholesale purchases. To sum up, businessmen engaged in the Panipat textile industry have the potential to boost sales and output by producing goods at competitive prices. Due to the excellent growth potential for Panipat, Textile's home textiles products are in high demand domestically and abroad.

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STRATEGIES FOR RETAINING EMPLOYEES AND HOW THEY AFFECT TURNOVER IN THE RETAIL INDUSTRY

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Abstract:

The company has strict standards for keeping its employees. This study focused on strategies for staff retention. The workforce is the organization's most valuable resource. In order to retain skilled and dedicated employees, management must address employee happiness. Ascertain the causes of employee turnover and take action to mitigate it. The purpose of this study is to illustrate the significance of employee retention in the contemporary workplace, along with the possible consequences and impacts on the industry and organization of organizations who do not act quickly enough when faced with a crisis. Given the importance of the retention problem for all organizations, the goal of this study is to examine the wealth of existing literature and research on the subject of employee retention and turnover in the retail industry.

Keywords: Employee Retention, Staff Turnover, Retail Industry, Workforce Management, Employee Engagement

Introduction:

The company is dealing with a challenging issue related to staff retention. This study focused on strategies for staff retention. The workforce is the organization's most valuable resource. In order to retain skilled and dedicated employees, management must address employee happiness. Ascertain the causes of employee turnover and take action to mitigate it. The purpose of this study is to illustrate the significance of employee retention in the contemporary workplace, along with the possible consequences and impacts on the industry and organization of organizations who do not act quickly enough when faced with a crisis. The goal of this study is to review the vast body of literature and research on employee retention and variables that is currently available, given the importance of the retention issue for any firm.

The ability of a business to retain its staff is known as retention. It is also referred to as a process that, in order to maintain the sustainability of the organization, promotes and inspires resources to work for it for extended periods of time. The ultimate goal of employee retention is to encourage stakeholders, including employers and employees. It makes it easier for loyal employees to stay with the business for a considerable amount of time. People that are happy with their work tend to be more committed to it and always want to improve the organizational

customer satisfaction of their company, according to Denton (2000) [1]. Companies currently put a lot of work into retaining their valuable and qualified employees because they are becoming more and more difficult to find, according to Panoch (2001) [2]. Effectively managing and retaining talented employees is essential for organizations to obtain a competitive edge, according to Walker (2001) [3].

Keeping the most vital and active people resources motivated and committed is one of the most critical management requirements in any organization today, according to Cutler (2001) [4]. The people who stay with the firm are more valuable than the people the organization hires. Researchers such as Kaliprasad (2006) [5] have proven that even in cases where an organization attempts to increase employee retention by addressing all of these issues, poor management may still lead an employee to choose to quit the company.

The notion that acquiring new hires is both more difficult and costly than keeping current employees in the company was brought up by Baker (2006) [6]. Because of this, the company needs to make a consistent effort to find and keep all of its top workers, no matter how old they are. Because they create or provide your goods or services, employees are the most valuable component of any firm (Bashir *et al.,* 2009). The company stands to gain if its staff stay with it longer and do not leave.

Knowing how employees stay in the company is crucial information for businesses to have. Previous research has identified a number of elements that are crucial for staff retention. Opportunities for career advancement, the workplace culture, and work-life balance all directly affect employee retention. "A strategy employed by companies to retain an efficient workforce while fulfilling operational requirements" is how Mita (2014) defined employee retention. Bidisha (2013) defined it as a procedure wherein workers are motivated to remain with the company for as long as possible or until the project is finished. Employee retention is defined as "a systematic effort to create and support an environment that encourages employees to remain employed by having policies and procedures in place that address their diverse needs" by Workforce Planning for Wisconsin State Government (2015).

Purpose of study

In order to determine the factors that different researchers frequently cite as the foundation for an employee's decision to stay with a company, this study will analyse earlier studies on employee retention.

