Draft Report

A COMPREHENSIVE STUDY ON THE EFFECTS OF ARTIFICIAL INTELLIGENCE ON INDUSTRY VALUE CHAINS, JOB REPLACEMENT, AND RESKILLING IN NEPAL

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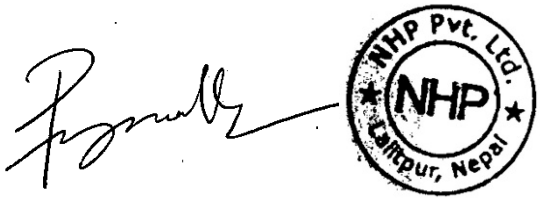
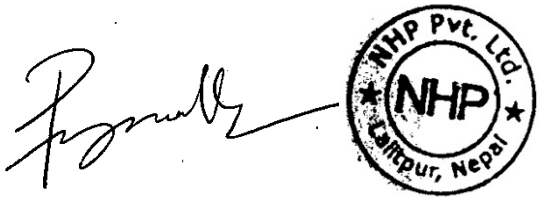


reformatting. These AI tools significantly enhanced the efficiency and rigor of our research process.

This study is a collective effort, and we are grateful to all who contributed their knowledge, resources, and time. We look forward to continued collaboration in ensuring Nepal is well-prepared to harness AI's opportunities while proactively addressing its challenges.

Research Team at **NHP Pvt. Ltd.,** Minbhawan, Kathmandu, Nepal

(February 2, 2025)



Executive Summary

Comprehensive Study on the Effects of Artificial Intelligence on Industry Value Chains, Job Replacement, and Reskilling in Nepal

Introduction

This report presents a comprehensive study on the transformative impact of Artificial Intelligence (AI) on industry value chains, job displacement, job creation, and reskilling requirements in Nepal. The study aims to provide a detailed assessment of how AI is reshaping various sectors, identify vulnerable industries, and propose strategies to mitigate the challenges and harness the opportunities presented by AI. The findings are based on extensive desk reviews, surveys, key informant interviews (KIIs), and focus group discussions (FGDs), ensuring a holistic understanding of AI's multifaceted effects.

Objectives

The primary objectives of this study are:

- To identify the sectors within Nepal most affected by AI advancements and automation, while highlighting new growth areas for industry value chains and the risk of job replacement.
- To assess the current and future demand for labor market skills, proposing strategies for effective talent development in response to AI-driven changes.
- To analyze the impact of AI on economic productivity, efficiency, and innovation across key industries in Nepal, identifying opportunities for business leaders to leverage AI for competitive advantage.
- To explore the role of government policies in supporting AI-driven business processes, workforce transitions, and ensuring that workers and businesses are equipped with the skills needed for the evolving job market.
- To provide actionable recommendations for policymakers, educators, bureaucracy, and industry leaders on creating inclusive reskilling initiatives and policies that support workforce and business transitions in an AI-driven economy.

Scope of Work

The study encompasses a comprehensive analysis of AI's impact on Nepal's industries and workforce, focusing on the following areas:

- **Desk Review**: Analyze global best practices, national policies, and case studies to evaluate AI's effects on industry value chains, job displacement, and reskilling.
- **Gap Analysis**: Identify vulnerable sectors, skill mismatches, and readiness gaps in industries, education systems, and policies for AI adaptation.
- **Stakeholder Consultations**: Engage policymakers, industry leaders, educators, and workers to gather insights on AI-driven challenges and opportunities.
- **Data Collection and Analysis**: Conduct surveys, interviews, and focus groups to generate sector-specific insights and strategies for workforce transformation.
- **Content Development**: Create actionable knowledge products, including reports, fact sheets, and policy briefs for diverse stakeholders.
- **Peer Review and Validation**: Validate findings through expert sessions and refine recommendations to ensure applicability to Nepal.
- **Coordination and Facilitation**: Collaborate with government, academia, and industry to align recommendations with national goals.

Research Methodology

This study employs a **mixed-methods approach** to assess AI's impact on Nepal's industry value chains, focusing on job displacement, creation, and reskilling. The methodology integrates **desk reviews, stakeholder consultations, and primary data collection** to ensure a comprehensive analysis.

Key components include:

- **Desk Review** of global AI trends, sectoral impacts, and Nepal-specific policies.
- **Stakeholder Consultations** through **25 Key Informant Interviews (KIIs)** and **Focus Group Discussions (FGDs) with 31 participants** from government, industry, academia, and trade unions.
- **Primary Data Collection** via **structured surveys** (278 respondents across diverse industries).

Data Analysis combined **quantitative methods** (statistical trend analysis of AI adoption and skill gaps) with **qualitative techniques** (thematic coding of KIIs and FGDs). The findings were synthesized to provide a holistic understanding of AI-driven workforce transformation and policy recommendations.

Ethical Considerations ensured informed consent, data confidentiality, and transparency. Limitations include **sectoral representation constraints, potential response biases, and self-reported data subjectivity.**

Key Findings

Sector-Specific Impact Analysis

- Most Affected Sectors: The sectors most impacted by AI include public administration and defense, education, healthcare, manufacturing, and financial services. These sectors are increasingly adopting AI technologies such as Machine Learning (ML), Natural Language Processing (NLP), and robotics to enhance efficiency and productivity.
- Job Displacement Risks: Sectors with high routine tasks, such as manufacturing, customer service, and finance/accounting, are at higher risk of job displacement due to automation. However, new roles are emerging in AI-related fields such as data science, AI system management, and AI ethics and governance.
- Growth Opportunities: AI presents significant growth opportunities in sectors like healthcare, education, and public services, where AI can improve service delivery, enhance decision-making, and drive innovation.

Workforce Reskilling Strategies

- Skill Gaps: There is a significant skill gap in technical expertise (e.g., data science, machine learning) and industry-specific AI applications. Many organizations lack employees with the necessary skills to implement and manage AI systems.
- Reskilling Needs: There is an urgent need for reskilling and upskilling programs to help workers transition from at-risk roles to emerging AI-related positions. Critical skills include data analysis, machine learning, AI ethics, and soft skills like critical thinking and adaptability.
- Educational Gaps: Current educational curricula in Nepal are not fully integrated with AI education, leading to a mismatch between the skills taught and the skills needed in the workforce.

Policy and Regulatory Recommendations

- Lack of AI Policies: Nepal currently lacks a comprehensive AI policy or regulatory framework, creating uncertainty for businesses and hindering AI adoption.

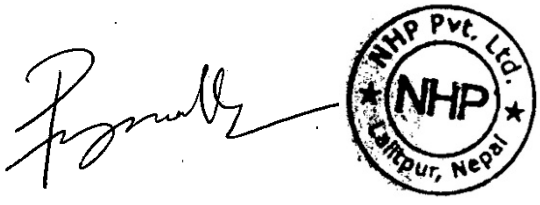
- Ethical Concerns: Respondents emphasized the importance of ethical AI practices, including transparency, accountability, and data privacy. There is a need for clear guidelines on the ethical use of AI, particularly in sensitive sectors like healthcare and finance.
- Workforce Transition Support: The government plays a crucial role in facilitating workforce transition by providing financial incentives for reskilling, developing AI-related policies, and collaborating with educational institutions to update curricula.
- Public-Private Partnerships: Collaboration between government agencies, industry leaders, and academia is essential to accelerate AI adoption and ensure inclusive development.
- AI Infrastructure Deficiency: The lack of AI research facilities, cloud computing infrastructure, and data centers hinders AI innovation and deployment.
- Incentives for AI Adoption: Businesses and startups face challenges in accessing financial support for AI integration, limiting their ability to adopt and scale AI solutions.

Economic Growth Opportunities

- Productivity Gains: AI has the potential to significantly boost economic productivity and efficiency across industries, particularly in manufacturing, healthcare, and finance. However, the benefits may not be evenly distributed across all regions and sectors.
- Regional Disparities: AI adoption is more prevalent in urban areas, leading to potential regional disparities in economic growth and job opportunities. Rural areas may lag behind due to limited access to digital infrastructure and AI education.
- Innovation and Competitiveness: AI fosters innovation through new product development and service optimization, creating opportunities for businesses to gain a competitive advantage.

AI-Driven Education and Training Programs

- Educational Reforms: There is a need for educational reforms to integrate AI-related topics into school and university curricula. Focus on AI fundamentals, machine learning, and data science to prepare students for AI-driven roles.
- Industry Collaboration: Collaboration between educational institutions and industry leaders is essential to provide students with hands-on experience through internships, project opportunities, and industry-led training programs.



- AI Literacy: Increasing AI literacy among employees and leadership is critical to ensure that the workforce can adapt to AI-driven changes.

Recommendations

Sector-Specific Impact Analysis

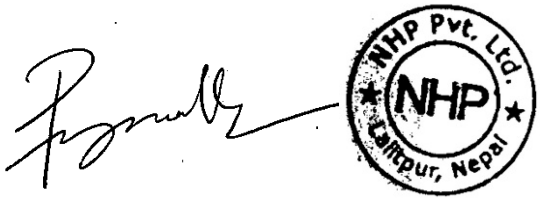
- Sector-Specific AI Strategies: Develop tailored AI strategies for high-impact sectors such as healthcare, education, and manufacturing. Focus on leveraging AI for productivity gains while addressing job displacement risks through reskilling programs.
- Investment in AI Infrastructure: Encourage both public and private sectors to invest in AI infrastructure, including high-speed internet, cloud computing, and data collection systems, to support AI adoption across industries.
- AI-Driven Innovation Hubs: Establish AI innovation hubs to foster research and development in key sectors, promoting collaboration between academia, industry, and government.

Workforce Reskilling Strategies

- Curriculum Integration: Integrate AI education into school and university curricula, focusing on AI fundamentals, machine learning, and data science. Collaborate with international institutions to develop a national AI curriculum framework.
- Reskilling and Upskilling Programs: Implement targeted reskilling and upskilling programs to help workers transition to new roles. Focus on technical skills (e.g., programming, data analytics) and soft skills (e.g., creativity, communication).
- Lifelong Learning Initiatives: Promote lifelong learning initiatives, offering online courses, workshops, and certifications in AI-related fields to help workers continuously update their skills.

Policy and Regulatory Recommendations

- National AI Policy: Formulate a national AI policy that outlines the government's vision for AI adoption, including ethical guidelines, data privacy laws, and workforce transition support. This policy should align with international best practices while being tailored to Nepal's socio-economic context.



- Ethical AI Frameworks: Develop and enforce ethical AI guidelines to ensure transparency, accountability, and data privacy in AI systems. Establish oversight bodies to monitor AI practices and address ethical concerns.
- Public-Private Partnerships: Encourage collaboration between the government, private sector, and educational institutions to fund AI research and development, particularly in high-impact sectors like healthcare and education.
- AI Infrastructure Development: Promote the establishment of AI research labs, innovation hubs, and centers of excellence in partnership with universities and private sector organizations. Encourage the development of advanced data centers and cloud computing infrastructure to support AI data processing needs.
- Incentives for AI Adoption: Introduce tax breaks or reduced rates for businesses investing in AI technologies and research. Offer targeted subsidies and grants to companies, particularly small and medium-sized enterprises (SMEs), that are incorporating AI into their processes. Establish funding mechanisms, such as low-interest loans or venture capital funds, for AI-related projects.

Economic Growth Opportunities

- Inclusive AI Policies: Develop policies that ensure the benefits of AI are distributed equitably across all regions and sectors. Focus on providing support to rural areas, including investments in digital infrastructure and AI education.
- Regional Development Initiatives: Launch regional development initiatives to promote AI adoption in rural areas, including funding for AI startups, digital literacy programs, and partnerships with local businesses.
- AI-Driven Economic Growth Models: Encourage industries to capitalize on AI advancements by adopting AI-driven business models that enhance productivity, innovation, and competitiveness.

AI-Driven Education and Training Programs

- AI-Focused Curricula: Integrate AI-focused curricula in all education levels, emphasizing mathematics, data analysis, and critical thinking. Collaborate with international institutions to develop a national AI curriculum framework.

- Faculty Development: Provide faculty development programs to upskill educators in AI-related subjects, ensuring they can effectively teach the next generation of AI professionals.
- Industry-Academia Partnerships: Foster partnerships between educational institutions and industry leaders to provide students with hands-on experience through internships, project opportunities, and industry-led training programs.

Conclusion

The study highlights both the transformative potential and the challenges of AI adoption in Nepal. While AI offers significant opportunities for economic growth, productivity gains, and innovation, it also poses risks of job displacement, skill gaps, and regional inequality. The findings from the desk review, surveys, key informant interviews (KIIs), and focus group discussions (FGDs) underscore the urgent need for a comprehensive and inclusive approach to AI integration in Nepal. To harness the benefits of AI, Nepal must invest in digital infrastructure, reskilling programs, and ethical AI policies. By fostering collaboration between the government, private sector, and educational institutions, Nepal can create a resilient and inclusive AI-driven economy that ensures equitable access to AI technologies and supports workforce adaptation.

The recommendations outlined in this report provide a comprehensive roadmap for Nepal to develop a robust regulatory and policy framework for AI adoption. By addressing the lack of AI policies, ethical concerns, infrastructure gaps, and workforce transformation needs, Nepal can create an enabling environment for AI integration. These measures will not only foster innovation and economic growth but also ensure that the benefits of AI are equitably distributed across society. Through public-private partnerships, targeted incentives, and inclusive policy-making, Nepal can position itself as a leader in responsible AI adoption while safeguarding the interests of its workforce and citizens.

List of Abbreviations

Abbreviation	Full Form
4IR	Fourth Industrial Revolution
ADB	Asian Development Bank
ADBI	Asian Development Bank Institute
AI	Artificial Intelligence
ANTUF	All Nepal Trade Union Federation
CTEVT	Council for Technical Education and Vocational Training
D4D	Data for Development
DOIT	Department of Information Technology
DTDA	Danish Trade Union Development Agency
FGDs	Focus Group Discussions
FNCCI	Federation of Nepalese Chambers of Commerce and Industry
FY	Fiscal Year
GDP	Gross Domestic Product
GFONT	General Federation of Nepalese Trade Unions
HR	Human Resources
IBM	International Business Machines Corporation
ICT	Information and Communication Technology
ILO	International Labor Organization
IMF	International Monetary Fund
IoT	Internet of Things
ISIC	International Standard Industrial Classification of All Economic Activities
IT	Information Technology
ITU	International Telecommunication Union
KIIs	Key Informant Interviews
LLMs	Large Language Models
ML	Machine Learning
MOCIT	Ministry of Communication and Information Technology
MOEST	Ministry of Education, Science and Technology

MOF	Ministry of Finance
MOICS	Ministry of Industry, Commerce, and Supplies
NAS-IT	Nepal Association for Software and IT Services Companies
NEET	Not in Employment, Education, or Training
NHP	Nepal Health Partnership
NLP	Natural Language Processing
NPC	National Planning Commission
NPR	Nepalese Rupee
NTA	Nepal Telecommunications Authority
NTUC	Nepal Trade Union Congress
OECD	Organisation for Economic Co-operation and Development
PPP	Public-Private Partnership
R&D	Research and Development
RPA	Robotic Process Automation
SDGs	Sustainable Development Goals
SMEs	Small and Medium-sized Enterprises
SPSS	Statistical Package for the Social Sciences
TVET	Technical and Vocational Education and Training
UN DESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
VR/AR	Virtual Reality/Augmented Reality
WEF	World Economic Forum
World Bank	World Bank

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1. Introduction

1.1 Impact of Industrial Revolutions on Job Displacement, Job Creation, and Reskilling Requirements

The industrial revolutions, from the first to the fourth, have fundamentally reshaped job markets by introducing transformative technologies. Each revolution brought significant changes in employment patterns, creating opportunities in emerging sectors while displacing traditional roles.

1.1.1 Job Displacement

The **First Industrial Revolution** saw the mechanization of agriculture, displacing traditional agrarian jobs as factories emerged as primary employment hubs. The **Second Industrial Revolution** accelerated automation, eliminating many routine manual tasks, particularly in manufacturing. By the **Third Industrial Revolution**, digital technologies and AI began replacing repetitive and low-skilled jobs in manufacturing and services. The ongoing **Fourth Industrial Revolution** has further intensified displacement, with automation and robotics replacing roles that rely on routine tasks, disproportionately affecting low-skilled workers. Large language models (LLMs) like ChatGPT are significantly impacting industry value chains by streamlining tasks such as customer support, content creation, and data analysis, enhancing efficiency and productivity. However, their adoption may lead to job displacement, particularly in roles involving routine or repetitive tasks.

1.1.2 Job Creation

Despite job losses, each revolution catalyzed new employment opportunities. The First and Second Revolutions led to the rise of manufacturing and engineering roles, while the Third spurred demand in technology-related fields such as software development, data science, and IT services. The Fourth Revolution has created advanced roles in AI, robotics, and digital platforms, with a growing need for multidisciplinary skills to navigate complex digital ecosystems.

1.1.3 Reskilling Requirements

All revolutions have emphasized the need for workforce adaptation. The First and Second Revolutions required workers to learn factory operations and tools. The Third demanded digital literacy and IT skills, while the Fourth underscores the urgency of advanced digital

competencies and analytical skills. Collaboration among governments, industries, and educational institutions has been pivotal in addressing reskilling needs, though challenges such as access disparities persist.

To mitigate the impact of LLMs, reskilling efforts are essential, focusing on empowering workers with the skills needed to collaborate with AI, adapt to new technologies, and thrive in AI-driven environments.

The industrial revolutions highlight a dual effect: while they disrupt existing roles, they also present opportunities for innovation and growth. Proactive policies, lifelong learning initiatives, and equitable training programs are critical to ensure workers can transition effectively into new roles, fostering inclusive growth in the evolving labor market.

1.1.4 AI Technologies and Their Relevance Across Industries

Artificial Intelligence (AI) encompasses a range of advanced computational techniques that enable machines to perform tasks traditionally requiring human intelligence, such as learning, reasoning, decision-making, and language processing. The transformative capabilities of AI lie in its ability to analyze vast datasets, identify patterns, and make predictions or decisions with remarkable accuracy and speed. These technologies are increasingly reshaping industries worldwide, including those crucial to Nepal's economy.

AI technologies can be classified into several key types, each with unique features and applications. These include Machine Learning, Deep Learning, Natural Language Processing (NLP), Predictive Analytics, Reinforcement Learning, Computer Vision, Robotic Process Automation (RPA), Recommendation Systems, Generative AI, and Speech Recognition and Agentic AI. Below, we explore their relevance to various industries in Nepal, focusing on their applications, implications for job dynamics, and the reskilling/upskilling requirements for the workforce.

Machine Learning involves creating algorithms that enable systems to learn from data and improve over time without explicit programming. It enhances crop yield prediction in agriculture, fraud detection in banking, and quality control in manufacturing. In Nepal, Machine Learning can optimize agricultural productivity and modernize manufacturing sectors

by improving efficiency and reducing costs. While repetitive manual tasks may decline, it creates demand for roles like data analysts and ML engineers, making upskilling in data modeling and programming essential.

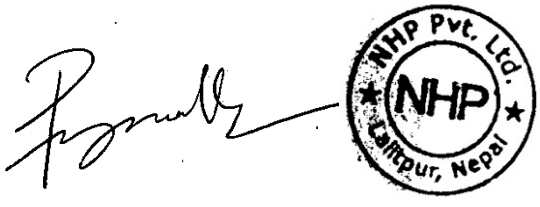
Deep Learning utilizes neural networks to analyze unstructured data such as images, videos, and sound. It powers autonomous vehicles, medical image analysis, and personalized education tools. In sectors like healthcare in Nepal, it can improve diagnostic accuracy and support telemedicine initiatives. Tasks in medical diagnostics and data processing may be automated, necessitating skills in AI ethics, neural network architecture, and data annotation.

Natural Language Processing (NLP) enables machines to interpret and respond to human language, both written and spoken. It supports citizen services in public administration, sentiment analysis in retail, and content generation in media. In Nepal, chatbots for government services can enhance citizen engagement, while sentiment analysis tools benefit tourism and retail industries. While traditional roles in customer service may decline, new opportunities emerge for conversational AI designers and data linguists.

Predictive Analytics uses historical data and statistical algorithms to forecast trends. It aids in demand forecasting in energy, inventory management in retail, and financial risk assessment. In Nepal, energy optimization and financial planning benefit from predictive insights, fostering sustainable development. Manual forecasting jobs may decline, but roles in data interpretation and business analytics will grow, requiring expertise in visualization tools.

Reinforcement Learning enables systems to learn through interactions with their environment by optimizing rewards. It drives autonomous navigation, gaming strategy development, and portfolio management. Reinforcement learning can optimize logistics in transportation and support advancements in game development in Nepal. Automation in strategic decision-making tasks may increase, creating demand for RL researchers and simulation experts.

Computer Vision allows machines to interpret visual data such as images and videos. It enhances precision farming, automated quality inspections in factories, and facial recognition in security. Applications in agriculture and manufacturing in Nepal can drive productivity and improve export quality. Manual inspection roles may decrease, but demand for vision system developers and AI trainers will rise.



Robotic Process Automation (RPA) automates repetitive, rule-based tasks across systems. It streamlines invoicing in administrative services, compliance reporting in banking, and patient record management in healthcare. In Nepal, RPA can modernize administrative processes in public and private sectors, improving efficiency. Clerical roles may decline, while demand for RPA developers and workflow analysts will increase.

Recommendation Systems suggest relevant content or products based on user preferences. Personalized shopping experiences in retail, travel recommendations in tourism, and content curation in entertainment are common applications. They can boost the tourism industry in Nepal by offering tailored travel packages and improve e-commerce. Traditional advisory roles may decrease, but data scientists and recommendation algorithm specialists will be in demand.
Generative AI creates content such as text, images, and videos using models like GPT and DALL-E. It supports content creation in media, personalized marketing in retail, and educational material development. In Nepal, it supports creative industries and enhances e-learning platforms with custom content. Basic content creation may decline, but demand for prompt engineers and creative AI experts will grow.

Speech Recognition enables machines to understand spoken language, while Agentic AI combines this with decision-making capabilities. Voice-activated systems in public services, virtual assistants in transportation, and hands-free healthcare solutions are key applications. Speech-enabled tools can enhance accessibility and service delivery in Nepal, especially in rural areas. While manual transcription roles may decline, expertise in voice interface design and AI integration will rise.

Agentic AI refers to artificial intelligence systems capable of autonomous decision-making, reasoning, and performing complex tasks without direct human intervention. Unlike traditional AI models that rely on predefined instructions, Agentic AI can analyze its environment, learn from interactions, and adapt its strategies to achieve specific goals. This technology holds immense potential across industries in Nepal. For instance, in public administration, Agentic AI could enhance disaster management systems by autonomously coordinating relief efforts and resource allocation during emergencies. In agriculture, it could support precision farming by making real-time decisions on irrigation, pest control, and crop management. Additionally, Agentic AI can improve healthcare accessibility through virtual health assistants that provide personalized medical advice in remote areas. While it may automate decision-based roles, the

technology creates demand for professionals skilled in AI governance, ethical programming, and system integration, highlighting the need for targeted reskilling initiatives to prepare Nepal's workforce for these emerging opportunities.

AI technologies have the potential to transform Nepal's industries by driving innovation, enhancing efficiency, and enabling new business models. However, these advancements also necessitate addressing challenges such as job displacement and workforce reskilling. By fostering AI education and training programs, Nepal can prepare its workforce for emerging opportunities, ensuring sustainable and inclusive growth in an AI-driven future.

1.1.5 Possible Impact of AI on Industry Value Chains

The **International Standard Industrial Classification of All Economic Activities (ISIC)**, provided by **UN DESA**, serves as a framework for understanding economic activities across industries. AI technologies are transforming industry value chains, leading to **job displacement, job creation, and reskilling requirements**. This study follows the ISIC classification for **stakeholder consultations**, including **surveys, Key Informant Interviews (KIIs), and Focus Group Discussions (FGDs)**, ensuring a structured approach to analyzing AI's impact across sectors. Based on extensive **literature reviews and stakeholder consultations**, the possible impact of AI across different industries, along with relevant AI technologies, is outlined below.

1. **Agriculture, Forestry, and Fishing (ISIC A):** AI-driven automation is replacing repetitive tasks like planting and harvesting, while creating opportunities in **precision agriculture, drone operations, and AI-powered irrigation systems**. Reskilling is required in AI-based tools and robotics. Key technologies include **computer vision (crop monitoring), robotics (automated farming), and predictive analytics (yield forecasting)**.
2. **Mining and Quarrying (ISIC B):** AI enables automation in **material extraction and mineral sorting**, leading to job displacement but also creating roles in **remote machinery operation and AI-driven geological mapping**. Workers need expertise in **autonomous vehicle operation and AI-driven data analysis**. Technologies include **machine learning (geological analysis), robotics (autonomous mining equipment), and IoT sensors (real-time monitoring)**.

3. **Manufacturing (ISIC C):** AI-powered **robotics and quality control systems** are replacing manual assembly tasks, while increasing demand for **AI maintenance engineers and data scientists**. Workers need training in **robotics operation, industrial IoT, and AI-based quality control**. Technologies include **robotics (automated assembly), computer vision (quality control), and digital twins (process simulation)**.
4. **Electricity, Gas, Steam, and Air Conditioning Supply (ISIC D):** AI is automating **grid management and energy distribution**, reducing jobs but creating new roles in **AI-powered energy optimization and forecasting**. Reskilling is needed in **grid automation tools and predictive analytics**. Key technologies include **machine learning (grid optimization), smart sensors (fault detection), and predictive analytics (demand forecasting)**.
5. **Water Supply, Sewerage, Waste Management, and Remediation (ISIC E):** AI automates **water treatment and waste sorting**, displacing some jobs while creating roles in **AI-based environmental monitoring**. Reskilling focuses on **robotics and AI-driven water system management**. Technologies include **predictive maintenance (water infrastructure), IoT sensors (real-time monitoring), and robotics (waste sorting)**.
6. **Construction (ISIC F):** AI-driven automation is transforming **bricklaying, surveying, and planning**, leading to job displacement but also opportunities in **AI-powered construction project management and 3D printing**. Workers need expertise in **construction robotics and predictive analytics**. Technologies include **drone technology (site surveying), robotics (automated equipment), and AI-driven project management tools**.
7. **Wholesale and Retail Trade (ISIC G):** AI automates **cashiering and inventory management**, replacing some jobs but creating roles in **e-commerce, customer analytics, and AI-powered logistics**. Reskilling is needed in **AI-driven customer insights and demand forecasting**. Technologies include **machine learning (demand forecasting), NLP (chatbots), and computer vision (automated checkouts)**.
8. **Transportation and Storage (ISIC H):** AI-powered **autonomous driving and logistics optimization** displace certain roles but create demand for **autonomous vehicle management and AI-driven logistics coordination**. Workers require expertise in **fleet monitoring and smart transportation systems**. Technologies

include **predictive analytics (logistics optimization), IoT sensors (fleet tracking), and autonomous driving systems**.

9. **Accommodation and Food Service (ISIC I):** AI is automating **ordering, cooking, and cleaning**, leading to job losses while generating opportunities in **AI-powered customer service and robotics**. Reskilling focuses on **managing service robots and AI-driven personalization systems**. Technologies include **machine learning (customer recommendations), robotics (service automation), and AI-driven personalization tools**.
10. **Information and Communication (ISIC J):** AI is reducing **manual data entry jobs** but increasing demand for **AI developers, data scientists, and cybersecurity professionals**. Reskilling involves training in **advanced AI technologies, cloud computing, and NLP**. Technologies include **deep learning (content personalization), NLP (chatbots), and AI-powered cybersecurity tools**.
11. **Financial and Insurance Activities (ISIC K):** AI automates **routine financial analysis and risk assessment**, while creating roles in **fraud detection and AI-driven investment strategies**. Workers need skills in **AI-powered fintech solutions and risk management**. Technologies include **machine learning (fraud detection), predictive analytics (investment strategies), and AI-driven risk analysis tools**.
12. **Public Administration and Defence (ISIC O):** AI reduces **manual data processing** while enabling new roles in **AI-driven policy analysis and public service optimization**. Reskilling focuses on **AI applications for governance and digital transformation**. Technologies include **NLP (policy document analysis) and machine learning (public service optimization)**.
13. **Education (ISIC P):** AI automates **administrative tasks** but creates opportunities in **AI-driven learning platforms and content development**. Reskilling is required in **adaptive learning systems and AI-powered content creation**. Technologies include **automated grading tools, NLP, and adaptive learning systems**.
14. **Human Health and Social Work (ISIC Q):** AI is automating **diagnostics and patient care**, while creating jobs in **AI-driven healthcare innovation**. Reskilling includes **AI-powered diagnostics and telemedicine tools**. Technologies include **computer vision (medical imaging), robotics (surgical assistance), and predictive analytics (health trends)**.
15. **Arts, Entertainment, and Recreation (ISIC R):** AI is changing **content curation and marketing**, replacing some jobs while expanding roles in **AI-assisted content**

generation and virtual reality experiences. Reskilling is needed in **AI-powered design, data analytics, and immersive technologies**. Technologies include **generative AI (content creation), VR/AR (interactive entertainment), and predictive analytics (event planning)**.

16. **Other Service Activities (ISIC S):** AI automates **personal services like cleaning and diagnostics**, but also enhances roles in **AI-driven customer service and smart service platforms**. Workers need skills in **AI-enhanced service delivery and IoT applications**. Technologies include **robotics (personalized service automation), machine learning (customer behavior prediction), and IoT (smart service devices)**.
17. **Activities of Households as Employers (ISIC T):** AI is automating **domestic tasks through smart home devices**, but creating roles in **AI-powered home management and caregiving applications**. Reskilling is needed in **home automation technologies and smart assistant management**. Technologies include **robotics (home automation), virtual assistants (Alexa, Google Assistant), and machine learning (home service recommendations)**.
18. **Undifferentiated Goods- and Services-Producing Activities (ISIC U):** AI's impact here is limited but may automate certain **household production tasks**, creating roles in **AI-driven DIY tools and smart farming**. Reskilling includes **AI-powered sustainability practices and smart farming techniques**. Technologies include **IoT (smart gardening), computer vision (quality control), and machine learning (personalized productivity tools)**.

