Exploring Gaps in Artificial Intelligence (AI) Competency of Middle-Level Government Officials for Effective Public Service Delivery: Challenges and Recommendations for Capacity Building Programs of Government of India (GoI)

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INDIAN INSTITUTE OF PUBLIC ADMINISTRATION, NEW DELHI

CERTIFICATE

I hereby declare that this dissertation titled '*Exploring Gaps in Artificial Intelligence (AI) Competency of Middle-Level Government Officials for Effective Public Service Delivery: Challenges and Recommendations for Capacity Building Programs of Government of India (GoI)'* is my original piece of work and to the best of my knowledge and belief, it contains no material previously published or written by any other person. I am aware of the University's norms and regulations regarding plagiarism including the disciplinary action that it may invite. Any use of the works by any other author, in any form, is adequately acknowledged at their point of use or in the Bibliography. The dissertation has not been submitted for any other degree of this university or elsewhere.

Date: April 2025

Place: New Delhi

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CERTIFICATE

I have the pleasure to certify that Brigadier Osiris Das, has pursued his research work and prepared the present dissertation titled '*Exploring Gaps in Artificial Intelligence (AI) Competency of Middle-Level Government Officials for Effective Public Service Delivery: Challenges and Recommendations for Capacity Building Programs of Government of India (GoI)'*, under my guidance and supervision. The same is the result of research done by him and to the best of my knowledge; no part of the same has been part of any monograph, dissertation or book earlier. This is being submitted to the Panjab University, Chandigarh, for the purpose of Master of Arts in Public Administration and Public Policy in partial fulfilment of the requirement for the Advanced Professional Programme in Public Administration (APPPA) of Indian Institute of Public Administration (IIPA), New Delhi.

I recommend that Brigadier Osiris Das's dissertation be considered for the award of Degree of Master of Arts of the Panjab University, Chandigarh.

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ABBREVIATIONS

AI	: Artificial Intelligence
AR	: Augmented Reality
B2B	: Business-to-Business
B2C	: Business-to-Consumer
CB	: Capacity building
CBC	: Capacity building commission
CDAC	: Centre for Advanced Computing
GoI	: Government of India
IIPA	: Indian Institute of Public Administration
IISc	: Indian Institute of Science
iGOT	: Integrated Government Online Training
IoT	: Internet of Things
JS	: Joint Secretary
MeitY	: Ministry of Electronics and Information Technology
ML	: Machine Learning
NASSCOM	: National Association of Software and Service Companies
NIELIT	: National Institute of Electronics & Information Technology
NPCSCB	: National Programme for Civil Services Capacity Building
NeGD	: National e-Governance Division
NeGP	: National e-Governance Plan
NIC	: National Informatics Centre
SeMTs	: State e- Mission Teams
VR	: Virtual Reality

EXECUTIVE SUMMARY

Artificial Intelligence (AI) has significantly made way into various aspects of life. As the world increasingly transitions towards AI-driven solutions, such innovations have also reached governance and public administration. As India rapidly progresses towards digitisation of its governance and delivery of public services, government officials play an important role in its success. The technological skills of government officials particularly in the field of AI will play a pivotal role in maximising exploitation of governance initiatives. Enhancing skills of government officials will ensure that digital transformation to include AI in public service delivery occurs seamlessly, improving efficiency, effectiveness, and overall service quality. However, many officials lack the necessary technological competencies to effectively manage AI technologies in public service delivery.

In early 2000s, Government of India (GoI) launched Capacity Building Programs to enhance the technological competence of government officials for effective public service delivery. These Capacity building Programs aimed to enhance the Digital Literacy, Project Management Skills, increase Cyber Security Awareness, AI knowledge and educate on Institutional Strengthening of government officials. Since 2006, The Ministry of Electronics and Information Technology (MeitY) and Capacity Building Commission (CBC) as lead agencies under the Digital India Vision Plans unveiled such capacity building initiatives related to Digital Governance. Capacity Building Scheme Phase I, II and III, Mission *Karmayogi* and FutureSkills Prime are a few to name. The National Program for Civil Services Capacity Building (NPCSCB) also known as Mission *Karmayogi* a larger frame work for capacity building for government officials in India, was launched to bring about

significant changes in the Indian Civil Services arena by shifting the focus from a rule-based approach to a role-based one.

While these programs i.e. Capacity Building Scheme Phases III, Mission Karmayogi iGoT, and FutureSkills Prime focus on up-skilling government officials in AI and emerging technologies competencies, they have not fully succeeded in meeting the specific AI training needs of middle-level government officials. These initiatives suffer from many drawbacks particularly in developing AI competencies. The programs are not yet geared up completely to train the government officials and often lack practical AI skill-building tailored for middle-level government officials. Similarly, FutureSkills Prime fails to meet the requirements of government officials as it is on a Business to Consumer (B2C) model.

Aims and Objectives of the Research

The research thus aimed at:-

- Identifing the AI competency required to be built in middle-level government officials of for addressing the needs of effective Public Service Delivery.
- Analysing gaps in existing capacity building programs in enhancing AI competency in middle-level government officials of GoI for effective Public Service Delivery.
- Suggesting policy recommendations to enhance the capacity building programs to address the gaps in AI competency in middle-level government officials of GoI.

Summary of Findings

Review of literature, interviews with various stakeholders and results of survey questionnaire circulated amongst middle-level government officials, identified

gaps in AI competency of such officials. The gaps identified and that need to be further focused on to build the capacities in middle-level government officials are:

- Basic Understanding of AI and Machine Learning Concepts.
- Data Analysis and Interpretation Skills.
- Knowledge of AI-driven Decision Support System.
- Ethical and Regulatory Awareness Related to AI Implementation.
- Change Management and Digital Transformation Strategies.
- Project Management & AI Integration.
- Cyber security Awareness.

Various capacity building programs like CB Phase III, iGoT Mission Karamayogi and FutureSkills Prime have understood the necessity and are aligned to develop futuristic competencies in the middle level government. All these programs have identified emerging technologies as the area where competency needs to be built in middle-level government officials. AI also forms a part of these emerging technology competencies.

The capacity building programs as mentioned above run these programs to enhance competencies of middle-level government officials. Most of these courses are run online with certifications but are not compulsory or mandatory for middle-level government officials to undertake such programs. Off late as per the directions of DOPT, government officials have to undertake six programs on the iGoT platform out of which one on emerging technologies is mandatory.

The training courses for various competency programs, including emerging technologies and AI are generic in nature. The programs do not necessarily focus on the requirement in public service delivery nor do they create tailor-made courses for middle-level government officers for such initiatives. All the courses are online

catering for everyone and do not distinguish competency requirement based on role and task of the middle-level government official.

FutureSkills PRIME by NASSCOM is a B2C model. It is not a government led initiative for government officials to develop their competencies in various fields including AI. It does imply that middle-level government officials may undertake these programs but on their own initiative to improve their competencies. It is not part of official government programs to upskill competencies.

Data with respect to the number of middle-level government officials who have participated in such AI-competency building programs was not readily available. Much of this research on AI-competency gaps in middle-level government officials is based on interpretations of survey questionnaire of the 58 respondents who responded to it.

Summary of Recommendations

Post the findings, few of the recommendations of the research are listed as under:

Steps-Based Approach to AI Training

The research recommends a *Step-Based Approach* to AI training for government officials. The *Four Steps* will ensure that the middle-level government officials have requisite AI competencies at all times based on task and role the officials are likely to play. Time to time upskilling as per requirement is the basic principle of the step-based approach to building AI competencies. Four steps to build AI competencies in middle-level government officials are as suggested:

- **Step I: Basic AI for All** This trg should be mandated at the entry level for all government officials and imparted at respective training academies. The focus should be to build basic essential AI competencies.

- **Step II: Sector-Specific AI Training** Sector specific training should be imparted to all officials as required for a specific department/ ministry where in AI-competency is a basic requirement for day to day work. The responsibility of such training should be of the specific ministry/ department, which can have dedicated pool of professionals for imparting that sector specific training.

- **Step III: Mandatory AI Upskilling** As government officials rise to middle level, apart for the mandated entry level AI training, upskilling in AI competencies should be made mandatory. This could be based on the role the government official is likely to play. These should be done through the existing capacity building platforms.

- **Step IV: Need-Based AI Competency Building** Based on the e-governance initiative that the government is likely to roll out, specific need based AI competencies in middle-level government officials can be built in for managing that project. Such training can be on an outsourced model, i.e. firms responsible for creating the digital platforms for such initiative should also impart training to develop requisite AI competencies in middle-level government officials.

- **B2G Model, Collaboration with NASSCOM and GoI for Operating AI Capacity Building Programs for Middle-Level Government Officials.**

As analysed earlier, at present many of the AI capacity building programs are being outsourced to the industry. The programs on iGOT platform are indicative of such programs. These however run under the government umbrella. Similarly the industry like NASSCOM could also run AI capacity building programs on its platforms. A B2G model, a step forward from the existing B2C could be thought of. NASSCOM being the lead on such initiatives in the industry could provide latest and most updated training contents. NASSCOM in collaboration with GoI could tailor courses for middle-level government officials to develop their AI competencies depending on their role and task as part of Step II and III of the *Steps Based Approach to AI Training.*

Role Based AI Competencies.

AI competencies should be built up in government official based on the role that they are likely to play in a department/ e-governance intitative rather than imparting generic AI training. The middle-level government officials are generally likely to be involved in project management and hence focus of building AI competencies in such officers should be issues related of management of projects.

Technical versus Task Based Competencies

The need for technical competencies in middle-level government officials may be less in comparison to task/role based competencies. Hence, after the compulsory basic AI training at the entry level, further enhancement of competencies should as per the role the government official is likely to play in AI driven governance projects.

Approach of Capacity Building Programs

While many AI competency building programs are being run by the government to enhance the competencies in middle-level government officials but these need to re-align and refocus as per the requirements of the department/ ministry. 'One Size Fits All' formula may not be the correct approach of building such competencies.

Mandatory AI training

As AI is going to play a major role in future governance initiates, building AI competencies in middle level government officials should be mandatory. The periodicity of such upgradations should be specified by DoPT

Training Methods for Building AI Competencies

Online format of training may not be the best format of training for building such competencies. These tend get theoretical and thus lose to attract middle-level government officials to develop such competencies. The training modules could thus be combination of online and offline modes with emphasis on practical case studies.

AI Competencies and Incentives

At present developing AI competencies in middle level government officials has no incentive. To promote building up of such AI competencies, the government needs to incentivize these programs in form of, career growth or monetary incentives apart from the requisite certification.

CHAPTER I: INTRODUCTION

1.1 Introduction

The renewed use of Artificial Intelligence (AI) has propelled the national innovation spirit in every field. In a world that is gradually being steered by AI, it is important that government officials in India too gear up to embrace this technological change to enhance the delivery of public services. This requires them to imbue a new set of knowledge, skills and attitude. Such capacities thus need to be built in government officials through various capacity building programs to ensure that digital transformation in public service delivery takes place in an effective manner. "Digital Capacity Building for Governments" (N.D.) defines capacity building as the process of developing and strengthening the skills, instincts, abilities, processes and resources that organisations and communities need to survive, adapt, and thrive in a fast-changing world. It further underscores that capacity building programs should aim to increase the effectiveness of public service delivery by training government officials with necessary knowledge and skills to help them cope up and employ AI technologies in their daily functioning. In present times when AI plays a vital role in our day to day lives, "Digital Capacity Building for Governments" (N.D.) lists out numerous competencies that should be acquired by government officials through these programs. Some of these competencies include systems thinking, problem identification and solutions, digital literacy, data driven decision making, privacy and security, legal, regulatory, AI fundamentals and so on.

In early 2000s, Government of India (GoI) launched Capacity Building Programs to enhance the technological competence of government officials for

effective public service delivery. These Capacity Building Programs aimed to enhance the Digital Literacy, Project Management Skills, increase Cyber Security Awareness, AI knowledge and educate on Institutional Strengthening of government officials. Since the year 2008, The Ministry of Electronics and Information Technology (MeitY) and Capacity Building Commission (CBC) as lead agencies under the Digital India Vision Plans unveiled such capacity building initiatives related to Digital Governance. Capacity Building Scheme Phase I, II and III, Mission *Karmayogi* and FutureSkills Prime are a few to name. The National Program for Civil Services Capacity Building (NPCSCB) also known as Mission *Karmayogi* a larger frame work for capacity building for government officials in India, was launched to bring about significant changes in the Indian Civil Services arena by shifting the focus from a rule-based approach to a role-based one. The program focused on three key aspects of competencies for civil servants i.e. behavioral, functional and domain competencies. Behavioral Competencies include soft skills and interpersonal abilities that are essential for communication, problem solving and teamwork. Functional Competencies are job specific and knowledge required to perform task efficiently within a particular role and Domain Competencies are defined as expertise in specific subject matters relevant for government officials' department or area of work. The core capacity building programs launched by GoI to enhance the skills of government officials are tabulated below :-

Table 1.1: Capacity Building Programs to Enhance Technical Competencies

Program Name	Year	Responsible Ministry/ Department	Objective	Key Focus
Capacity Building Program Phase I	2008	Ministry of Electronics and Information Technology (MeitY)	To establish foundational e-governance infrastructure and skills through State e-Mission Teams (SeMTs) and Project e-Mission Teams (PeMTs).	Building institutional capacity for e-governance and establishing a foundational structure across states and departments.
Digital India Capacity Building Program	2015	Ministry of Electronics and Information Technology (MeitY)	To improve digital literacy and technical skills across government departments as part of the Digital India vision.	Enabling government employees to use digital tools effectively for governance and citizen service delivery.
Capacity Building Program Phase II under Digital India and NeGP 2.0	2015	Ministry of Electronics and Information Technology (MeitY)	To enhance technical and managerial skills necessary for managing and implementing complex e-governance projects.	Developing a technically skilled workforce focused on complex e-governance project management and sustainability.
Mission *Karmayogi* iGoT	2020	Capacity Building Commission (CBC) under the Ministry of Personnel, Public Grievances, and Pensions	To create a continuous, competency-based learning framework for civil servants, including digital, managerial, and leadership skills, using platforms like iGOT *Karmayogi*.	Enabling a dynamic, efficient civil service through structured digital and non-digital skill development at all career stages.
FutureSkills Prime	2020	Ministry of Electronics and Information Technology (MeitY) & NASSCOM	To provide training in emerging technologies like AI, cloud computing, and cybersecurity.	Preparing officials for future challenges in digital and advanced technologies.
Capacity Building Program Phase III	2024	Ministry of Electronics and Information Technology (MeitY)/ Capacity Building Commission (CBC)	To establish a sustainable, continuous learning environment through the iGOT *Karmayogi* platform and certifications for long-term digital competency development.	Creating a continuous learning culture within government and supporting digital governance sustainability at all levels.