Review of Literature

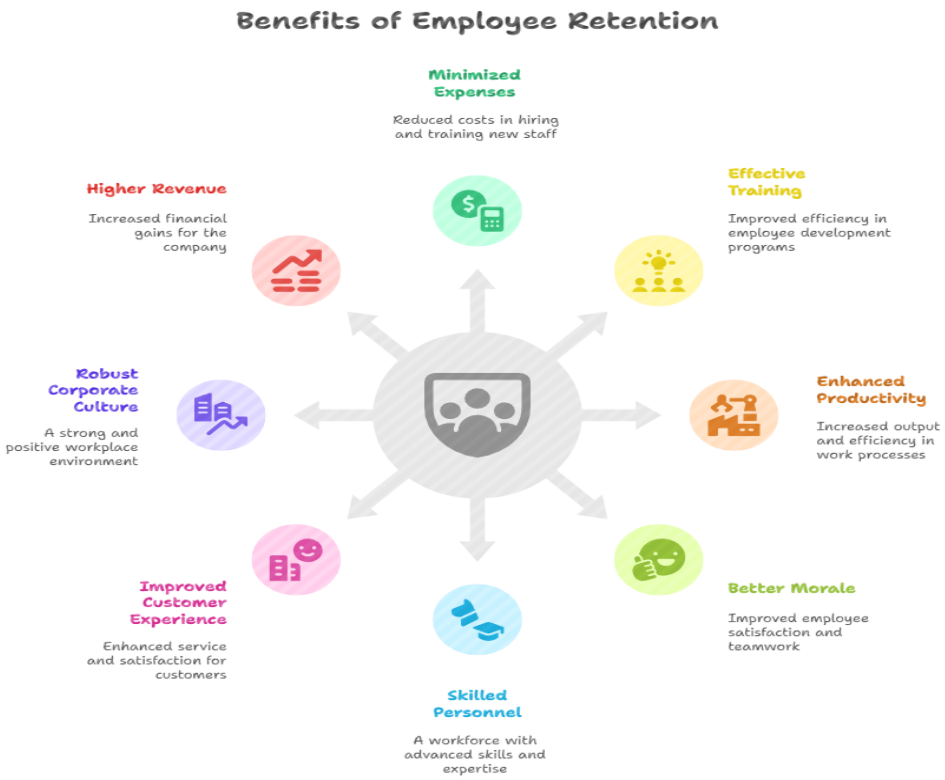
1. Meaning of Employee Retention

Employee loyalty, 2012, Sinha, C., and Sinha, R. refers to different procedures and guidelines that let workers stay with a company for extended periods of time. All organizations

have to spend money and effort training a new hire to get him up to speed with current staff members and become business material staff members. When workers quit after receiving their full training, the company is left with no recourse.

The many steps done to ensure that a worker stays with the company for as long as feasible are taken into consideration when discussing employee retention. Essentially Achieving employee retention is an organizational objective, according to Hannay, M., & Northam, M. (2000). It involves creating a work environment that is positive, encouraging engagement, demonstrating appreciation for employees, offering competitive pay and benefits, and encouraging a healthy work-life balance. When unemployment is low and there is more competition for talent, employers' main goal is to keep their workforces. Organizations are embracing HR technology to find, hire, train, and recognize employees in addition to providing modern benefits like financial and physical health programs and more flexibility in the workplace to keep employees.

2. Importance of Employee Retention



Employee retention is crucial as companies fight for the top personnel. A 90% retention rate is a good target, according to some experts, but in practice, this depends on the company and the industry. But keeping employees around is always advantageous for a variety of reasons. Below are the top nine advantages:

i. **Minimization of expenses:** Every year, US firms invest hundreds of millions of dollars in hiring and onboarding new employees. Should the employee depart early, these expenses

are incurred. There is a financial impact as well as effects on morale, team cohesiveness, and productivity. Professionals and temporary managers may have to pay up to 200% of their total compensation in replacement of each employee, while entry-level workers may only have to pay 90% of their wage.

ii. **Training and recruitment effectiveness:** Businesses save money on hiring and get more out of employee training when they concentrate on staff retention. Travel expenses for interviews, money spent on publicizing the position or paying recruiters, and any signing bonuses are all considered recruiting expenditures. Training, which can also be costly, comes next. That money is lost if the hire quits before expected.

iii. **Enhanced productivity:** Lower productivity is caused by employee turnover, since new hires require time to adjust and reach par with experienced workers. The remaining staff members suffer too, having to take on more work and maybe resulting in lower-quality production. On the other hand, employees in companies with high retention rates are typically more engaged and productive as a result.

iv. **Better employee morale:** Companies that implement effective staff retention strategies encourage more engagement and connectivity, which boosts morale and ultimately improves retention. A consistent flow of departures, on the other hand, lowers workplace morale and has the unintended consequence of increasing employee turnover.

v. **Skilled personnel:** It makes sense that as people work for a company longer, they get more involved, informed, and proficient. Additionally, they have built beneficial partnerships with both clients and employees. When an employee departs, the business loses out on the potential value they may have brought.