This analysis highlights AI's pervasive impact across industries, emphasizing the need for proactive strategies to manage job displacement, harness job creation, and address reskilling challenges.

Across all the industries from A to U (Agriculture to Entertainment), we can identify **common types of applications**, **job impacts** in terms of **job displacement**, **job creation**, and **reskilling/upskilling** that arise in the age of AI, particularly with technologies like **Generative AI**, **Robotic Process Automation (RPA)**, **Predictive Analytics**, **Speech Recognition**, and others.

1.1.6 Common Types of Applications

Across all industries, AI technologies are being applied to the following common categories:

a) Automation of Repetitive Tasks

- **Examples**: Automating data entry, report generation, customer support, and administrative tasks.
- **Industries**: Agriculture, Manufacturing, Retail, Healthcare, Education, Public Administration, etc.
- **Global Practice**: RPA tools like **UiPath** and **Automation Anywhere** are widely used for automating back-office functions such as invoice processing, payroll, and customer service queries.

b) Predictive Analytics for Decision Support

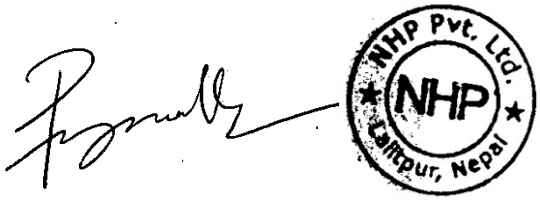
- **Examples**: Predicting market trends, equipment maintenance, customer behavior, and operational bottlenecks.
- **Industries**: Manufacturing, Retail, Healthcare, Transportation, Finance, etc.
- **Global Practice**: In **manufacturing**, companies like **Siemens** use predictive maintenance to prevent equipment failure. **Netflix** and **Amazon** use predictive analytics for customer recommendations and inventory management, respectively.

c) Personalized Services and Recommendations

- **Examples**: Personalized shopping, learning paths, healthcare treatment plans, and media recommendations.
- **Industries**: Retail, Healthcare, Education, Entertainment, etc.
- **Global Practice**: **Spotify** uses AI-driven algorithms to recommend music based on listening habits. In **education**, platforms like **Khan Academy** offer personalized learning experiences using AI.

d) Natural Language Processing (NLP) and Speech Recognition

- **Examples**: Chatbots, virtual assistants, automated transcription, sentiment analysis, and speech-to-text systems.
- **Industries**: Retail, Finance, Customer Service, Healthcare, etc.
- **Global Practice**: **Amazon's Alexa**, **Google Assistant**, and **Apple's Siri** are examples of NLP and speech recognition in consumer products. In **healthcare**, AI-driven voice assistants like **Nuance's Dragon Medical** are used for dictating medical records.



e) Design and Content Generation

- **Examples**: AI-assisted design, content creation, marketing copy generation, and virtual content (videos, music, etc.).
- **Industries**: Manufacturing, Marketing, Entertainment, Media, etc.
- **Global Practice**: **Adobe** uses AI to assist in creative content generation. **OpenAI's GPT-4** can write articles, generate code, and even produce creative content.

f) Automation in Customer Experience and Service Delivery

- **Examples**: Chatbots, AI-driven help desks, customer service automation, and virtual agents.
- **Industries**: Retail, Telecommunications, Healthcare, Finance, etc.
- **Global Practice**: **Bank of America's Erica** and **Lloyds Banking Group** use AI-powered virtual assistants for customer service. In **telecommunications**, AI chatbots handle troubleshooting and account inquiries.

The Need for This Study within the Context of Nepal's Socio-Economic Development

Nepal is a developing country with a population of nearly 30 million, characterized by a predominantly agrarian economy. However, in recent years, the country has made strides towards modernization, with key sectors such as manufacturing, services, and information technology driving economic growth. Despite this progress, Nepal faces challenges such as high unemployment rates, skill gaps in the workforce, and the need for innovation to sustain long-term growth.

The rapid development of AI technology offers a unique opportunity to address some of these challenges. However, the pace of AI adoption is not uniform across industries, and understanding how AI can impact job creation, displacement, and transformation is critical. As Nepal aims to embrace Industry 4.0, it is crucial to understand the socio-economic implications of AI, particularly its impact on employment, skill requirements, and economic growth.

This study is essential to inform policy development, industry practices, and workforce planning in Nepal. It will provide evidence-based recommendations to ensure that AI's integration into Nepal's industries is aligned with the country's development goals, creates sustainable jobs, and enhances overall economic resilience.

1.2 Objectives

This study aims to evaluate the impact of Artificial Intelligence (AI) on Nepal's industry value chains, workforce, and economy. It identifies sectors most affected by AI advancements and automation, assesses labor market trends, and proposes strategies for workforce reskilling and adaptation.

Key objectives include:

- Identifying vulnerable sectors and opportunities for AI-driven growth.
- Assessing labor market demands and proposing strategies for talent development.
- Analyzing AI's impact on productivity, efficiency, and innovation in key industries.
- Exploring the role of government policies in supporting workforce transitions.
- Providing actionable recommendations for policymakers, educators, and industry leaders to develop inclusive reskilling initiatives and AI-aligned strategies.

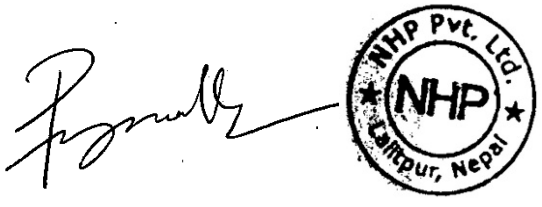
1.3 Expected Outcomes

The study aims to provide a strategic roadmap for Nepal's transition into an AI-driven economy by analyzing AI's impact on industries, workforce, and economic growth. The expected outcomes are summarized below:

- Sector-Specific Impact Analysis
    - Assess how AI is reshaping industry value chains in Nepal.
    - Identify sectors most affected by automation, job displacement, and productivity shifts.
    - Highlight industries with the potential to leverage AI for competitive advantage.
- Workforce Reskilling Strategies
    - Develop recommendations for reskilling and upskilling initiatives to address AI-driven job displacement.
    - Promote industry-government-education partnerships to align workforce skills with AI advancements.
- Policy and Regulatory Recommendations
    - Propose policy measures to integrate AI into industries while protecting employment.
    - Identify gaps in labor regulations and suggest frameworks for an inclusive workforce transition.

- Economic Growth Opportunities
    - Explore AI's role in boosting Nepal's productivity, innovation, and efficiency.
    - Recommend strategies for industries to harness AI while minimizing workforce disruption.
    - Suggest collaboration models for knowledge-sharing, resource pooling, and joint AI investment.
- AI-Driven Education and Training Programs
    - Develop strategies for AI-integrated curricula in educational and vocational institutions.
    - Bridge the gap between academia and AI-driven industries to ensure a skilled workforce pipeline.

These outcomes will help Nepal harness AI's transformative potential while mitigating job displacement and skill gaps, fostering inclusive growth and sustainable development in the digital era.



2. Research Methodology

This study employs a **mixed-methods approach** to analyze the impact of artificial intelligence (AI) on industry value chains in Nepal, focusing on job displacement, job creation, and reskilling requirements. The methodology integrates **desk reviews**, **stakeholder consultations**, and **primary data collection** to ensure a comprehensive understanding of AI's transformative role.

2.1 Research Design

2.1.1 Methodological Approach

The study combines **qualitative and quantitative methods** to explore AI's multifaceted impacts. This approach bridges statistical trends with contextual insights, captures sector-specific dynamics, and supports evidence-based policy recommendations.

2.1.2 Research Framework

The research is structured around:

1. **Desk Review:** Analysis of global AI trends, sectoral impacts, and Nepal-specific policies.
2. **Stakeholder Consultations:** KIIs with 25 stakeholders (20 industry, 5 government with a structured Questionnaire using Google Forms) and FGDs with 31 participants (Government, Industry, AI innovators and Start-ups, Academia, HR, trade unions-views based).
3. **Primary Data Collection:** Structured Questionnaire based Surveys with 278 respondents across diverse industries using Google Forms distributed among major stakeholders in the Industry Value chain.

2.2 Data Collection Methods

2.2.1 Desk Review and Literature Analysis

The desk review examined global AI trends, sectoral impacts, and Nepal's policy landscape, drawing from policy documents, industry reports, and academic literature.

2.2.2 Stakeholder Consultations

Consultations included:

- **KIIs:** Structured interviews with government, industry, academia, and labor representatives.

- **FGDs:** Discussions with Government representative, IT professionals, trade unions, academia and cross-industry stakeholders.

2.2.3 Primary Data Collection

- **Surveys and KIIs:** Structured questionnaires collected data on AI's sectoral impacts and workforce challenges.
- **FGDs:** Provided qualitative insights on workforce transformation and policy needs.

2.2.4 Sampling Framework and Strategy

The study targeted **278 respondents** from diverse sectors (agriculture, manufacturing, IT, healthcare, telecommunications) and stakeholder groups (government, industry, academia, HR, labor, AI specialists). This ensured balanced representation and comprehensive insights.

2.3 Data Analysis Methods

2.3.1 Quantitative Analysis

Survey data were analyzed using statistical tools to identify trends, correlations, and sector-specific challenges, such as AI adoption levels and skill gaps.

2.3.2 Qualitative Analysis

KII and FGD data were coded and thematically analyzed to extract insights on stakeholder perceptions, workforce transformation, and policy needs.

2.3.3 Integration of Findings

Qualitative and quantitative data were synthesized to provide a holistic understanding of AI's impact, supporting actionable recommendations.

2.4 Ethical Considerations

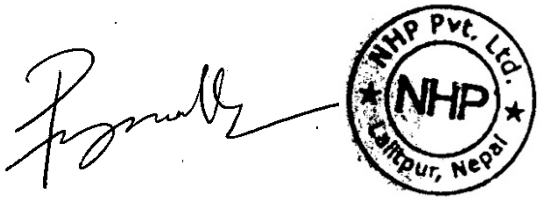
The study adhered to ethical principles, ensuring:

- **Informed Consent:** Participants were briefed and provided explicit consent.
- **Confidentiality:** Data were anonymized and securely stored.
- **Transparency:** Clear communication on study objectives and data usage.

2.5 Limitations of the Study

- **Limited Generalizability:** Sample size and sectoral representation may restrict broader applicability.

- **Potential Biases:** Stakeholder responses may reflect personal or organizational perspectives.
- **Self-Reported Data:** Reliance on participant recollections and perceptions may introduce subjectivity.



3. Findings and Discussion

3.1 Introduction

This chapter presents the key findings of the study on the impact of **Artificial Intelligence (AI) on industry value chains in Nepal**, with a particular focus on **job displacement, job creation, and reskilling requirements**. The findings are structured based on insights gathered from **four primary sources**: **(i) Desk Review/Literature Review, (ii) Surveys, (iii) Key Informant Interviews (KIIs), and (iv) Focus Group Discussions (FGDs).** The integration of these diverse data sources ensures a comprehensive understanding of AI's transformative role across various industries in Nepal.

The **desk review** provides a contextual foundation by analyzing global AI trends, sectoral impacts, and Nepal-specific policies related to AI adoption, workforce transformation, and digital economy strategies. It also highlights best practices from other countries and their relevance to Nepal's emerging AI ecosystem.

The **survey**, conducted with **278 respondents across diverse industries**, offers quantitative insights into AI adoption levels, workforce challenges, and the evolving skill demands within Nepal's labor market. It identifies sector-specific variations in AI deployment and assesses the preparedness of industries to adapt to AI-driven changes.

The **Key Informant Interviews (KIIs)** with **25 stakeholders**, including **industry leaders, policymakers, trade union representatives, and AI innovators**, provide qualitative insights into the perceived risks and opportunities associated with AI. These interviews help contextualize statistical trends by capturing sectoral perspectives on AI's impact on employment, productivity, and policy needs.

The **Focus Group Discussions (FGDs)**, conducted with **31 participants** representing **government, industry, AI startups, academia, HR professionals, and trade unions**, offer a dynamic exchange of viewpoints on workforce transformation. They provide in-depth discussions on **AI-driven job shifts, the effectiveness of existing reskilling initiatives, and policy measures required to support Nepal's AI transition.**

By synthesizing **quantitative and qualitative** findings, this chapter not only identifies emerging trends but also explores **policy implications, workforce challenges, and strategic**

opportunities for Nepal's industries in the AI era. The discussion highlights both the **potential benefits** of AI, such as enhanced efficiency and job creation in new AI-driven sectors, and the **risks**, including workforce displacement and the digital divide.

The following sections systematically present the findings from each data source, followed by a **thematic discussion** integrating these insights to inform evidence-based policy recommendations.

3.2 Findings and Discussion from Desk Review/Literature Review

The literature review for this study synthesizes a broad range of research and insights on the transformative effects of Artificial Intelligence (AI) on industry value chains, job displacement, and reskilling. The findings are systematically mapped to the study's key objectives, highlighting critical areas such as identifying vulnerable sectors and AI-driven growth opportunities, assessing labor market demands and proposing talent development strategies, and analyzing AI's impact on productivity, efficiency, and innovation across various industries. Additionally, the review explores the role of government policies in supporting workforce transitions and provides actionable recommendations for policymakers, educators, and industry leaders to develop inclusive reskilling initiatives and AI-aligned strategies. This comprehensive mapping helps frame the study's exploration of AI's potential to reshape economic landscapes, foster innovation, and ensure equitable workforce adaptation.

3.2.1 Identifying Vulnerable Sectors and Opportunities for AI-driven Growth

Vulnerable Sectors:

- **Digital Infrastructure and Access in Marginalized Communities:** The Digital Nepal Conclave 2024 report identifies marginalized communities, particularly those with limited access to digital technologies and literacy, as being at risk of exclusion from AI-driven growth. This includes rural areas where digital infrastructure remains underdeveloped. The report emphasizes the need for equitable access and robust infrastructure to foster digital inclusion.
- **Labor Market Vulnerabilities in Informal Sectors:** The Danish Trade Union Development Agency (2023) report highlights vulnerabilities in Nepal's informal labor sector, where workers face insufficient protections. The report stresses that these workers, along with small businesses, are particularly exposed to disruptions from AI and automation, requiring targeted policy interventions to mitigate risks and enhance protections.

Opportunities for AI-driven Growth:

- **Public Sector Efficiency and Transparency:** Neupane (2023) discusses the transformative potential of AI in improving public service delivery, focusing on increased transparency, efficiency, and responsiveness. This presents opportunities for AI to augment government services, with a focus on ethical AI and responsible implementation to avoid negative social impacts.
- **AI in Journalism and Public Services:** The Digital Media Foundation Nepal's AI Summit Report (2024) highlights AI's role in augmenting human expertise in journalism and public services. AI presents opportunities for innovation in these sectors, but requires overcoming infrastructure and regulatory gaps.

Identifying Vulnerable Sectors and Opportunities for AI-driven Growth

1. AI-Driven Job Evolution vs. Displacement:
   - Job Evolution and Creation of New Roles
     - Benhamou (2020) suggests that AI will create new jobs and transform existing roles in sectors like healthcare, retail banking, and transport, emphasizing job evolution rather than displacement.
     - Bessen (2018) highlights AI's potential to cause job disruption in certain sectors but also to create opportunities in others, particularly in roles requiring creativity and complex problem-solving.
2. Sector-Specific AI Impact:
   - Impact on Workforce Skills and Adaptability
     - Morandini et al. (2023) analyze AI's effect on workforce skills and emphasize the importance of combining technical and soft skills to enhance workforce adaptability.
     - Shi Weichang (2024) underscores AI's role in enhancing productivity, fostering innovation, and driving industrial upgrading in sectors like production, services, education, and healthcare.
3. Vulnerable Sectors and AI's Transformative Role:
   - Adapting Organizations to AI's Workforce Impact
     - Morandini et al. (2023) provide insights into AI's role in adapting organizations to AI's workforce impact, suggesting a blend of technical expertise and transversal skills for success.

- Yadav & Shrawankar (2024) emphasize AI's transformative impact on education, creating new roles while reshaping traditional learning and teaching practices.

Vulnerable Sectors to AI-induced Job Displacement and Opportunities for AI-driven Growth

1. Vulnerable Sectors to AI-induced Job Displacement:

- Sectors with High Routine Tasks
  - Manufacturing, retail, customer service, assembly, and quality control (e.g., Sultana et al., 2024; Hussain, 2024; Soueidan & Shoghari, 2024).
- Impact on Low-skilled Jobs
  - Sultana et al. (2024), Hussain (2024), Krstic (2024) discuss job displacement in low-skilled positions due to automation and AI technologies.

2. AI-driven Opportunities in High-skilled Sectors:

- Tech-driven Roles and High-skilled Opportunities
  - AI's role in creating high-skilled positions, particularly in healthcare, finance, AI development, data analysis, and digital transformation (e.g., Jacob, 2024; Jadhav & Banubakode, 2024; Krstic, 2024; Waite et al., 2024).
- Industry Transformations
  - Opportunities for innovation and growth in industries like healthcare, finance, manufacturing, and retail (e.g., Weng et al., 2024; Lodhi et al., 2024).

Job Displacement and Emerging Opportunities in AI-related Fields

1. Job Displacement in Routine and Manual Labor Sectors:

- Displacement in Routine Tasks
  - Philip et al. (2023), Akhmad Farhan (2023), Yihang Liang (2024), Melemuku (2023) highlight job displacement, particularly in sectors involving routine tasks and manual labor, driven by AI and automation.

2. Impact on White-collar Jobs:

- AI's Impact on White-collar Roles
  - Goudira (2024) focuses on AI's displacement of white-collar jobs in marketing and business, while also noting the creation of new opportunities.

3. Vulnerable Sectors in Traditional Industries:

- AI's Impact in Traditional Sectors

- Tashenov (2024), Rossomakha et al. (2024), and Saverkin (2024) explore the impact of AI in traditional sectors such as manufacturing, service industries, and industrial work.

4. Emerging Opportunities in High-tech and AI-related Fields:

- Growth in AI-related Fields
  - Yihang Liang (2024), Babashahi et al. (2024), and Vivek et al. (2024) discuss opportunities in AI-related fields like data science, AI development, software engineering, and other emerging sectors.

5. Technological Advancements Driving Industry Growth:

- Revolutionizing Industries through AI
  - Madancian et al. (2024) emphasize AI's role in revolutionizing supply chains and industries such as software engineering, automation, and media, creating growth opportunities.

3.2.2 Assessing Labor Market Demands and Proposing Strategies for Talent Development Labor Market Demands:

- Skills Gaps and Structural Barriers:
  - The World Bank's Jobs Diagnostic for Nepal (Bulmer et al.) identifies structural barriers such as low productivity and skill gaps, particularly in sectors like agriculture, tourism, and hydroelectricity. These gaps hinder workforce adaptation in the face of AI disruptions. The report also highlights the high NEET (Not in Employment, Education, or Training) rate among youth, particularly women.
- Mismatch in TVET System and Market Needs:
  - The Danish Trade Union Development Agency (2023) underscores the misalignment between Nepal's Technical and Vocational Education and Training (TVET) system and labor market needs. The misalignment is exacerbated by skill shortages, especially in technical and vocational areas, which could impede the country's ability to harness AI-driven opportunities.

Talent Development Strategies:

- Education System Reform:
  - The paper "AI, the Global 4th Industrial System and Nepali Labour Future?" (2022) stresses the urgent need to modernize Nepal's education system. This

includes updating the national curriculum and strengthening TVET programs to cultivate a skilled workforce capable of adapting to AI-driven changes. Recommendations include providing free skills training and preparing the workforce for the Fourth Industrial Revolution (4IR).

- Strengthening Digital Literacy and Vocational Training:
    - Both the Digital Nepal Conclave 2024 report and the "AI, the Global 4th Industrial System and Nepali Labour Future?" study emphasize the importance of expanding digital literacy and vocational training to equip workers with AI-related skills.

Assessing Labor Market Demands and Proposing Strategies for Talent Development

1. Shifts in Skill Demand Due to AI:
    - Increasing Demand for High-tech Skills:
        - AI-related roles such as machine learning, data science, and AI management are in high demand (e.g., Jadhav & Banubakode, 2024; Vyshnavi et al., 2024).
    - Upskilling and Reskilling:
        - There is a continuous need for education to adapt to AI, with an emphasis on both technical and soft skills (e.g., Krstic, 2024; Sultana et al., 2024; Harsh Mishra, 2024).
2. Workforce Adaptability:
    - Impact on Middle-skill Workers:
        - Middle-skill job reductions in sectors like manufacturing and logistics require targeted retraining (e.g., Kanagarla Krishna Prasanth Brahmaji, 2024).
    - Technological Literacy:
        - Technological literacy is crucial for workers to remain competitive in an AI-driven job market (e.g., Hussain, 2024; Soueidan & Shoghari, 2024).

Job Creation, Skill Demand, and Workforce Adaptability

1. Job Creation and Skill Demand:
    - Emerging Roles and Skills:
        - New skills are needed in data science, AI, engineering, and high-tech roles to meet the demand for talent (e.g., Akhmad Farhan, 2023; Yihang Liang, 2024; Babashahi et al., 2024).
2. Workforce Adaptability and Reskilling:
    - Reskilling Initiatives:

- Reskilling is vital for workers to transition into AI-driven roles, as emphasized by Rossomakha et al. (2024), Tashenov (2024), and Vivek et al. (2024).

3. Lack of Relevant Skills for AI Integration:

- Skills Gap and Continuous Learning:
  - There is a gap in the necessary skills for AI integration. Continuous learning and strategic reskilling are critical to addressing this gap (e.g., Babashahi et al., 2024; Dogra et al., 2024).

4. Skill Development in Emerging Sectors:

- Human-Machine Collaboration and AI Integration:
  - Skill development in areas like human-machine collaboration, AI integration, and advanced industries like Industry 5.0 and IT is crucial (e.g., Kumar and Das, 2024; Liu, 2024; Goudira, 2024).

5. Education and Training Programs:

- Educational Reforms and Collaborative Efforts:
  - There is a need for educational reforms and collaborative efforts between governments, businesses, and educational institutions to support AI-related talent development (e.g., Tashenov, 2024; Du, 2024; Bansal, 2024).

3.2.3 Analyzing AI's Impact on Productivity, Efficiency, and Innovation in Key Industries

1. Productivity and Efficiency Gains

- Public Service Modernization:
  - Neupane (2023) highlights AI's potential to improve public sector efficiency and responsiveness. AI-driven solutions in public services could reduce inefficiencies and enhance government service delivery, thereby boosting overall productivity.
- Impact on Remittance-Dependent Households:
  - The World Bank (Bulmer et al.) discusses Nepal's heavy reliance on remittances due to limited domestic job creation. AI's potential to enhance domestic productivity and generate new job opportunities could mitigate this dependency and improve labor market efficiency.
- AI's Role in Enhancing Organizational Efficiency:

- IBM's (2024) report indicates that organizations leveraging AI and data infrastructure report improvements in revenue and profit margins, demonstrating AI's impact on operational efficiency and business goals alignment.

- AI in Workforce Efficiency and Economic Impact:
  - The Future of Jobs Report (2020) finds that while AI-driven automation may disrupt 15% of the workforce, it will also create new roles, particularly in emerging sectors like the green economy and AI, ultimately leading to productivity gains.
- AI-Driven Operational Transformations:
  - AI enhances flexibility and precision in business processes and manufacturing, optimizing workflows and improving output efficiency (e.g., Lodhi et al., 2024; Pokamestov & Nikitin, 2024).

2. AI's Role in Innovation

- AI in Journalism and Public Service Innovation:
  - The Digital Media Foundation Nepal (2024) highlights AI's role in fostering innovation in journalism and public services, particularly in data analysis, reporting, and decision-making processes. AI augments human expertise and enables novel solutions in key sectors.
- Creation of New Job Roles:
  - Prakash Adhikari (2024) examines AI's dual impact on employment. While AI may displace existing jobs, it also fosters job creation through new industries and roles, stimulating innovation and economic transformation.
- AI as an Innovation Catalyst:
  - AI contributes to business and product innovation across various sectors, including finance, healthcare, and manufacturing, by driving advanced analytics and automation (e.g., Weng et al., 2024; Kalukuri et al., 2024).
- Generative AI's Role in Creativity and Technological Advancement:
  - The emergence of generative AI significantly enhances creativity and technological development, leading to breakthrough innovations (e.g., Huaize Zhang, 2024).

Analyzing AI's Impact on Productivity, Efficiency, and Innovation in Key Industries

1. AI's Transformative Impact on Industry Operations

- Supply Chain and Decision-Making Enhancements:

- AI improves supply chain management, optimizes resource allocation, and enhances decision-making, reducing environmental impacts and boosting productivity (e.g., Madancian et al., 2024).

2. Efficiency Gains Across Sectors
   - Cross-Industry AI Adoption:
     - AI significantly enhances efficiency in manufacturing, education, legal services, and service sectors (e.g., Saverkin, 2024; Philip et al., 2023; Kumar and Das, 2024).

3. AI's Role in Innovation
   - Technological Advancements in High-Tech Industries:
     - AI fosters innovation within high-tech industries, leading to the development of new products and services (e.g., Vivek et al., 2024; Rossomakha et al., 2024; Bansal, 2024).

4. Dual Impact of AI on Industry Standards
   - Productivity vs. Ethical Concerns:
     - AI's benefits in productivity and efficiency must be balanced with ethical concerns such as labor displacement and privacy risks (e.g., Lin, 2024; Babashahi et al., 2024; Tashenov, 2024).

5. AI's Dual Impact on Economic Sectors
   - Sector-Specific AI Influence:
     - AI drives economic growth while presenting challenges for traditional industries (e.g., Bansal, 2024; Dogra et al., 2024).

3.2.4 Exploring the Role of Government Policies in Supporting Workforce Transitions

1. Policy Interventions for Workforce Transition
   - Support for Vulnerable Workers:
     - The *Digital Nepal Conclave 2024* report stresses the need for equitable access to digital transformation. Policies must ensure marginalized communities, including rural populations, informal workers, and underrepresented groups, have the necessary resources to benefit from AI-driven opportunities.
   - Social Protections for Informal Economy Workers:

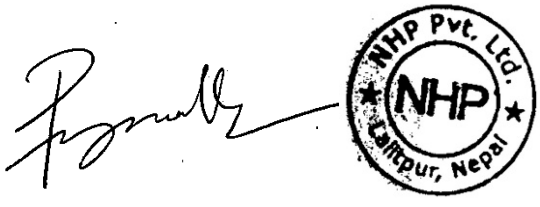
    - The *Danish Trade Union Development Agency (2023)* report calls for stronger social protections for workers in informal economies. This includes strengthening legislative frameworks, enforcing labor rights, and ensuring a smooth transition into new AI-enabled roles.
- Legislative Actions for Workforce Support:
    - Effective policies should focus on ensuring equitable access to education, training, and AI-related workforce protections (e.g., *Sultana et al., 2024; Krstic, 2024*).

2. Lifelong Learning and Digital Literacy Policies

- Inclusive Education and Training Programs:
    - *Neupane (2023)* suggests that national-level training programs and ethical AI guidelines for public officials are crucial for helping the workforce transition to an AI-integrated economy. Lifelong learning initiatives must ensure continuous adaptability to technological advancements.
- Enhancing AI Regulations and Infrastructure:
    - The *Digital Media Foundation Nepal (2024)* emphasizes the government's role in developing digital infrastructure and reforming outdated policies to create an environment conducive to AI adoption.
- Investing in Workforce Adaptability:
    - Governments should invest in proactive reskilling programs and education reforms to ensure the workforce remains competitive (e.g., *Soueidan & Shoghari, 2024; Kanagarla Krishna Prasanth Brahmaji, 2024*).

3. AI Governance and Ethical Considerations

- Developing Inclusive AI Policy Frameworks:
    - The *AI for Good Global Summit (2023)* calls for responsible AI frameworks to ensure equitable access and contribute to the *Sustainable Development Goals (SDGs)*, particularly for underserved populations.
- Balancing Innovation with Ethics and Fairness:
    - *Aamresh & Preethi (2021)* advocate for AI regulations that promote innovation while ensuring fairness, accountability, and the protection of democratic values.
- Regulatory Measures for Worker Protection:
    - Strong policy interventions are needed to establish ethical AI standards that safeguard workers (e.g., *Krstic, 2024; Zivko Krstic, 2024*).
- Addressing Ethical and Regulatory Challenges:



- *Madancian et al. (2024)* and *Saverkin (2024)* stress the need for governments to balance technological advancements with ethical concerns, such as worker safety, privacy, and data security.

4. Supporting Job Transitions and Economic Adaptability

- Bridging the Digital Divide and Promoting Lifelong Learning:
  - The *World Economic Forum (2024)* and the *Broadband Commission (ITU, UNESCO)* emphasize government policies aimed at enhancing digital literacy and workforce adaptability in an AI-driven economy.
- Government-Industry Collaboration for Skill Development:
  - *Rossomakha et al. (2024), Vivek et al. (2024), and Tashenov (2024)* highlight the importance of collaboration between governments, educational institutions, and industry stakeholders to create strategic AI workforce policies and reskilling programs.
- Proactive Government Interventions:
  - *Du (2024)* and *Tashenov (2024)* argue for policies such as universal basic income, AI-driven worker retraining, and expanded education investments to mitigate the effects of job displacement.
- Social Security and Employment Support:
  - *Lin (2024), Melemuku (2023), and Du (2024)* advocate for AI-aligned social security policies that ensure economic stability during workforce transitions.
- Policy Frameworks for Just Transitions:
  - *Dogra et al. (2024) and Goudira (2024)* recommend governments develop policies to manage challenges like technostress and economic equity, ensuring a fair transition for workers in AI-integrated industries.