These compounded by the vision of *Viksit Bharat 2047***,** a dream to transform India as a developed nation by the centenary year of Independence also involves the development of such competencies and capacities of government officials. The officials must thus be skilled in policy analysis, data-driven decision-making, be attuned to technological advancements and AI knowledge to improve public service delivery.

UNESCO (2021), also identified strong demand to strengthen capacities of government officials to leverage digital technologies. UNESCO (2022) as the co-lead of the Broadband Commission Working Group on AI Capacity Building, developed competency framework to support national digital capacity building efforts by policymakers, regulators and digital leaders.

The moot questions, however, are "What competencies in AI are required in middle-level government officials to ensure effective public service delivery?"; "Are these competencies being addressed by the existing Capacity Building Programs?"

1.2 Statement of Problem

As is noticed, existing Capacity Building Programs are presumed to be inadequate in addressing the technological competencies of government officials, particularly in the field of AI. Government officials thus need more specialised training to effectively execute digital initiatives of GoI. In addition, it is often observed that the officials might possess varying degree of digital skills that can further accentuate the problem. The research thus aims to identify AI competency gaps in middle-level government officials for effective Public Service Delivery and the challenges they face in developing these competencies through the ongoing Capacity Building Programs of GoI.

1.3 Purpose/ Objectives

The research was undertaken with the following aims and objectives:-

1.3.1 **To identify** the AI competency required to be built in middle-level officials of GoI for addressing the needs of effective Public Service Delivery.

1.3.2 **To analyse** gaps in existing capacity building programs in enhancing AI competency in middle-level government officials of GoI for effective Public Service Delivery.

1.3.3 **To suggest policy recommendations** to enhance the capacity building programs to address the gaps in AI competency in middle-level government officials of GoI.

1.4 Rationale/Justification

As India rapidly progresses towards digitisation of its governance and delivery of public services, government officials play an important role in its success. The technological skills of government officials particularly in the field of AI will play a pivotal role in maximising exploitation of such initiatives. However, many officials lack the necessary technological competencies to effectively manage gamut of AI technologies. This study is thus crucial for pinpointing gaps in their current training and enhancing the ability of government officials to meet the growing demands of digital governance. This study also provides solutions that will strengthen the training programs and improve government officials' capacity to adapt to AI and implement these for effective digital governance. The study aimed to provide recommendations to enhance capacity-building efforts so as to equip middle-level government officials with requisite competency in AI for effective public service delivery and help India achieve its vision of *Viksit Bharat 2047*.

1.5 Research Questions

The research aimed to find answers to the following questions:-

1.5.1 What specific AI competency is primarily required by middle-level government officials to effectively facilitate public service delivery in India?

1.5.2 What are the key gaps in AI competency that limit the middle-level government officials for effective public service delivery?

1.5.3 Have the AI competency gaps been identified by various capacity building programs (Capacity Building Scheme Phase III, iGoT Mission *Karmayogi* and FutureSkills Prime)?

1.5.4 Do these capacity building initiatives address the AI competency required by middle-level government officials as identified earlier?

1.5.5 What are the gaps in these programs related to development of AI competency in middle-level government officials?

1.5.6 How can Capacity Building Programs be further improved to enhance the AI competency of middle-level government officials to address the identified gaps and align more closely with the demands of public service delivery?

1.6 Scope/Limitations/ Delimitations

The research was limited by the following:-

1.6.1 The first and foremost is the *definition of middle-level officials*. For the context of the study, the middle-level officials were defined as officers of GoI of the rank of Directors and Joint Secretaries(JS). The research thus focused on Directors and JS for various surveys and interviews. Secretaries to the GoI were be considered as senior officers and kept out of the purview of

the research. This may have restricted the generalisation of the outcomes of the research.

1.6.2 The study also focused on line ministries of central government. The study did not focus on ministries of state government. This again could have restricted the generalisation of the outcomes of the research.

1.6.3 A potential self-bias from the respondents in the survey could have been possible.

1.6.4 The study focused on Capacity Building Programs from 2020 onwards i.e. Capacity Building Scheme Phase III, iGoT Mission *Karmayogi* and FutureSkills Prime and the outcomes were thus dependent on the availability of data of these initiatives. The data of such programs was not readily available and was collected from open source. Data was also collected through survey questionnaire which had 58 respondents.

1.7 Research Strategy and Research Design

This study employed a mixed-methods approach, combining quantitative surveys and qualitative interviews. This approach provided a comprehensive understanding of competency gaps, capturing both measurable skill levels and subjective insights into challenges and needs. The quantitative aspect involved surveys of government officials in the rank of Directors and JS who have undergone or are likely to undertake such capacity building programs in future for their views on AI capacity building of government officials. The qualitative aspects included interviews with stake holders i.e. officials and experts who have promulgated policies wrt capacity building programs and also middle-level government officials. This comprehensive strategy facilitated a holistic understanding of the issue. A thematic literature review was also undertaken for qualitative analysis.

1.8 Data Collection. Data was collected through:-

1.8.1 Quantitative Surveys. Survey questionnaire to gather data on self-assessed AI competencies, skill gaps, and perceived effectiveness of current AI capacity building programs was conducted of middle-level government officials across random central ministries. 58 officers from various central ministries responded to the survey in form of structured questionnaire. The data was analysed for outcomes and assessment.

1.8.2 Qualitative Interviews. Semi- structured interviews were conducted to explore detailed insights into middle-level officials' experiences, challenges, and training needs that may not be captured in quantitative surveys. Out of the many contacted, only 4 officials responded and were interviewed. The interviews focused on challenges in skill acquisition in AI, perceived gaps in existing training programs in AI, and recommendations for improvements in capacity building programs in AI. The interviews were thematically analysed for outcomes.

1.8.3 Document Analysis. Relevant policy documents, program reports, and evaluation studies were analysed for a better understanding of the issue.

1.9 Data Analysis.

1.9.1 Analysis of interview data, identifying key themes such as challenges in digital skills acquisition, experiences with training programs, and suggestions of middle-level government officials for improvements was carried out.

1.9.2 Categorisation of data of surveys into themes to highlight commonalities and unique insights was done for assessment.

1.9.3 Cross-verification of findings from surveys, interviews, and document analysis to ensure validity and reliability of results.

1.10 <u>Chapterisation</u> The dissertation consists of 05 Chapters.

1.10.1 Chapter One is the Introduction which gives out background context, research problem, objectives of study, research questions, significance of study and the structure of the dissertation.

1.10.2 Chapter Two centres on Review of Literature. It also gives an overview of digital initiatives related to public service delivery in India. It also discusses the existing capacity building programs in India since 2020 i.e. Capacity Building Programs Phase III, Mission Karmayogi (iGOT) and FutureSkills Prime, and their focus on AI for effective public service delivery.

1.10.3 Chapter Three primarily focuses on Research Methodology.

1.10.4 Chapter Four identifies and analyses the gaps in AI competency in middle-level government officials for effective public service delivery based on review of literature, analysis of interviews and survey questionnaire. It also identifies gaps in AI competency programs

1.10.5 Chapter Five goes on to give recommendations to further enhance the AI competency of middle-level government officials and suggest improvements in various AI CB Programs.

Table 1.2: Chapterisation of the Dissertation

Chapter I: Introduction	• Background and Context • Research Problem • Objectives of the Study • Research Questions • Structure of the Dissertation
Chapter II: Literature Review	• Overview of Digital Initiatives related to Public Service Delivery in India. • Existing Capacity Building Programs in India since 2020 and their focus on AI for effective public service delivery.
Chapter III: Research Methodology	• Research Design • Data Collection Methods ✓ Quantitative Surveys ✓ Qualitative Interviews ✓ Document Analysis • Data Analysis Methods ✓ Thematic analysis of interviews ✓ Categorisation of data of surveys ✓ Cross-verification of findings
Chapter IV: Findings and Observations	• Identification and analysis of gaps in AI competency of middle-level government officials for effective public service delivery based on review of literature, analysis of interviews and survey questionnaire. • Identification of gaps in AI competency programs.
Chapter V: Recommendations	• Recommendations to further enhance the AI competency of middle-level government officials to incorporate these in Digital Governance Initiatives. • Suggest improvements in various AI CB Programs

CHAPTER II: REVIEW OF LITERATURE

2.1 Literature Review

The review was done in a thematic manner. The literature was reviewed under the following themes to include:

Definition of AI

Importance and relevance of AI

Overview of Digital Initiatives related to Public Service Delivery in India

AI Competency gaps in middle-level government officials

Analysis of Capacity Building Programs of GoI to Adapt to AI

2.2 Definitions of AI

Definitions of AI are as complex and ever evolving as AI itself. No definition of AI is universally accepted. Russell and Norvig (1995) classify AI definitions into four approaches

- Systems that think like humans
- Systems that act like humans
- Systems that think rationally
- Systems that act rationally

Russell and Peter (2021), highlight that AI may be understood as machines or computer systems that think and act humanly by executing tasks that generally require human intelligence or that think and act rationally by focusing on logic and carefully considering all options. AI is represented as an entirely different set of technological revolutions that will not only improve the efficacy and effectiveness of public service delivery but also fundamentally structure the future service delivery mechanism, which will influence the shape of organizations (Dwivedi et al.,

2020, Wirtz et al., 2019). IBM defines AI as a synthesis of computer science and robust datasets, paving the way for innovative problem-solving methodologies. In this sphere, machine learning and deep learning transpire as crucial sub-fields, seldom interweaved with the broader concept of AI. These fields leverage AI algorithms to build expert systems capable of extrapolations or divisions based on inputs.

European Commission (2018) High-Level Expert Group on AI defines AI as “Systems that display intelligent behaviour by analyzing their environment and taking actions – with some degree of autonomy – to achieve specific goals.” U.S. National AI Initiative Act (2020) defines AI as “A machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments.” Kaplan and Haenlein define AI as "a system's ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation" (Kaplan & Haenlein, 2019).

2.2.1 Definitions in the Indian Context

Government agency like NITI Aayog's [National Strategy for AI (2018)] defines AI as "a constellation of technologies that enable machines to act with higher levels of intelligence and emulate the human capabilities of sense, comprehend and act." The Ministry of Electronics and Information Technology (MeitY) (2020) characterizes AI as "the ability of machines to perform cognitive tasks like thinking, perceiving, learning, problem solving and decision making," while highlighting its role in India's digital transformation. India's AI Standards developed by the Bureau of Indian Standards (2022) defines AI systems as those that "can, for explicit or implicit objectives, infer from the input they receive, which could be either structured

or unstructured data, and generate appropriate recommendations, predictions, and/or decisions."

Indian academia, IIT Madras' Robert Bosch Centre for Data Science and AI (2018) describes AI as "computational systems that are able to perform tasks that would otherwise require human intelligence," while emphasizing the need for responsible AI development within India's unique societal contexts. The Indian Institute of Science (IISc) (2019) characterised AI with specific attention to applications in Indian languages and contexts, defining it as "systems capable of understanding, learning, and functioning in environments with diverse linguistic and cultural parameters." The AI-ML Research Consortium (2022), a collaboration between Indian academic institutions, defined AI as "computational models and systems that can learn patterns from data, optimize for objectives, and create solutions for India-specific challenges."

Indian industry, NASSCOM (National Association of Software and Service Companies) (2020) defines AI as "a set of technologies that enable machines to sense, comprehend, act and learn either on their own or to augment human activities," with particular focus on India's IT service capabilities. NASSCOM and Deloitte (2022) jointly characterize AI in the "AI Adoption Index" as "technologies that allow machines to learn from experience, adjust to new inputs, and perform human-like tasks.” Reliance Jio's AI Division (2023) defines AI as "autonomous systems that can perform complex tasks and provide solutions specifically tailored to Indian languages, cultural contexts, and economic conditions."

2.3 Importance and Relevance of AI

Malhotra (2000), highlights the increasing reliance on digital governance across the globe. The paper underscores that technological competence is no longer a luxury but a requirement for modern governance and IT can significantly improve the efficiency, effectiveness, and overall competence of government officials in public service.

Basu (2004), analyses the role, challenges, and potential of e-government in developing countries. The article highlights the transformative potential of e-governance in developing countries, the global shift towards e-governance as a tool for improving transparency, and efficiency, reducing corruption, and public service delivery, particularly in countries where inefficiencies, corruption, and lack of accessibility characterise governance systems. One of Basu's key contributions is his detailed discussion of the challenges developing countries face in implementing e-governance projects which include digital divide, lack of infrastructure and skills.

Margetts and Dorobantu (2019), provides a forward-thinking analysis of how AI and data analytics reshape public administration. The authors argue that AI technologies and data-driven decision-making tools have the potential to transform public sector operations, enhance government performance, and improve service delivery. At the same time, they address significant challenges, such as ethical considerations, accountability, and capacity building. The article's central theme is that AI and data analytics can play a transformative role in public administration by making government operations more efficient, transparent, and responsive. The authors emphasize that AI technologies, such as machine learning, predictive analytics, and natural language processing, can help governments optimize processes, predict policy outcomes, and deliver personalized services to citizens. Margetts and

Dorobantu's.(2019). The article is a detailed exploration of the opportunities that AI presents for public administration. These include Efficiency and Automation, Predictive Analytics for Better Decision-Making, Personalization of Public Services. While the authors acknowledge the significant potential of AI and data analytics in public administration, they also highlight several challenges and ethical concerns that must be addressed to ensure that AI is used responsibly and effectively. The article stresses the importance of building capacity within public administrations to manage AI and data analytics effectively. Margetts and Dorobantu argue that governments must invest in both technical infrastructure and human capital to realize the potential of AI fully.