vi. **Improved customer experience:** New hires with less experience and skill may be more likely to make mistakes that harm the customer's relationship with the business. Longer-term, happy workers are frequently more adept at handling consumers and may develop close bonds with them. This is true at every step. both before the contract is signed and after the sale, at which point the client can get in touch with customer service. Another important component of brand uniqueness may be an improved consumer experience.

vii. **Improved employee satisfaction and experience:** There is a mutually beneficial relationship between employee engagement, or the level of dedication that employees bring to their work, and employee retention and satisfaction, or the contentment and fulfilment of employees. Workers that are happy and involved at work are more likely to stick with the company, and companies with high employee retention rates typically have happier and more engaged workforces.

viii. **A more robust corporate culture:** Over time, an organization's culture is shaped by the collective traits and experiences of its personnel. Retaining engaged personnel who share the organization's culture helps to strengthen the organizational ethos. Productivity and performance are also enhanced by a strong corporate culture.

ix. **Higher revenue:** Anecdotal evidence suggests that employee retention can positively affect revenue in addition to cost reduction. Employers who have higher retention rates retain top individuals with expertise, offer a better working and customer experience, and are more productive—all of which can spur growth.

3. Employee Turnover

In an organization, turnover is inevitable, and some of it might even be advantageous since it makes room for fresh talent. Businesses that frequently hire a lot of seasonal, part-time, and entry-level workers. But there is a cost to high turnover. Higher turnover rates cost businesses more money since they have to pay for the recruitment, hiring, and training of departing employees. J. J. Phillips and A. O. Connell (2003) For the others, productivity and morale may suffer. Organizations that have higher rates of employee attrition should also pay greater emphasis to hiring new employees and addressing problems with decreased employee engagement, fatigue, and lost productivity. These detrimental consequences may impede the company's overall development and result in even more turnover.

4. Identified Reasons for Turnover

According to research, Michael, O. S., and Crispen, C. (2009). that frequent conflict with coworkers or superiors is the main reason why most employees quit a company. Some employees are forced to look for a move due to low salary, a lack of growth opportunities, and a lack of enthusiasm. Retaining personnel who are acknowledged to be great contributors and who are genuinely valuable to the system is a top priority for management. It is the duty of management and line managers to guarantee that workers are happy with their jobs and that they are constantly challenged and learning new things at work.

Research Methodology

Research is basically a search for knowledge; the Advance Learner's Dictionary of Current English defines research as a careful investigation or enquiry, especially through search for new facts in any branch of knowledge. The primary goal of research is to find answers to specific questions through the application of scientific and systematic technique. Prior to arriving at an appropriate solution to a problem, the researcher must decide how he writes to proceed work in the future. This refers to the development of a proper research design.

Finding of Study

Recognition and reward system is always motivated to retain in the organisation. Otherwise highly paid jobs of competitor will attract the skills employees. But here it is observed that very few employees give importance to the strategy of perks and reward system. Most of the respondents feel that employee engagement, training and development and employee satisfaction is most important strategies which the organisation should have to give to their employees for retaining them for a long period of time. According to the overall analyses approximately 25% % of the employees have strongly accepted the importance of training and development in employee retention. This employee retention strategy hits the employees to retain in the organisation. It was found that most of the respondents feel the employee engagement in their workplaces which lead the increase in the level of employee satisfaction and at the end of the employee retention.

Overall, the analysis revealed that about 43% of employees felt that on-the-job training helped retail sector employees improve the quality of their work and also gave them career opportunities instead of rewards, reorganizations, or salary increases. Additionally, the majority of employees strongly agreed that improving the working environment for employees is important because it truly helps them to improve the quality of their work. Finally, the majority of respondents felt that the workplace and facilities had an impact on employee satisfaction, which in turn helped the employees improve the quality of their work and stay with the company.

Conclusion:

The results of this study demonstrate how crucial it is for businesses to retain their workforces. It draws attention to employee retention tactics and their effects on turnover in the retail industry, as well as the causes of high turnover. The purpose of this study is to examine different employee retention strategies, what are the implications and how it would affect the organization and the industry. This study briefly covers the various areas where employee retention strategies are implemented, namely work environment, work culture, training and development, benefits and rewards, and employee recognition. Retailers who can keep employees engaged and motivated will have a significant advantage over the competition. Still, many companies are struggling to understand how to increase employee retention in retail. A company's work culture, recognition within the workplace, benefits, pay increases, recognition, ongoing training, and a top-notch workspace are just a few of the many elements that affect employee retention. Job training has the greatest influence on employees in the retail sector to improve the quality of their work and also provide them career opportunities, according to the research and data I have collected from the respondents, rather than giving them rewards,

recognition, or money increases. Based on my research, I've found that in the retail industry, 50% of workers are retained for as long as they wish due to job satisfaction; consequently, worker engagement at work raises worker satisfaction levels, which in turn boost worker retention.