3.2.5 Providing Actionable Recommendations for Policymakers, Educators, and Industry Leaders to Develop Inclusive Reskilling Initiatives and AI-Aligned Strategies

1. Reskilling and Inclusive Strategies

- Human-Centric Approach to AI Adoption:
  - The *Digital Media Foundation Nepal (2024)* report advocates for a human-centric approach to AI, ensuring that AI augments human labor rather than

replaces it. Policymakers and industry leaders should focus on strategies that enhance workers' skills and adaptability to AI-driven transformations.

- Inclusive Reskilling Programs for Vulnerable Groups:
    - The *World Bank's Jobs Diagnostic (Bulmer et al.)* highlights the need for targeted reskilling and upskilling initiatives for marginalized communities, such as women and rural workers. Government-supported programs should facilitate smooth workforce transitions into AI-integrated roles.
- Targeted Reskilling for Sectors Facing Automation:
    - Focused reskilling efforts should be implemented in sectors at high risk of AI-driven job displacement (e.g., *Hussain, 2024; Sultana et al., 2024*).
- Collaboration Between Key Stakeholders:
    - Effective reskilling strategies require joint efforts from governments, educators, and industry leaders to ensure a workforce equipped for future AI demands (e.g., *Harsh Mishra, 2024; Soueidan & Shoghari, 2024*).

2. Collaborative Leadership in AI Adoption

- Multi-Sector Collaboration for AI Implementation:
    - The *Digital Media Foundation Nepal (2024)* underscores the importance of government institutions, universities, and the private sector working together to develop infrastructure and workforce skills necessary for AI adoption.
- Investment in Digital Infrastructure and Skill Development:
    - *Neupane (2023)* calls for stronger investments in both digital infrastructure and workforce skill development, ensuring AI integration in key sectors such as public services.
- Fostering Government-Industry-Academia Partnerships:
    - Governments must work alongside businesses and educational institutions to align reskilling initiatives with industry needs (e.g., *Rossomakha et al., 2024; Kumar & Das, 2024*).

3. Policy Recommendations for Inclusive Reskilling

- Designing Inclusive AI Reskilling Programs:
    - The *World Economic Forum (2024)* and the *AI for Good Global Summit (2023)* advocate for collaboration between employers, governments, and educators to create reskilling initiatives that cater to diverse workforces, considering age, gender, and cultural backgrounds.
- Balancing Technological Growth with Inclusion:

    - AI-driven economic growth should promote inclusive outcomes for all societal groups, preventing further digital divides (e.g., *Jacob, 2024; Soueidan & Shoghari, 2024*).
- Ensuring Ethical and Responsible AI Use:
    - AI governance frameworks must ensure that AI technologies are applied equitably and do not exacerbate existing social inequalities (e.g., *Weng et al., 2024; Tairov et al., 2024*).

4. Promoting Lifelong Learning and Workforce Adaptability

- Embedding Lifelong Learning in AI Strategies:
    - *Akhmad Farhan (2023), Yihang Liang (2024), and Babashahi et al. (2024)* emphasize the importance of continuous skill development programs to equip workers with the necessary AI competencies.
- AI Awareness and Professional Development:
    - *Goudira (2024)* recommends that professionals enhance their understanding of AI tools for career advancement, while *Vivek et al. (2024)* call for interdisciplinary research and robust AI governance.
- Reforming Educational Systems for AI Integration:
    - *Tashenov (2024), Bansal (2024), and Du (2024)* suggest embedding AI-related topics into educational curricula and vocational training to prepare future workforces for AI-aligned roles.

5. Strategies for Bridging the Digital Divide

- Addressing the AI Gender Gap and Regional Disparities:
    - The *Broadband Commission (ITU, UNESCO)* stresses the importance of policies that close the digital divide, particularly ensuring that rural communities and women benefit from AI advancements.
- Equitable Access to AI Benefits Through Digital Infrastructure:
    - *Yadav & Shrawankar (2024)* propose government investments in digital infrastructure and AI-focused reskilling initiatives to support small businesses and underserved communities.

6. Human-AI Synergy in Workforce Development

- Ensuring AI Complements, Rather Than Replaces, Human Labor:
    - *Kumar & Das (2024), Saverkin (2024), and Melemuku (2023)* emphasize strategies that integrate AI as a collaborative tool rather than a replacement for

human jobs. Policymakers should prioritize frameworks that promote a balanced human-AI work environment.

3.3 Structured Survey

3.3.1 Key Findings and Recommendations

3.3.1.1 Industry Value Chains: Effects of AI and Obstacles to Adoption

Key Findings:

- **Most Affected Sectors:** The sectors most affected by AI advancements in Nepal include **public administration and defense**, **education**, **healthcare**, **manufacturing**, and **financial services**. These sectors are increasingly adopting AI for tasks such as customer service, finance/accounting, IT support, and supply chain management.
- **AI Technologies:** The most disruptive AI technologies identified include **Machine Learning (ML)**, **Natural Language Processing (NLP)**, **Chatbots and Virtual Assistants**, **Robotics**, and **Autonomous Systems** (e.g., drones, self-driving vehicles).
- **Obstacles to AI Adoption:** The primary barriers to AI adoption in Nepal are:
    - **Lack of skilled workforce**: Many organizations report a shortage of employees with the necessary technical skills to implement and manage AI systems.
    - **High cost of implementation**: The financial burden of adopting AI technologies is a significant barrier, especially for small and medium-sized enterprises (SMEs).
    - **Insufficient digital infrastructure**: Limited access to modern AI tools and technologies hinders AI integration.
    - **Resistance to change**: Both employees and management often resist adopting AI due to fear of job displacement and lack of understanding of AI benefits.
    - **Regulatory challenges**: The absence of clear AI policies and regulatory frameworks creates uncertainty for businesses.

Recommendations:

- **Investment in Digital Infrastructure:** The government and private sector should invest in improving digital infrastructure to support AI adoption, including high-speed internet and cloud computing resources.

- **Public-Private Partnerships:** Encourage collaborations between the government, private sector, and educational institutions to fund AI research and development, particularly in high-impact sectors like healthcare and education.
- **AI Awareness Campaigns:** Conduct awareness campaigns to educate businesses and the public about the benefits of AI, addressing fears and misconceptions.
- **Regulatory Frameworks:** Develop clear and supportive AI policies and regulations to provide a stable environment for AI adoption, ensuring ethical use and data privacy.

3.3.1.2 Job Displacement: Sectors at Risk and Changing Job Functions

Key Findings:

- **Sectors at Risk:** The sectors most at risk of job displacement due to automation include **manufacturing**, **customer service**, **finance/accounting**, and **IT support**. These sectors are increasingly automating repetitive tasks, leading to potential job losses.
- **Changing Job Functions:** While some jobs may be displaced, new roles are emerging in AI-related fields such as **data science**, **AI system management**, and **AI ethics and governance**. There is a growing demand for roles that require **AI integration**, **data analysis**, and **AI-driven decision-making**.
- **Job Creation:** Despite concerns about job displacement, many respondents believe AI will create new job opportunities, particularly in **AI development**, **AI maintenance**, and **AI-driven innovation**.

Recommendations:

- **Reskilling and Upskilling Programs:** Implement targeted reskilling and upskilling programs to help workers transition from at-risk roles to emerging AI-related positions. Focus on skills such as **data analysis**, **machine learning**, and **AI system management**.
- **Job Transition Support:** Provide support for workers transitioning to new roles, including career counseling, job placement services, and financial assistance for retraining.
- **AI-Driven Job Creation:** Encourage the development of new industries and job roles that leverage AI, such as **AI-driven healthcare diagnostics**, **autonomous vehicle management**, and **AI-based financial services**.

3.3.1.3 Reskilling Needs: Essential Skills and Closing Skill Gaps

Key Findings:

- **Essential Skills:** The most critical skills for AI-related roles include **data science**, **machine learning**, **AI ethics and governance**, **programming**, and **AI system integration**. There is also a need for **soft skills** such as **critical thinking**, **problem-solving**, and **adaptability**.
- **Skill Gaps:** The primary skill gaps identified are in **technical expertise** (e.g., data science, machine learning) and **industry-specific AI applications**. Many organizations report a lack of employees with the necessary skills to implement and manage AI systems.
- **Educational Gaps:** Current educational curricula in Nepal are not fully integrated with AI education, leading to a mismatch between the skills taught and the skills needed in the workforce.

Recommendations:

- **Curriculum Integration:** Integrate AI education into school and university curricula, focusing on **AI fundamentals**, **machine learning**, and **data science**. Collaborate with international institutions to develop a national AI curriculum framework.
- **Faculty Development:** Provide faculty development programs to upskill educators in AI-related subjects, ensuring they can effectively teach the next generation of AI professionals.
- **Industry Collaboration:** Foster partnerships between educational institutions and industry leaders to provide students with hands-on experience through internships, project opportunities, and industry-led training programs.
- **Lifelong Learning:** Promote lifelong learning initiatives, offering online courses, workshops, and certifications in AI-related fields to help workers continuously update their skills.

3.3.1.4 Social and Economic Impacts: Inequality and Income Distribution

Key Findings:

- **Income Inequality:** There is a concern that AI adoption could exacerbate income inequality, as higher-skilled workers in AI-related fields may benefit more than those in low-skilled, at-risk jobs.
- **Regional Disparities:** AI adoption is more prevalent in urban areas, leading to potential regional disparities in economic growth and job opportunities. Rural areas may lag behind due to limited access to digital infrastructure and AI education.
- **Economic Productivity:** AI has the potential to significantly boost economic productivity and efficiency, particularly in sectors like **manufacturing**, **healthcare**, and **finance**. However, the benefits may not be evenly distributed across all regions and sectors.

Recommendations:

- **Inclusive AI Policies:** Develop policies that ensure the benefits of AI are distributed equitably across all regions and sectors. Focus on providing support to rural areas, including investments in digital infrastructure and AI education.
- **Social Safety Nets:** Strengthen social safety nets to support workers displaced by AI, including unemployment benefits, retraining programs, and financial assistance for transitioning to new roles.
- **Regional Development Initiatives:** Launch regional development initiatives to promote AI adoption in rural areas, including funding for AI startups, digital literacy programs, and partnerships with local businesses.

3.3.1.5 Policy Recommendations: Ethical AI and Workforce Transformation

Key Findings:

- **Ethical AI:** Respondents emphasized the importance of ethical AI practices, including **transparency**, **accountability**, and **data privacy**. There is a need for clear guidelines on the ethical use of AI, particularly in sensitive sectors like healthcare and finance.
- **Workforce Transformation:** The government should play a key role in facilitating workforce transformation by providing **financial incentives** for reskilling, **developing AI-related policies**, and **collaborating with educational institutions** to update curricula.

- **Regulatory Frameworks:** There is a strong demand for regulatory frameworks that support AI adoption while safeguarding jobs and ensuring ethical use. Respondents called for policies that promote **AI innovation** while protecting vulnerable sectors.

Recommendations:

- **Ethical AI Guidelines:** Develop and enforce ethical AI guidelines to ensure transparency, accountability, and data privacy in AI systems. Establish oversight bodies to monitor AI practices and address ethical concerns.
- **Government-Led Training Programs:** Establish government-led training programs to reskill and upskill workers, particularly in at-risk sectors. Provide financial incentives for private organizations to participate in these programs.
- **AI Innovation Hubs:** Create dedicated AI innovation hubs or centers of excellence to foster AI research, development, and innovation. These hubs should focus on high-impact sectors and provide resources for startups and SMEs.
- **Public Awareness Campaigns:** Launch public awareness campaigns to educate the workforce about the benefits of AI and the importance of reskilling. Address fears and misconceptions about AI-driven job displacement.

3.3.2 Conclusion

The survey data highlights both the opportunities and challenges presented by AI in Nepal. While AI has the potential to drive economic growth, improve productivity, and create new job opportunities, it also poses risks of job displacement and increased inequality. To harness the benefits of AI, Nepal must invest in digital infrastructure, reskilling programs, and ethical AI policies. By fostering collaboration between the government, private sector, and educational institutions, Nepal can create a resilient and inclusive AI-driven economy.

3.4 Key Informant Interviews (KIIs) with AI Stakeholders

3.4.1 Key Findings and Recommendations

3.4.1.1 Industry Value Chains: Effects of AI and Obstacles to Adoption

Key Findings:

- **Sectors Most Affected by AI:** The sectors most impacted by AI advancements in Nepal include **financial and insurance activities**, **education**, **manufacturing**, **information and communication**, and **public administration**. These sectors are exploring or partially adopting AI

technologies such as **machine learning**, **natural language processing (NLP)**, and **generative AI**.

- **Obstacles to AI Adoption:** The primary challenges include **high implementation costs**, **lack of technical expertise**, **ethical concerns**, **data privacy and security risks**, and **resistance to change** from employees. Additionally, there is a **lack of regulatory clarity** and **limited availability of high-quality data**.
- **New Growth Areas:** AI is expected to drive growth in areas such as **process automation**, **predictive maintenance**, **quality control**, **customer engagement**, and **advanced analytics**. These areas are seen as having the most potential for AI integration.

Recommendations:

- **Investment in AI Infrastructure:** Encourage both public and private sectors to invest in AI infrastructure, including **digital platforms**, **data collection systems**, and **cloud computing**.
- **Capacity Building:** Develop **training programs** and **workshops** to build technical expertise in AI technologies across industries.
- **Regulatory Frameworks:** Establish clear **AI policies** and **ethical guidelines** to address concerns around data privacy, security, and bias in AI systems.

3.4.1.2 Job Displacement: Sectors at Risk and Changing Job Functions

Key Findings:

- **Sectors at Risk:** Sectors such as **manufacturing**, **administrative and support services**, and **financial services** are at higher risk of job displacement due to automation of repetitive tasks and operational processes.
- **Job Function Changes:** While some roles may be displaced, AI is also expected to **create new job roles** that require **higher technical skills**, such as **data analysts**, **AI specialists**, and **machine learning engineers**. There will also be a shift towards **greater collaboration between humans and AI systems**.

- **Impact on Workforce:** The workforce will need to adapt to new roles, with an increased demand for **reskilling** and **upskilling** in areas such as **programming**, **data analytics**, and **AI literacy**.

Recommendations:

- **Reskilling Programs:** Implement **reskilling initiatives** to help employees transition to new roles. Focus on **technical skills** (e.g., programming, data analytics) and **soft skills** (e.g., creativity, communication).
- **Job Transition Support:** Provide **workforce transition support programs** to assist employees in adapting to new job roles created by AI.
- **Public-Private Partnerships:** Encourage collaboration between **educational institutions**, **industry leaders**, and **government agencies** to develop **tailored training programs** that address the specific needs of different sectors.

3.4.1.3 Reskilling Needs: Essential Skills and Closing Skill Gaps

Key Findings:

- **Critical Skills for AI Roles:** The most critical skills for AI-related roles include **programming and data analytics**, **creativity and innovation**, **communication and collaboration**, and **domain-specific technical expertise**.
- **Skill Gaps:** There is a significant gap in **AI literacy** among employees and leadership, as well as a lack of **technical expertise** in AI technologies. Many organizations are offering **on-the-job training**, **online courses**, and **workshops** to address these gaps.
- **Training Programs:** Organizations are increasingly investing in **partnerships with academic institutions** and **online learning platforms** to provide **AI-related training** to their workforce.

Recommendations:

- **AI Literacy Programs:** Launch **AI literacy campaigns** to educate employees and leadership about the benefits and challenges of AI.
- **Upskilling Initiatives:** Develop **upskilling programs** that focus on **AI technologies**, **data-driven decision-making**, and **advanced analytics**.
- **Collaboration with Academia:** Strengthen partnerships with **universities** and **technical institutes** to integrate AI-related courses into their curricula.

3.4.1.4 Social and Economic Impacts: Inequality and Income Distribution

Key Findings:

- **Income Distribution:** AI adoption could lead to **income inequality** if not managed properly, as higher-skilled workers may benefit more from AI-driven opportunities.
- **Regional Inequality:** There is a risk of **regional inequality**, as urban areas with better infrastructure and access to technology may adopt AI faster than rural areas.
- **Economic Productivity:** AI has the potential to significantly boost **economic productivity** and **efficiency** across industries, particularly in **manufacturing**, **finance**, and **healthcare**.

Recommendations:

- **Inclusive AI Policies:** Develop **inclusive AI policies** that ensure equitable access to AI technologies across different regions and sectors.
- **Support for Rural Areas:** Provide **financial incentives** and **technical support** to rural areas to encourage AI adoption and reduce regional disparities.
- **Social Safety Nets:** Implement **social safety nets** to support workers who may be displaced by AI, including **unemployment benefits** and **retraining programs**.

3.4.1.5 Policy Recommendations:

Key Findings:

- **Government Role:** The government plays a crucial role in facilitating AI adoption through **policy formulation**, **financial incentives**, and **infrastructure development**.
- **Ethical AI Frameworks:** There is a need for **ethical AI frameworks** to address concerns around **bias**, **privacy**, and **security** in AI systems.
- **Public-Private Collaboration:** Collaboration between **government**, **industry**, and **academia** is essential for creating a **sustainable AI ecosystem** in Nepal.

Recommendations:

- **National AI Policy:** Formulate a **national AI policy** that outlines the government's vision for AI adoption, including **ethical guidelines**, **data privacy laws**, and **workforce transition support**.

- **Financial Incentives:** Provide **tax incentives** and **subsidies** for businesses that invest in AI technologies and workforce reskilling.
- **AI Research and Development:** Invest in **AI research and development** to foster innovation and create new opportunities for economic growth.
- **Ethical AI Standards:** Develop **ethical AI standards** to ensure that AI technologies are used responsibly and do not exacerbate social inequalities.

3.4.2 Conclusion

The KII data highlights the transformative potential of AI across various sectors in Nepal, while also underscoring the challenges related to **job displacement**, **skill gaps**, and **regional inequality**. To harness the benefits of AI, it is crucial for **policymakers**, **industry leaders**, and **educators** to work together to create **inclusive reskilling initiatives**, **ethical AI frameworks**, and **supportive policies** that ensure a smooth transition to an AI-driven economy. By addressing these challenges proactively, Nepal can position itself as a leader in AI adoption while ensuring that the benefits are shared equitably across society.

3.5 KII with Government Agencies

3.5.1 Key Findings and Recommendations

3.5.1.1 Industry Value Chains:

Key Findings:

- **Current Level of AI Adoption:** AI adoption in Nepal is still at a **very early stage** across most industries, with only a few sectors showing **moderate advancement** in AI integration. The government acknowledges that AI adoption is limited and primarily driven by **awareness programs** and **workshops**.
- **Policies and Regulatory Frameworks:** There are **no existing policies** or **regulatory frameworks** specifically for AI adoption in Nepal. However, the **Ministry of Communication and Information Technology (MOCIT)** is in the process of preparing an **AI policy** and **concept paper** to guide AI adoption.
- **Challenges in AI Regulation:** Key challenges include a **lack of technical expertise** in AI regulation, **ethical concerns** (e.g., AI bias), **limited public**

awareness of AI risks, and **difficulty in tracking AI's real-time usage and impact**.

Recommendations:

- **Accelerate AI Policy Development:** The government should expedite the development and implementation of a **national AI policy** to provide clear guidelines for AI adoption across industries.
- **Public Awareness Campaigns:** Launch **public awareness campaigns** to educate industries and the general public about the benefits and risks of AI.
- **Technical Expertise Development:** Invest in building **technical expertise** within government agencies to effectively regulate AI technologies and address ethical concerns.

3.5.1.2 Job Displacement:

Key Findings:

- **Workforce Reskilling and Job Transitions:** The government plans to support industries in adapting to AI by fostering **partnerships between educational institutions and industries**. However, current efforts are limited to **awareness programs** and **workshops**, with no concrete plans for **reskilling** or **job transition support**.
- **Challenges in Workforce Adaptation:** There is a significant **lack of technical expertise** and **public awareness** regarding AI, which could hinder workforce adaptation to AI-driven changes.

Recommendations:

- **Reskilling Initiatives:** Develop **comprehensive reskilling programs** in collaboration with **educational institutions** and **industry leaders** to prepare the workforce for AI-driven job transitions.
- **Job Transition Support:** Establish **workforce transition support programs** to assist employees in adapting to new roles created by AI, particularly in sectors at risk of job displacement.
- **Public-Private Partnerships:** Encourage **public-private partnerships** to create **tailored training programs** that address the specific needs of different industries.

3.5.1.3 Reskilling Needs:

Key Findings:

- **Current Efforts:** The government is focusing on **awareness programs** and **workshops** to address AI-related skill gaps. However, there are no **structured reskilling initiatives** in place.
- **Challenges in Reskilling:** The lack of **technical expertise** and **public awareness** about AI poses significant challenges to reskilling efforts.

Recommendations:

- **AI Literacy Programs:** Launch **AI literacy programs** to educate employees and leadership about AI technologies and their implications.
- **Upskilling Initiatives:** Develop **upskilling programs** that focus on **AI technologies**, **data-driven decision-making**, and **advanced analytics**.
- **Collaboration with Academia:** Strengthen partnerships with **universities** and **technical institutes** to integrate AI-related courses into their curricula.

3.5.1.4 Social and Economic Impacts:

Key Findings:

- **Economic Productivity:** AI has the potential to significantly boost **economic productivity** and **efficiency** across industries, but its adoption is still in the early stages.
- **Regional Inequality:** There is a risk of **regional inequality**, as urban areas with better infrastructure and access to technology may adopt AI faster than rural areas.
- **Ethical Concerns:** Ethical concerns, such as **AI bias** and **data privacy**, are significant challenges that need to be addressed to ensure equitable AI adoption.

Recommendations:

- **Inclusive AI Policies:** Develop **inclusive AI policies** that ensure equitable access to AI technologies across different regions and sectors.
- **Support for Rural Areas:** Provide **financial incentives** and **technical support** to rural areas to encourage AI adoption and reduce regional disparities.
- **Ethical AI Frameworks:** Establish **ethical AI frameworks** to address concerns around **bias**, **privacy**, and **security** in AI systems.

3.5.1.5 Policy Recommendations:

Key Findings:

- **Government Role:** The government plays a crucial role in facilitating AI adoption through **policy formulation**, **financial incentives**, and **infrastructure development**. However, current efforts are limited, and there are **no existing policies** or **regulatory frameworks** for AI.
- **Incentives for AI Adoption:** The government is considering **innovation grants** for AI-driven startups and **tax relief** for AI development and adoption. However, no **financial incentives** have been implemented yet.

Recommendations:

- **National AI Policy:** Formulate a **national AI policy** that outlines the government's vision for AI adoption, including **ethical guidelines**, **data privacy laws**, and **workforce transition support**.
- **Financial Incentives:** Provide **tax incentives** and **subsidies** for businesses that invest in AI technologies and workforce reskilling.
- **AI Research and Development:** Invest in **AI research and development** to foster innovation and create new opportunities for economic growth.
- **Ethical AI Standards:** Develop **ethical AI standards** to ensure that AI technologies are used responsibly and do not exacerbate social inequalities.

3.5.2 Conclusion

The KII government data highlights the **early stage** of AI adoption in Nepal and the **lack of structured policies** and **regulatory frameworks** to guide AI integration. To harness the benefits of AI, it is crucial for the government to **accelerate policy development**, **invest in reskilling initiatives**, and **address ethical concerns**. By fostering **public-private partnerships** and providing **financial incentives**, Nepal can create a **sustainable AI ecosystem** that drives economic growth while ensuring equitable access and workforce adaptation.

3.6 Key Findings from Focus Group Discussions (FGDs)

3.6.1 Mapping AI's Impact in Nepal: Insights from the Focus Group Discussion

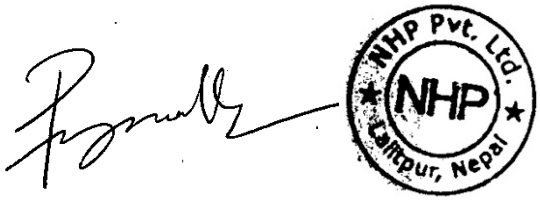
1. Identifying Vulnerable Sectors and Opportunities for AI-Driven Growth

- Sectors at Risk of Job Displacement:

    - Back-office roles, content writing, and data entry have already faced significant workforce reductions due to AI automation.
    - IT service exports, particularly in outsourcing and repetitive tasks, face the risk of losing nearly 50% of jobs due to AI-driven automation.
- Emerging Opportunities in AI-Driven Industries:
    - **AI-Augmented Roles:** Growth in prompt engineering, AI tool management, and AI-supported creativity (e.g., product development, AI-powered customer service).
    - **AI for Local and Global Markets:** Leveraging pre-built AI models from global firms (e.g., OpenAI) to develop innovative Nepali products and services.
    - **No-Code and Low-Code AI Tools:** Democratising AI development for broader participation and market accessibility.

2. Assessing Labor Market Demands and Proposing Strategies for Talent Development
- Shift in Skill Demand:
    - Increasing demand for **coding, problem-solving, and programming** across all industries.
    - Decline in demand for **hardcore programming**; rise in importance of **soft skills** like analytical thinking, communication, and deal-closing abilities.
- Urgency for Skilling, Reskilling, and Upskilling:
    - Need for **structured training programs** on AI tools and applications to enhance employability.
    - Focus on **AI literacy** in both technical and non-technical domains for diverse workforce adaptation.
    - Industry collaboration to integrate **practical AI exposure** into education and professional training.
- Educational Reforms to Address AI Needs:
    - Integration of **AI-focused curricula** in all education levels, emphasizing mathematics, data analysis, and critical thinking.
    - Project-based learning and stronger **academia-industry collaboration** to ensure education aligns with real-world AI applications.

3. Analyzing AI's Impact on Productivity, Efficiency, and Innovation in Key Industries
- AI as a Productivity Enhancer:
    - AI is driving efficiency in content generation, data management, and back-office automation.



- Adoption of **AI-powered analytics** is improving business decision-making and operational efficiency.

- AI for Innovation and Competitive Advantage:
  - AI is fostering innovation through new product development and service optimization.
  - Companies are increasingly integrating AI-driven solutions in **healthcare, finance, education, and customer service**.
  - Growing AI-driven **startups and entrepreneurship ecosystems** focused on local and international markets.
- Balancing Job Displacement with New AI-Driven Roles:
  - While AI eliminates certain repetitive tasks, it also creates new employment opportunities in AI governance, model training, and system management.
  - Encouraging domestic **IT consumption** and AI-powered service adoption to reduce dependency on outsourcing.

4. Exploring the Role of Government Policies in Supporting Workforce Transitions

- AI Policy Development and Regulatory Framework:
  - The Nepalese government is finalizing an **AI policy**, which must translate into concrete regulations for implementation.
  - Addressing issues like data sharing regulations, workforce protection, and AI ethics in policy formulation.
- Government's Role in Reskilling Initiatives:
  - Investing in **AI training programs** and funding skill development initiatives.
  - Establishing **public-private partnerships** for AI knowledge transfer and workforce transition strategies.
- Reforming Labor Laws for the AI Era:
  - Current labor laws do not address **worker rights and job security** in the face of AI-driven disruptions.
  - Urgent need for social security provisions and income inequality mitigation measures.
- Investment in AI Infrastructure:
  - **Government-backed AI R&D** initiatives to support innovation and technology-driven economic growth.
  - Creating a regulatory framework for **emerging AI technologies**, including data mining and cryptocurrency mining.

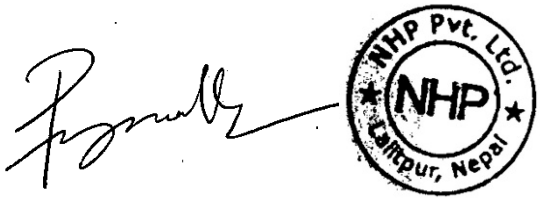
5. Providing Actionable Recommendations for Policymakers, Educators, and Industry Leaders to Develop Inclusive Reskilling Initiatives and AI-Aligned Strategies

- Policy Recommendations for Inclusive Reskilling:
    - Collaboration between **government, industry, and academia** to design inclusive AI reskilling programs.
    - Targeted reskilling for workers displaced by automation, ensuring equitable AI transition policies.
- Promoting AI Awareness and Professional Development:
    - Raising AI awareness among professionals to **ensure responsible and ethical AI use** in Nepal's workforce.
    - Encouraging interdisciplinary research and AI governance frameworks for **ethical AI adoption**.
- Bridging the Digital Divide in AI Adoption:
    - Ensuring AI training opportunities reach **rural and underrepresented groups**.
    - Promoting **AI-driven solutions in Nepali language and context** to enhance accessibility and local adoption.
- Human-Centered AI Adoption:
    - Encouraging **AI-human collaboration rather than AI replacement**, fostering a balanced approach to automation.
    - Maintaining focus on **ethical AI development**, addressing bias, misinformation, and social fairness concerns.

3.6.2 Conclusion

The Focus Group Discussion emphasized that while AI presents challenges such as job displacement and shifting skill demands, it also offers **unprecedented opportunities** for economic growth, innovation, and skill enhancement. However, **strategic policy interventions, government support, and collaborative leadership** are necessary to ensure that Nepal effectively navigates this transition.

By focusing on inclusive AI policies, reskilling initiatives, ethical AI practices, and investment in AI infrastructure, Nepal can harness AI's potential while ensuring equitable workforce development in the digital era.