UNESCO. (2021), *Artificial Intelligence Needs Assessment Survey in Africa* provides a comprehensive overview of the opportunities and challenges associated with AI adoption in Africa. The assessment highlights the uneven levels of AI readiness and implementation, the barriers that hinder progress, and recommendations for realizing AI's benefits across different sectors. The report identifies significant disparities in AI adoption, largely driven by infrastructure limitations, poor internet connectivity, and a pervasive digital divide across African countries. This infrastructure deficiency in severely restricts the ability of African nations to fully leverage AI technologies, particularly in rural areas. Addressing these fundamental infrastructure gaps is a prerequisite for realizing the full potential of AI across the continent. Capacity-building and skills development are also recognized as crucial to overcome barriers of AI adoption. While there has been progress in some countries, with a growing emphasis on AI education and research, a substantial skills gap remains. This gap must be addressed through specialized training programs, support for higher education institutions to offer AI-related courses, and initiatives that foster

innovation and creativity in the AI space. Investing in AI literacy is essential to build a workforce capable of driving AI adoption and addressing Africa's socio-economic challenges. The report also emphasizes the importance of ethical regulation and governance in AI deployment. To ensure AI is used responsibly, the report calls for developing national and regional regulatory frameworks that are crucial to safeguarding human rights while promoting the positive impact of AI in society. The survey also underscores the potential of AI to address critical socio-economic challenges unique to Africa, particularly in sectors like agriculture, healthcare, and education. AI applications in agriculture can enhance productivity by providing precise farming solutions. In healthcare, AI can help improve diagnostics and healthcare delivery in underserved regions. In education, AI-based tools can expand access to quality learning resources, thereby addressing inequity in educational opportunities. By addressing these challenges, African countries can unlock the transformative potential of AI, which can drive economic growth, promote social development, and improve the quality of life across the continent.

UNESCO. (2022), *Artificial Intelligence and Digital Transformation: Competencies for Civil Servants*, addresses the growing importance of integrating AI and digital transformation into public administration. With the increasing adoption of AI technologies in governance, civil servants are required to develop new skills and competencies to manage, implement, and oversee AI-driven processes. AI is transforming how governments operate, from improving public service delivery to enabling data-driven policy decisions. The report emphasizes that AI has the potential to increase efficiency, reduce human error, and enhance decision-making processes in public administration. The 2022 report focusses on identifying the competencies that civil servants need to effectively manage AI and digital transformation. These

competencies are categorised into three main areas; Technical Skills, Ethical and Legal Competencies and Strategic and Leadership Skills. The report highlights the growing need for public sector employees to develop AI and digital transformation competencies. Civil servants must possess technical, ethical, and leadership skills to effectively manage AI technologies in public administration. However, significant challenges remain, including unequal access to training, resistance to change, and the complexity of ethical and legal considerations in AI use.

UNESCO, (2024), *Consultation Paper on AI Regulation* explores the emerging regulatory landscape of AI as countries worldwide seek to address its growing impact on society, governance, and human rights. Since 2016, more than thirty nations have introduced legislation explicitly related to AI, highlighting the urgency of effective governance to ensure that the benefits of AI are maximised while potential harms are minimised. The consultation paper identifies nine regulatory approaches that countries must adopt to govern AI systems. Despite the range of approaches being adopted, significant challenges remain. The paper highlights the difficulty of balancing the need for technological innovation with effective control and regulation. This is particularly challenging given the rapid pace of AI development, which often outpaces existing regulatory measures. Inclusivity also remains a concern, as marginalized groups may be disproportionately affected by AI without adequate protections. To overcome these challenges, UNESCO (2024) recommends a hybrid approach, combining different regulatory models to create agile and adaptable frameworks suited to local contexts.

2.4 Overview of Digital and AI Initiatives related to Public Service Delivery.

India has undertaken numerous digital initiatives to enhance public service

delivery, improve governance efficiency, and ensure accessibility for citizens. These initiatives are primarily driven by the Digital India Program, launched in 2015, which focuses on digital empowerment, e-governance, and improving service delivery through technology. e-governance initiatives in recent past have focused on enhancing efficiency and reducing costs. Advancements in technology, propelled by AI, has significantly boosted public services. AI has applications in public sectors such as health, education, security, and defence (Agarwal, 2018, Janssen and Kuk, 2016, Pencheva et al., 2020, Sun and Medaglia, 2019). The adoption, employment, and usage of AI is a emerging trend in public organizations (Valle-Cruz et al., 2020) studies indicate the transformational capacities of AI in the public sector spanning services and policy. AI technology integration in public service delivery is viewed as a fourth wave of Information and Communication Technologies (ICTs) next to social media, robotics, and big data in the area. Criado and Gil-Garcia (2019) noted that emerging technology like AI could inspire transformative practices in the public sector. In another study, Criado et al., (2013) highlighted the potential of social media for the innovation of public sector organizations. Furthermore, the study noted that Artificial Intelligence (AI) and algorithms have the potential to transform critical dimensions of public sector organizations and people working in them. Valle-Cruz (2019) also highlighted that new and smart technologies help to improve e-government services in digitalized nations.

The shift towards a technology-centric approach in service delivery in government encourages service delivery to citizens using digital platforms without compromising the quality of service (Dunleavy et al., 2006; Wirtz and Müller, 2018; Nakolisa, 2023). The application of AI in public service delivery aids government in forecasting and better decision-making, improving communication

between the citizens and government, public service personalization, and administrative burden reduction (Margetts and Dorobantu, 2019). These may improve the quality of public service and create public value. The AI-based technology can be used in areas such as process automation, knowledge management, predictive analysis, resource allocation, conversational agents and assistants, fraud and threat detection, and supporting expert tasks (Wirtz et. al., 2019). The adoption of AI systems in public services proposes optimism and apprehension. Governments around the globe are progressively utilizing AI to augment decision-making procedures and streamline service delivery to citizens. The assortment of AI administration in the public sector is wide and includes anything from the use of anticorruption robots to tailor-made service delivery (Saura et al., 2023). Significantly, AI systems reinforce government efficiency, exalt service quality, and improve accountability apparatuses. As exemplified by Odilla (2023), AI-powered "bots" in Brazil carry out obscure duties like spotting questionable activity connected to contract fraud, bid-rigging, and corruption. Similarly, Androutsopoulou et al. (2019) advise an AI-powered model of communication enabling greater interaction between citizens and government entities, thereby refining the delivery of service.

Generative Artificial Intelligence (AI) has arisen as a revolutionary force in public service delivery, providing creative ways to improve the effectiveness, efficiency, and satisfaction of citizens. Generative AI technologies, like Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs), have proven to be exceptionally proficient in performing tasks like image synthesis, natural language processing, and production of innovative content (Brock et al., 2019; Goodfellow et al., 2014; Kingma and Welling, 2013). These models allow public administrations to automate the creation of documents, customize communication with individuals, and

conduct actionable insights analysis on massive datasets which is helpful in decision-making. Furthermore, the deployment of generative AI in public services can lead to cost savings, improved service quality, and enhanced citizen satisfaction (Moradi et al., 2021). The application of generative AI in public administration shows potential for numerous functional domains like content production, citizen engagement, and predictive analytics. By leveraging the generative model's proficiencies, governments can open up new potentials for novelty and produce more comprehensive and receptive public institutions.

Zuiderwijk et al. (2021) highlight advantages such as enhanced efficiency, risk mitigation, and improved citizen engagement. Wirtz et al. (2019) delineate ten diverse AI application areas in the public sector, ranging from knowledge management to advanced data analytics. The process of AI deployment involves acquiring new knowledge and skills, ultimately transforming organizational practices (Ashok et al., 2016). Successful integration necessitates careful planning and user acceptance to transition from adoption to routine usage. Recent studies by Janssen and Kuk (2016) and Sun and Medaglia (2019) underscore AI's potential to revolutionize public organizations across service fields and policy sectors. AI-enabled technological innovations, akin to previous e-government initiatives, prioritize efficiency and cost-effectiveness in public administration (Madan and Ashok, 2023).

The application of AI technologies encompasses a wide array of functionalities aimed at enhancing service delivery and operational efficiency. One prominent example is the use of AI-powered chatbots for citizen engagement and support services, as observed in various municipalities globally (Senadheera et al., 2021). These chatbots provide round-the-clock assistance to citizens, addressing inquiries, processing service requests, and providing relevant information promptly

and efficiently. Moreover, AI-driven predictive analytics systems are being deployed to optimize resource allocation and improve decision-making processes at grass root levels i.e municipalities . For instance, machine learning algorithms are utilized to analyze vast datasets related to infrastructure maintenance, waste management, and urban planning, enabling municipal authorities to anticipate needs, allocate resources effectively, and prioritize interventions (Dutta and Agrawal, 2020). Additionally, the adoption of AI-enabled smart sensors and IoT devices in urban infrastructure facilitates real-time monitoring of various parameters such as traffic flow, air quality, and energy consumption, allowing municipal corporations to implement data-driven policies and interventions for sustainable development (Kitchin, 2018). AI-powered drones are being explored for tasks like aerial surveillance, disaster response, and infrastructure inspection, offering municipalities innovative solutions for enhancing public safety and service delivery (Shi, 2022). By leveraging these diverse AI applications, municipal corporations aim to optimize resource utilization, improve service delivery efficiency, and enhance overall urban governance effectiveness.

The literature on the integration of AI in public services illustrates its potential to revolutionize governmental operations while also highlighting notable challenges. Criado and Gil-Garcia (2019) and Criado et al. (2020) emphasize that AI adoption significantly improves citizen-centric services and enhances municipal processes by automating routine tasks and facilitating more efficient data management. Valle-Cruz et al., (2019) supports this by noting improvements in decision-making processes due to AI's analytical capabilities. The importance of ethical considerations and fairness is further elaborated by Boer and Raaphorst (2021) and Ahonen and Tero (2020), who caution that AI can have a moderate impact on human-centric aspects, such as user experience and equity. Researchers extend this

discussion by exploring the ethical and social implications of AI in public services, emphasizing the need for robust oversight frameworks to ensure that AI deployment promotes fairness and prevents discrimination. Senadheera et al (2024) also noted that despite concerns about accuracy and accountability, chatbots hold promise in enhancing outreach and service quality of local governments..

Despite the growing discussion, the actual diffusion of AI in public sector practice remains low, particularly compared to private sector companies (Wirtz and Müller, 2019; Wirtz et al., 2019). AI adoption in the public sector may be backed by many challenges ranging from data management and privacy to ethical issues and societal impact (Zuiderwijk et al., 2021, Wirtz and Müller, 2018). AI is performing tasks of a hundred individuals at a time which may seize the job of people in this sector (Ford, 2013). Regulatory issues such as effective supervision and corresponding laws and regulations are needed in different public sectors.

According to Wirtz et al., (2019), the challenges embody the issues of system quality, financial viability, social legitimacy, trust, privacy, safety, responsibility, accountability, and ethical dilemmas. Furthermore, adoption of AI may aggravate societal disparities and impede public confidence through implications such as rights violations, digital divides, predictive policing biases, and economic inequalities (Chu et al., 2022, Yu and Carroll, 2022, Papachristos, 2022; Eubanks, 2018; Acemoglu and Restrepo, 2017). While AI innovation holds tremendous potential for refining public services, it is vital to tackle the multifaceted challenges and ethical considerations to ensure responsible and equitable deployment in public administration. Margetts and Dorobantu (2019) explained that challenges to adopting AI in public organizations stem from factors more prevalent in the public context such as lack of technical staff to introduce and assess new technologies, the risk of potential erroneous use of AI

like security risks, privacy concerns, the need to guarantee transparency in the context of AI, moral dilemmas such as when to use AI, and ethical considerations.

2.5 AI in the Overall Context of Public Service Delivery in India.

2.5.1 AI Competency and Training Needs, Gupta & Jaiswal (2024) emphasize the necessity of AI training programs tailored for government officials. They discuss factors influencing AI competency development, including technical literacy, decision-making abilities, and ethical considerations.

2.5.2 Pedagogical Approaches to AI Training, Kavitha & Joshith (2025) discuss AI-powered pedagogy, highlighting the role of adaptive learning platforms in professional education. They propose blended learning models combining theoretical and hands-on AI training.

2.5.3 AI in Recruitment and Workforce Development, Sandeep et al. (2025) explore AI applications in recruitment, emphasizing how AI enhances workforce decision-making. AI-based systems can be leveraged to identify competency gaps and personalize training programs for officials.

2.5.4 Emotional Intelligence and AI Adoption, Sharma & Tiwari (2024) examine the intersection of emotional intelligence and AI competency. Effective AI adoption requires not only technical knowledge but also the ability to navigate ethical dilemmas and human-AI interactions.

2.5.5 Agriculture and AI Adoption Malhotra and Anand (2020) explore the transformative role of AI and the Internet of Things (IoT) in accelerating public service delivery in Indian agriculture. Their study emphasises how

these technologies, when integrated thoughtfully, can address systemic inefficiencies, enhance productivity, and empower farmers through context-aware, data-driven solutions. However, the authors stress that for such innovations to be impactful in developing countries like India, a personalized, integrated approach, such as a unified "Kisan One" platform, is essential to overcome socio-economic and infrastructural barriers.

2.5.6 Challenges in AI Integration for Public Service, Kohli (2025) identifies structural and cultural barriers to AI adoption in governance. These include resistance to change, lack of skilled trainers, and limited access to AI-driven decision-making tools.