Suggestion:

Prioritizing training and development is a crucial first step. Rather than offering awards, recognition, or pay increases, identifying training requirements and giving staff with the proper training would help them enhance the quality of their work and open up career options. Their talents will also grow as a result, and this will inspire them to pursue positions at higher levels.

Retaining employees in the retail industry can be difficult, but by knowing exactly what your staff members require to succeed and using technology to support them, you can help the industry as a whole.

Retail companies can increase employee engagement and retention by using mobile learning, which provides staff with convenient access to training materials whenever they need them.

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IMPACT OF ARTIFICIAL INTELLIGENCE ON NEW VENTURE CREATION AND BUSINESS INNOVATION

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Abstract:

The rapid advancement of Artificial Intelligence (AI) is reshaping new venture creation and driving business innovation across various industries. This research paper explores the impact of AI on startups and established businesses, focusing on how AI technologies facilitate the development of new business models, enhance operational efficiency, and foster innovation. The study employs AI's contribution to Automation and decision making its impact on risk, opportunity and sustainability & framework and policies to support AI driven innovation. Key findings reveal that AI significantly lowers entry barriers for new ventures by automating processes, improving decision-making, and enabling scalable solutions. Moreover, AI contributes to business innovation by generating novel products and services, optimizing customer targeting, and enhancing competitive advantage. However, the research also identifies challenges such as ethical considerations, data privacy issues, and the need for technical expertise. The paper concludes that while AI presents substantial opportunities for innovation and growth, it also requires careful management and strategic implementation to fully realize its potential. Recommendations include adopting best practices for AI integration and developing supportive policies to nurture AI-driven entrepreneurial ecosystems.

Keywords: Artificial Intelligence, New Venture, Business, Innovation, Creation, Start-Ups, Automation, Decision Making.

Introduction:

The rapid advancement of Artificial Intelligence (AI) is revolutionizing the entrepreneurial landscape, transforming the way new ventures are created and businesses innovate. AI's capabilities, such as machine learning, natural language processing, and predictive analytics, are being leveraged by entrepreneurs to develop innovative products, services, and business models. This technological shift is presenting both opportunities and challenges for entrepreneurs and organizations, and its impact on new venture creation and business innovation is multifaceted. As AI continues to evolve, it is enabling entrepreneurs to identify new business opportunities, optimize business processes, and create innovative solutions that were previously

unimaginable. The integration of AI in entrepreneurship has the potential to drive significant economic growth, improve productivity, and enhance competitiveness. However, it also raises important questions about the future of work, the role of humans in AI-driven businesses, and the potential risks and challenges associated with AI adoption. This paper will explore the impact of AI on new venture creation and business innovation, examining the ways in which AI is shaping the future of entrepreneurship and innovation. By investigating the role of AI in entrepreneurship, this research aims to provide insights into the opportunities and challenges presented by this technological shift and to contribute to the development of new theories and frameworks for understanding the impact of AI on business and entrepreneurship.

Review of Literature:

Garbuio & Lin (2019): AI-driven innovation enables businesses to innovate and stay competitive by leveraging machine learning, natural language processing, and predictive analytics. This study highlights the potential of AI to drive innovation and growth in businesses. AI's capabilities can be used to develop new products, services, and business models, improving efficiency and productivity. By adopting AI-driven innovation, businesses can stay ahead of the competition and achieve sustainable growth. Effective innovation requires a deep understanding of AI's potential and its limitations.[1]

Manyika *et al.* (2017): AI can enable new business models, improve productivity, and drive economic growth by automating tasks, enhancing decision-making, and creating new products and services. This study emphasizes the potential of AI to transform businesses and industries. AI's impact on business models can be significant, enabling companies to create new revenue streams and improve customer experiences. By leveraging AI, businesses can gain a competitive advantage and achieve long-term success. However, AI adoption requires careful consideration of its potential risks and challenges. Businesses must develop strategies to address these challenges.[2]