4. Conclusion and Recommendations

4.1 Introduction

The rapid advancement of Artificial Intelligence (AI) is reshaping industry value chains, workforce dynamics, and economic structures globally, and Nepal is no exception. This study has examined AI's transformative impact on Nepal's industries, focusing on job displacement, job creation, and the evolving demand for skills. It has also explored the role of government policies, industry adaptation, and educational initiatives in ensuring a smooth transition to an AI-driven economy.

This chapter synthesizes the findings from the study on the effects of AI on industry value chains, job replacement, and reskilling in Nepal. The study aimed to provide a comprehensive understanding of how AI is reshaping Nepal's economy, workforce, and industries, while offering actionable recommendations for policymakers, educators, and industry leaders. The findings from the **desk review**, **surveys**, **key informant interviews (KIIs)**, and **focus group discussions (FGDs)** have highlighted both the opportunities and challenges posed by AI adoption in Nepal. These findings provide a comprehensive picture of how AI is affecting various economic sectors, altering employment patterns, and creating new opportunities for innovation and efficiency.

Based on these conclusions, the chapter offers strategic recommendations for policymakers, industry leaders, educators, and other stakeholders. These recommendations aim to:

- **Identify and support industries most impacted by AI-driven disruptions and automation**, while fostering new areas of growth.
- **Develop workforce reskilling strategies** to equip Nepal's labor market with AI-relevant skills.
- **Propose policy and regulatory measures** to ensure a balanced AI adoption that safeguards employment and economic stability.
- **Highlight economic opportunities enabled by AI**, promoting innovation, productivity, and industrial competitiveness.
- **Suggest education and training reforms** that align Nepal's workforce development with AI's evolving demands.

By addressing these objectives, this chapter seeks to ensure that Nepal can harness the benefits of AI while mitigating its risks. The recommendations provided here are designed to guide Nepal's transition into an AI-driven economy, fostering inclusive growth, workforce adaptability, and sustainable industrial development.

4.2 Key Findings and Recommendations

4.2.1 Sector-Specific Impact Analysis

Key Findings:

- **Sectors Most Affected by AI:** The study identified that sectors such as **public administration and defense**, **education**, **healthcare**, **manufacturing**, and **financial services** are the most impacted by AI advancements. These sectors are increasingly adopting AI technologies like **machine learning (ML)**, **natural language processing (NLP)**, and **robotics** to enhance efficiency and productivity.
- **Job Displacement Risks:** Sectors with high routine tasks, such as **manufacturing**, **customer service**, and **finance/accounting**, are at higher risk of job displacement due to automation. However, new roles are emerging in **AI development**, **data science**, and **AI ethics**, creating opportunities for workforce transformation.
- **Growth Opportunities:** AI presents significant growth opportunities in sectors like **healthcare**, **education**, and **public services**, where AI can improve service delivery, enhance decision-making, and drive innovation.

Recommendations:

- **Sector-Specific AI Strategies:** Develop tailored AI strategies for high-impact sectors such as healthcare, education, and manufacturing. Focus on leveraging AI for productivity gains while addressing job displacement risks through reskilling programs.
- **Investment in AI Infrastructure:** Encourage both public and private sectors to invest in AI infrastructure, including high-speed internet, cloud computing, and data collection systems, to support AI adoption across industries.
- **AI-Driven Innovation Hubs:** Establish AI innovation hubs to foster research and development in key sectors, promoting collaboration between academia, industry, and government.

4.2.2 Workforce Reskilling Strategies

Key Findings:

- **Skill Gaps:** The study revealed significant skill gaps in **technical expertise** (e.g., data science, machine learning) and **industry-specific AI applications**. Many organizations lack employees with the necessary skills to implement and manage AI systems.
- **Reskilling Needs:** There is an urgent need for **reskilling** and **upskilling** programs to help workers transition from at-risk roles to emerging AI-related positions. Critical skills include **data analysis**, **machine learning**, **AI ethics**, and **soft skills** like **critical thinking** and **adaptability**.
- **Educational Gaps:** Current educational curricula in Nepal are not fully integrated with AI education, leading to a mismatch between the skills taught and the skills needed in the workforce.

Recommendations:

- **Curriculum Integration:** Integrate AI education into school and university curricula, focusing on **AI fundamentals**, **machine learning**, and **data science**. Collaborate with international institutions to develop a national AI curriculum framework.
- **Reskilling and Upskilling Programs:** Implement targeted reskilling and upskilling programs to help workers transition to new roles. Focus on technical skills (e.g., programming, data analytics) and soft skills (e.g., creativity, communication).
- **Lifelong Learning Initiatives:** Promote lifelong learning initiatives, offering online courses, workshops, and certifications in AI-related fields to help workers continuously update their skills.

4.2.3 Policy and Regulatory Recommendations

Key Findings:

- **Lack of AI Policies:** Nepal currently lacks a comprehensive AI policy or regulatory framework, creating uncertainty for businesses and hindering AI adoption.
- **Regulatory Clarity and Flexibility:** AI regulations must provide clear legal responsibilities, safety standards, and intellectual property rights while remaining flexible to accommodate rapid technological advancements.
- **Ethical Concerns:** Respondents emphasized the importance of ethical AI practices, including transparency, accountability, and data privacy. There is a need for clear

guidelines on the ethical use of AI, particularly in sensitive sectors like healthcare and finance.

- **Workforce Transition Support:** The government plays a crucial role in facilitating workforce transition by providing financial incentives for reskilling, developing AI-related policies, and collaborating with educational institutions to update curricula.
- **Public-Private Partnerships:** Collaboration between government agencies, industry leaders, and academia is essential to accelerate AI adoption and ensure inclusive development.
- **AI Infrastructure Deficiency:** The lack of AI research facilities, cloud computing infrastructure, and data centers hinders AI innovation and deployment.
- **Incentives for AI Adoption:** Businesses and startups face challenges in accessing financial support for AI integration, limiting their ability to adopt and scale AI solutions.

Recommendations:

1. National AI Policy:
    - **Develop a Comprehensive AI Policy:** Formulate a national AI policy that outlines the government's vision for AI adoption, including ethical guidelines, data privacy laws, and workforce transition support. This policy should align with international best practices while being tailored to Nepal's socio-economic context.
    - **Regulatory Clarity and Flexibility:** Ensure that regulations governing AI use provide clarity on legal responsibilities, safety standards, and intellectual property rights related to AI technologies. These regulations must remain flexible to accommodate rapid technological advancements and the unique needs of Nepal's industries.
    - **Public Consultation and Stakeholder Involvement:** The development of AI policies should include consultations with a wide range of stakeholders, including government agencies, industry leaders, academia, civil society, and the public. This inclusive approach will ensure that AI policies are well-informed, broadly supported, and responsive to diverse needs and concerns.
2. Ethical AI Frameworks:
    - **Establish Ethical Guidelines:** Develop and enforce ethical AI guidelines to ensure transparency, accountability, and data privacy in AI systems. These

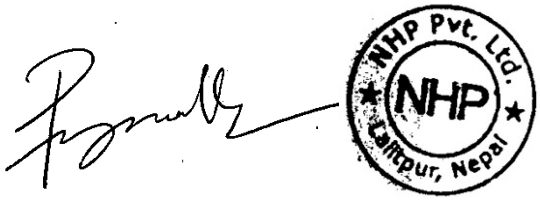
guidelines should emphasize responsible AI design, ensuring that AI systems are fair, non-discriminatory, and serve the public interest.

- **Address Algorithmic Bias:** Promote research into methods for detecting and mitigating algorithmic biases that may arise in AI systems. Ensure that AI models are trained on diverse datasets and do not perpetuate discrimination against vulnerable populations.
- **AI Governance Framework:** Establish a national AI governance framework to oversee the ethical development and deployment of AI systems. A dedicated body should monitor AI practices, address ethical concerns, and ensure compliance with established guidelines.

3. AI Infrastructure Development:
    - **Investment in AI Research Labs:** Promote the establishment of AI research labs, innovation hubs, and centers of excellence in partnership with universities and private sector organizations. These labs can serve as incubators for AI-related innovation and foster collaboration between academia, industry, and the government.
    - **Data Centers and Cloud Infrastructure:** Encourage the development of advanced data centers and cloud computing infrastructure to support AI data processing needs. Incentivize investments in high-performance computing facilities, which will be critical for AI model development and deployment.
    - **Smart Cities and AI in Infrastructure:** Integrate AI technologies into smart city initiatives, such as using AI for traffic management, energy optimization, and public services. This will not only improve urban efficiency but also demonstrate the practical benefits of AI to the general public.
4. Public-Private Partnerships:
    - **Collaborative Research and Development:** Encourage joint R&D projects between the public sector, private companies, and academic institutions. These partnerships can pool resources, knowledge, and expertise to address challenges in AI research, development, and application.
    - **Innovation Incubators and Startups:** Provide government incentives to foster the growth of AI-focused startups and small businesses. This can include the creation of innovation incubators, accelerators, and funding programs that support AI entrepreneurs and facilitate the commercialization of AI solutions.

- **Government Procurement for AI Solutions:** Adopt a proactive approach by being an early adopter of AI technologies in public service delivery. Incorporate AI-based solutions for healthcare, education, transportation, and public safety to showcase the benefits of AI and set an example for the private sector.

5. Incentives for AI Adoption:
    - **Tax Incentives:** Introduce tax breaks or reduced rates for businesses investing in AI technologies and research. This could include exemptions or deductions for R&D expenses related to AI development, as well as reduced taxes for businesses deploying AI solutions in their operations.
    - **Subsidies and Grants:** Offer targeted subsidies and grants to companies, particularly small and medium-sized enterprises (SMEs), that are incorporating AI into their processes. These financial incentives can help reduce the initial costs associated with AI adoption, such as the purchase of AI technologies, training of personnel, or upgrading infrastructure.
    - **Public Financing for AI Projects:** Establish funding mechanisms, such as low-interest loans or venture capital funds, for AI-related projects to help businesses access the financial resources needed for the development and deployment of AI solutions.
6. Workforce Transformation Support:
    - **National Reskilling Initiatives:** Launch national reskilling and upskilling programs that focus on training workers in AI-relevant skills. Partner with educational institutions, industry leaders, and vocational training centers to develop curricula and certification programs that align with AI industry needs.
    - **Funding for Training Programs:** Allocate public funding to support AI-focused training programs for the existing workforce. Provide financial support to companies that offer on-the-job training for their employees in AI-related fields to help workers adapt to new roles and responsibilities created by AI integration.
    - **AI Skill Certification Programs:** Establish AI-related skill certification programs to help individuals demonstrate their competence in areas such as machine learning, data analytics, and AI programming. These programs can provide workers with recognized credentials, increasing their employability in AI-driven industries.



- **Government-Backed Reskilling Platforms:** Create online platforms or digital portals that offer free or subsidized AI courses, enabling workers to gain the skills needed for new roles in AI-driven industries. Ensure these platforms are accessible to all demographics, including those in rural and underserved areas.

7. Data Privacy and Ethical Guidelines:
    - **Data Privacy Laws:** Introduce robust data privacy laws that protect citizens' personal data from misuse in AI systems. These laws should regulate how data is collected, stored, processed, and shared, ensuring that businesses comply with ethical standards and citizens' rights are safeguarded.
    - **AI Transparency and Accountability:** Mandate transparency in AI algorithms, ensuring that AI systems are explainable and auditable. This will help build trust in AI technologies and ensure that decisions made by AI systems are understandable and justifiable.
    - **Ethical Guidelines for AI Developers:** Establish ethical guidelines for AI developers that emphasize responsible AI design, including ensuring that AI systems are fair, non-discriminatory, and serve the public interest. These guidelines should be developed in consultation with relevant stakeholders, including AI practitioners, ethicists, and policy experts.

4.2.4 Economic Growth Opportunities

Key Findings:

- **Productivity Gains:** AI has the potential to significantly boost economic productivity and efficiency across industries, particularly in **manufacturing**, **healthcare**, and **finance**. However, the benefits may not be evenly distributed across all regions and sectors.
- **Regional Disparities:** AI adoption is more prevalent in urban areas, leading to potential regional disparities in economic growth and job opportunities. Rural areas may lag behind due to limited access to digital infrastructure and AI education.
- **Innovation and Competitiveness:** AI fosters innovation through new product development and service optimization, creating opportunities for businesses to gain a competitive advantage.

Recommendations:

- **Inclusive AI Policies:** Develop policies that ensure the benefits of AI are distributed equitably across all regions and sectors. Focus on providing support to rural areas, including investments in digital infrastructure and AI education.
- **Regional Development Initiatives:** Launch regional development initiatives to promote AI adoption in rural areas, including funding for AI startups, digital literacy programs, and partnerships with local businesses.
- **AI-Driven Economic Growth Models:** Encourage industries to capitalize on AI advancements by adopting AI-driven business models that enhance productivity, innovation, and competitiveness.

4.2.5 AI-Driven Education and Training Programs

Key Findings:

- **Educational Reforms:** There is a need for educational reforms to integrate AI-related topics into school and university curricula. Focus on **AI fundamentals**, **machine learning**, and **data science** to prepare students for AI-driven roles.
- **Industry Collaboration:** Collaboration between educational institutions and industry leaders is essential to provide students with hands-on experience through internships, project opportunities, and industry-led training programs.
- **AI Literacy:** Increasing AI literacy among employees and leadership is critical to ensure that the workforce can adapt to AI-driven changes.

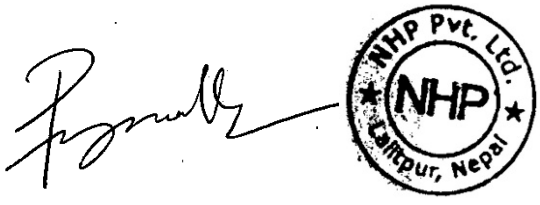
Recommendations:

- **AI-Focused Curricula:** Integrate AI-focused curricula in all education levels, emphasizing mathematics, data analysis, and critical thinking. Collaborate with international institutions to develop a national AI curriculum framework.
- **Faculty Development:** Provide faculty development programs to upskill educators in AI-related subjects, ensuring they can effectively teach the next generation of AI professionals.
- **Industry-Academia Partnerships:** Foster partnerships between educational institutions and industry leaders to provide students with hands-on experience through internships, project opportunities, and industry-led training programs.

4.2.6 Trade Union Perspective

Key Findings

1. Impact on Jobs and Employment Security
    - AI-driven automation is expected to replace certain low-skilled and repetitive jobs, raising concerns about job losses and economic displacement, particularly in sectors like manufacturing, customer service, and administrative work.
    - Workers in traditional industries are at risk of being left behind due to a lack of AI-related skills, exacerbating income inequality and widening the digital divide.
    - The lack of clear labor policies addressing AI-induced workforce changes creates uncertainty for employees regarding job security and career growth opportunities.
2. Need for Workforce Reskilling and Upskilling
    - The majority of the workforce in Nepal lacks formal AI training or digital literacy, making them vulnerable to technological disruptions.
    - Existing vocational training programs are not aligned with AI-driven industry needs, leading to a mismatch between the skills workers possess and those required in an AI-driven job market.
    - Trade unions and labor organizations have not been systematically included in discussions on AI policy, limiting their ability to advocate for worker protections effectively.
3. Workplace Rights, Fair Wages, and Working Conditions
    - AI-enabled performance monitoring and automated decision-making systems pose risks to worker privacy, workplace rights, and fair treatment.
    - There is growing concern about algorithmic bias in hiring, promotion, and compensation decisions, which could reinforce workplace inequalities.
    - AI-driven gig economy platforms have increased job opportunities but lack sufficient labor protections, leaving workers vulnerable to wage exploitation, job insecurity, and unfair working conditions.
4. Collective Bargaining and Labor Representation
    - The rise of AI and automation has reduced workers' bargaining power, as employers increasingly rely on digital tools and automation for decision-making.
    - Existing labor laws do not explicitly address AI-related employment issues, such as job displacement, algorithmic bias, and the right to collective bargaining in AI-driven workplaces.



- The role of trade unions in shaping AI-related policies and advocating for workers' rights is currently limited, making it difficult to ensure fair outcomes in AI integration.

5. Ethical AI Use and Worker Protection

- AI deployment in the workplace lacks transparency, making it difficult for workers to understand how decisions are made regarding hiring, promotions, and performance evaluation.
- The absence of strict AI governance frameworks increases the risk of worker surveillance, exploitation, and discrimination.
- There is limited awareness among workers about their rights concerning AI use in workplaces, highlighting the need for stronger advocacy and legal protections.

Recommendations

1. National AI Policy with a Worker-Centric Approach

- The government should develop a national AI policy that explicitly considers labor rights, job security, and fair working conditions.
- AI-related labor policies should be designed with active participation from trade unions and workers' representatives to ensure inclusive and fair outcomes.
- The policy should mandate ethical AI use in workplaces, ensuring that AI systems do not exploit or discriminate against workers.

2. AI-Driven Workforce Reskilling and Upskilling Programs

- Establish nationwide AI-focused reskilling and upskilling programs in collaboration with trade unions, vocational institutions, and industry leaders.
- The government should provide financial incentives (such as subsidies, grants, and tax breaks) to companies that invest in workforce training and AI literacy programs.
- AI-focused training should be made accessible to workers from all backgrounds, including those in rural and marginalized communities.

3. Stronger Labor Protections for AI-Affected Workers

- Update labor laws to ensure AI does not undermine fair wages, worker rights, and job security.
- Implement regulatory safeguards against AI-driven workplace surveillance, ensuring workers' privacy and dignity are respected.
- Mandate algorithmic transparency in AI-driven hiring, performance evaluation, and wage determination to prevent bias and discrimination.

4. Inclusion of Trade Unions in AI Governance and Policy-Making

- Trade unions must be included in AI policy discussions at the national level to ensure worker perspectives are represented.
- Create a dedicated AI-Labor Task Force that includes government officials, trade union representatives, and industry leaders to monitor the impact of AI on employment.
- Promote collective bargaining rights in AI-driven workplaces, ensuring that workers have a voice in shaping workplace AI policies.

5. Ethical AI Implementation and Workplace Transparency

- Establish clear ethical guidelines for AI use in workplaces, ensuring transparency in AI-driven decision-making processes.
- Require companies to disclose how AI impacts employment decisions and ensure workers have a mechanism to challenge AI-based decisions affecting their careers.
- Enforce strict penalties for companies that use AI unethically or in ways that violate labor rights.

4.3 Conclusion

The study highlights both the transformative potential and the challenges of AI adoption in Nepal. While AI offers significant opportunities for economic growth, productivity gains, and innovation, it also poses risks of job displacement, skill gaps, and regional inequality. The findings from the desk review, surveys, key informant interviews (KIIs), and focus group discussions (FGDs) underscore the urgent need for a comprehensive and inclusive approach to AI integration in Nepal. To harness the benefits of AI, Nepal must invest in **digital infrastructure**, **reskilling programs**, and **ethical AI policies**. By fostering collaboration between the government, private sector, and educational institutions, Nepal can create a resilient and inclusive AI-driven economy that ensures equitable access to AI technologies and supports workforce adaptation.

The recommendations outlined in this chapter provide a comprehensive roadmap for Nepal to develop a robust regulatory and policy framework for AI adoption. By addressing the lack of AI policies, ethical concerns, infrastructure gaps, and workforce transformation needs, Nepal can create an enabling environment for AI integration. These measures will not only foster innovation and economic growth but also ensure that the benefits of AI are equitably distributed across society. Through **public-private partnerships**, **targeted incentives**, and **inclusive**

policy-making, Nepal can position itself as a leader in responsible AI adoption while safeguarding the interests of its workforce and citizens.

The study has also emphasized the importance of **ethical AI frameworks**, **data privacy laws**, and **transparency in AI systems** to build public trust and ensure that AI technologies are used responsibly. By addressing algorithmic bias, promoting AI literacy, and establishing oversight bodies, Nepal can mitigate the risks associated with AI and ensure that its adoption aligns with societal values and ethical standards.

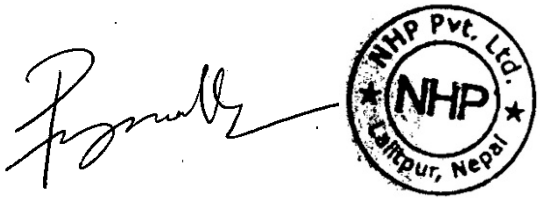
Furthermore, the study highlights the critical role of **education and training reforms** in preparing Nepal's workforce for the AI-driven economy. By integrating AI-related topics into school and university curricula, promoting lifelong learning initiatives, and fostering industry-academia partnerships, Nepal can bridge the skill gaps and create a continuous pipeline of skilled professionals. These efforts will not only enhance workforce adaptability but also drive innovation and competitiveness across key industries.

In conclusion, the findings and recommendations presented in this study provide a clear pathway for Nepal to navigate the challenges and opportunities presented by AI. By implementing these strategies, Nepal can position itself as a leader in AI adoption while ensuring that the benefits are shared equitably across society. The proactive measures outlined in this chapter—ranging from policy development and infrastructure investment to workforce reskilling and ethical AI practices—will enable Nepal to harness the full potential of AI, driving sustainable economic growth and inclusive development in the digital era.

References

- Zirar, A., Ali, S. I., & Islam, N. (2023). Worker and workplace Artificial Intelligence (AI) coexistence: Emerging themes and research agenda. Technovation, 124, 102747. https://doi.org/10.1016/j.technovation.2023.102747
- OECD. (2024). Who Will Be the Workers Most Affected by AI? A Closer Look at the Impact of AI on Women, Low-Skilled Workers, and Other Groups. OECD Artificial Intelligence Papers, (26), October 2024.
- OECD. (2024). Measuring the demand for AI skills in the United Kingdom. OECD Artificial Intelligence Papers, No. 25.
- Huang, Y. (2024). The labor market impact of artificial intelligence: Evidence from US regions (IMF Working Paper No. WP/24/199). International Monetary Fund.
- Arntz, M., Gregory, T., & Zierahn, U. (2016). The risk of automation for jobs in OECD countries: A comparative analysis (OECD Social, Employment and Migration Working Papers No. 189). OECD Publishing. https://dx.doi.org/10.1787/5jlz9h56dvq7-en
- International Organisation of Employers. (2024). The impact of AI on work and employment. IOE Policy Review.
- Milanez, A. (2023). The impact of AI on the workplace: Evidence from OECD case studies of AI implementation (OECD Social, Employment and Migration Working Papers No. 289). OECD Publishing. https://dx.doi.org/10.1787/2247ce58-en
- OECD. (2024). What impact has AI had on wage inequality? OECD Publishing.
- OECD. (2024). How is AI changing the way workers perform their jobs and the skills they require? OECD Publishing.
- OECD. (2024). Algorithm and Eve: How AI will impact women at work [Policy Brief]. OECD Publishing.
- Pasricha, M., Thakur, V., & Ghosh, D. (2024). The future of work, artificial intelligence, and digital government: Policy perspectives for Asia (ADBI Policy Brief No. 2024-20). Asian Development Bank Institute.
- OECD. (2024). Artificial intelligence and the health workforce: Perspectives from medical associations on AI in health (OECD Artificial Intelligence Papers No. 28). OECD Publishing.
- Halal, W., Kolber, J., & Davies, O. (2016). Forecasts of AI and future jobs in 2030: Muddling through likely, with two alternative scenarios. Journal of Futures Studies, 21(2), 83-96. https://doi.org/10.6531/JFS.2016.21(2).R83

- Bodea, C. N., Paparic, M., Mogoș, R. I., & Dascălu, M. I. (2024). Artificial intelligence adoption in the workplace and its impact on the upskilling and reskilling strategies. Amfiteatru Economic, 26(65), 126-144.
- Deloitte. (2024). Talent and workforce effects in the age of AI: Insights from Deloitte's State of AI in the Enterprise, 2nd Edition survey. Deloitte Insights.
- "Reference:
- ICT Foundation Nepal. (2024). HARMONIZING DIGITALIZATION & DEVELOPMENT. Digital Nepal Conclave 2024 Event Report."
- Frey, C. B., & Osborne, M. A. (2013). The future of employment: How susceptible are jobs to computerisation? Oxford Martin Programme on Technology and Employment Working Paper
- IBM Corporation. (2024). AI in Action 2024 think report. IBM Corporation.
- Morandini, S., Fraboni, F., De Angelis, M., Puzzo, G., Giusino, D., & Pietrantoni, L. (2023). The impact of artificial intelligence on workers' skills: Upskilling and reskilling in organisations. Informing Science: The International Journal of an Emerging Transdiscipline, 26, 039-068. https://doi.org/10.28945/5078
- Danish Trade Union Development Agency. (2023). Nepal Labour Market Profile 2022/2023. Copenhagen: DTDA.
- Ruppert Bulmer, E., Shrestha, A., & Marshalian, M. (2024). Jobs diagnostic Nepal (Jobs Series Issue No. 2). World Bank Group.
- Digital Media Foundation Nepal. (2024). Harnessing the potential of AI: Its impact on media, public service, and governance. National Summit on Artificial Intelligence 2024 Summit Report.
- National Statistics Office. (2024). Nepal Living Standards Survey IV 2022/23 Statistical Report. Government of Nepal.
- Gelal, P. R. (2022). A descriptive study on youth and the Nepalese labour market. The Batuk: A Peer Reviewed Journal of Interdisciplinary Studies, 8(1), 82-95. https://doi.org/10.3126/batuk.v8i1.43510
- Benhamou, S. (2020). Artificial intelligence and the future of work. Revue d'économie industrielle, 169(1). https://doi.org/10.4000/rei.8727
- Neupane, A. (2023). Transformation of public service: Rise of technology, AI and automation. Prashasan, 55(2), 42-52. https://doi.org/10.3126/prashasan.v55i2.63538



- International Telecommunication Union. (2024). United Nations Activities on Artificial Intelligence (AI) 2023. ITU Publications.
- International Telecommunication Union (ITU). (2023). AI for Good Global Summit 2023 Snapshot Report.
- Aamresh, Preethi. (2021). The Future is Here: The Emergence of Artificial Intelligence in Governance. NIICE Special Report 1008, Kathmandu: Nepal Institute for International Cooperation and Engagement.
- "Reference:
- Broadband Commission for Sustainable Development. (2024). The State of Broadband 2024: Leveraging AI for Universal Connectivity (Part One). International Telecommunication Union and United Nations Educational, Scientific and Cultural Organization."
- Morandini, Sofia & Fraboni, Federico & De Angelis, Marco & Puzzo, Gabriele & Giusino, Davide & Pietrantoni, Luca. (2023). The Impact of Artificial Intelligence on Workers' Skills: Upskilling and Reskilling in Organisations. Informing Science, 26, 39-68. https://doi.org/10.28945/5078.
- Bessen, James. (2018). AI and Jobs: The Role of Demand. NBER Working Paper No. 24235. National Bureau of Economic Research. http://www.nber.org/papers/w24235.
- Campbell, D., Slany, A., & Khare, S. (n.d.). Employment-led Growth in Nepal. International Labour Office.
- International Labour Organization. (2020). COVID-19 Labour Market Impact in Nepal. International Labour Organization, Switzerland.
- World Economic Forum. (2024). Unlocking Opportunity: A Global Framework for Enabling Transitions to the Jobs of Tomorrow. White Paper, September 2024.
- World Economic Forum. (2020). The Future of Jobs Report 2020. World Economic Forum, October 2020.
- Chui, M., Manyika, J., & Miremadi, M. (2016). Where machines could replace humans—and where they can't (yet). McKinsey Quarterly, July 2016. Retrieved from McKinsey.com.
- Fan, X. (2024). Artificial Intelligence's Impact on Employment: Challenges, Potential Consumers, and Policy Responses Through Automation and Workforce Rehabilitating. Lecture Notes in Education Psychology and Public Media, 73(1), 21-26. https://doi.org/10.54254/2753-7048/73/20241040

- Kapri Uttam(2022), AI, the Global 4th Industrial System and Nepali Labour Future?. American Journal of IR 4.0 and Beyond, 1(1), 1-8. 10.54536/ajirb.v1i1.1021
- Shi, W. (2024). Artificial Intelligence and Economic Dynamics: Shaping the Future of Industries and Markets. *Communications of International Proceedings*, (forthcoming). https://doi.org/10.5171/2024.4326724
- "Meng, Z. (2024). The Role of AI in Transforming Local Economies: Exploring How AI Technologies Are Impacting Local Businesses and Labor Markets. *Applied and Computational Engineering, 108*(1), 1-6. https://doi.org/10.54254/2755-2721/108/2025ld0053
- high-quality jobs in emerging fields related to AI."
- Yuan, C., Tang, J., Cao, Y., Wei, T. Z., & Shen, W. (2024). The Impact of Artificial Intelligence on Economic Development: A Systematic Review. 1(1), 130-143. https://doi.org/10.70693/itphss.v1i1.57
- Yadav, U., & Shrawankar, U. (2024). Artificial Intelligence Across Industries. In Advances in educational marketing, administration, and leadership book series (pp. 275-320). doi:10.4018/979-8-3693-5443-8.ch010
- Sultana, Fozia & Talpur, Urooj & Iqbal, Muhammad & Ali, Ahmed & Memon, Khalid. (2024). The Macroeconomic Implications of Automation and AI on Labor Markets and Employment. The Critical Review of Social Sciences Studies. 2. 497-507. 10.59075/f9hdkk61.
- Jacob, A. A. (2024). Exploring the multifaceted impact of artificial intelligence: A comprehensive study. Recent Trends in Management and Commerce, 5(2), 83-86. https://doi.org/10.46632/rmc/5/2/18
- Weng, Y., Wu, J., Kelly, T., & Johnson, W. (2024). Comprehensive Overview of Artificial Intelligence Applications in Modern Industries. Preprints, 202409.1638.v1. https://doi.org/10.20944/preprints202409.1638.v1
- Song, Qingshuang. (2024). Multiple Impacts of Artificial Intelligence on Occupations and Labor Markets. Academic Journal of Management and Social Sciences. 8. 107-111. 10.54097/7t0k2573.
- Kalukuri, P. N., Jain, P., Thakre, N., Dubey, A., & Awasthi, C. (2024). A comprehensive literature review on AI and its impact on business value. *International Journal of Innovative Research in Science, Engineering and Technology, 13*(06), 1-14. https://doi.org/10.15680/ijirset.2024.1306279