2.5.7 The Literature review highlights the following gaps in AI competency development:

- **Limited AI Exposure**: Many officials lack fundamental AI knowledge due to inadequate training programs.
- **Resistance to AI Adoption**: Cultural and structural resistance within government organizations slows AI integration.
- **Lack of Personalized Training**: One-size-fits-all AI training does not cater to the diverse needs of public officials.
- **Ethical and Policy Challenges**: AI applications in governance raise concerns about bias, transparency, and accountability.

2.6 AI Competency Gap in Middle-Level Government Officials in India

The government has demonstrated increasing interest in AI implementation across various sectors. Saxena and Sharma (2022) argue that digital governance is becoming a priority, with initiatives like Digital India aimed at transforming government services through technological innovation. However, the practical implementation of AI technologies remains constrained by limited human capital and technological expertise among mid-level bureaucrats. Recent research consistently identifies a notable disparity between the existing skills of middle-level government officials and the AI competencies required to effectively perform their duties, which in turn hampers the efficient administration and implementation of policies (Gupta & Sharma, 2021; Mishra, Rao, & Kumar, 2022; Singh & Rajan, 2023). Raghavan and Kumar (2023) highlight that while national-level policies emphasize AI adoption, there is a significant disconnect between policy formulation and implementation at the middle management level. Their research indicates that only 28% of middle-level government officials possess basic digital literacy skills required for emerging AI technologies, creating a substantial competency gap. Recent literature also brings out AI-related competency gaps among government officials, which obstruct effective integration of AI in public service delivery.

Firstly, government officials lack technical understanding and AI-specific skills, including knowledge of basic AI technologies such as machine learning, data analytics, and AI systems functionalities. This limits the capacity of an official to adopt and implement AI-driven solutions effectively (INDIAai, 2023).

Secondly, government officials also lack awareness of ethical considerations and legal frameworks concerning AI deployment. Malhotra, Kotwal, and Dalal (2018) emphasise the critical need for an ethical framework to guide the development and application of machine learning (ML) technologies. As ML increasingly influences decision-making in areas such as finance, healthcare, and governance, concerns have emerged about its potential to reinforce societal biases and ethical inconsistencies.

Additionally, officials lack the preparedness to manage cross-functional teams, handle resistance to technological change, and cultivate an organisational culture that promotes innovation and continuous learning (Dwivedi et al., 2021).

Further, officials are challenged by stakeholder engagement and communication. Effective communications, building consensus, and fostering partnerships about AI concepts in governance with non-technical stakeholders, are policymakers, and the public, essential components for successful AI project execution (INDIAai, 2023).

Project management competencies tailored specifically to AI initiatives also represent a significant gap. Given the iterative and dynamic nature of AI projects, officials often lack proficiency in agile methodologies, risk assessment, and AI-specific performance evaluations, which differ markedly from traditional IT project management practices (Dwivedi et al., 2021).

Finally, government officials often lack sufficient insight into how AI can effectively solve challenges within particular domains such as healthcare,

agriculture, or education, significantly limiting their ability to identify and capitalize on strategic opportunities for AI integration (INDIAai, 2023).

The competency gap has substantial implications for public service delivery. Chakrabarti and Iyer (2022) argue that ineffective AI integration can lead to:

- Reduced operational efficiency
- Increased bureaucratic resistance to digital transformation
- Compromised quality of public services
- Missed opportunities for innovative governance solutions

The National Institution for Transforming India (NITI Aayog, 2022) has acknowledged the strategic imperative of addressing the AI competency gap among government officials. The report recommends comprehensive training programs, specialized certifications, and partnerships with educational and private-sector institutions to build robust AI competencies. However, implementation of these recommendations has been uneven and varies widely across states and governmental departments, indicating systemic challenges in capacity-building measures (NITI Aayog, 2022).

Research suggests the need for a comprehensive competency framework specifically tailored to government officials. Desai and Reddy (2023) propose a multi-dimensional approach to AI competency that includes:

- Technical understanding of AI technologies
- Ethical considerations in AI implementation
- Data privacy and security awareness

- Strategic thinking in technological integration
- Adaptability to technological changes

Researchers have proposed several strategies to address the AI competency gap:

- **Comprehensive Training Programs**: Developing targeted, continuous learning initiatives that focus on practical AI skills (Rao & Narayanan, 2023).
- **Collaborative Learning Models**: Creating partnerships between government institutions and technology companies to provide hands-on training (Khanna & Basu, 2024).
- **Skill Assessment and Personalized Learning Paths**: Implementing adaptive learning approaches that address individual skill gaps (Malhotra & Chatterjee, 2022).

2.7 Capacity Building Programs of GoI to Adapt to increase AI competencies in Government Officials Phase III.

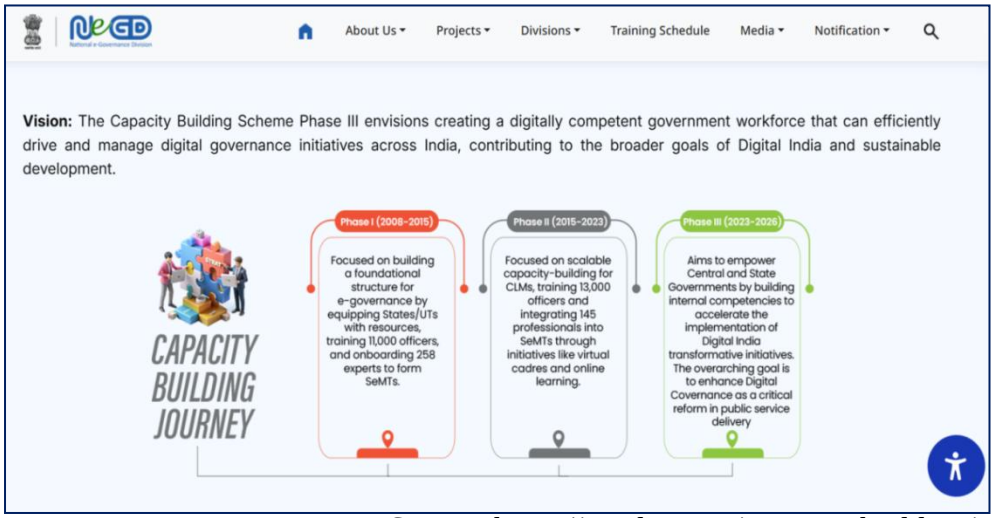
United Nations Development Programme (UNDP) 2020, defines capacity building as "the process by which individuals, organizations, and societies develop abilities to perform functions, solve problems, set and achieve objectives". Since 2006, the Government of India has placed significant emphasis on capacity-building programs for its officials.

The capacity building initiatives have undergone significant changes since then, moving from Phase I in 2006 to Phase III in 2024. The Capacity Building Program Phase III is a significant change from its previous versions, with enhanced focus on emerging technologies (Department of Personnel and Training [DoPT], 2022). CBP Phase III integrates traditional training methodologies with digital

learning platforms and specialized domain-specific modules (Ministry of Electronics and Information Technology [MeitY], 2023).

- **Phase I (2008-2015):** Established foundational structures and training frameworks.
- **Phase II (2015–2023):** Focused on stakeholder engagement and long-term sustainability.
- **Phase III (2024):** Introduces digital governance, emerging technologies, and artificial intelligence (AI) to enhance decision-making and operational efficiency.

Figure 2.1: Capacity Building Journey



Source: https://negd.gov.in/capacity-building/

2.7.1 Objectives of Capacity Building Phase I and Phase II

Phase I focused primarily on basic skills development for lower and middle-level government employees, while Phase II (2011-2020) expanded to include senior officials and introduced technology-enabled learning methods (Sharma & Joshi, 2022). The **primary objectives** of CB Phase I and Phase II programs were:

- To provide professional resources to States/UTs.

- To equip political and policy-level decision-makers across States/UTs and Central Line Ministries with essential skills.
- To develop in-house capacities for the design, implementation, and monitoring of various e-Governance initiatives.

The table below (Table 2.1) outlines the key components of both capacity-building schemes:

Table 2.1: Constituent Elements of Capacity Building Scheme Phase I & Phase II

Constituent Element	**CB- Phase I (2008-2015)**	**CB- Phase II (2015-2023)**
Total Outlay	Rs 313 Cr	Rs. 423.87 Cr
Physical Progress	• Under training & knowledge sharing, around 11,000 officers were trained from the Centre & States/UTs. • Around 258 experts were on- boarded into State e-Mission Teams (SeMTs).	• Under training & knowledge sharing, around 13,000 officers were trained from the Centre & States/UTs. • Around 145 professionals from open- market were on-boarded into State e- Mission Teams (SeMTs)
Objective	"To provide professional resources to States/UTs and training to political and policy level decision makers for all States/UTs and Central Line Ministries and to build the in-house capacity for implementation of various e-Governance initiatives".	
Focus	The schemes' focus was to address: • Lack of personnel with appropriate qualifications, skill sets and expertise in managing large IT/ e-Governance projects • Lack of appropriate institutional framework to implement capacity building programme	The second phase focus was to continue the key components identified under of Phase I with new emphasis on: • Strengthening of State Administrative Institutes (ATI)-Central Training Institutes (CTI) to ensure scalability and sustenance of Capacity Building efforts • Focus on officers from Central Line Ministry in Trainings • E-Governance competency framework

2.7.2 Phase I: Laying the Foundation for Capacity Building (2008-2015)

The initial phase of capacity building in India was primarily focused on institutional development. The objective was to create structures that could support essential governance functions.

- **Key Features of Phase I**
  - ✓ **Infrastructure Development** – Establishing government training academies and digital infrastructures for learning.
  - ✓ **Skill Enhancement** – Training government personnel to improve administrative efficiency and service delivery.
  - ✓ **Process Standardization** – Implementing standard operating procedures (SOPs) for uniformity across departments.

At this stage, the emphasis was more on institution-building than on continuous learning. While this phase successfully laid the groundwork, it had several shortcomings.

2.7.3 Phase II: Towards Integrated Capacity Building (2015-2023)

In response to the shortcomings of Phase I, Phase II of capacity-building programs took a more holistic approach. Instead of focusing solely on training, the government introduced stakeholder engagement, knowledge sharing, and digital learning models.

- **Key Features of Phase II**
  - ✓ **Stakeholder Collaboration** – Encouraging **public-private partnerships** to enhance capacity-building efforts.
  - ✓ **Technology-Driven Learning** – Initiating **e-learning platforms** to make training **more accessible and scalable**.
  - ✓ **Sustainability Measures** – Integrating capacity-building initiatives into **long-term governance reforms**.

2.7.4 Trends in Training

The CB Phase I and II were successful in many ways. It trained more than it had intended to do.

Table 2.2 : Personnel Trained in CB Phase I & II

CB	No. of Trainings		No. of Participants	
	Target	Achieved	Target	Achieved
Phase I	345	347	8,800	11,055
Phase II	-	135	-	13,270

2.7.5 Observations Capacity Building Phase I and II

Table 2.3: Observations of Third-Party Assessment of CB Scheme

Capacity Building Phase I	Capacity Building Phase II
• Central Line Ministries were not covered • Sub-optimalutilization of trained manpower • No incentive for government officers to encourage participation • Limited coverage of training • Training Institutions and trainers were limited • Nominations were a challenge • Practical and hands-on approach was missing • Training Management System and e- Learning was not in place	• Absence of a Vision statement and measurable objectives. • Base lining of ICT Maturity to measure required effort was not in place to factor State-specific customization • No Training Management System/ Centralised trainee dossier for nomination, training-need analysis and feedback • Study and promotion of Institutional Structure like Virtual Cadre is not provisioned • Sub-optimal nomination • No provision for refresher course • Important Role like CTO envisioned in e-Gov • Competency framework and CISO are not addressed in role-based trainings

Despite these hurdles, Phase II successfully laid the foundation for continuous and technology-driven learning. However, as governance became more data-intensive, it became clear that AI and Big Data Analytics needed to be integrated into capacity-building frameworks. For CB Scheme Phase III to be cohesive, it is essential to connect the dots of learning elements of existing training programmes with a defined learning path for different

level of roles mapped through technology led learning platform with hybrid learning and measuring the post learning results. Additionally, SeMTs are found to be high-value resources in the States with their contribution to the initiatives and activities requiring specialized skills, whether in-terms of technology management, procurement, change management, project & programme management. With the new paradigm shift in digital transformation, it has been observed that the requirement for niche skill sets have risen like Artificial Intelligence, Machine Learning, Cloud Computing, Blockchain, Research & Development, Design Thinking, Data Analytics, all of which make the previous roles as sub-skills.

2.7.6 Need for a New Capacity Building Program

A total of 05 Empowered Committee meetings under the Chairmanship of Secretary, MeitY had been held for CB-II. After several deliberations with various State government and practitioners, recommended actions were included in the CB-III scheme. The highlights and recommendations of the committee include the following.

- **Partnerships**

  ✓ Association with National & States, Industry, Academia for CB activities across the country.

  ✓ Joint programmes to be conducted with the premiere institutions and the State institutions.

- **Manpower & Subject Matter Expertise**

  ✓ Strengthen and augment SeMTs by hiring resources in emerging technologies Creating pool of experts with expertise on specialized fields like geo-spatial technologies with fair

compensations where required.

✓ Promote national best practices like BISAG, UMANG, Digilocker, Open forge etc., with help from national level expert pool for replication and adoption.

- **Knowledge Management**

  ✓ Establishing an e-Governance Academy/Digital University through collaboration of major institutes.

  ✓ A process for quick replication or adoption of best practices by other States or at National level and building capacity module for it.

  ✓ Organize an international conference on Digital Governance and other domains under the Digital India programme to encourage international exposure and quality research.

  ✓ To create a database of APIs and various e-Governance initiatives carried out successfully by other states to reduce redundancy.

- **Training**

  ✓ Reorientation and knowledge management for IndEA 2.0 with focus on agile methodologies and emerging technologies.

  ✓ Focus on Platform/ Domain specific programmes including management of large infrastructure like cloud, hyperscale data centre etc.