Shoufu *et al.* (2023): AI can drive technological progress, economic growth, and entrepreneurship by providing new opportunities for innovation and entrepreneurship. This study highlights the potential of AI to enable new business opportunities and drive economic growth. AI's impact on entrepreneurship can be significant, enabling startups and small businesses to innovate and compete with larger companies. By leveraging AI, entrepreneurs can develop new products, services, and business models, improving efficiency and productivity. AI's potential to drive economic growth is substantial, and its adoption is likely to continue growing.[3]

Giuggioli & Pellegrini (2023): AI presents new opportunities for businesses to innovate and grow by leveraging AI-powered tools, platforms, and ecosystems. This study emphasizes the

potential of AI to enable business innovation and growth. AI's impact on business innovation can be significant, enabling companies to develop new products, services, and business models. By leveraging AI-powered tools and platforms, businesses can improve efficiency and productivity, achieving long-term success. AI's potential to drive innovation is substantial, and its adoption is likely to continue growing. Businesses must develop strategies to leverage AI's potential.[4]

Brynjolfsson & McAfee (2017): AI is crucial for innovation management, requiring new knowledge, resources, and capabilities to leverage AI's potential. This study highlights the importance of AI in innovation management. AI's impact on innovation management can be significant, enabling companies to develop new products, services, and business models. By leveraging AI, businesses can improve efficiency and productivity, achieving long-term success. Effective innovation management requires a deep understanding of AI's potential and its limitations. Businesses must develop strategies to address the challenges associated with AI adoption.[5]

Davenport & Dyché (2013): AI provides a competitive advantage for businesses that leverage its capabilities, such as machine learning, natural language processing, and predictive analytics. This study emphasizes the potential of AI to drive business success. AI's impact on business can be significant, enabling companies to improve efficiency and productivity. By leveraging AI, businesses can gain a competitive advantage and achieve long-term success. AI's potential to drive innovation is substantial, and its adoption is likely to continue growing. Businesses must develop strategies to leverage AI's potential and address its challenges. [6]

Bhimani & Willcocks (2014): AI helps businesses manage risk, identifying potential threats and opportunities by leveraging AI-powered risk management tools and platforms. This study highlights the potential of AI to improve risk management. AI's impact on risk management can be significant, enabling companies to identify and mitigate potential risks. By leveraging AI-powered risk management tools, businesses can improve their resilience and achieve long-term success. Effective risk management requires a deep understanding of AI's potential and its limitations. Businesses must develop strategies to address the challenges associated with AI adoption. [7]

Courtney *et al.* (2017): AI can inform strategic decision-making, providing insights and recommendations to businesses. This study emphasizes the potential of AI to inform business strategy. AI's impact on strategic decision-making can be significant, enabling companies to make more informed decisions. By leveraging AI, businesses can improve their resilience and achieve long-term success. Effective strategic decision-making requires a deep understanding of

AI's potential and its limitations. Businesses must develop strategies to leverage AI's potential and address its challenges. [8]

Objectives of the Study:

1. To explore AI's role in driving innovation and growth in new ventures.
2. To investigate AI's impact on entrepreneurship and new business creation.
3. To analyze AI's impact on risk, opportunity and sustainability
4. To identify opportunities and challenges presented by AI in entrepreneurship.
5. To develop strategies for businesses to leverage AI's potential.
6. To examine AI's role in innovation management and competitiveness.
7. To study framework and policies to support AI driven innovation

Research Methodology:

As it is an exploratory study, the research paper is primarily dependent on secondary data that was gathered from many journals, periodicals, and publications. The needs of the study's objectives are taken into consideration when using a descriptive study. The study made considerable use of secondary data.

AI's Contribution to Automation, Decision Making, and Innovation:

Artificial Intelligence (AI) has significantly impacted various aspects of business and innovation, particularly in automation, decision-making, and innovation itself. By leveraging machine learning algorithms, natural language processing, and predictive analytics, AI can automate repetitive and mundane tasks, freeing up human resources for more strategic and creative work. This automation capability not only enhances operational efficiency but also reduces the likelihood of human error, thereby improving overall productivity.

In decision-making, AI's ability to analyze vast amounts of data in real-time provides businesses with actionable insights that can inform strategic decisions. AI-driven analytics can identify patterns, trends, and correlations that might be missed by human analysts, enabling more informed and data-driven decision-making. This capability is particularly valuable in today's fast-paced business environment, where timely and accurate decision-making can be a significant competitive advantage.