- Zhang, H. (2024). Economic Impacts of Generative Artificial Intelligence: A Comprehensive Review of the Literature. *International Business & Economics Studies, 6*(5), 69. https://doi.org/10.22158/ibes.v6n5p69
- Krstic, Z. (2024). Economic Theory and Artificial Intelligence: A Cross-model Perspective on Labour Market Dynamics. *Croatian Regional Development Journal*, (issue number), (page range). https://doi.org/10.2478/crdj-2024-0008
- Adhikari, P. (2024). Comprehensive View on the Effect of Artificial Intelligence and Employment. *Contemporary Social Science*, (forthcoming). https://doi.org/10.62047/css.2024.03.31.91
- Mishra, H. (2024). The changing landscape of employment: The impact of artificial intelligence and robotics. *International Journal for Science Technology and Engineering, 12*(6), 776-785. https://doi.org/10.22214/ijraset.2024.63220
- Tairov, I., Стефанова, Н.А., Aleksandrova, A., & Aleksandrov, M. (2024). Review of AI-Driven Solutions in Business Value and Operational Efficiency. Економіка, екологія, соціум, 8(3), 55-66. https://doi.org/10.61954/2616-7107/2024.8.3-5
- Masood, F. (2024). The Role of AI in Shaping the Future of Labor Markets: A Comparative Analysis of Developed vs. Emerging Economies. *International Journal of Emerging Multidisciplinaries: Social Science, 3*(1), [pages not specified]. https://doi.org/10.54938/ijemdss.2024.03.1.346
- Hussain, M. A. (2024). The impact of artificial intelligence on workforce automation and skill development. *Journal of Artificial Intelligence, Machine Learning and Neural Network, 44*(1), 11-21. https://doi.org/10.55529/jaimlnn.44.11.21
- Soueidan, M. H., & Shoghari, R. (2024). The Impact of Artificial Intelligence on Job Loss: Risks for Governments. Technium Social Sciences Journal, 57(1), 10.47577/tssj.v57i1.10917.
- Lodhi, S. K., Gill, A. Y., & Hussain, I. (2024). AI-powered innovations in contemporary manufacturing procedures: An extensive analysis. *International Journal of Multidisciplinary Sciences and Arts, 3*(4), 15-25. https://doi.org/10.47709/ijmdsa.v3i4.4616
- Kanagarla, K. K. P., & Brahmaji, A. I. (2024). Artificial Intelligence and Employment Transformation: A Multi-Sector Analysis of Workforce Disruption and Adaptation. *International Journal of Scientific Research in Computer Science, Engineering and

Information Technology*, (issue number), (page range). https://doi.org/10.32628/cseit24106170

- Aini, Q., Rusilowati, U., Asfi, M., Sunarya, P. A., Putra, S. N. W., & Az Zahra, A. R. (2024). Assessing the Influence of Artificial Intelligence on Human Resource Management Practices. 1-6. https://doi.org/10.1109/iccit62134.2024.10701158
- Kalukuri, P. N., Jain, P., Thakre, N., Dubey, A., & Awasthi, C. (2023). A comprehensive literature review on AI and its impact on business value. *International Journal of Innovative Research in Computer and Communication Engineering, 12*(06), 9096-9100. https://doi.org/10.15680/ijircce.2024.1206105
- Pokamestov, I. E., & Nikitin, N. A. (2024). Modern Artificial Intelligence Technologies as a Tool of Transformation of Value Chains of Russian Commercial Banks. Finansy: teoriâ i praktika, 28(4), 122-135. https://doi.org/10.26794/2587-5671-2024-28-4-122-135
- Tabbassum, A., Chintale, P., Praveen, G., & Najana, M. (2024). The Impact of AI on Future Employment Patterns. Journal of Emerging Technologies and Employment Studies, (Issue Number), (Page Range). https://doi.org/10.21428/e90189c8.e99f270c
- Jadhav, R., & Banubakode, A. (2024). The Implications of Artificial Intelligence on the Employment Sector. International Journal For Multidisciplinary Research, 6(3). https://doi.org/10.36948/ijfmr.2024.v06i03.22716
- Vyshnavi, A., Agarwal, T., Choudhry, P., Gv, A., M, D., Hegde, S. R., & Kothari, R. (2024). A Study on Impact of Artificial Intelligence on Employment in the Next Decade. *International Journal For Multidisciplinary Research*, 6(2), 1-15. https://doi.org/10.36948/ijfmr.2024.v06i02.16283
- Jaleel, Mohammed & Kurbonnazarovich, Khannaev. (2024). Assessing the Potential Impact of AI and Automation on Employment, Productivity, And Economic Growth. 10.20944/preprints202411.0875.v1.
- Tripathi, M. (2024). The impact of artificial intelligence on employment. *International Scientific Journal of Engineering and Management, 3*(3), 1-9. https://doi.org/10.55041/isjem01393
- Pritchard Aldurae Rascheed Waite, Esmeralda Camile Camile Ortiz Torres, & Hamed Taherdoost. (2024). The impact of AI integration on business processes over the next five years. In *Advances in Business Strategy and Competitive Advantage* (pp. 77-102). IGI Global. https://doi.org/10.4018/979-8-3693-3759-2.ch004

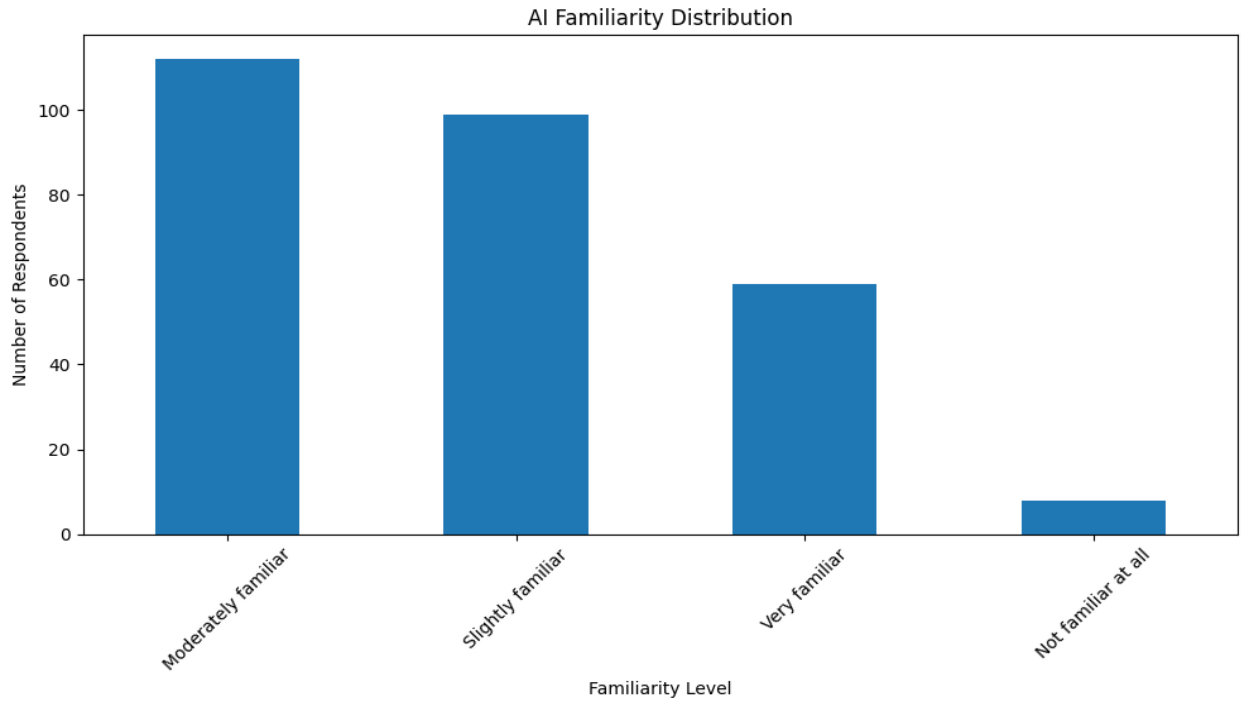
- Philip, D., D'Souza, A. T., & Xavier, R. (2023). The Implications of AI Dominance in the Workforce: A Comprehensive Analysis. *International Journal For Multidisciplinary Research*, 5(5), 1-15. https://doi.org/10.36948/ijfmr.2023.v05i05.7607
- Goudira, E. (2024). How AI Impacts Marketing and Business Jobs and Decision-Making Processes in the Leading AI Economy and in a Technostress Environment. In *Advances in Marketing, Customer Relationship Management, and E-Services* (pp. 228-248). IGI Global. https://doi.org/10.4018/979-8-3693-2754-8.ch012
- V. Vivek, V. Gambhir, and A. Gill, "Understanding the Societal Impacts of Artificial Intelligence and Machine Learning on Employment and Workforce Dynamics," in *Proceedings of the 2024 International Conference on Advances in Computing, Robotics, and Systems Engineering Technology (ACROSET)*, 2024, pp. 1-6. doi: 10.1109/ACROSET62108.2024.10743405.
- "Revolutionizing industries: the impact of artificial intelligence applications," CONFERENCE PROCEEDING, 2024, [Online]. Available: https://api.semanticscholar.org/CorpusID:270041312
- Babashahi, L., Barbosa, C. E., Lima, Y., Lyra, A., dos Santos, H. S., Argôlo, M., de Almeida, M. A., & de Souza, J. M. (2024). AI in the workplace: A systematic review of skill transformation in the industry. *Administrative Sciences, 14*(6), 127-127. https://doi.org/10.3390/admsci14060127
- Farhan, A. (2023). The impact of artificial intelligence on human workers. *Journal of Communication Education, 17*(2), [page range]. https://doi.org/10.58217/joce-ip.v17i2.350
- Liang, Y. (2024). The Impact of Artificial Intelligence on Employment and Income Distribution. *Journal of Education, Humanities and Social Sciences*, (issue number), (page range). https://doi.org/10.54097/2a7a8830
- Dogra, S., Rana, G., & Sharma, I. (2024). The Impact of Robot and AI on Human Workforce. *Indian Scientific Journal Of Research In Engineering And Management, 08*(09), 1-6. https://doi.org/10.55041/ijsrem37548
- Rossomakha, I., Kyrylenko, O. N., & Borysiuk, A. (2024). The impact of artificial intelligence on the labor market in the world and particularly in Ukraine. *Ekonomìka, finansi, pravo*, (2), 6. https://doi.org/10.37634/efp.2024.2.6

- Saverkin, O.V. (2024). Can Artificial Intelligence Replace Humans in Industry? [Journal Name], 10, 14-17. https://doi.org/10.33920/pro-01-2410-02
- Tashenov, A. (2024). The impact of automation and artificial intelligence on the international labor market in the context of digitalization. Московский экономический журнал, (9), 7-325. https://doi.org/10.55186/2413046x_2024_9_7_325
- Liu, J. (2024). The Impact of the Development of Artificial Intelligence on Unemployment Rates. *Advances in Economics, Management and Political Sciences, 121*(1), 154-163. https://doi.org/10.54254/2754-1169/121/20242410
- Lin, S.-S. (2024). Research on the Employment Effect and Influence Mechanism of Artificial Intelligence. *Academic Journal of Science and Technology, 10*(1), 89-96. https://doi.org/10.54097/mwvj2f56
- Melemuku, S. A. (2023). *Artificial Intelligence and the Associated Threats on the Human Workforce*. Retrieved from https://doi.org/10.31219/osf.io/amnyq
- Mitra Madancian, Hamed Taherdoost, Maassoumeh Javadi, Inam Ullah Khan, Alaeddin Kalantari, Dinesh Kumar. (2024). The Impact of Artificial Intelligence on Supply Chain Management in Modern Business. In Proceedings of the International Conference on Advanced Technologies and Innovations (pp. 566-573). Springer. https://doi.org/10.1007/978-3-031-48573-2_82
- Nnadozie, C. E. (2024). The impact of artificial intelligence on the global workforce. *International Journal of Science and Research*, (forthcoming). https://doi.org/10.21275/mr24206150601
- Du, J. (2024). The Impact of Artificial Intelligence Adoption on Employee Unemployment: A Multifaceted Relationship. International Journal of Social Sciences and Policy Analysis, 2(3), Article 45. https://doi.org/10.62051/ijsspa.v2n3.45
- Bansal, A. (2024). The Impact of Artificial Intelligence on the Labor Market in the Finance and Manufacturing Industry. International Journal of Social Science and Economic Research, 09(09), 3394-3441. https://doi.org/10.46609/ijsser.2024.v09i09.015
- Kumar, K. Y., & Das, V. T. (2024). Role of artificial intelligence in enhancing productivity & human-machine integration-industry 5.0 – An empirical analysis. EPRA International Journal of Economics, Business and Management, 1-9. https://doi.org/10.36713/epra17635

Annex- 1 Survey Questionnaire and Responses

1. How familiar are you with Artificial Intelligence?

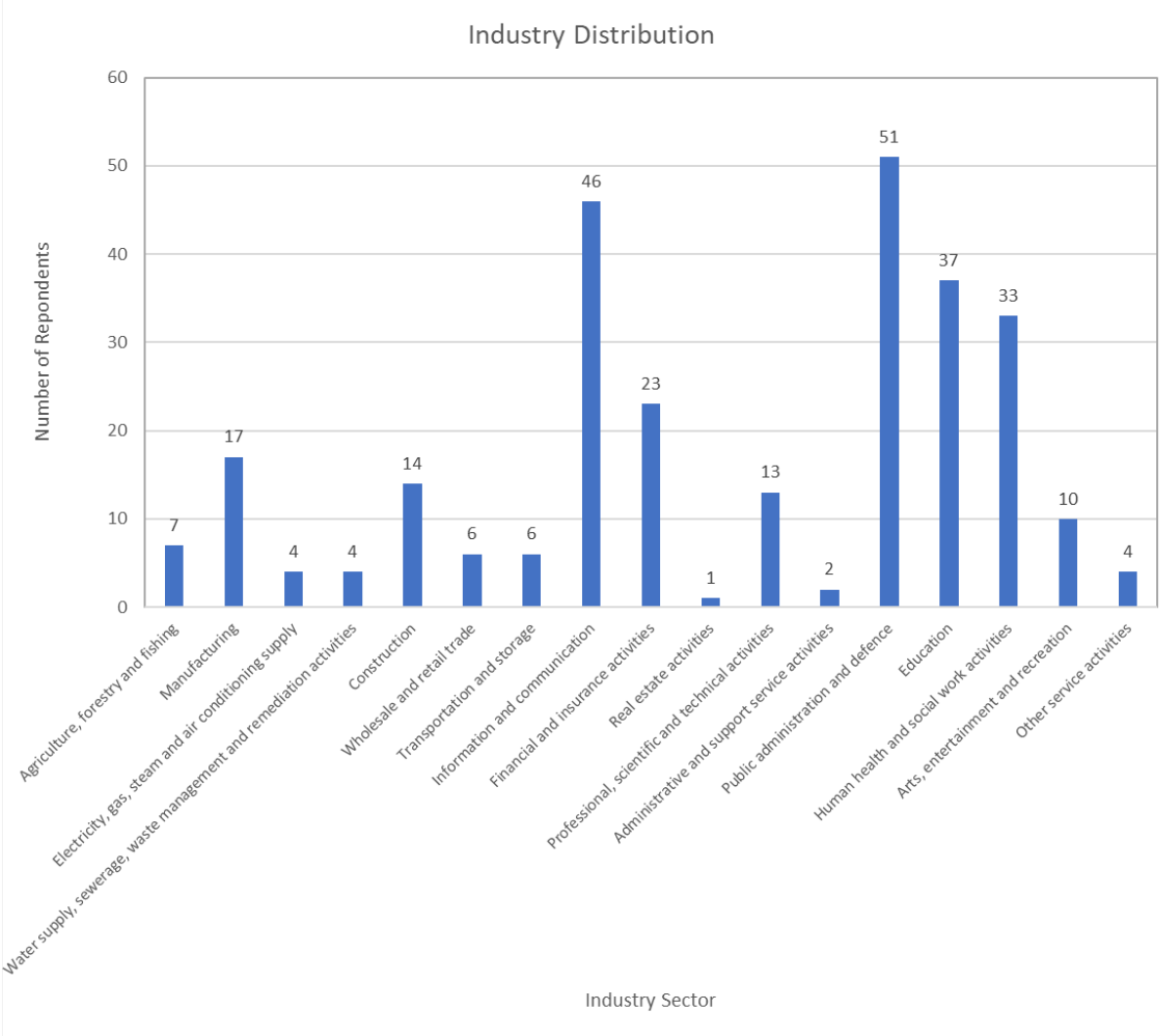
- Moderately Familiar : 112
- Slightly Familiar : 99
- Very Familiar: 59
- Not familiar at all :8



2. Which industry do you currently work in? (Multiple Choice)

- Agriculture, forestry and fishing: 7
- Manufacturing: 17
- Electricity, gas, steam and air conditioning supply: 4
- Water supply, sewerage, waste management and remediation activities: 4
- Construction: 14
- Wholesale and retail trade: 6
- Transportation and storage: 6
- Information and communication: 46
- Financial and insurance activities: 23
- Real estate activities: 1
- Professional, scientific and technical activities: 13

- Administrative and support service activities: 2
- Public administration and defence: 51
- Education: 37
- Human health and social work activities: 33
- Arts, entertainment and recreation: 10
- Other service activities: 4



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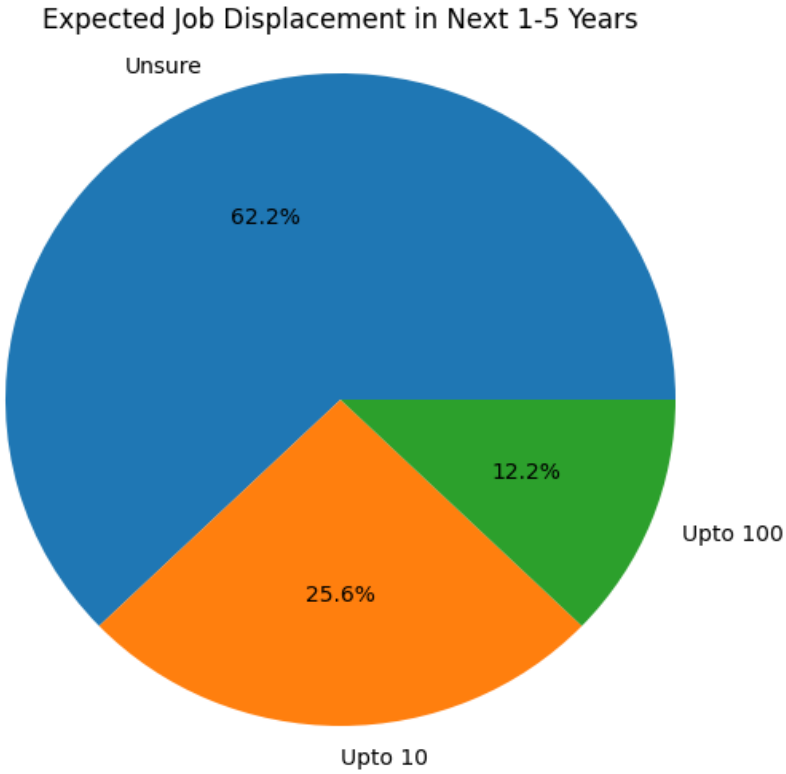
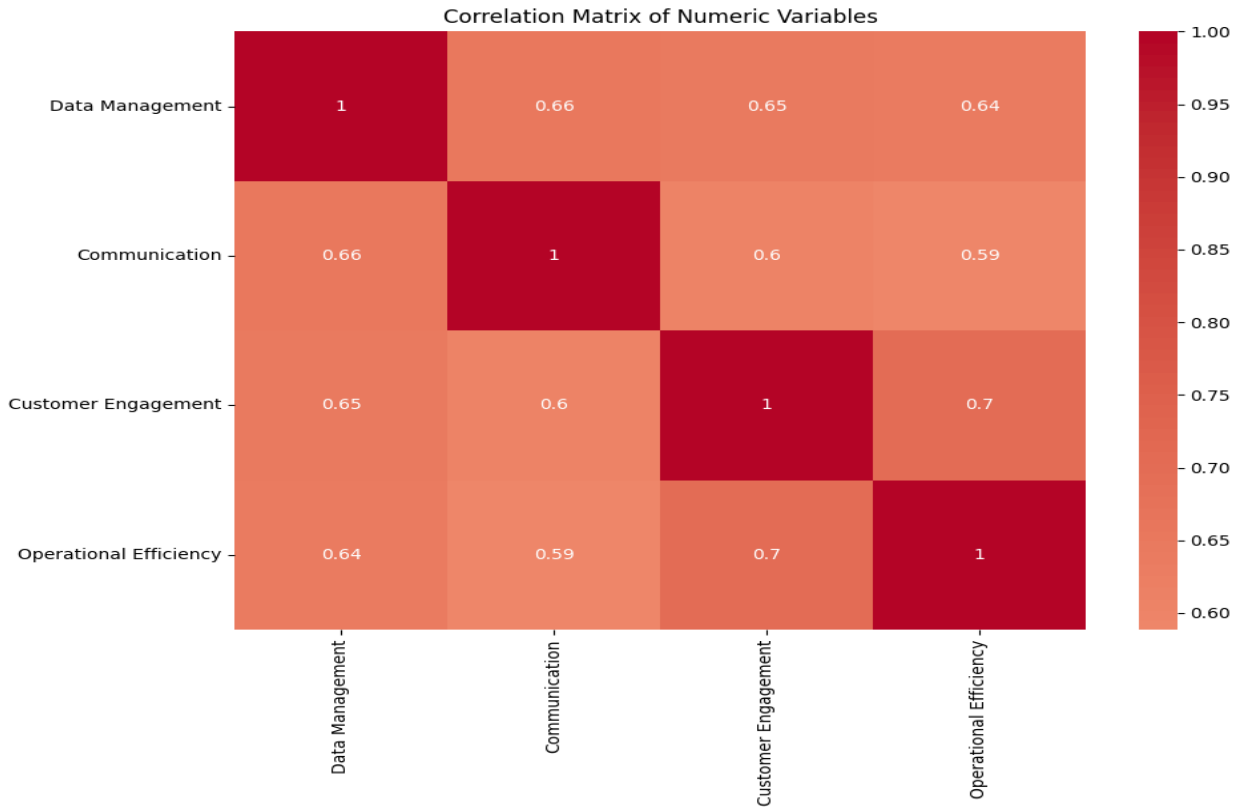
3.How many jobs do you think will be displaced by the use of AI in your organization in the next 1 to 5 years?



Correlation matrix for the numeric data



- Observations: Operational Efficiency & Customer Engagement (~0.7)
    - There is a strong positive association (≈0.7) between increased operational efficiency and enhanced engagement.
    - Example interpretation: Operational efficiency typically increases in tandem with improvements in customer engagement scores.
- Interaction with Customers and Communication (~0.6)
    - Better communication appears to improve consumer involvement, as indicated by the somewhat positive correlation (≈0.6).
    - For instance, improved customer interactions result from more efficient internal and external communication.
- Operational Efficiency & Communication (~0.59)
    - There is a moderately favorable correlation (≈0.59), suggesting that communication contributes to improvements in operations.
    - Example: Procedures function more efficiently when communication tactics are improved.

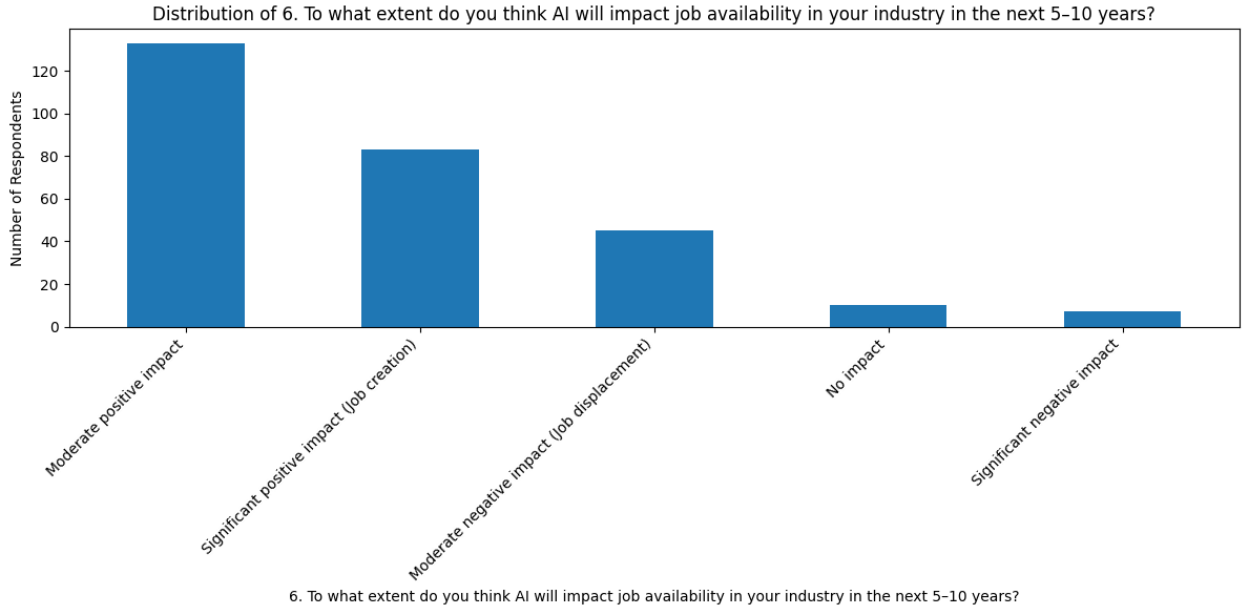
4.What percentage of your business processes are:

- Semi-automated: 50% 224
- Fully manual: 0% 35
- Fully automated: 100% 19

The data represents three categories of processes based on their level of automation, along with their respective counts:

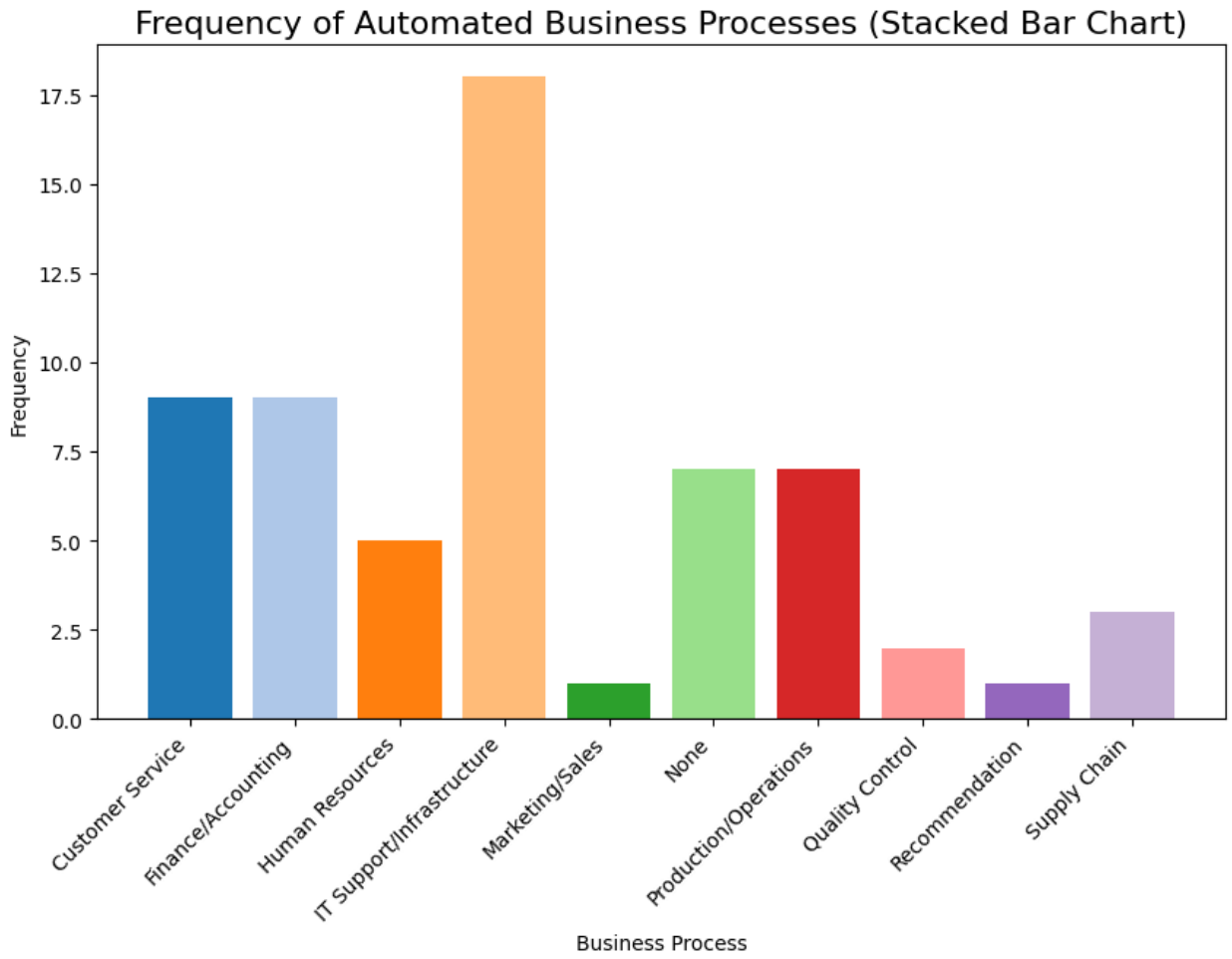
1. **Semi-automated (50%)**: This category accounts for the largest portion, with 224 processes being partially automated, combining manual and automated efforts.
2. **Fully manual (0%)**: A smaller segment, with 35 processes being completely manual and requiring no automation.
3. **Fully automated (100%)**: The least represented category, with only 19 processes being entirely automated, eliminating any manual intervention.