  ✓ Programmes for distributed workforce working virtually at NeGD, CDAC and NIC.

  ✓ Extensive training to the existing resources (SeMTs) in newer technologies.

- ✓ National best practices (IndEA, UMANG, Digilocker, GIS etc.) to be embedded into all training programmes as special sessions.
- ✓ Focus on programmes specific to ministries and departments like Healthcare, Justice Delivery, Financial,etc.
- ✓ Joint Programmes with premier institutions and State Government Institutions for Capacity Building programs.

2.7.7 Phase III: Capacity Building with a Focus on Emerging Technologies Artificial Intelligence

As analysed in CB Programs Phase II, the Phase III focused on empowering government officials through training on emerging technologies. Announced in Sep 2024, MeitY formally launched Capacity Building Programs Phase III. The critical focus areas are Digital Public Infrastructure, Contract and Procurement Management, the Application of AI & ML, Managing Large Digital Transformation Projects, Digital Governance, and Data Management. Kumar and Singh (2023) argue that CBP Phase III differs fundamentally from its predecessors in three ways: first, its competency-based rather than seniority-based approach; second, its integration of technology in both delivery and content; and third, its alignment with broader governance reforms like Mission Karmayogi. This evolution reflects "a shift from training as an event to learning as a continuous process". This phase emphasizes transformational change, leveraging advanced technologies to enhance organizational capabilities and service delivery.

Figure 2.2: Vision and Objectives Capacity Building III

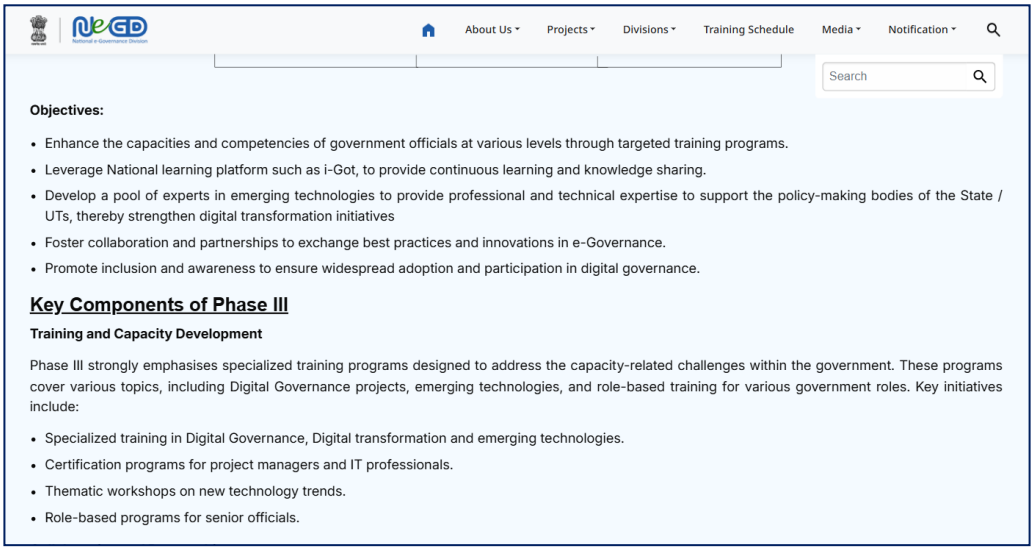
Source: https://negd.gov.in/capacity-building/

The notable objectives of Phase III as hosted on the NeGD website are:

- Develop a pool of experts in emerging technologies to provide professional and technical expertise to support the policy-making bodies of the State / UTs, thereby strengthen digital transformation initiatives
- Foster collaboration and partnerships to exchange best practices and innovations in e-Governance.
- Promote inclusion and awareness to ensure widespread adoption and participation in digital governance.

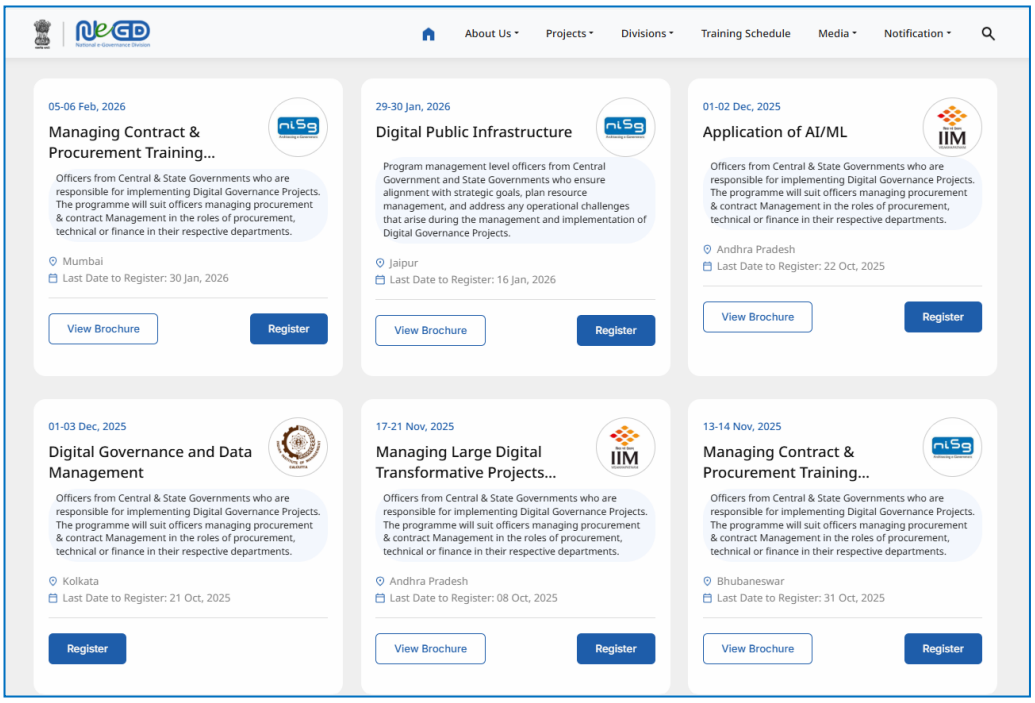
Similarly, a key focus of this phase is training in digital governance and emerging technologies**,** underscoring the government's commitment to leveraging innovation for improved public service delivery. Additionally, dashboard insights indicate a growing emphasis on AI-related courses**,** though most are scheduled to commence later in the year. Since this phase was recently launched, comprehensive data on the number of training programs and participants is not yet available.

Figure 2.3: Objectives and Key Components of Capacity Building III



Source: https://negd.gov.in/capacity-building/

Figure 2.4: Objectives and Key Components of Capacity Building



Source: https://negd.gov.in/capacity-building/

2.7.8 Integration with National AI Strategy

CBP Phase III closely aligns with National Strategy for Artificial Intelligence, articulated by NITI Aayog (2018). Bhatia and Kumar (2024)

examine this and observe that the program operationalises key aspects of the strategy by building capacities in government officials to implement AI in governance. They argue that "the program represents a critical missing link between ambitious policy vision and ground-level implementation capability" (p. 178). The Center for Study of Science, Technology and Policy (2023) analysed the gaps between AI competencies emphasised in CBP Phase III and actual requirements in e-governance projects. Their findings suggest reasonable alignment in technical domains but identify gaps in "contextualizing AI solutions for local governance challenges and integrating AI with legacy administrative systems" (p. 44), indicating areas for refinement.

2.8 Analysis of Capacity Building Program Phase III

2.8.1 Standard Curriculum

Sharma and Gupta (2023) conducted a comparative analysis of twelve international AI capacity building frameworks and found that CBP Phase III employed an excessively standardized curriculum that failed to account for diverse departmental contexts and varying baseline competencies among participants. Their mixed-methods evaluation, which combined curriculum analysis with interviews of 45 program architects, revealed significant conceptual tensions in the program design:

"The program's uniform training structure disregards the heterogeneous nature of AI applications across different administrative functions, creating a misalignment between training content and actual implementation requirements. This standardization appears to prioritize scalability and

administrative convenience over effectiveness and relevance" (Sharma & Gupta, 2023, p. 127).

This observation aligns with Kumar and Reddy's (2023) survey-based study of 324 program participants across 18 departments, which found that 67% of respondents reported a disconnect between the AI competencies developed through the program and their actual job requirements.

2.8.2 Inadequacies in Competency Mapping

Venkatesh and Krishnan (2023) conducted a detailed analysis of the CBP Phase III competency framework, comparing it with established AI skills taxonomies from industry and international civil service programs. Their comparison revealed substantial gaps in the program's competency architecture:

"The program's competency dictionary demonstrates notable omissions in data governance capabilities, AI ethics and responsibility frameworks, and system integration skills—all critical for effective AI deployment in administrative contexts. These gaps appear to stem from an outdated understanding of AI implementation requirements that emphasized technical knowledge over governance capabilities" (Venkatesh & Krishnan, 2023,p. 91).

Patel and Mehta (2023) employed a Delphi study with 28 AI governance experts to evaluate the program's competency framework. Their findings indicated significant misalignment between expert-identified priority competencies and those emphasized in the program curriculum, with particularly notable gaps in "regulatory understanding," "ethical impact assessment," and "algorithmic transparency governance"—all rated as high-

priority by experts but receiving minimal attention in the CBP Phase III framework.

2.8.3 Time Allocation vs Workload

Agarwal and Das (2023) conducted a time-use study with 156 program participants, finding that the average time required for meaningful engagement with program modules (7.4 hours weekly) significantly exceeded the officially allocated time (3 hours weekly). Their analysis revealed that this misalignment created substantial implementation barriers:

"Without formal workload adjustment or protected time allocations, participants consistently prioritized immediate operational responsibilities over capacity development activities, resulting in fragmented learning experiences and superficial engagement with complex AI concepts" (Agarwal & Das, 2023, p. 183).

2.8.4 Theory-Practice Imbalance

Singh and Patel (2023) conducted a content analysis of the program's learning materials and assessment frameworks, identifying an overemphasis on theoretical knowledge at the expense of practical application skills. Their comparative assessment with international benchmarks concluded that CBP Phase III dedicated only 23% of learning time to hands-on application, compared to the 60-70% recommended in effective AI training frameworks.

This critique is expanded upon by Das (2024), whose longitudinal study tracked learning outcomes among 189 program participants over an 18-month period:

"The program's reliance on knowledge-based assessments rather than competency demonstrations has created an artificial sense of progress that

does not translate to implementation capabilities. Our 18-month follow-up revealed that 71% of participants who scored highly on program assessments reported significant difficulties when tasked with actual AI implementation projects" (Das, 2024, p. 86).

2.8.5 Knowledge Retention

Agarwal and Krishnan (2023) tracked retention and application of AI skills among 156 program graduates over a twelve-month period, finding significant competency degradation without structured application opportunities:

"In the absence of continuous practice and application contexts, participants demonstrated an average 47% decline in applicable skill demonstration over the study period. This decay was particularly pronounced for complex competencies such as data preprocessing, model evaluation, and ethical impact assessment" (Agarwal & Krishnan, 2023, p. 227).

2.8.6 Incentives and Career Integration

A major of concern is the program's integration with career progression frameworks. Venkatesh (2023) conducted an institutional analysis of how CBP Phase III connected with performance evaluation systems across five ministries, finding minimal formal integration:

"The program exists largely in isolation from performance evaluation frameworks, career progression pathways, and departmental innovation systems. This structural disconnect creates few incentives for sustained competency development beyond initial certification, undermining the program's potential to drive deeper institutional transformation" (Venkatesh, 2023, p. 152).

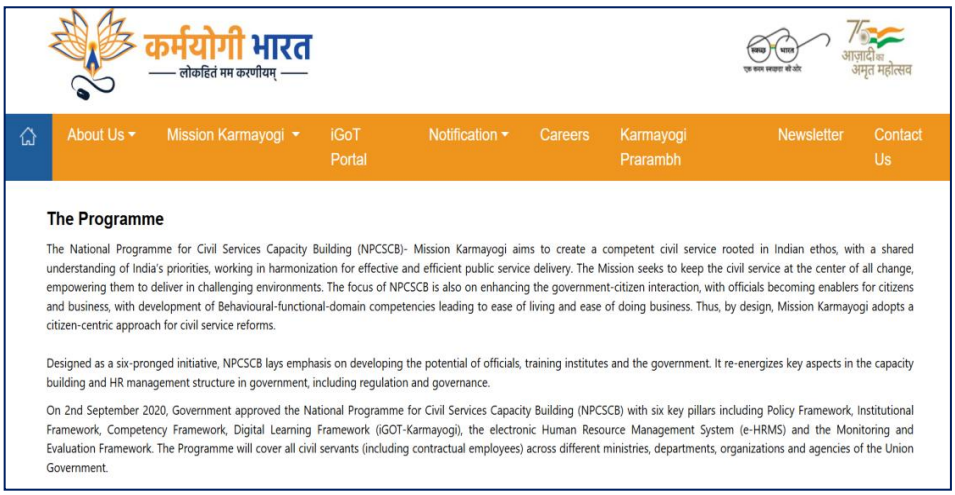
Building on this observation, Mishra and Kumar (2023) surveyed 278 program participants regarding motivational factors and institutional incentives, finding that 83% reported no tangible connection between program participation and career advancement opportunities.

2.9 Mission Karmayogi and Its Role in Developing AI Competencies

In 2020 Mission Karmayogi, or the National Programme for Civil Services Capacity Building (NPCSCB), was launched by the GoI as a major reform initiative aimed at transforming the learning and capacity-building framework for government employees. Mission Karmayogi focuses on creating a competency-driven, role-based civil service that is responsive, future-ready, and efficient in delivering governance outcomes (Katikithala, 2020).

The mission marks a shift from a "rule-based" approach to a "role-based" system, ensuring that civil servants are trained not only on policy implementation but also on new technologies, governance strategies, and evolving public service requirements. A significant aspect of this transformation is the focus on Artificial Intelligence (AI) competencies, recognizing that emerging technologies are shaping the future of governance.