When it comes to innovation, AI plays a crucial role in driving new product development, service innovation, and business model innovation. By analyzing market trends, customer preferences, and competitor activity, AI can generate insights that fuel innovation. Moreover, AI can facilitate the innovation process by automating certain aspects of product development, such as design optimization and testing, thereby accelerating the time-to-market for new products and services.

Overall, AI's contributions to automation, decision-making, and innovation are transforming the way businesses operate and compete. By harnessing the power of AI, organizations can enhance their operational efficiency, make more informed decisions, and drive innovation, ultimately leading to sustainable growth and competitiveness in an increasingly complex and dynamic business environment.

Impact of Artificial Intelligence on New Venture Creation:

Artificial intelligence (AI) is transforming the landscape of entrepreneurship, presenting both opportunities and challenges for new venture creation. Here's how AI impacts new ventures:

Key Impacts of AI on Entrepreneurship

- **Enhanced Productivity:** AI can significantly improve overall performance in complex work tasks, showing consistent improvements in efficiency and quality.
- **New Job Creation:** While some jobs may be displaced, AI also creates new opportunities in areas like AI validation, verification, and integration.
- **Leveling the Playing Field:** AI can support lower performers and help identify broad market possibilities, particularly for entrepreneurs with limited economic resources.
- **Skills Development:** AI can bridge literacy gaps and enhance skills development in areas like marketing, finance, and logistics.
- **Simplifying Complex Tasks:** AI can automate tasks like market research, business planning, pricing, inventory management, and social media management.

Benefits for Entrepreneurs

- **Saving Time and Resources:** AI can help entrepreneurs save time, energy, and money, boosting productivity and efficiency.
- **Data-Driven Decision Making:** AI provides valuable insights, enabling entrepreneurs to make informed decisions and drive innovation.
- **New Business Opportunities:** AI can create new markets and opportunities for entrepreneurs, particularly in areas like consulting, big data analytics, and coding.

Preparing the Workforce for AI

- **Professional Development:** Employers should provide training on practical AI uses, including ethical and legal implications.
- **Equity and Inclusion:** AI implementation should prioritize equity awareness, benefiting people with disabilities and underrepresented groups.

- **AI Literacy Campaigns:** Tailored training programs can help mitigate job displacement and ensure proactive measures are in place.

Example of AI driven Business Innovation:

Here are some examples of AI-driven business innovation case studies:

Enhancing Customer Experience

- **Netflix**: Personalized Entertainment – Netflix uses AI to analyze individual viewing habits, ratings, and preferences, providing users with tailored content recommendations that keep them engaged and satisfied.
- **Spotify**: Personalized Music Experience – Spotify's AI-driven algorithms analyze user listening habits and preferences to recommend music tracks and playlists, increasing customer engagement and retention.
- **IKEA**: Virtual Reality for Customer Experience – IKEA introduced AI-powered virtual reality apps that allow customers to visualize furniture before buying, enhancing customer decision-making and satisfaction.

Optimizing Operations

- **Amazon**: Predictive Inventory Management – Amazon employs AI algorithms to forecast product demand, optimizing inventory levels and reducing operational costs.
- **General Electric:** Predictive Maintenance in Energy Production – GE uses AI to predict maintenance needs and optimize energy production, ensuring efficient operation and reducing downtime.
- **Unilever**: Sustainable Supply Chain Management – Unilever implemented AI to optimize its supply chain operations, reducing waste and promoting sustainability.

Improving Healthcare

- **IBM Watson Health:** Revolutionizing Patient Care – IBM Watson Health uses AI to analyze medical records, research papers, and clinical trial data, enhancing patient diagnosis and treatment recommendations.
- **Deep 6 AI:** Accelerating Clinical Trials – Deep 6 AI employs AI to identify potential trial participants based on specific criteria, speeding up the recruitment process and enabling faster trial completions.
- **Roche**: AI-Powered Drug Discovery – Roche uses AI to analyze medical data and simulate drug interactions, accelerating the drug discovery process and reducing costs.

Enhancing Security

- **American Express:** Real-Time Fraud Detection – American Express utilizes machine learning models to detect unusual patterns and behaviors indicative of fraud, minimizing financial losses.
- **HSBC**: AI-Driven Security Systems – HSBC employed AI-driven security systems to observe transactions and identify suspicious activities, strengthening security measures and reducing incidence of fraud.
- **Cisco**: AI-Powered Network Security – Cisco leverages AI to enhance its cybersecurity measures, detecting and responding to threats more effectively.