To what extent do you think AI will impact job availability in your industry in the next 5–10 years?



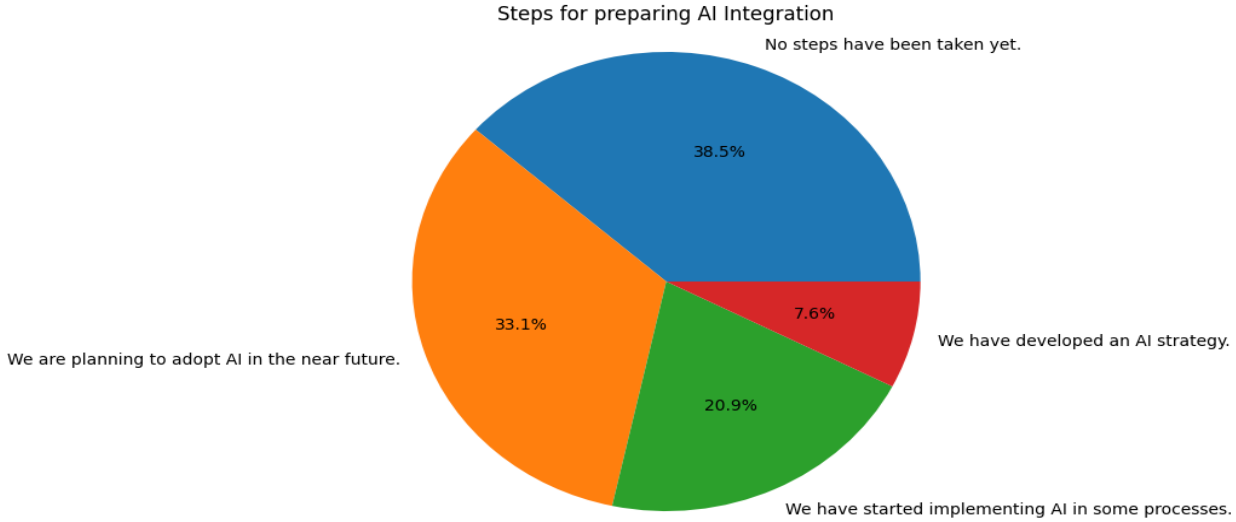
- 133 responses: Expect a moderate positive impact from AI.
- 83 responses: Predict significant job creation due to AI.
- 45 responses: Anticipate moderate job displacement caused by AI.
- 7 responses: Foresee significant negative impacts (major job losses).
- **10 responses**: Believe AI will have **no impact** on job availability.
- **Summary**: Optimism dominates, with most predicting positive effects and fewer concerned about job losses.

5.Which business processes are currently automated in your organization? (Multiple Choice)



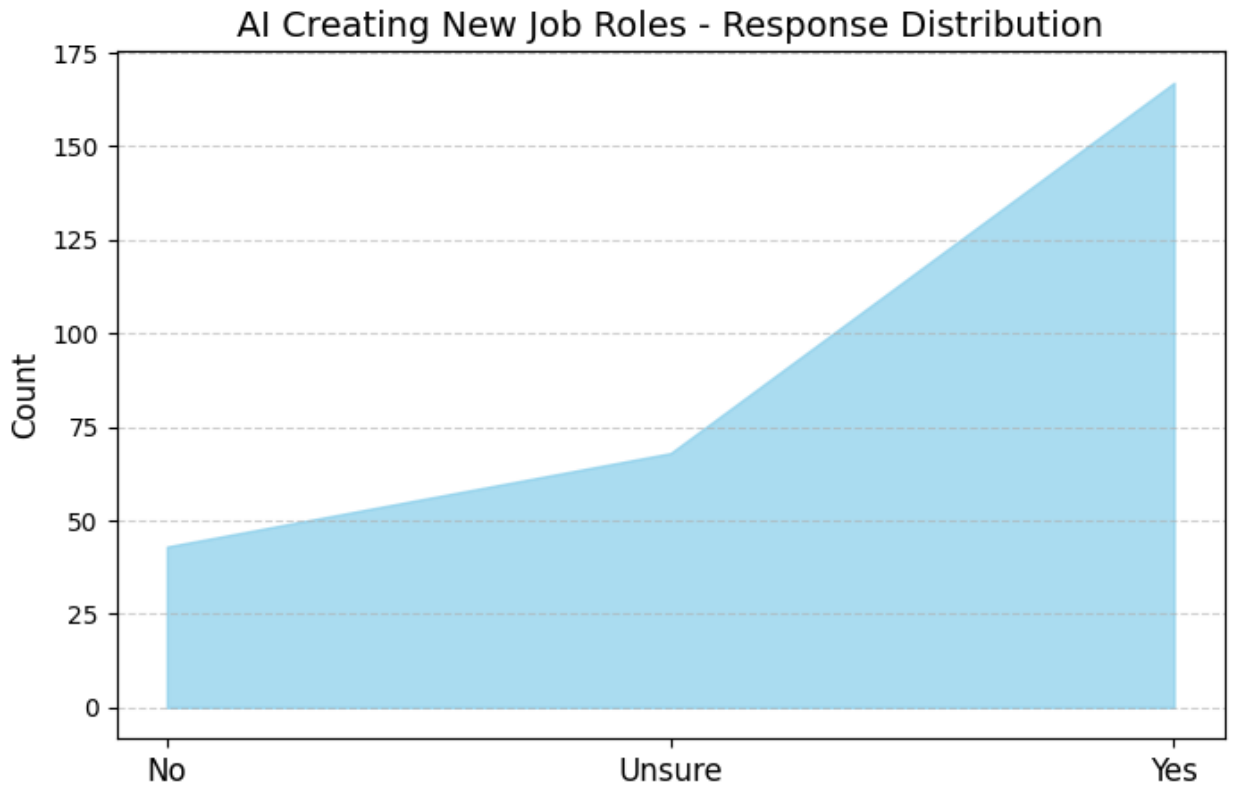
- **IT Support/Infrastructure leads** with 39 mentions, indicating a strong reliance on tech.
- Customer Service (15) and Production/Operations (12) are key but secondary priorities.
- **Combined roles (e.g., Finance & IT)** show collaboration across functions.
- **Human Resources (6)** and **Quality Control (4)** have fewer mentions, likely niche or specialized roles.
- The overlap of **Finance/Accounting and IT Support (11)** highlights the integration of tech in financial processes.

6. What steps has your organization taken to prepare for AI integration?



- No AI preparation yet: 107 organizations
- Planning AI adoption soon: 92 organizations
- Some AI implementation started: 58 organizations
- Developed an AI strategy: 21 organizations

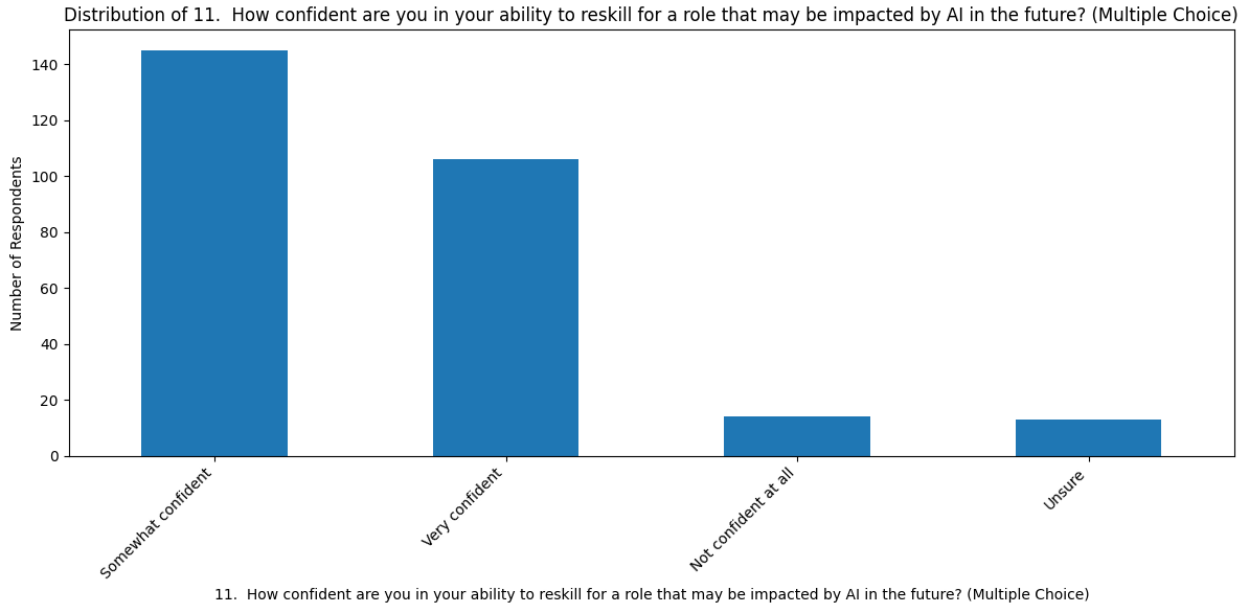
7. Do you believe that AI will create new job roles in your industry?



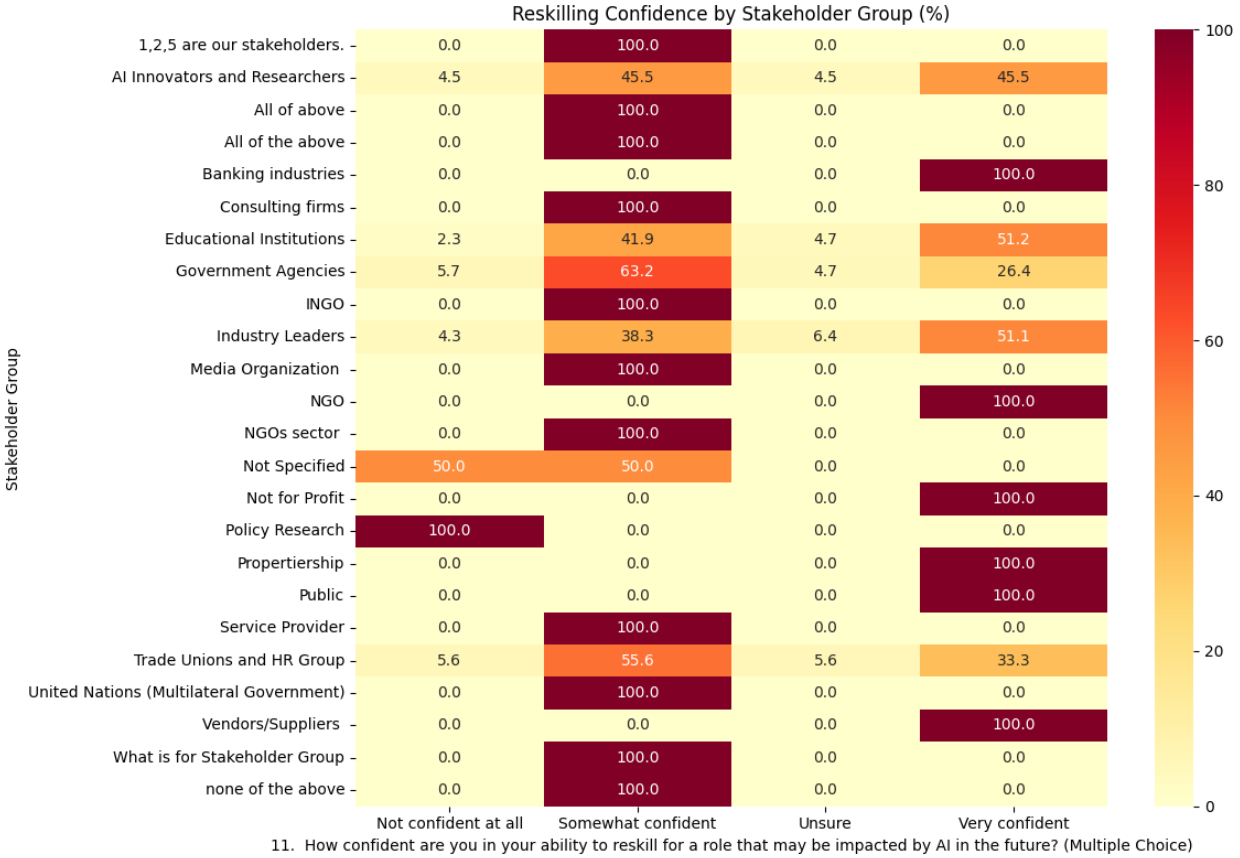
- Yes: 167 respondents believe AI will create new job roles in their industry.
- Unsure: 68 respondents are uncertain about AI's impact on job creation.
- No: 43 respondents do not believe AI will create new job roles.

8. How confident are you in your ability to reskill for a role that may be impacted by AI in the future? (Multiple Choice)

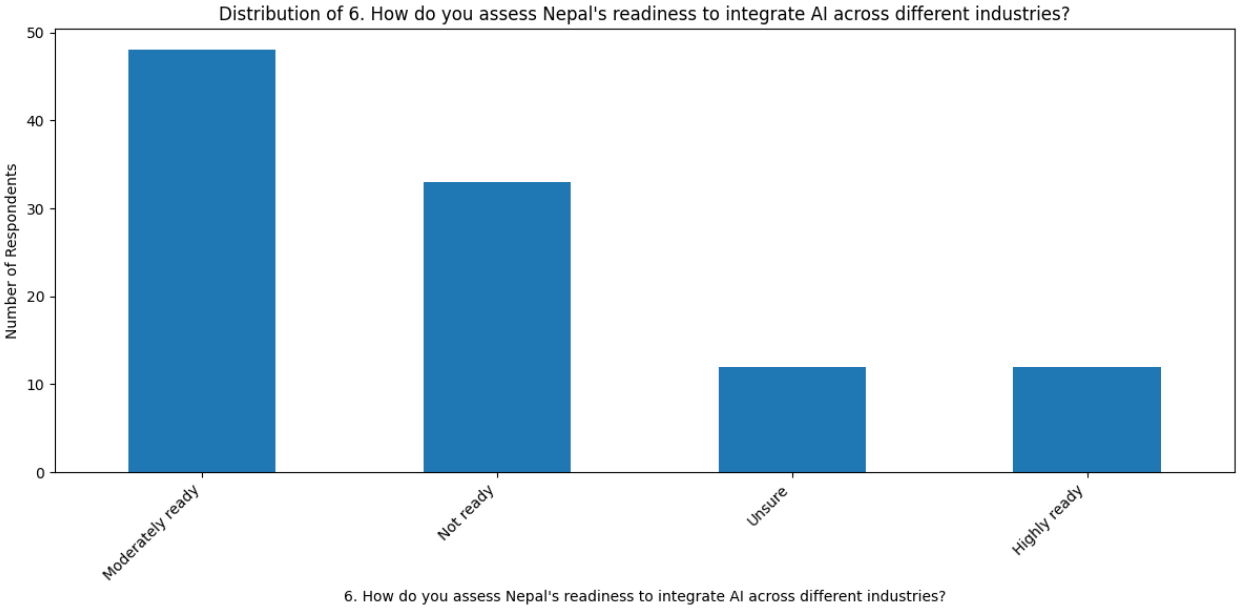
- Somewhat confident: 145 individuals
- **Very confident**: 106 individuals
- Not confident at all: 14 individuals
- **Unsure**: 13 individuals



Reskilling Confidence by stakeholder group



9. How do you assess Nepal's readiness to integrate AI across different industries?



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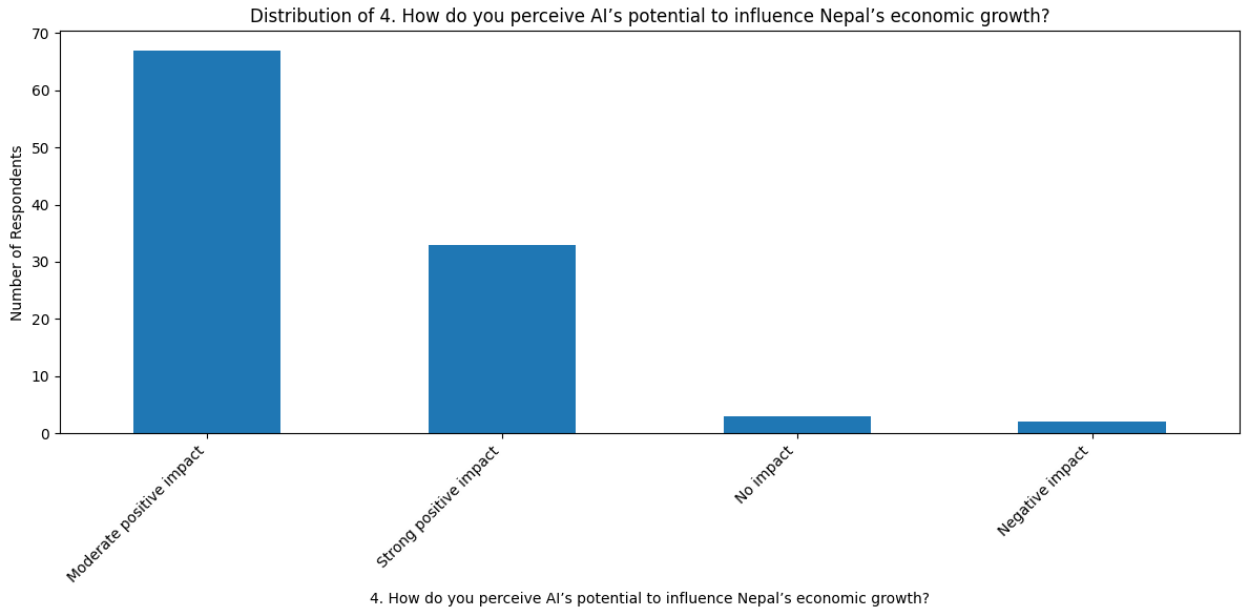
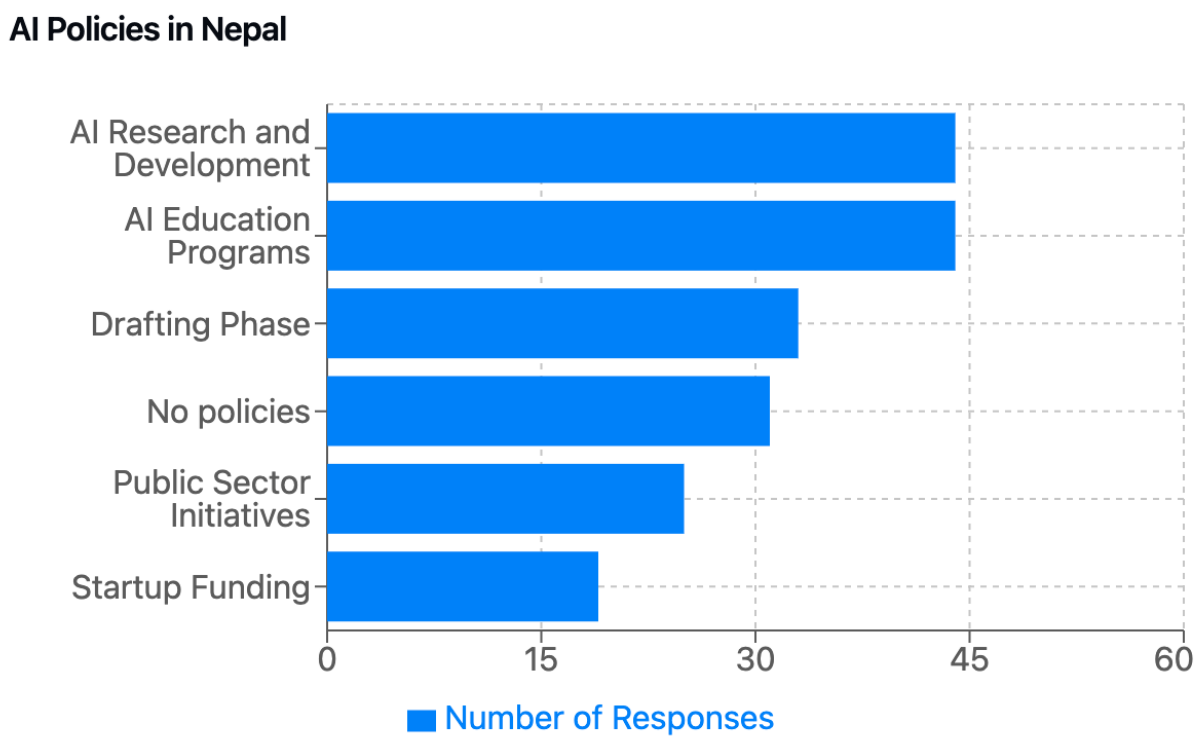
- Moderately ready: 48 respondents believe Nepal is somewhat prepared to integrate AI across industries. This is the majority opinion.
- Not ready: 33 respondents feel Nepal is not prepared for AI integration.
- Unsure: 12 respondents are uncertain about Nepal's readiness for AI.
- Highly ready: 12 respondents believe Nepal is fully prepared for AI integration.

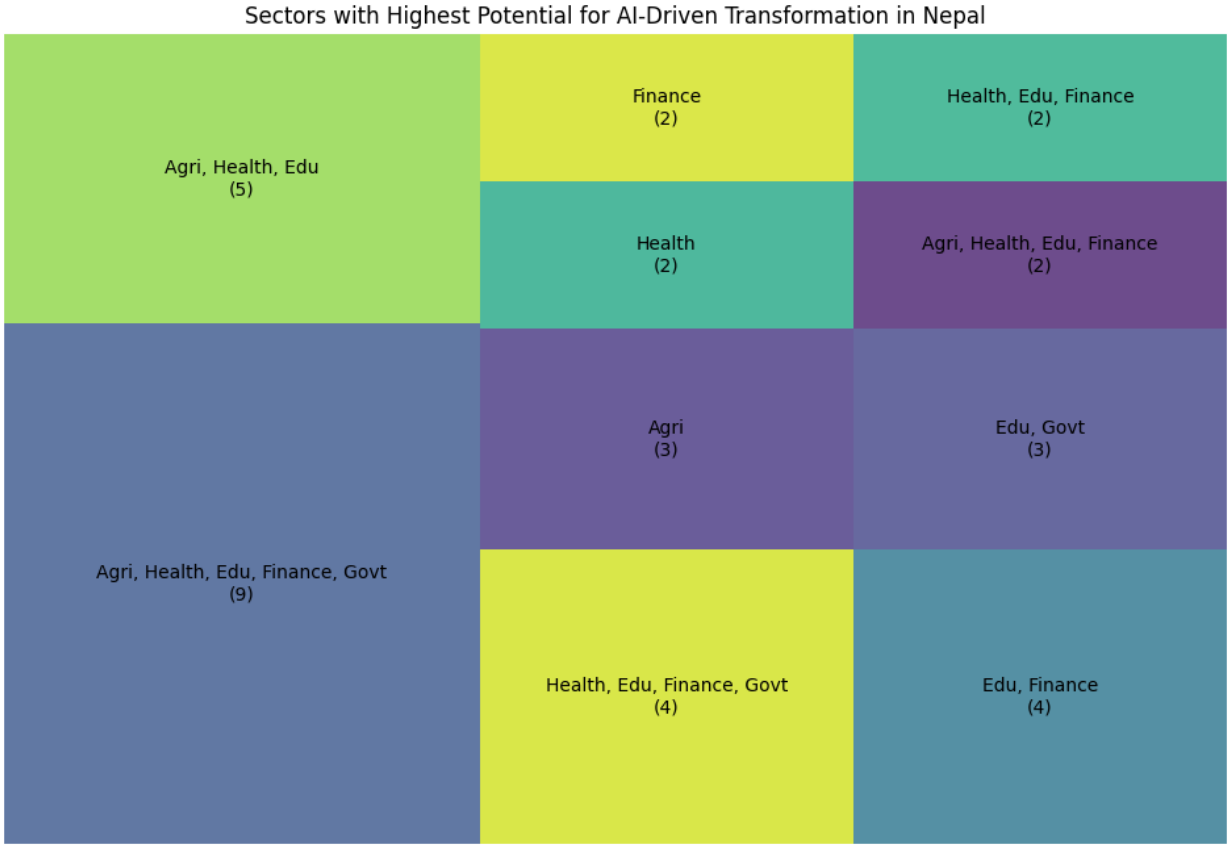
10. How do you perceive AI's potential to influence Nepal's economic growth?



- Moderate positive impact: 67 respondents believe AI will have a moderate positive influence on Nepal's economic growth. This is the majority view.
- Strong positive impact: 33 respondents think AI will have a strong positive impact on economic growth.
- No impact: 3 respondents feel AI will have no effect on Nepal's economy.
- Negative impact: 2 respondents believe AI will have a negative impact on economic growth.



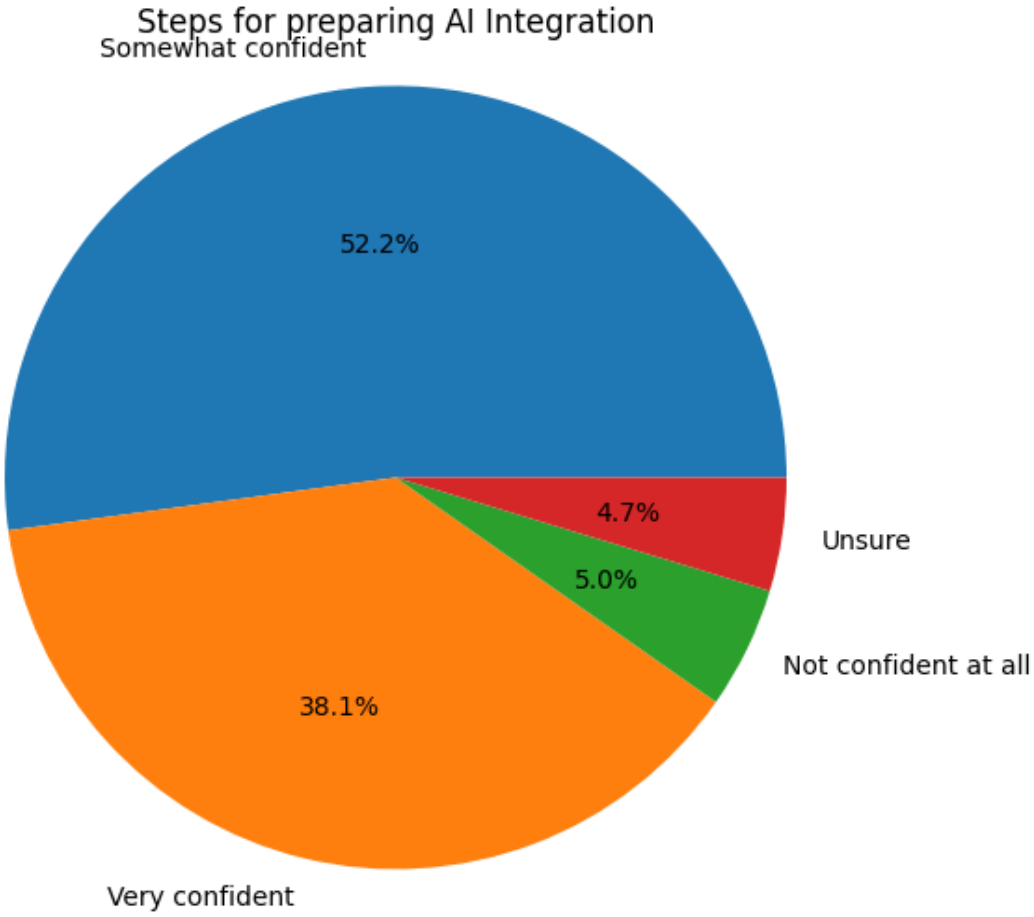
Sectors with Highest Potential for AI-Driven Transformation in Nepal



- Top Sector: The combination of Agriculture, Health, Education, Finance, and Government (size = 9) has the highest potential for AI-driven transformation in Nepal.

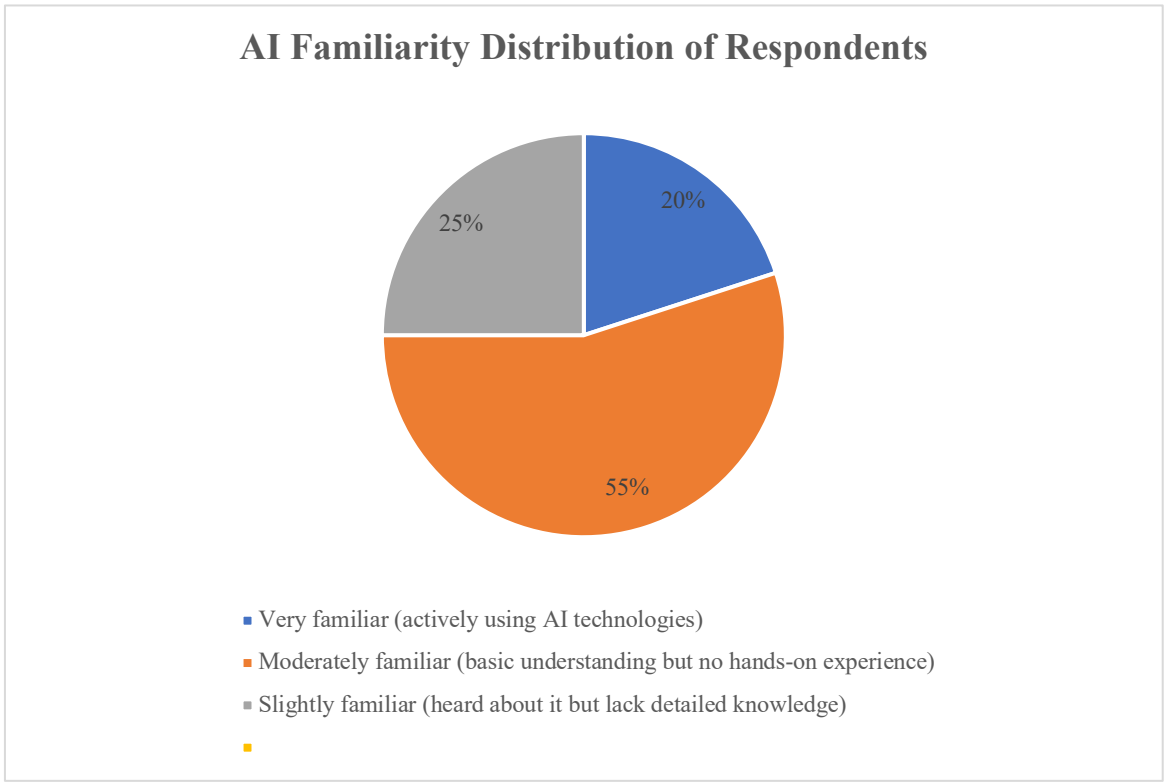
- Key Areas: AI can significantly impact Agriculture, Health, and Education (size = 5) and Health, Education, Finance, and Government (size = 4).
- Smaller Sectors: Individual sectors like Agriculture (size = 3), Health (size = 2), and Finance (size = 2) also show potential but are less prominent compared to combined sectors.