Figure 2.5 : Mission Karmayogi



Source: https://karmayogibharat.gov.in/

2.9.1 From Rule-Based to Role-Based Civil Service

A fundamental shift introduced by Mission Karmayogi is the transition from a rule-based to a role-based approach in civil service capacity building. Pande and Rao (2021) argue that this shift represents a significant departure from traditional administrative paradigms, focusing on competencies required for specific roles rather than adhering to procedural frameworks. This transition aligns with global public administration trends emphasizing performance over procedure (Rao, 2022).

Agarwal (2021) terms the shift as the "competency driven capacity building" approach, which attempts to map specific competencies to roles rather than positions or ranks. Sharma and Mehta (2022) note that this approach enables a more targeted and efficient training ecosystem that responds to the actual needs of governance rather than hierarchical conventions.

2.9.2 The Competency Framework

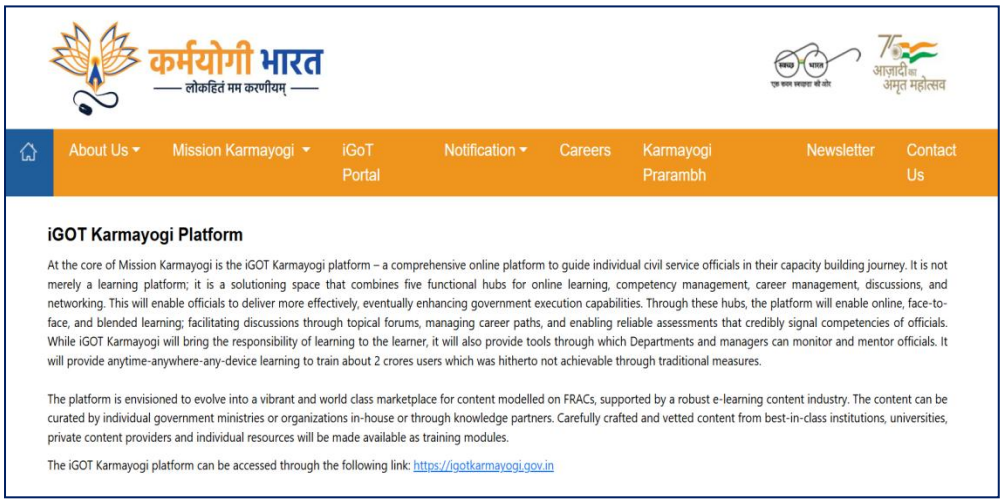
The National Framework for Civil Services Capacity Building anchors Mission Karmayogi conceptually consists of two main components: a Competency Framework and a Capacity Building Plan. The Competency Framework identifies 38 domain competencies, 19 functional competencies, and 25 behavioral competencies considered essential for civil servants at various levels (Department of Personnel and Training [DoPT], 2021).

2.9.3 The iGOT Karmayogi Platform

At the core of Mission Karmayogi is the iGOT Karmayogi platform – a comprehensive online platform to guide individual civil service officials in their capacity building journey. A key pillar of this initiative is the Integrated

Government Online Training (iGOT) Karmayogi platform, which acts as a digital learning ecosystem for civil servants, offering them access to structured training programs that are aligned with their roles and responsibilities (IMPRI, 2023).

Figure 2.6 : Mission Karmayogi iGoT platform



Source: https://karmayogibharat.gov.in/

It is not merely a learning platform; it combines five functional hubs for online learning, competency management, career management, discussions, events, and networking. This enables officials to deliver more effectively, eventually enhancing government execution capabilities. Through these hubs, the platform enables online, face-to-face, and blended learning; facilitating discussions through topical forums, managing career paths, and enabling reliable assessments that credibly signal competencies of officials. While iGOT Karmayogi brings the responsibility of learning to the learner, it also provides tools through which Departments and managers can monitor and mentor officials. It provides anytime-anywhere-any-device learning to train about 2 crores users which was hitherto not achievable through traditional measures. Carefully crafted and vetted content from best-in-class institutions,

universities, private content providers and individual resources are made available as training modules on iGOT.

Figure 2.7 : Six hubs of Mission Karmayogi

https://igotkarmayogi.gov.in/

Key features of the platform include:

- A structured competency-based training approach, where officers can track their progress and gain certifications for skills.
- A vast repository of learning materials, including video lectures, assessments, real-world case studies, and interactive simulations.
- AI-driven personalized learning recommendations, ensuring that civil servants receive training tailored to their current role and future career trajectory.
- Integration with national governance frameworks, allowing government agencies to monitor training completion, competency enhancement, and overall workforce preparedness.

2.9.4 Challenges in AI Competency Development

Despite these efforts, several challenges in AI competency development emerge from the literature. Bhatia and Kumar (2023) identify four key challenges:

- The rapidly evolving nature of AI technologies, which makes curriculum development difficult
- The shortage of domain-specific AI training materials relevant to Indian governance contexts
- The varying baseline technical literacy among civil servants
- The difficulty in providing hands-on AI experience through an online platform

Addressing these challenges, Singh (2023) advocates for a "learning ecosystem" approach that complements online iGoT content with in-person workshops, mentorship programs, and actual AI project experiences. The Ministry of Electronics and Information Technology (2023) reports initial efforts to create such integrated learning experiences through partnerships with academic institutions and the private sector.

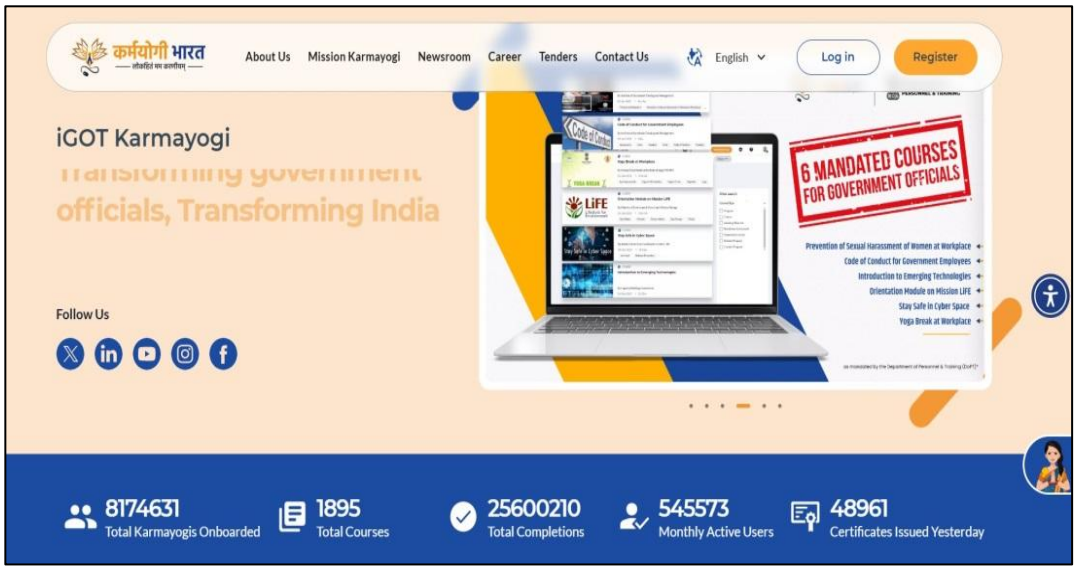
2.9.5 Key AI related programs under iGoT – platform

Table 2.4 : Key AI related programs

Content_Name	Content_ Provider_Name
ChatGPT and Generative AI tools for Government Officials	Wadhwani Foundation
AI led Digital Transformation in Urban Governance	Wadhwani Foundation
AI led Digital Transformation in Agriculture	Wadhwani Foundation
AI led Digital Transformation in Education	Wadhwani Foundation
AI led Digital Transformation in Rural Development	Wadhwani Foundation
Introduction to Emerging Technologies	Wadhwani Foundation
ChatGPT and Generative AI tools: An Introduction	Wadhwani Foundation
AI for Digital Transformation: Machine Learning and Deep Learning	Wadhwani Foundation
AI led Digital Transformation in Healthcare	Wadhwani Foundation
AI for Digital Transformation: Computer Vision	Wadhwani Foundation
AI Using Google Bard and ChatGPT for Beginners	Invest India
Introduction to Leveraging AI and ChatGPT	Invest India
AI Essentials: Leveraging Meta Bots for WhatsApp Automation	Invest India
Better Prompting Techniques for Beginners	Invest India
Artificial Intelligence_L2	UpGrad
AI in Agri Food Systems	CEP IIT-DELHI
Artificial Intelligence for Investments	IIT Kanpur
Basics of Artificial Intelligence (AI)	Microsoft
Artificial Intelligence (AI)	Microsoft
Boost your productivity with Microsoft Copilot	Microsoft
Gen AI and AR-VR Fundamentals	Meta
GenAI for Everyone	Fractal
Responsible AI in the Generative AI Era	Fractal

Under the iGOT platform, 25 AI related programs are being run since 2022. 9,21,978 out of the total 12,90,462 enrolled have completed certifications. As the latest guide lines of the DoPT, government officials have to undertake 6 competency programs compulsorily out of which one has to be on emerging technologies.

Figure 2.8 : iGOT Mission Karmayogi



Source: https://karmayogibharat.gov.in/

2.10 Analysis of iGOT, Mission Karmayogi

2.10.1 Relevance of Curriculum

Banerjee and Kohli (2023) conducted a comprehensive content analysis of 28 AI modules available on the platform, comparing them with current technological trends and governance requirements. Their findings indicate that while foundational AI concepts were well-covered, the platform demonstrated significant gaps in emerging areas such as generative AI, large language models, and AI ethics frameworks—all essential for middle-level officers tasked with policy implementation.

Patel et al. (2024) further note that the platform's update cycle for AI content was insufficient to keep pace with rapid technological developments:

"Our longitudinal analysis revealed an average lag of 8-14 months between significant advances in AI technologies and their incorporation into iGOT learning modules. For middle-level officers making critical

implementation decisions, this knowledge gap represents a significant challenge to effective governance" (Patel et al., 2024, p. 192).

2.10.2 Assessment

Mishra (2023) analyzed the assessment patterns across 12 AI-related modules and found an overreliance on multiple-choice questions and theoretical knowledge testing. Their evaluation concluded that these assessment methods failed to adequately measure the application-oriented competencies that middle-level officers require for implementing AI solutions.

Complementing this critique, Singh and Kapoor (2022) propose that more authentic assessment methods are necessary for meaningful AI competency development:

"Effective assessment of AI competencies requires simulation-based evaluations and project-based assessments that mirror the complexity of real-world governance scenarios. The platform's current assessment approach privileges theoretical knowledge over practical application skills" (Singh & Kapoor, 2022, p. 245).

2.10.3 Competency Development and Performance Improvement

Chakraborty and Sen (2023) conducted a study comparing AI project implementation outcomes between departments with high and low adoption of iGOT AI modules. Their analysis found a modest but statistically significant improvement in project success rates (12% higher) among departments with higher platform utilization.

However, Rahman (2023) argues that these improvements are unevenly distributed across different levels of the civil service:

"While senior leadership and entry-level officials demonstrated measurable gains in AI literacy through the platform, middle-level officers—who serve as crucial implementation nodes—showed more varied outcomes. This indicates that the platform's one-size-fits-all approach may be insufficient for this pivotal cadre" (Rahman, 2023, p. 173).

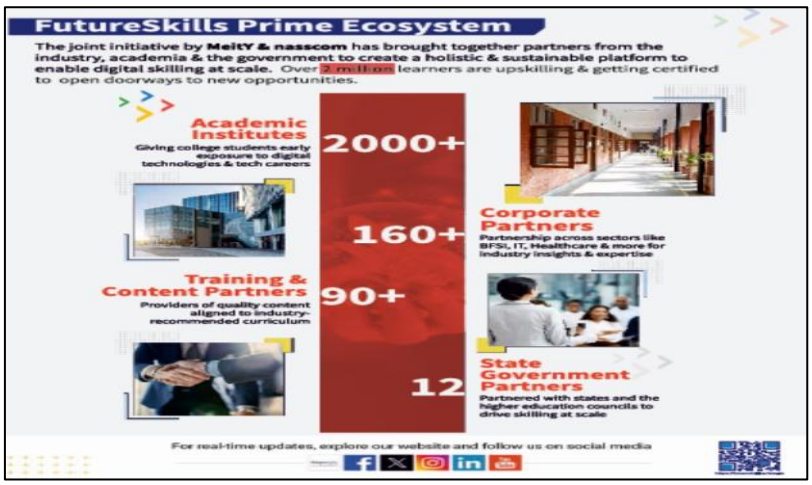
2.10.4 Incentives and Career Progression

Mathur and Krishnan (2024) surveyed 362 middle-level officers and found that only 23% perceived a clear connection between AI competencies developed through the platform and their career advancement opportunities. Their analysis concluded that this disconnect significantly reduced motivation to invest time in developing advanced AI skills.

Reinforcing this concern, Sinha (2023) notes:

"The platform's AI competency development exists largely in parallel to formal performance evaluation systems. Without systematic integration of these competencies into annual performance assessments and promotion criteria, the incentive structure remains misaligned with the platform's objectives" (Sinha, 2023, p. 89).

2.11 Future Skills Prime: Evolution and AI Competency Enhancement



Source: https://FutureSkills.gov.in/

Future Skills Prime is a digital skilling initiative launched by NASSCOM (National Association of Software and Service Companies) in collaboration with the Ministry of Electronics and Information Technology (MeitY), Government of India. This initiative aims to equip India’s workforce, both corporate and government with relevant digital skills in emerging technologies. This initiative aims to bridge the digital skills gap, focusing on AI competency enhancement to ensure India's competitiveness in the global digital economy.