Comparison of AI with Traditional Business Models:

The integration of Artificial Intelligence (AI) into business models has revolutionized the way companies operate, innovate, and compete. Compared to traditional business models, AI-driven models offer enhanced efficiency, agility, and scalability. Traditional business models often rely on manual processes, human intuition, and historical data, which can be time-consuming, prone to errors, and limited in their ability to adapt to changing market conditions. In contrast, AI-powered models can analyze vast amounts of data in real-time, identify patterns, and make predictions, enabling businesses to make informed decisions and respond quickly to market shifts.

Moreover, AI-driven models can automate repetitive tasks, freeing up human resources for more strategic and creative work. This not only improves productivity but also enables businesses to innovate and experiment with new products, services, and business models. Additionally, AI can help businesses personalize their offerings, enhance customer experiences, and build stronger relationships with their customers.

However, traditional business models have their own strengths, such as established processes, industry expertise, and customer trust. To leverage the benefits of AI while minimizing its risks, businesses can adopt a hybrid approach that combines the strengths of traditional models with the agility and innovation of AI-driven models. By doing so, companies can stay competitive, drive growth, and thrive in today's fast-paced and rapidly evolving business landscape.

Ultimately, the comparison between AI-driven business models and traditional models highlights the need for businesses to be adaptable, innovative, and open to new technologies and approaches. By embracing AI and leveraging its potential, companies can unlock new opportunities, improve their operations, and deliver more value to their customers.

Impact of Artificial Intelligence on Risk, Opportunity & Sustainability:

The impact of Artificial Intelligence (AI) on risk, opportunity, and sustainability is multifaceted and far-reaching. AI has the potential to significantly mitigate risks by identifying patterns and anomalies in data, enabling businesses to anticipate and respond to potential threats. For instance, AI-powered predictive analytics can help companies detect fraud, predict market trends, and optimize supply chains, thereby reducing the risk of financial losses and reputational damage.

On the other hand, AI also presents new opportunities for businesses to innovate, grow, and create value. By leveraging AI's capabilities, companies can develop new products and services, enhance customer experiences, and improve operational efficiency. AI can also enable businesses to identify new markets, customer segments, and revenue streams, driving growth and profitability.

In terms of sustainability, AI can play a critical role in helping businesses reduce their environmental footprint and promote sustainable practices. For example, AI can optimize energy consumption, predict and prevent waste, and enable more efficient use of resources. Additionally, AI can help companies develop more sustainable supply chains, reduce carbon emissions, and promote eco-friendly products and services.

However, AI also raises important sustainability concerns, such as the potential for job displacement, bias in decision-making, and increased energy consumption. To mitigate these risks, businesses must prioritize responsible AI development and deployment, ensuring that AI systems are transparent, explainable, and aligned with human values.

Ultimately, the impact of AI on risk, opportunity, and sustainability will depend on how businesses choose to develop and deploy this technology. By prioritizing responsible AI development and leveraging its potential, companies can unlock new opportunities, mitigate risks, and promote sustainable growth and development.

Framework and Policies to Support AI driven Innovation:

To support AI-driven innovation, organizations and governments can establish frameworks and policies that foster development, deployment, and adoption of AI technologies. A comprehensive framework should include components such as data governance, AI talent development, research and development, ethics and responsibility, and infrastructure. Data governance policies ensure data quality, security, and compliance, while AI talent development programs invest in education and training to upskill the workforce. Research and development initiatives encourage innovation and collaboration between industry, academia, and government.

Policies to support AI-driven innovation include regulatory frameworks that balance innovation with public safety and trust, funding and investment incentives for AI startups and research projects, and collaboration and partnership initiatives that drive innovation. Intellectual property protection is also crucial to ensure that innovators can benefit from their creations. Public awareness and education initiatives can promote understanding of AI benefits, risks, and applications.

Effective frameworks and policies can accelerate AI innovation, drive economic growth, and improve competitiveness. By establishing clear guidelines and standards, organizations and governments can increase adoption of AI technologies, improve public trust, and develop a skilled workforce. Ultimately, well-designed frameworks and policies can unlock the potential of AI, enabling organizations to harness its power to drive innovation, improve efficiency, and create value for society.

By prioritizing responsible AI development and deployment, organizations and governments can ensure that AI-driven innovation benefits everyone, while minimizing its risks and challenges. This requires a collaborative approach, involving stakeholders from industry, academia, government, and civil society, to develop and implement frameworks and policies that support AI-driven innovation while promoting societal well-being.