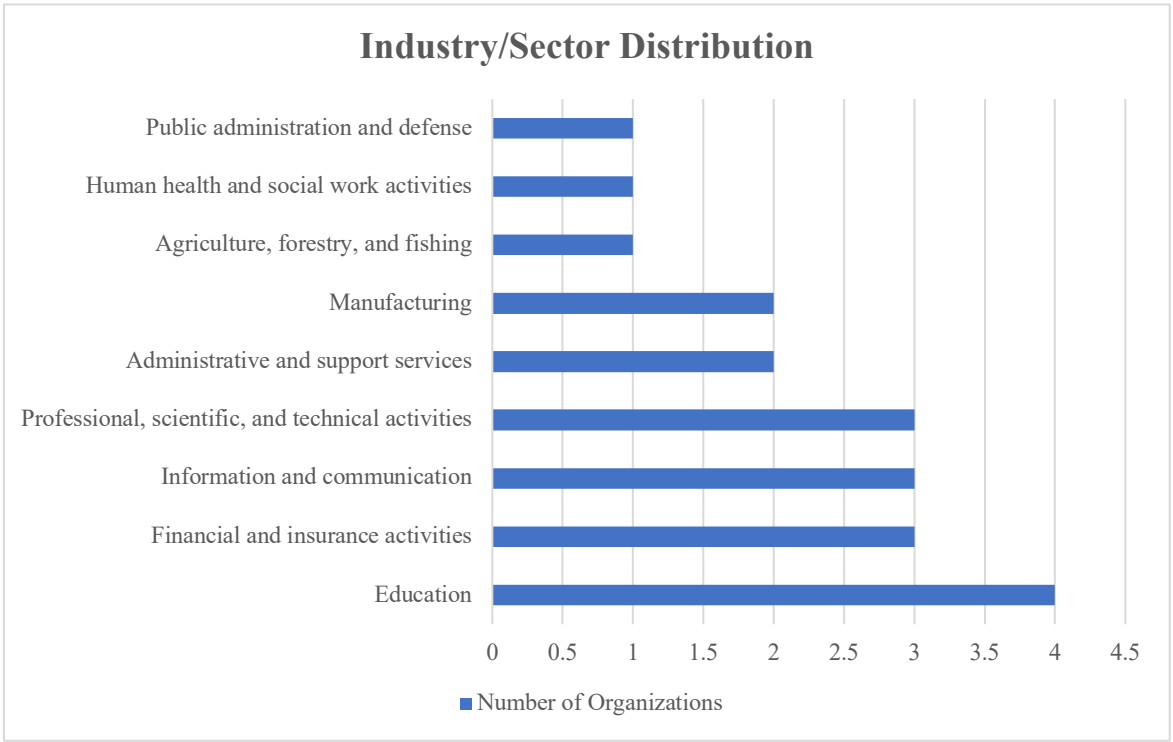
11. How confident are you in your ability to reskill for a role that may be impacted by AI in the future? (Multiple Choice)



- Majority Somewhat Confident: 52.2% feel partially prepared for AI integration but may need more support.
- Significant Confidence: 38.1% are very confident, indicating strong readiness.
- Low Confidence/Uncertainty: 9.7% (combined) are unsure or not confident, highlighting a need for targeted assistance.

Annex-2 KII Questionnaire and Responses from the Stakeholders





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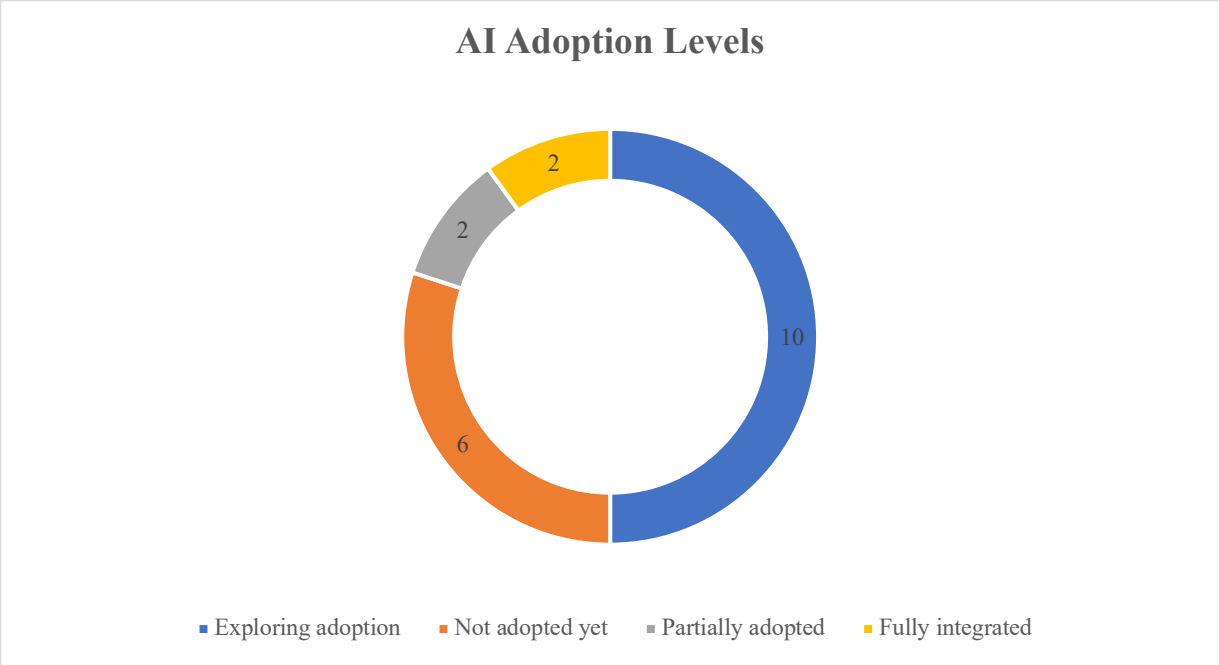
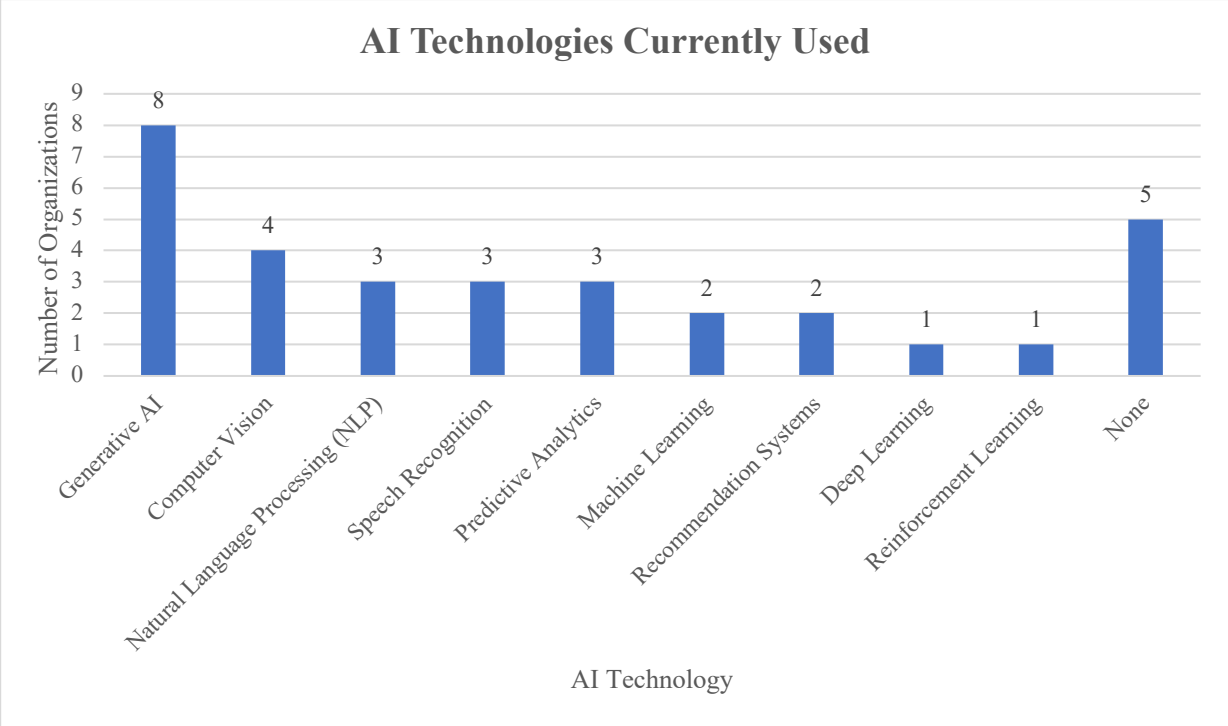
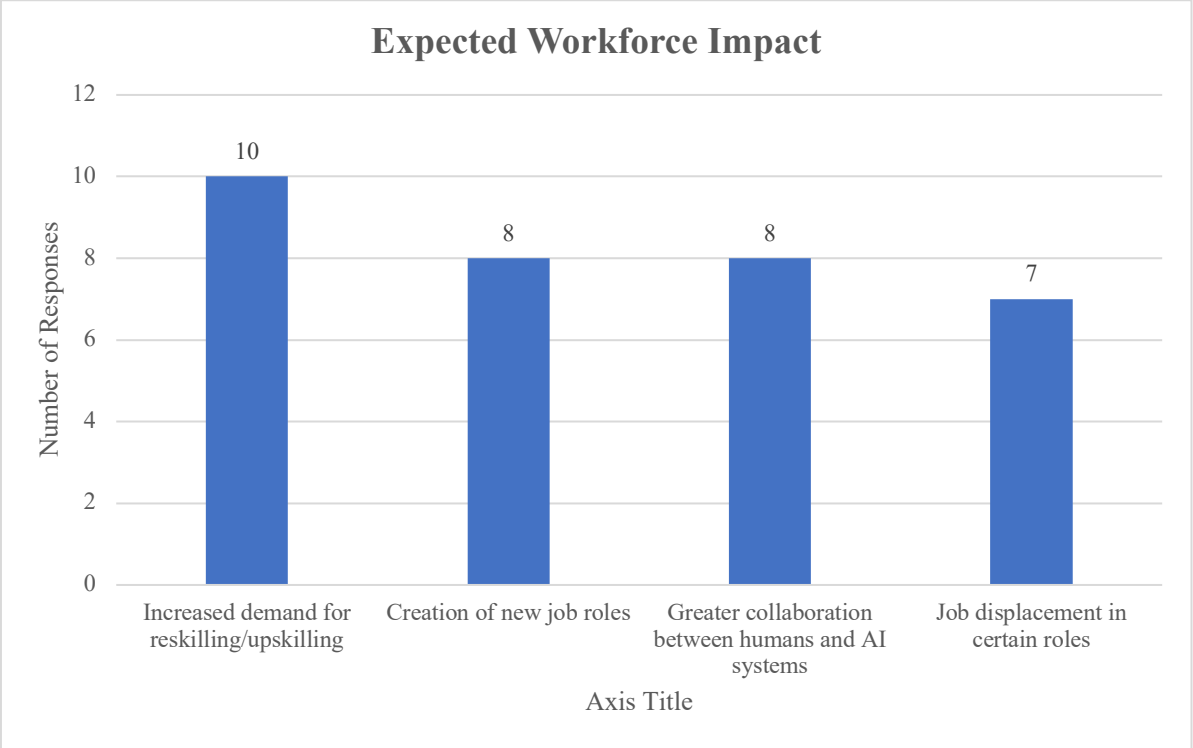
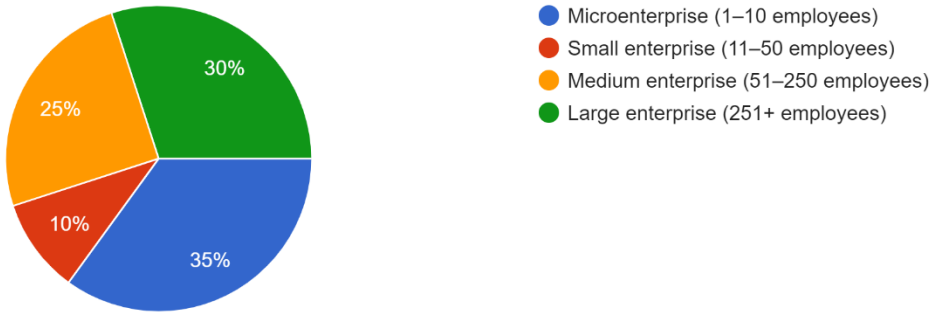






What is the size of your organization? [Select one]

20 responses



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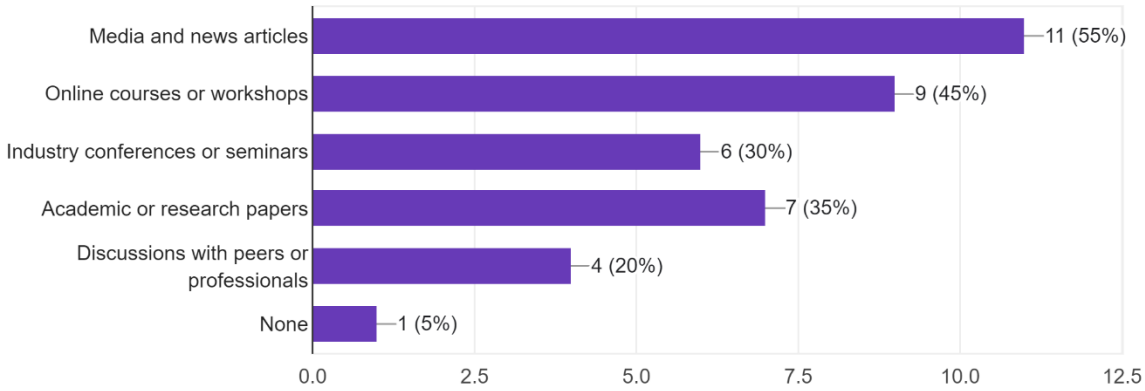
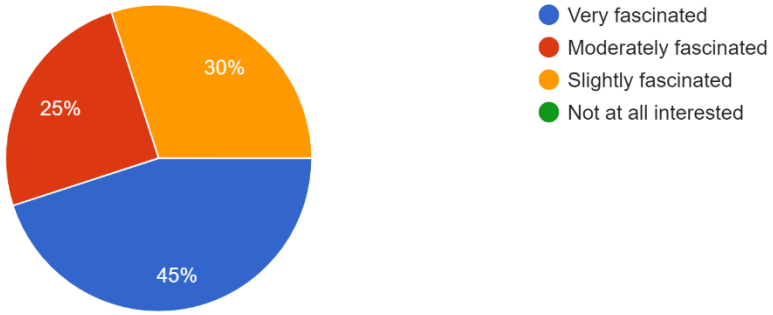
What sources have you used to learn about AI? [Select all that apply]

20 responses



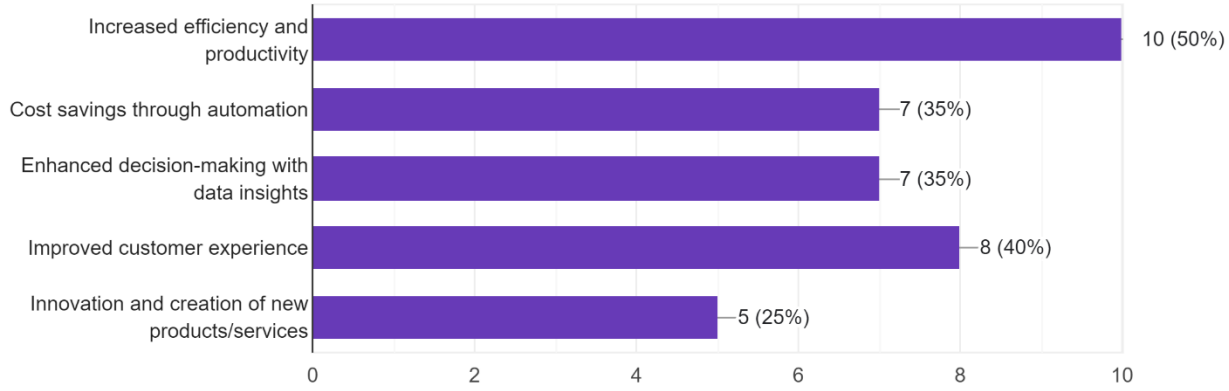
Are you fascinated by the possibilities of AI use in your industry? [Select one]

20 responses



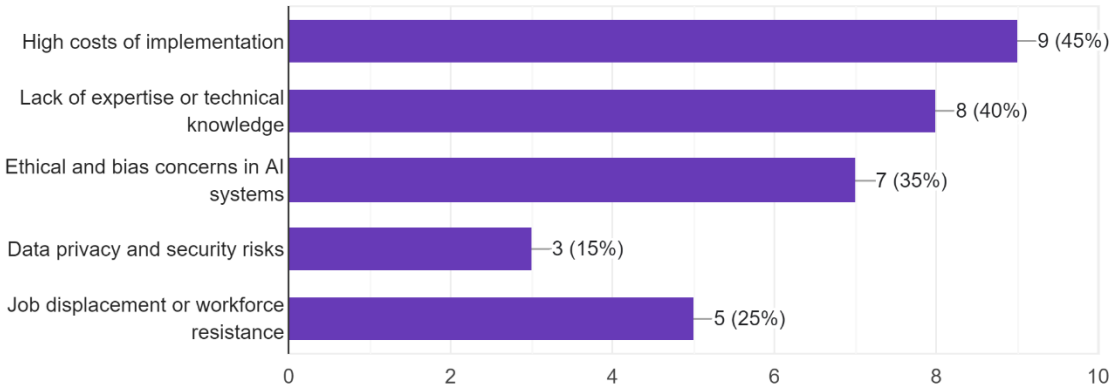
What excites you most about AI technologies in your industry? [Select all that apply]

20 responses



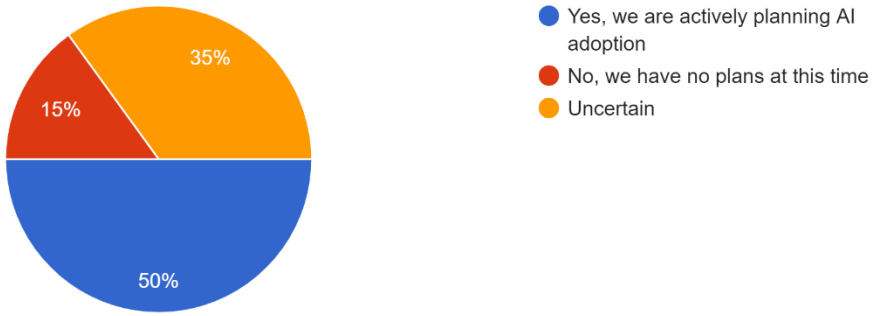
What concerns do you have about AI adoption in your industry? [Select all that apply]

20 responses



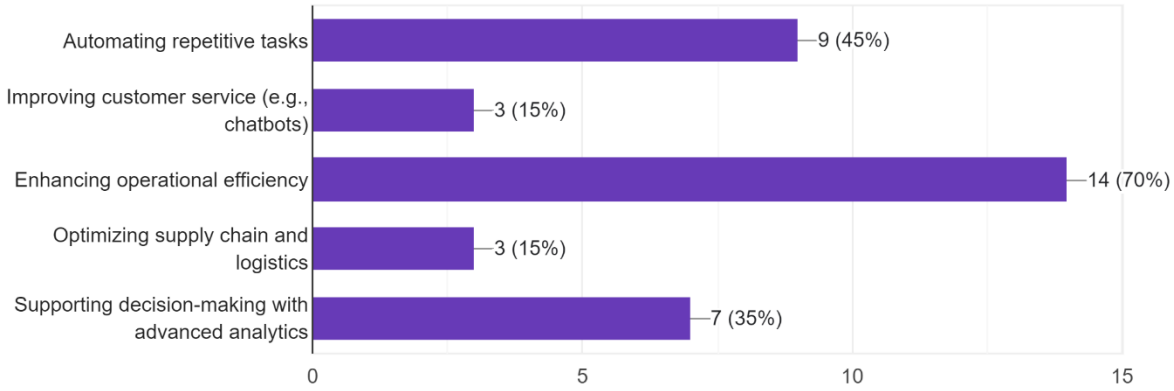
Is your organization planning to adopt AI technologies? [Select one]

20 responses



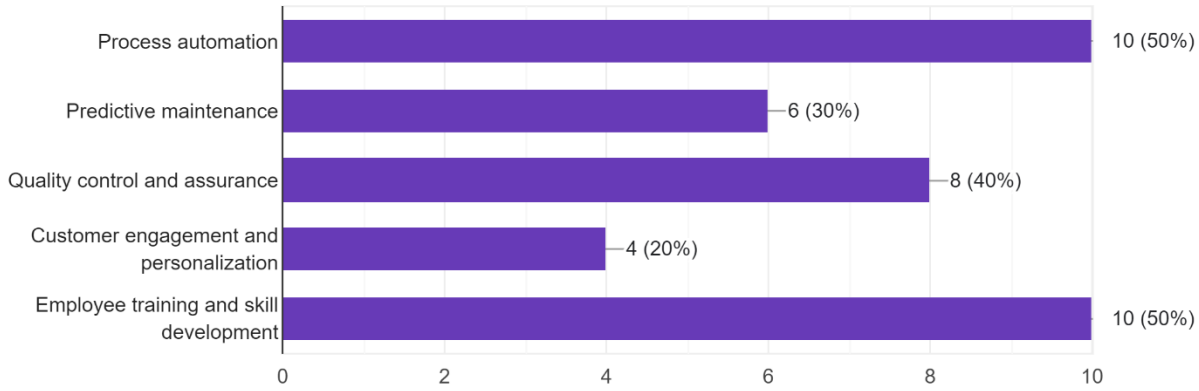
If planning AI adoption, for which purposes are you considering AI technologies? [Select all that apply]

20 responses



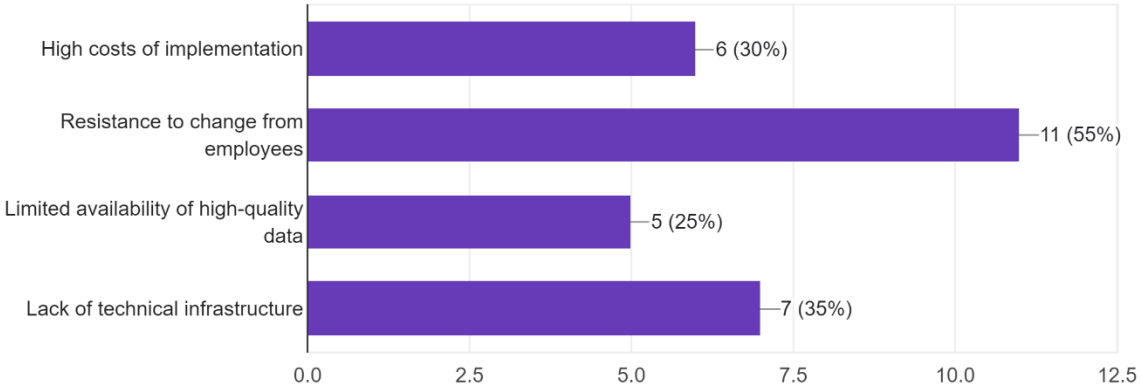
Which areas in your industry do you think could benefit most from AI? [Select all that apply]

20 responses



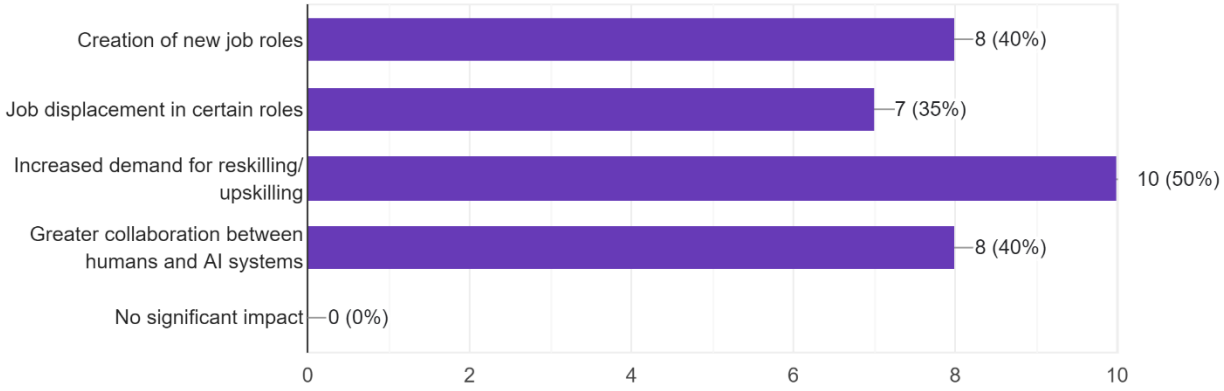
Do you foresee challenges in integrating AI into your industry? [Select all that apply]

20 responses



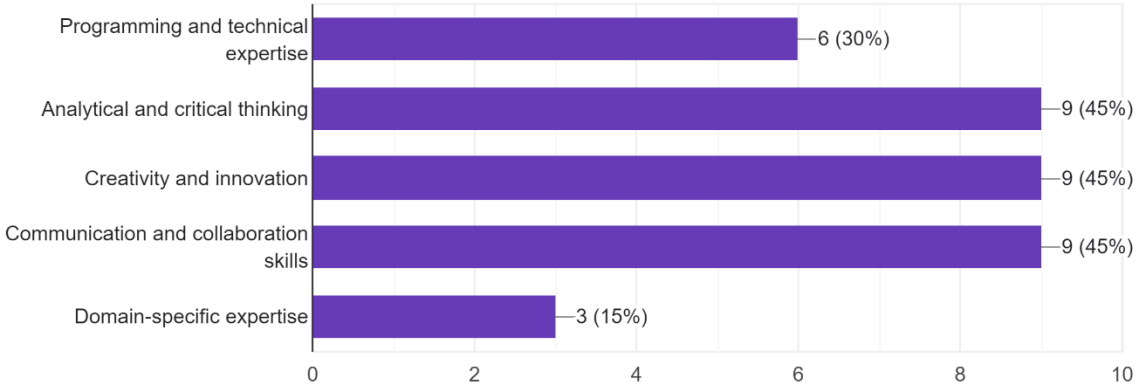
What impact do you think AI will have on the workforce in your industry? [Select all that apply]

20 responses



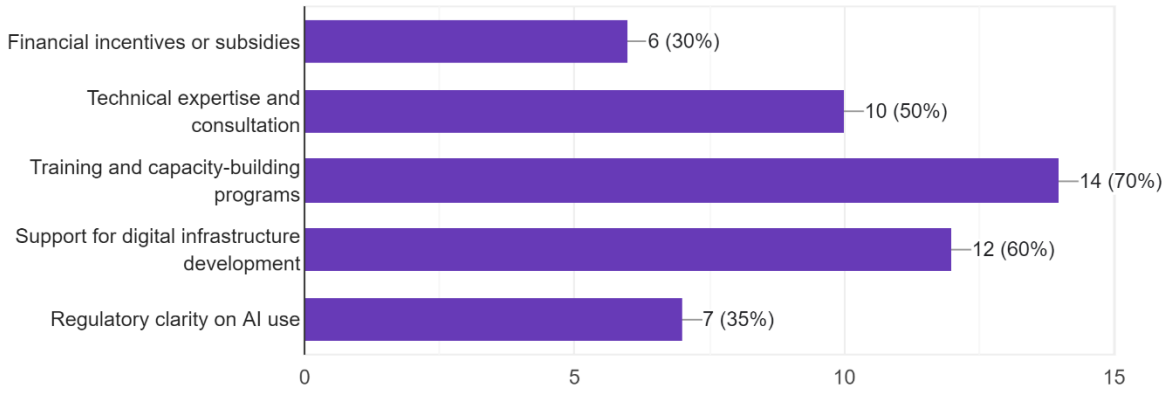
Which skills do you think are critical for employees to stay relevant in the AI age? [Select all that apply]