In 2018, NASSCOM launched the Future Skills program with an aim to bridge the digital skills gap and equip professionals with industry relevant knowledge in emerging technologies such as Artificial Intelligence (AI), cybersecurity, cloud computing, and data analytics., It was designed as a Business-to-Business (B2B) platform. Its primary objective was to collaborate with IT companies to reskill and upskill their existing workforce in emerging technologies such as Artificial Intelligence (AI), Internet of Things (IoT), Big Data Analytics, and more. This initiative aimed to address the industry's demand for a digitally proficient talent pool by focusing on employees within organizations.

By 2020, the role of emerging technologies to include AI and digital skills were integral to every industry and even governance. The demand for AI and digital skills grew beyond corporate environs. The FutureSkills program thus transitioned to a Business-to-Consumer (B2C) model and was launched as FutureSkills Prime, making digital skills training accessible to everyone. NASSCOM, in partnership with MeitY, thus expanded the platform's reach. Students, professionals, and even government officials could access online AI and digital training courses.

Sharma and Tripathi (2021) distinguish this as an "industry-led, government-supported" approach that separates it from traditional government skilling initiatives. This collaborative framework leverages NASSCOM's industry connection while utilizing government resources and policy support. Mehta (2022) brings out that this collaborative model represents a paradigm shift in India's skill development ecosystem, traditionally dominated by either purely government-driven or private sector initiatives with limited coordination. The governance structure includes representation from both government and industry stakeholders, creating what Bhatia and Singh (2023) term a "symbiotic ecosystem" that aligns industry requirements with national skills priorities.

Table 2.5 : Milestones FutureSkills

Year	Program	Milestone	Aim
2018	Future Skills	Launched, B2B Model	To upskill IT professionals within corporate organizations in emerging technology.
2020	Future Skills Prime	Launched, Transition to B2C	To upsill and re-skill all in emerging technologies.

2.11.1 Key Features of FutureSkills Prime

As available on open resources, the key features of the program are:

- **Industry-Aligned Learning Paths**: Courses are designed in collaboration with leading technology firms, academic institutions, and government bodies.
- **AI & Emerging Tech Training**: FutureSkills Prime provides customized AI training programs for all to include government officers, policymakers, and public sector employees in emerging technologies.

- **Certification & Incentives**: Provides MeitY-recognized certificates upon completion of select courses. Some courses are eligible for fee reimbursements, making them accessible to a wider audience.

2.11.2 Programs of Emerging Technologies

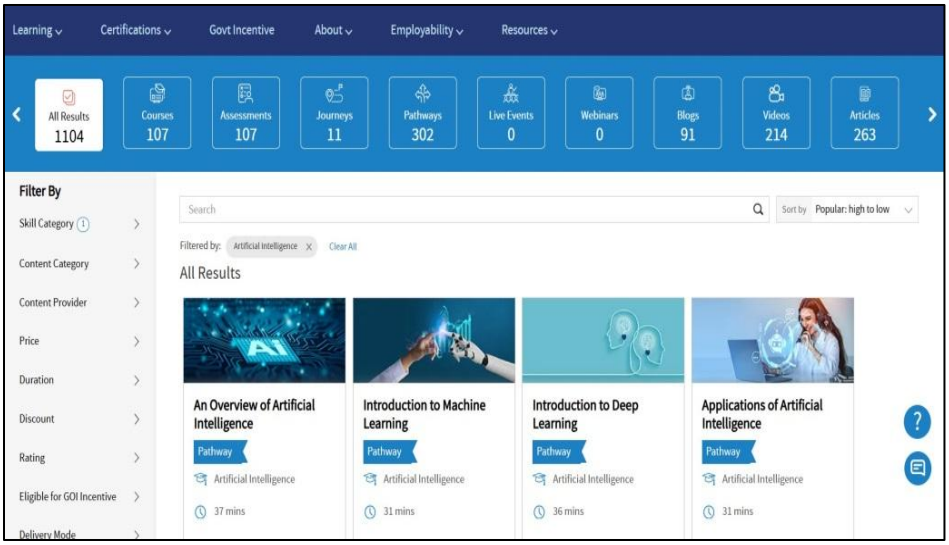
Future Skills PRIME identifies ten key emerging technology areas as critical for India's IT workforce:

- Artificial Intelligence
- Blockchain
- Cloud Computing
- Cybersecurity
- Internet of Things
- Virtual Reality/Augmented Reality
- Robotic Process Automation
- 3D Printing/Additive Manufacturing
- Data Science and Analytics
- Quantum Computing

For each of these areas, NASSCOM (2022) developed detailed competency frameworks in partnership with industry and academia. Rao and Krishnan (2022) analyze these frameworks, noting that they adopt a tiered approach to skills development i.e. foundation, intermediate, and advanced, allowing for progressive skill acquisition across career stages.

2.11.3 AI Competency Framework

Figure 2.10 : Future Skills Competency Framework



Source: https://FutureSkills.gov.in/

Artificial intelligence represents one of the most emphasized technology domains within Future Skills Prime. NASSCOM (2022) developed a comprehensive AI competency framework that Krishnan and Jain (2022) describe as "role-based, industry-validated, and future-oriented." This framework identifies 14 distinct AI-related roles across three proficiency levels:

- **Foundation Roles**: AI Associate, Junior Data Scientist, AI Testing Specialist
- **Intermediate Roles**: AI Engineer, ML Engineer, Computer Vision Specialist, NLP Engineer
- **Advanced Roles**: AI Architect, AI Research Scientist, AI Ethics Specialist, AI Product Manager

For each role, the framework defines core competencies across technical, domain, and behavioral dimensions.

2.11.4 Implementation

Although comprehensive long-term evaluation studies are still emerging, several publications document early implementation results. NASSCOM (2023) reports that as of December 2022:

- Over 425,000 learners were registered on the platform
- Approximately 62,000 individuals had completed at least one certification
- More than 2,100 courses were available across the ten focus technologies
- 250+ organizations had integrated with the platform for workforce development

Analysis of the available data (Krishnan et al. 2023), brings out significant variation across technology domains. Domains like cloud computing and data analytics find higher footfall than emerging fields like quantum computing etc. Comparatively early-career professionals (0-5 years) subscribe to these course more as compared to mid-career or senior practitioners.

2.11.5 Future Skills Prime's Training Initiatives Addressing AI Integration and Governance

AI's integration into various sectors has very deep impact and implications. In industry, AI technologies are revolutionizing operations by automating processes, enhancing decision-making, and fostering innovation. For instance, AI-driven analytics enable predictive maintenance in manufacturing, personalized marketing in retail, and improved diagnostics in healthcare. In governance, AI facilitates efficient service delivery, policy formulation, and citizen engagement. Applications include chatbots for public inquiries, data analytics for policy development, and AI-driven platforms for transparent governance. Future Skills Prime offers a diverse array of courses tailored to bridge the AI competency gap:

- AI and Economic Development Pathway – Educates learners on AI's impact on economic growth.
- Introduction to Artificial Intelligence – A foundational course covering AI concepts and applications.

2.11.6 Training Government Officials in AI

Recognizing the pivotal role of government officials in AI adoption, FutureSkills Prime has initiated specialized training programs to government officials in partnership with the National Institute of Electronics & Information Technology (NIELIT). FutureSkills Prime conducted a 40-hour online training program covering AI fundamentals, machine learning, and practical case studies. Data on institutional collaboration of NASSCOM with GoI is not available. It is learnt that the programs are open to all and hence open to government officials. Data of such government officials trained on AI on their own initiative was not available.

2.11.7 Integration with Digital Governance Frameworks

The integration of FutureSkills Prime with broader digital governance initiatives has been examined by several researchers. Kumar and Mehta (2023) analyze the program's relationship with the National Digital Governance Architecture (NDGA), identifying both complementarities and coordination challenges. They note that "while conceptual alignment exists at the policy level, operational integration remains limited by institutional silos and fragmented governance structures" (p. 213).

Kapoor and Singh (2024) examine the program's contribution to implementation capabilities for the India Enterprise Architecture (IndEA) framework, finding that "AI modules significantly enhance technical capacity

but demonstrate limited coverage of the architectural governance aspects necessary for enterprise-wide implementation".

2.12 Analysis of FutureSkills Prime

2.12.1 Inadequacies in AI Competency Framework

Sharma and Gupta (2023) conducted a comprehensive analysis of the platform's AI skill taxonomy, comparing it against established international frameworks from IEEE, OECD, and industry standards. Their evaluation revealed significant gaps in the platform's conceptualization of AI competencies:

"The platform's AI competency framework demonstrates a disproportionate emphasis on technical implementation skills over critical dimensions of AI governance, ethics, and socio-technical integration. This imbalance reflects an outdated understanding of AI proficiency that prioritizes tool proficiency over holistic capability development" (Sharma & Gupta, 2023, p. 142).

This critique aligns with Venkatesh and Mahajan's (2022) comparative analysis of AI skill frameworks, which found that FutureSkills Prime covered only 58% of the competency dimensions identified in comprehensive international benchmarks. Their study highlighted particular deficiencies in areas such as "AI ethics and responsible deployment," "socio-technical systems understanding," and "AI governance and policy frameworks"—all increasingly recognized as critical components of functional AI literacy.

2.12.2 Standardised Curriculum

Mishra and Patel (2023) conducted a mixed-methods evaluation of FutureSkills Prime's AI learning pathways, combining curriculum analysis

with surveys of 312 platform users. Their findings revealed substantial dissatisfaction with the platform's standardized approach:

"Despite catering to learners from diverse industry segments, the platform's AI learning pathways demonstrate minimal contextual adaptation for different domains and application scenarios. This standardization significantly diminishes the relevance and applicability of acquired skills in specific industry contexts" (Mishra & Patel, 2023, p. 89).

2.12.3 Pedagogical Limitations

Krishnan and Patel (2023) conducted a comprehensive evaluation of the platform's AI learning modules, analyzing instructional design, assessment methodologies, and learning activities. Their evaluation, based on established adult learning principles and technology education frameworks, identified several critical limitations:

"The platform's instructional approach demonstrates an overreliance on passive content consumption and knowledge-based assessments, with limited opportunities for authentic practice, formative feedback, and guided reflection. This pedagogical model is particularly ill-suited to developing the complex, contextual competencies required for effective AI implementation" (Krishnan & Patel, 2023, p. 112).

Mehta's (2023) mixed-methods study of learning outcomes among 276 platform users who completed AI certifications. Their analysis, which combined pre-post assessments with qualitative interviews, found that while participants demonstrated significant increases in conceptual knowledge, they showed minimal improvement in practical application capabilities and problem-solving skills.

2.12.4 Application Challenges

Das (2023) conducted a study tracking 156 platform users who completed advanced AI certifications, evaluating their ability to apply acquired knowledge to practical scenarios. Their analysis revealed substantial transfer challenges:

"Despite demonstrating high levels of conceptual understanding in assessments, study participants exhibited significant difficulties applying these concepts to novel problems or real-world scenarios. This theory-practice gap appears to stem from limited authentic practice opportunities and insufficient scaffolding for knowledge transfer" (Das, 2023, p. 175).

CHAPTER III: RESEARCH METHODOLOGY

3.1 Research Strategy

The research is exploratory in nature. A mixed research strategy was adopted involving both qualitative and quantitative approaches. As part of the qualitative analysis, subject matter experts and policy makers were interviewed to understand the limitations in AI competencies in middle- level goverement officers and how various capacity building programs were bridging these gaps to make the government officials future ready. A survey was conducted using a questionnaire to assess gaps in *Artificial Intelligence Competency of Middle-Level Officers for Effective Public Service Delivery: Challenges & Recommendations for Capacity Building Programs.* The survey was circulated amongst middle level officers of GoI i.e. JS and equivalent levels and Directors and equivalent levels in various lines ministries. The responses to the questionnaire were correlated and analysed to get to findings and recommendations of the research.

3.2 Primary Data Sources

3.2.1 Personal Interviews. Semi-structured interviews were conducted of various policy makers and subject matter experts for their views to arrive at findings and recommendations, important for the research. The interviews are analysed thematically in Chapter IV. The following were interviewed.

Name	Designation	Extracts	Remarks
Ms Charru Malhotra	Professor IIPA	Appx I	The views expressed are personal and do not represent the views of the organization they represent
Mr Rajnish Kumar	COO, NeGD	Appx II	
Mr Rajesh Kumar	Academic Counseller IGNOU	Appx III	
Mr Carlyn Khongwar Deshmukh	Addition secretary, Ministry of Justice & Empowerment, GoI	Appx IV	

3.2.2 Survey Questionnaire.

- A Google Form was circulated to middle level government officials for their views on AI competencies and improving capacity building programs of GoI. The survey questionnaire had 23 questions. The questionnaire was designed to assess four aspects: (i) Basic Information of Respondents; (ii) AI Competency and Awareness of respondents, (iii) Impact Gaps in Capacity Building Programs, and (iv) Recommendations for improvements in various AI CB Programs. A copy of the survey questionnaire along with results is attached at **Appendix V**.
- Systematic sampling technique was used. The survey was circulated amongst middle-level officers of GoI i.e. JS and equivalent levels and Directors and equivalent levels in various lines ministries so as to reduce the respondent biases.
- A total of 58 middle-level officers of GoI responded out of which 26 were Joint Secretary Level and 36 were Director level officers. Apart from 4 officers, all had more than 10 years of service.

Table 3.1: Designation of Respondents

Designation	**No. of Respondents**	**Percentage (%)**
Joint Secretary/Additional Secretary	26	44.8
Director/ Deputy Secretary	32	55.2

Table 3.2: Experience of Respondents in GoI

Years of experience	**No. of Respondents**	**Percentage %**
5-10 Years	4	6.9
11-15 Years	20	34.5
16-20 Years	7	12.1
More than 20 Years	27	46.6

Departments/ Ministries of Respondents

The respondent officers were from various ministries and departments. The sample was thus quite mixed. However maximum respondents were from Ministry of Information and Broadcasting (10), followed by Ministry of External Affairs, Railways and Defence with 6 respondents each.