Findings of the Study:

1. AI enhances entrepreneurial productivity and efficiency.
2. AI-driven innovation enables new business models and revenue streams.
3. AI-powered tools facilitate idea generation and validation.
4. AI improves decision-making through data-driven insights.
5. AI automates repetitive tasks, freeing up resources for strategic activities.
6. AI-driven analytics enable personalized customer experiences.
7. AI accelerates product development and innovation.
8. AI enhances risk management and mitigation.
9. AI fosters collaboration and knowledge sharing among entrepreneurs.
10. AI-driven innovation creates new opportunities for entrepreneurship and economic growth.

Implications for future business models and Entrepreneurial system:

The implications of Artificial Intelligence (AI) for future business models and entrepreneurial systems are profound. AI is poised to revolutionize the way businesses operate, innovate, and compete. Future business models will likely be shaped by AI's ability to analyze vast amounts of data, automate processes, and provide personalized experiences. This could lead to new revenue streams, increased efficiency, and improved decision-making.

For entrepreneurs, AI presents both opportunities and challenges. On the one hand, AI can enable entrepreneurs to develop innovative products and services, automate processes, and gain a competitive edge. On the other hand, AI can also increase competition, disrupt traditional business models, and require entrepreneurs to develop new skills and expertise.

The entrepreneurial system will likely undergo significant changes as AI becomes more prevalent. Entrepreneurs will need to be agile, adaptable, and willing to experiment with new business models and technologies. They will also need to prioritize AI literacy and develop a deep understanding of AI's potential applications and limitations.

Ultimately, the future of business and entrepreneurship will be shaped by AI's ability to drive innovation, improve efficiency, and create new opportunities. As AI continues to evolve, entrepreneurs and businesses will need to stay ahead of the curve, leveraging AI's potential to drive growth, innovation, and success.

Conclusion and Suggestions:

The impact of Artificial Intelligence (AI) on new venture creation and business innovation is significant, enabling entrepreneurs to develop innovative products and services, automate processes, and gain a competitive edge. AI's ability to analyze vast amounts of data, identify patterns, and make predictions can help entrepreneurs make informed decisions, reduce risks, and drive growth.

To fully leverage the potential of AI, entrepreneurs and businesses should prioritize AI literacy, invest in AI talent, and develop strategies for AI adoption. Governments and policymakers can also play a crucial role by providing funding for AI research, developing regulatory frameworks that support AI innovation, and investing in education and training programs that develop AI talent.

Furthermore, entrepreneurs and businesses should focus on developing responsible AI practices, ensuring transparency, explainability, and accountability in AI decision-making. By doing so, they can build trust with customers, investors, and stakeholders, and ensure that AI-driven innovation benefits society as a whole.

In conclusion, AI has the potential to transform the entrepreneurial landscape, enabling new venture creation, driving business innovation, and creating new opportunities for growth and success. By embracing AI and developing strategies for its adoption, entrepreneurs and businesses can stay ahead of the curve and thrive in an increasingly competitive and rapidly evolving business environment.

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Digital Transformation in Commerce and Management: A Practical Guide for the 21st Century

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Nishi holds a Master's degree in Commerce with a specialization in Finance and currently serves as an Assistant Professor at Guru Nanak Khalsa College, with over five years of teaching experience. She qualified the National Eligibility Test (NET) in 2024, reflecting her academic competence. Deeply inclined toward research, she has published papers in reputed international journals and presented at both national and international conferences, enriching her understanding of contemporary issues in commerce and finance. Her academic journey highlights a commitment to knowledge dissemination and student development. Passionate about lifelong learning, she believes in the transformative power of education. This book reflects her dedication to academic excellence and her mission to inspire future generations through insightful contributions in the field of commerce and finance.

Dr. Madhvi Kush is a distinguished academician and researcher with over 16 years of experience in teaching, research, and publishing in the domain of banking and finance. She holds a Ph.D. in Banking and Finance, an MBA in Finance, and is UGC-NET qualified. Her scholarly contributions include numerous research papers published in reputed national and international journals, with a focus on financial systems, banking operations, and global financial trends. Currently, she serves as a Visiting Professor at the Bahrain Institute of Banking and Finance (BIBF), Bahrain, where she integrates academic rigor with industry insights. Known for her integrity and innovative approach, Dr. Kush remains committed to academic excellence and lifelong learning, continually contributing to the field through her research, teaching, and editorial leadership.

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