20 responses



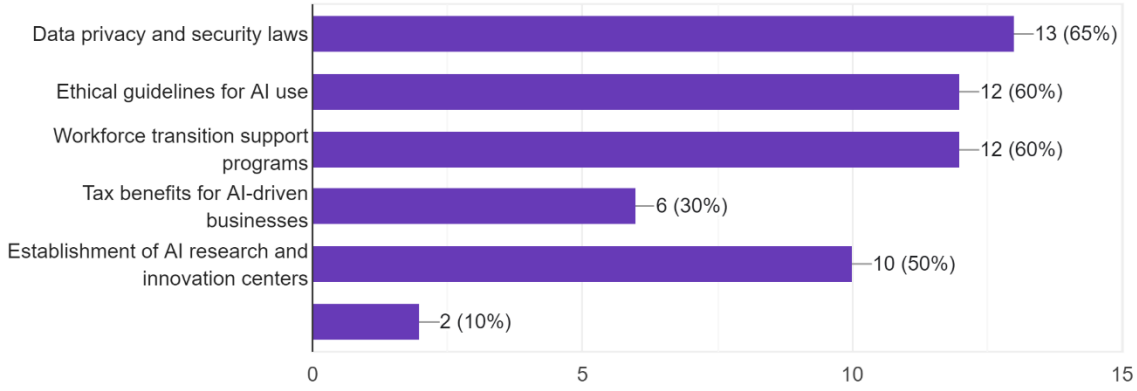
What type of support would help your organization adopt AI? [Select all that apply]

20 responses



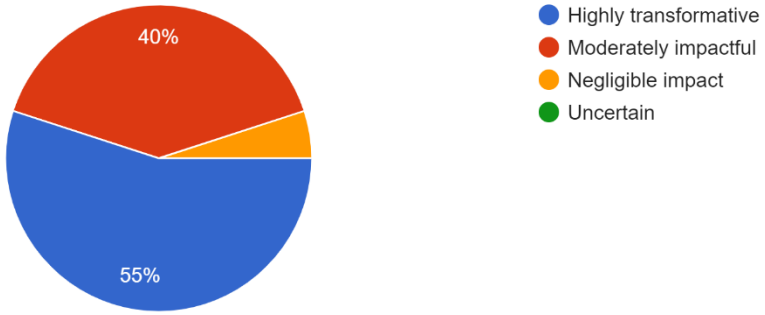
What policies or regulations would encourage responsible AI adoption in your industry? [Select all that apply]

20 responses



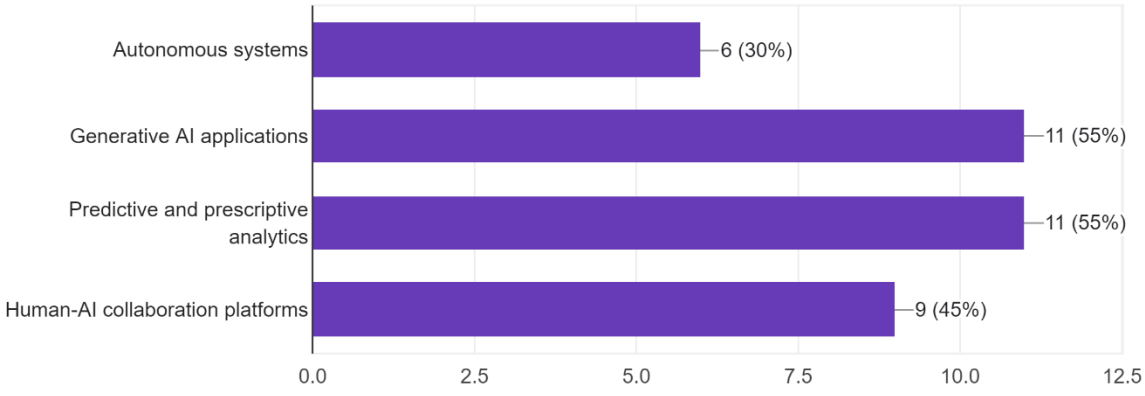
What is your long-term outlook on AI's role in your industry? [Select one]

20 responses



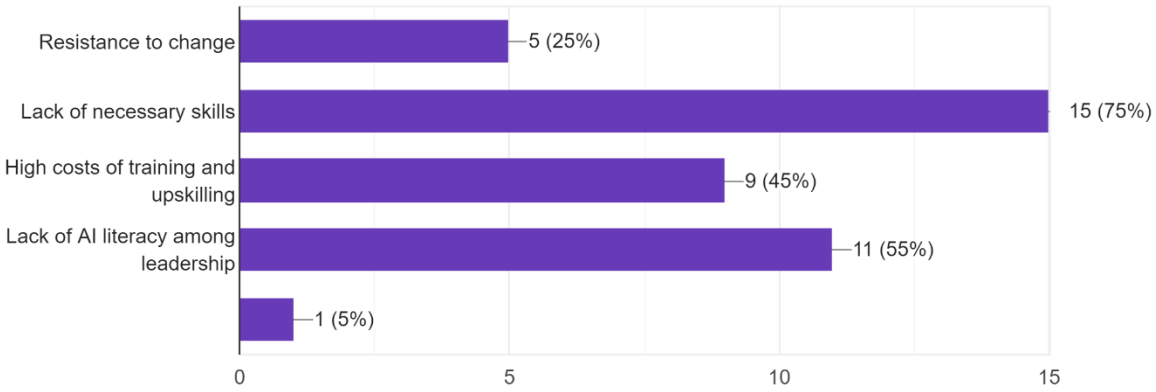
Which AI innovations do you think will have the greatest impact on your industry in the next 5–10 years? [Select all that apply]

20 responses



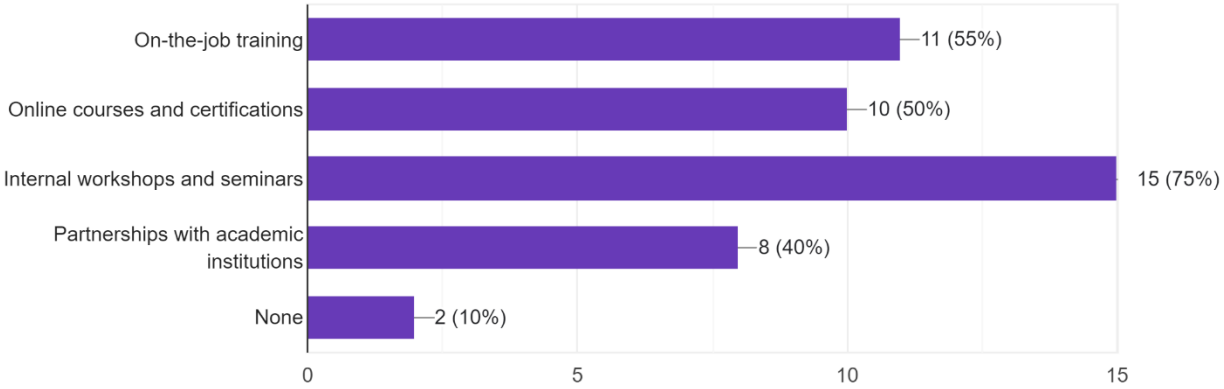
What challenges has your organization faced in managing the workforce during AI implementation? [Select all that apply]

20 responses



What types of training programs does your organization offer to address AI-related skill gaps? [Select all that apply]

20 responses



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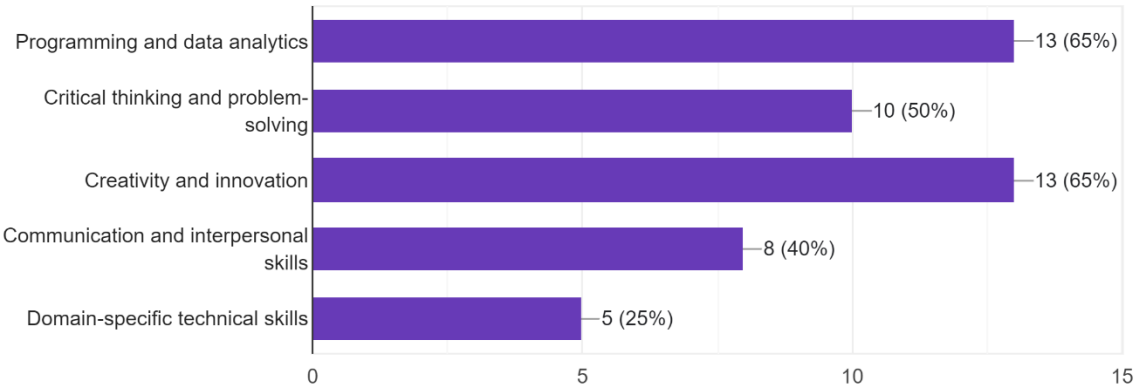
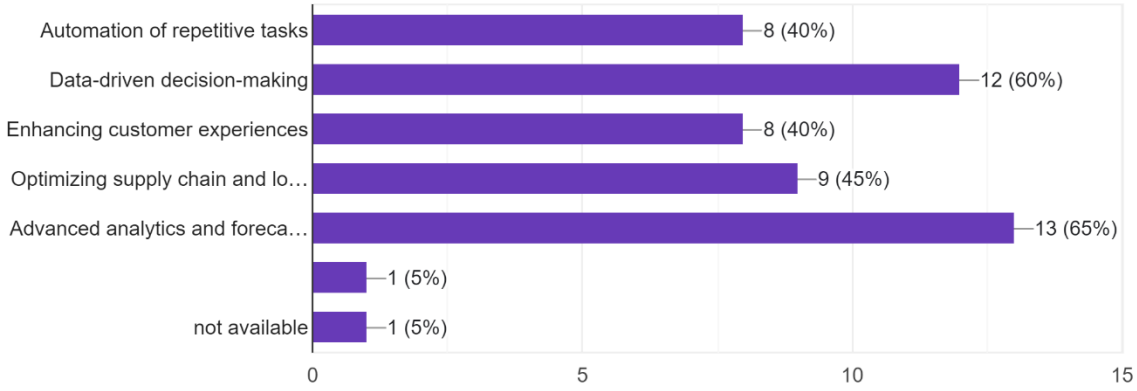
Which skills are considered a priority for AI adoption in your organization? [Select all that apply]

20 responses



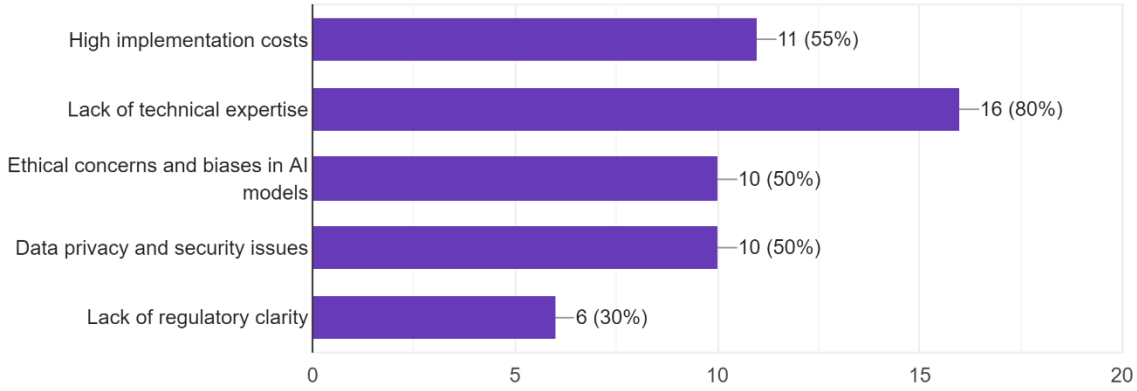
In what ways is AI being utilized in your sector/industry? [Select all that apply]

20 responses



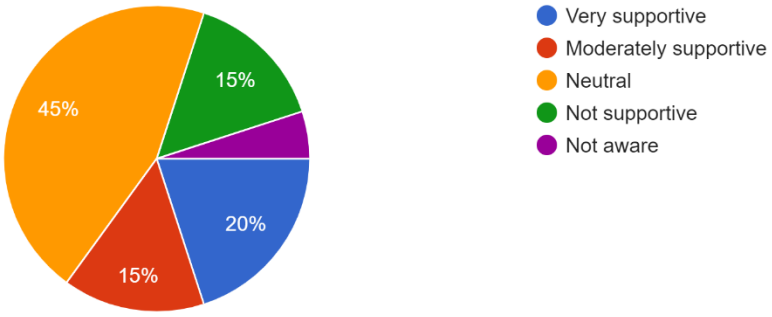
What challenges have you faced in applying AI in your industry? [Select all that apply]

20 responses



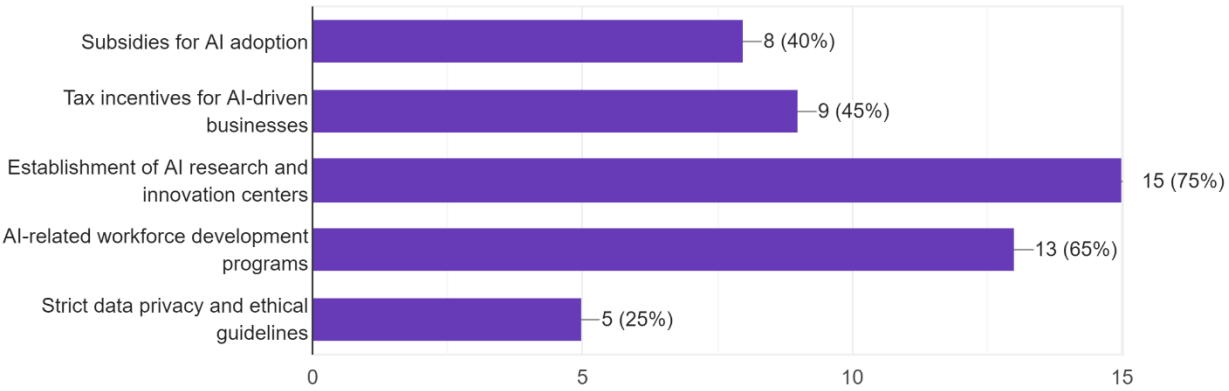
What is your perception of the current AI-related policies and regulations in Nepal? [Select one]

20 responses



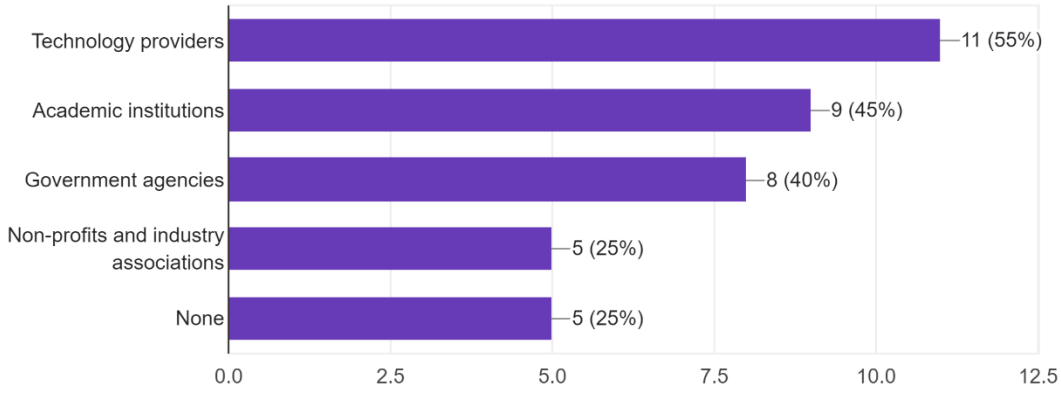
What policy recommendations would you suggest to support AI adoption in your sector? [Select all that apply]

20 responses



Does your organization collaborate with external stakeholders for AI development or adoption? [Select all that apply]

20 responses



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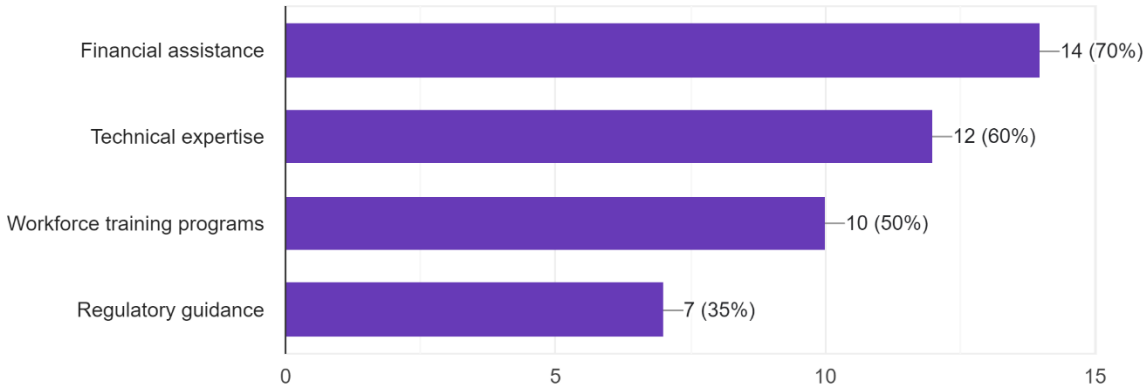
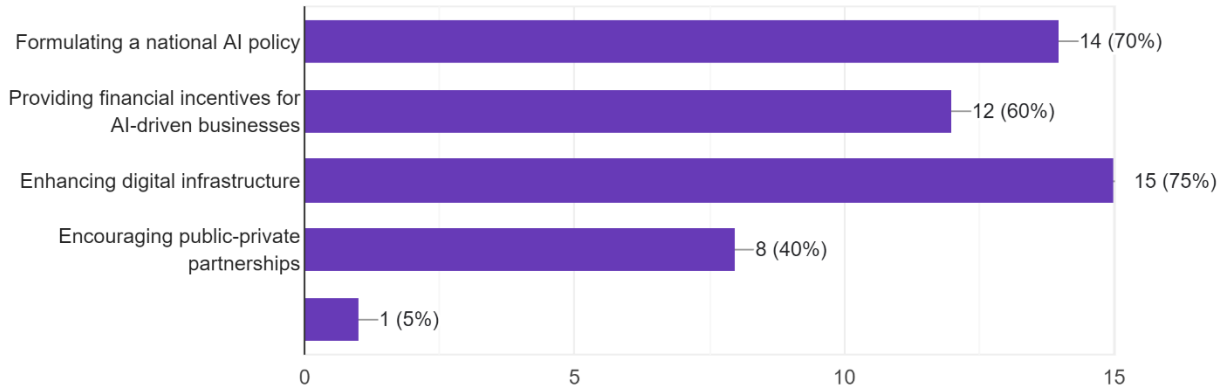
What type of support would be most beneficial from external stakeholders? [Select all that apply]

20 responses



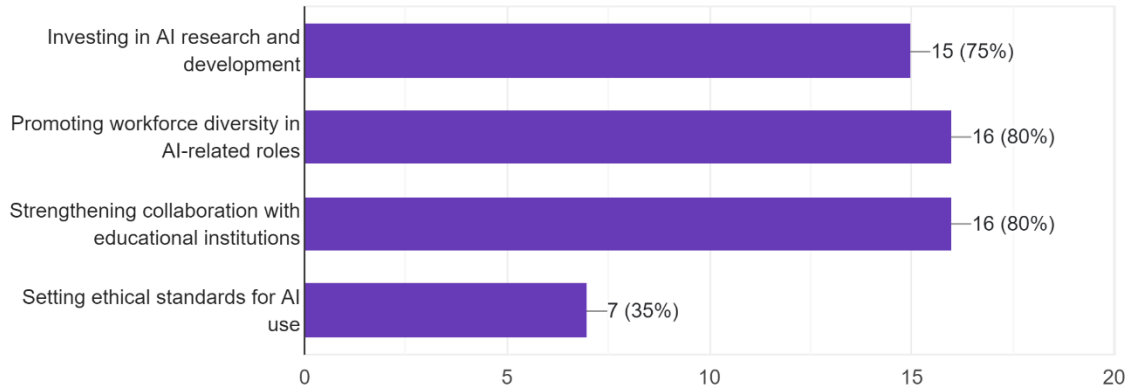
What actions can the government take to accelerate AI adoption in Nepal? [Select all that apply]

20 responses



What actions can industry leaders take to support AI-driven transformation? [Select all that apply]

20 responses



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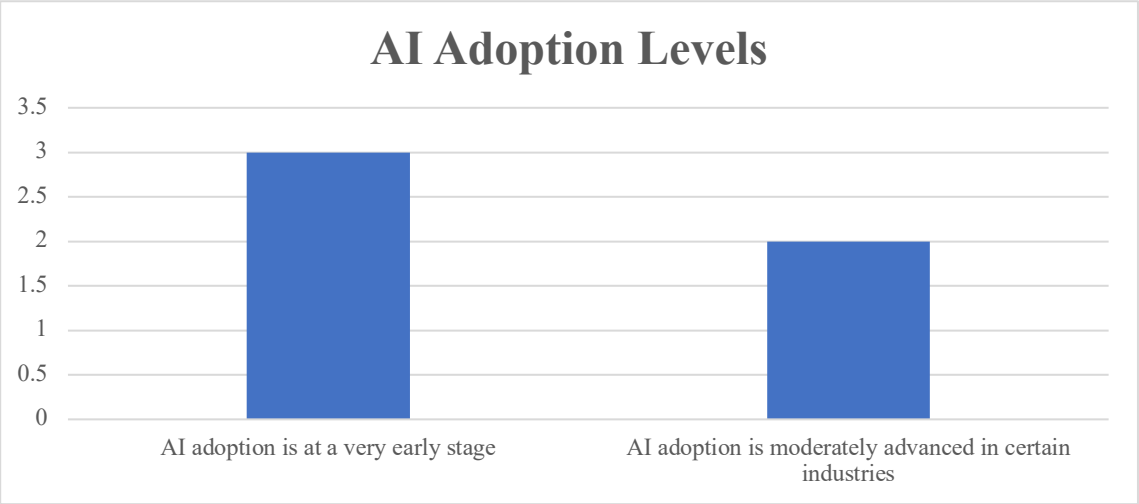
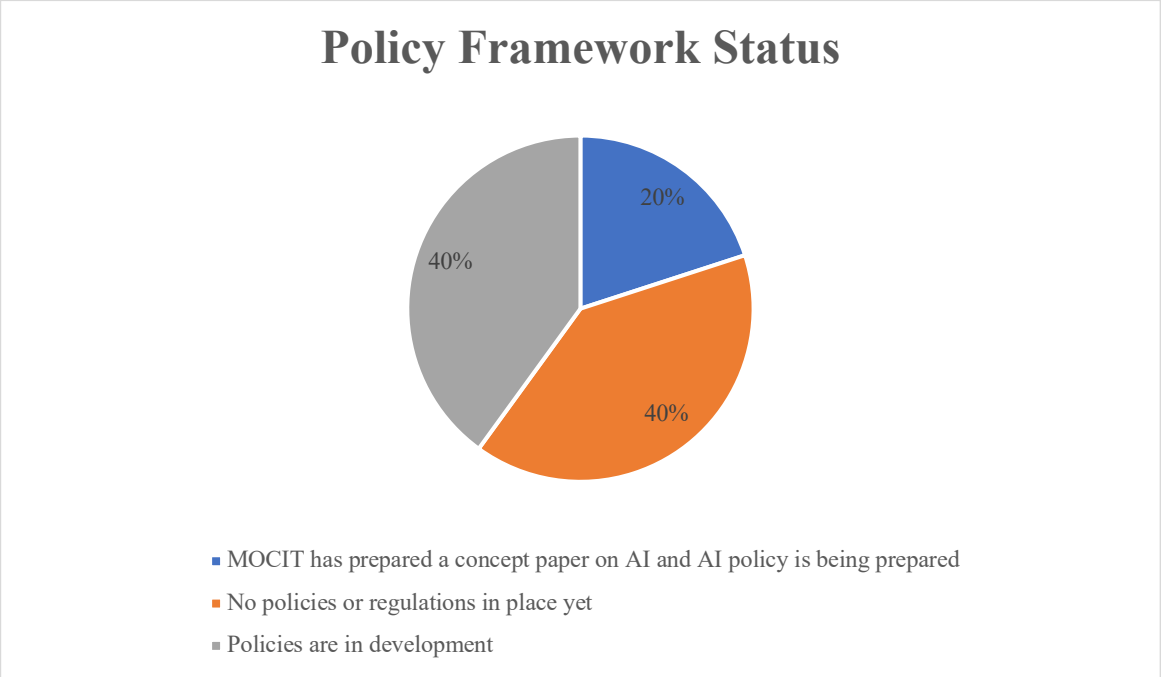
Annex-3 KII Questionnaire and Responses from the Government Agencies





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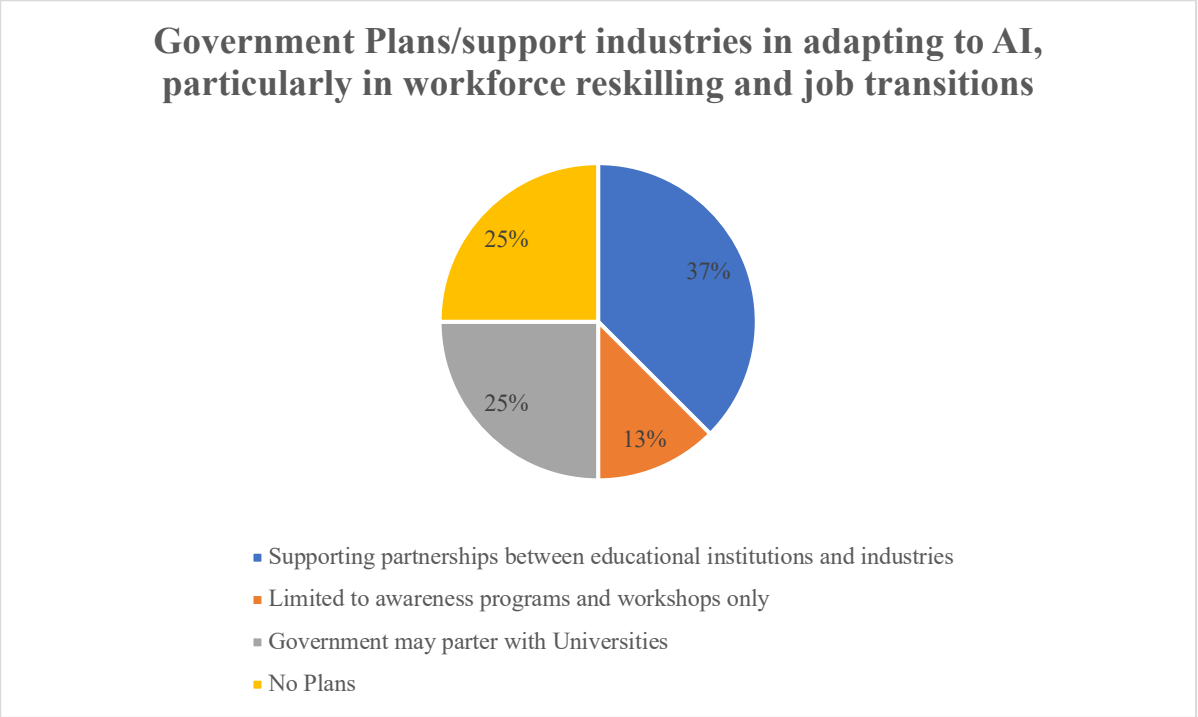

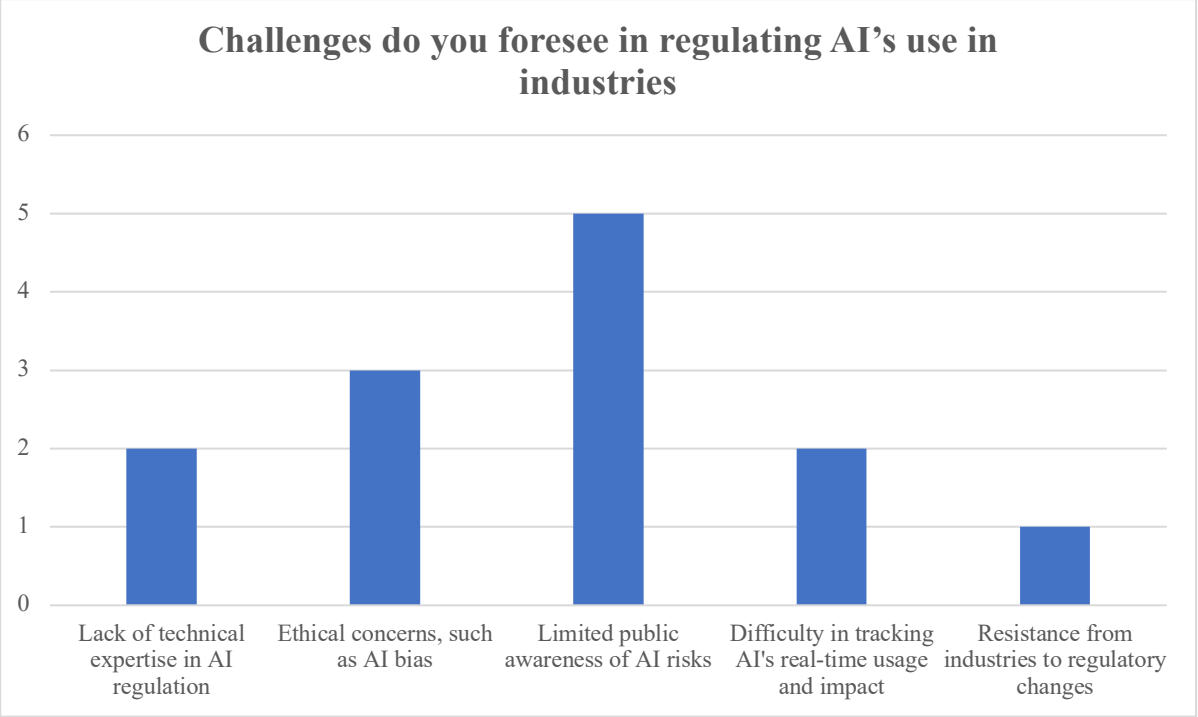

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