Table 3.3: Departments/ Ministries of Respondents

AYUSH - 1	FAI - 1	MSME -1	NCERT - 2
Defence - 6	Finance - 4	Electronics& IT -2	Private Practice -1
Defence Production -1	Home - 2	Civil Aviation - 1	Railway - 6
Telecommunication - 4	I&B - 10	Food& Public Distribution - 2	
DoPT - 2	Lok Sabha Secretariat -1	Housing& Urban Affairs - 1	
External Affairs - 6	MNRE - 1	Panchayti Raj - 1	

Awareness of Respondents in AI Application in Governance

Most of the respondents, approx 74% had average and lower levels of awareness of AI concepts.

Table 3.4: Awareness of Respondents in AI Application in Governance

Response	No. of Respondents	Percentage (%)
Very High	6	10.3
High	9	15.5
Moderate	32	55.2
Low	10	17.2
Very Low	1	1.7

Involvement of Respondents in AI-related Projects or Policy Decisions at Work

Majority of the respondents, 65% were not exposed to AI related projects/ policy decision in their departments/ ministries.

Table 3.5: Respondents Involvement in AI-related Projects or Policy Decisions at Work

Response	No. of Respondents	Percentage (%)
Yes	20	34.5
No	38	65.5

Frequency of AI-Related Discussions or Implementations in Respondents' Official Role

Most of the respondents, approx, 54% rarely or never encountered AI related discussions/ implementations in their official role.

Table 3.6: Frequency of AI-Related Discussions or Implementations in Respondents Official Role

Response	No. of Respondents	Percentage (%)
Daily	5	8.6
Weekly	10	17.2
Monthly	12	20.7
Rarely	25	43.1
Never	6	10.3

Role of AI in Public Service Delivery

Most of the respondents agreed that AI can assist their department or ministries in delivery of public services. Most had a fair idea how AI can assist their ministries in delivery of public services.

Table 3.7: Role of AI in Public Service Delivery (PSD)

Does AI Assist PSD	Percentage
Yes	72.4
No	15.5
Areas of Application Maintain law and order Crowd control Planning of trains Augmentation of carrying capacity of trains Improvement of Government Communication Major role in Media Setting up streaming analysis systems	

3.3 Secondary Data Sources

Data from websites of various Ministries / Departments, like NeGD, CBC and NASSCOM was analysed. Besides books and journals, articles in various online resources were accessed.

3.4 Research Methodology

This study employed a mixed-methods approach, combining quantitative surveys and qualitative interviews. This approach provided a comprehensive understanding of competency gaps, capturing both measurable skill levels and subjective insights into challenges and needs. The quantitative aspect involved surveys of government officials in the rank of Directors and Joint Secretaries who have undergone or are likely to undertake such capacity building programs in future for their views on technical capacity building of government officials. The qualitative aspects included interviews with stake holders i.e. officials and experts who have promulgated policies wrt capacity building programs and also middle-level government officials. This comprehensive strategy facilitated a holistic understanding of the issue.

Correlation of observations with primary and secondary data was carried out. Analysis of Review of literature, interviews and questionnaire was undertaken to arrive at findings in Chapter IV.

3.5 Limitations of the Data and Study

The research was limited by the following:-

- The first and foremost is the *definition of middle-level officials*. For the context of the study, the middle-level officials were defined as officers of GoI of the rank of Directors and Joint Secretaries. The research thus focussed on Directors and Joint Secretaries for various surveys and interviews. Secretaries

to the GoI were be considered as senior officers and kept out of the purview of the research. This may have restricted the generalisation of the outcomes of the research.

- The study also focused on line ministries of central government. The study did not focus on ministries of state government. This again could have restricted the generalisation of the outcomes of the research.
- A potential of self-bias could have been possible from the respondents in the survey.
- The study focused on Capacity Building Programs from 2020 onwards i.e. Capacity Building Scheme Phase III, iGoT Mission *Karmayogi* and FutureSkills Prime and the outcomes were thus dependent on the availability of data of these initiatives. The data of such programs was not readily available and was collected from open source. Data was also collected through survey questionnaire which had 58 respondents.

CHAPTER IV: FINDINGS

As part of the research, both qualitative and quantitative analysis was undertaken. A deliberate and detailed document analysis was carried out. A few select policy makers and subject matter experts were interviewed for their responses on AI related capacity building programs. A questionnaire was circulated amongst middle-level government officials for their responses.

4.1 Thematic Analysis of Review of Literature

4.1.1 Definition of AI

An analysis of the review of literature indicates that there is no universally accepted definition of AI. As per European Commission AI is defined as “Systems that display intelligent behavior by analyzing their environment and taking actions – with some degree of autonomy – to achieve specific goals.” In the India context, NITI Aayog defines AI as "a constellation of technologies that enable machines to act with higher levels of intelligence and emulate the human capabilities of sense, comprehend and act." The Ministry of Electronics and Information Technology (MeitY) (2020) defines AI as "the ability of machines to perform cognitive tasks like thinking, perceiving, learning, problem solving and decision making."

4.1.2 Importance and Relevance of AI

Literature from 2000 and even earlier indicates the importance and relevance of AI. Various literature highlights :-

- The opportunities that AI presents for public administration.
- AI and data analytics are reshaping public administration.

- AI technologies and data-driven decision-making tools have the potential to transform public sector operations, enhance government performance, and improve service delivery.
- Ethical considerations, accountability, and capacity building pose significant challenges.

4.1.3 AI and Competencies for Civil Servants

The review highlights:-

- The growing importance of integrating AI and digital transformation into public administration.
- Identifies the competencies that civil servants need to effectively manage AI and new age technologies for improved public service delivery. These competencies are categorised into three main areas; Technical Skills, Ethical and Legal Competencies and Strategic and Leadership Skills.
- The growing need for public sector employees to develop competencies in AI and digital transformation.
- Significant challenges remain, including unequal access to training, resistance to change, and the complexity of ethical and legal considerations in AI use.

4.1.4 Digital Initiatives related to Public Service Delivery in India

Available literature brings out the various digital initiatives undertaken by the GoI. Such initiatives were driven by the Digital India Program with a focus on digital empowerment, e-governance, and improving service delivery through technology. The application of AI technologies encompasses a wide array of functionalities aimed at enhancing service delivery and operational efficiency.

4.1.5 AI Training in Public Service Delivery in Indian Context

The necessity of AI training programs tailored for government officials is highlighted in the review. AI competency development, including technical literacy, decision-making abilities, and ethical considerations emerge as major factors for consideration for AI pedagogy. The importance of blending learning models combining theoretical and hands-on AI training is highlighted.

4.2 Thematic Analysis of the Interviews

4.2.1 AI and its Relevance in Governance

All the interviewees believed that Artificial Intelligence (AI) is transforming governance by enhancing efficiency, improving decision-making, and streamlining public service delivery. Interviewee I brought out that AI transforms public service delivery by enhancing efficiency, automating processes, and improving decision-making. AI adoption in governance can increase operational efficiency by up to 40%. Interviewee II highlighted that AI is set to play a pivotal role in enhancing public service delivery by increasing efficiency, transparency, and accessibility. Interviewee III brought out that AI is expected to be more involved into government operations in coming years, leading to smarter governance, proactive service delivery, and improved resource management. The IVth interviewee mentioned that AI can ensure faster Public Service Delivery with targeted focused interventions. With adoption of AI, most field positions are likely to become irrelevant after some time. Specific sectors that stand to benefit the most include:

- Healthcare
- Law Enforcement

- Public Finance
- E-Governance & Citizen Services
- Predictive Analytics for Policy Planning
- Agriculture & Rural Development
- Law Enforcement & Judiciary

4.2.2 Challenges in Integrating AI in Governance

Several barriers hinder the adoption of AI in government agencies, and addressing these is crucial for seamless AI integration. All the interviewees believed that budget constraints, lack of AI expertise and training, resistance to change, and data security concerns are significant barriers in adoption of AI in public service delivery. Specific barriers as brought out by the interviewees are as mentioned below:

- **Budget Constraints:** Limited financial allocation restricts the scope of AI projects and slows their deployment. Government bodies need to prioritise AI in their financial planning and seek partnerships with private sector entities that can offer technological investments.

- **Lack of AI Expertise:** Another significant barrier is the shortage of skilled professionals with AI expertise. Gaps in expertise hinders the effective utilization of AI technologies. Addressing this requires comprehensive training programs, upskilling initiatives, and hiring AI specialists who can guide and mentor existing staff.

- **Resistance to Change**: Many government officials view AI as a potential threat to job security, leading to reluctance in its adoption. To mitigate this, it is thus essential to foster a culture of innovation and

continuous improvement. Providing clear communication about how AI can enhance jobs rather than replace them, and involving employees in the AI integration process can help in reducing resistance.

- **Data Security Concerns:** Ensuring data privacy and security is paramount when implementing AI models that require large datasets. Government agencies must establish robust data governance frameworks that ensure compliance with data protection regulations and build public trust. Implementing advanced encryption methods and regular security audits can also mitigate data security risks.

4.2.3 Suggestions to Ensure Smooth AI Integration in Governance:

- **Expanding AI Expertise & Training**: It is essential to upskill government officials to bridge knowledge gaps and ensure AI literacy.
- **Optimizing Budget Allocation**: Investing in AI infrastructure such as cloud computing, AI labs, and data centres will facilitate widespread adoption.
- **Strengthening Data Privacy & Cyber security Measures**: Ensuring secure and lawful data sharing across ministries while maintaining compliance with privacy regulations voice ensure cross sectoral learning.
- **Encouraging a Culture of Innovation**: Promoting digital adoption through structured change management initiatives and awareness campaigns.

4.2.4 AI Competencies Required in Middle-level Government Officials

All the interviewees believed that most middle-level government officials lack AI competencies, as AI adoption is still in its infancy in governance. To bridge this gap, comprehensive AI training programs tailored for government officials are necessary. These programs should focus on practical applications, case studies, and hands-on training to build proficiency in AI tools and techniques. Additionally, continuous learning and professional development opportunities should be provided to keep pace with the rapidly evolving AI landscape. Most believed that most middle-level government officers were not geared up for adoption of AI in governance and huge capabilities need to be built in them. Summarily, all interviewees believed that the following AI competencies are required in middle level government officers:

- Basic Understanding of AI and Machine Learning Concepts.
- Data Analysis and Interpretation Skills.
- Knowledge of AI-driven Decision Support System.
- Ethical and Regulatory Awareness Related to AI Implementation.
- Change Management and Digital Transformation Strategies.
- Project Management & AI Integration.
- Cybersecurity Awareness.

Strengthening these competencies will empower officials to leverage AI effectively for governance transformation.

4.2.5 AI Training Programs and It's Effectiveness

GoI has initiated several AI training programs to build AI competency among officials. The programs as brought out by the interviewees include:

- **Mission Karmayogi (iGOT Platform):** iGOT Platform introduces AI concepts for government officials. It would however be more beneficial if more hands-on training and real-world application are covered. The program is designed to provide continuous learning and upskilling of government officials. The program includes both online and offline training sessions, focusing on theoretical knowledge and practical applications of AI.

- **Capacity Building Program III:** The NeGD program aims to enhance the digital skills of government employees. It provides specialised training in emerging technologies, including AI. The program seeks to equip officials with the skills needed to utilise AI in various aspects of governance, thereby improving efficiency and effectiveness. The training includes workshops, seminars, and hands-on projects that help officials apply AI concepts to real-world problems.

- **FutureSkills Prime (NASSCOM & MeitY):** The program supports AI skilling and offers structured learning. These could however be tailored further for governance applications. A collaborative initiative between the government and NASSCOM, FutureSkills Prime offers comprehensive training in AI and other emerging technologies. The program is designed to build a robust

talent pool to drive digital transformation within the public sector. It provides a mix of online courses, certification programs, and industry-led projects that give officials practical experience with AI tools and techniques.

- **AI for Government Leaders (NITI Aayog & Microsoft):** The Programs provides policy insights and leadership training but could be enriched by practical exercises.

- **IIM & IIT AI Leadership Programs:** This program offers AI strategy training with potential for more immersive, real-world learning experiences.

The interviewees have highlighted that while these programs have made significant progress in raising awareness about AI, their effectiveness remains inconsistent across departments. Practical components of AI training programs are essential to bridge the competency gaps. This could involve integrating more hands-on projects, case studies, and live demonstrations of AI applications in governance. Additionally, providing continuous learning opportunities and updating the curriculum to reflect the latest advancements in AI technology will ensure that government officials remain proficient and up-to-date. By doing so, these programs can better prepare middle-level officers to harness the full potential of AI in improving public service delivery.

4.2.6 AI Competency Gaps in Middle Level Officers

Several competency gaps regarding AI have been identified among middle-level officers by the interviewees. These gaps hinder the effective use

of AI technologies in governance and public service delivery. Key gaps include:

- **Lack of Technical Understanding of AI Frameworks:** Many middle-level officers lack a thorough understanding of AI frameworks, and how these technologies can be integrated into existing systems. This gap limits their ability to make informed decisions about AI deployment and utilization.
- **Inability to Interpret AI-Driven Insights for Policy Formulation:** Another critical gap is the inability to interpret and utilise AI-driven insights for effective policy formulation and decision-making.
- **Resistance to AI Adoption Due to Fear of Job Redundancy:** There is a notable resistance to AI adoption among middle-level government officers due to fear of job redundancy.
- **Limited Knowledge of Data Ethics and Privacy Laws:** With the increasing use of AI, understanding data ethics and privacy laws is crucial. However, many officers have limited knowledge in this area.

Capacity-building programs like Mission Karmayogi, Capacity Building Program III, and FutureSkills Prime do not fully address these gaps. More hands-on training and AI literacy programs are required to build confidence and capability among middle-level government officials.

4.2.7 Gaps in Capacity Building Programs to Address AI Competencies Required by Middle-level Government Officials

The interviewees believe that existing capacity-building programs such as Mission Karmayogi, Capacity Building Program III, and FutureSkills Prime fall short

in providing the necessary practical exposure and comprehensive understanding required to implement AI technologies in governance effectively. The identified gaps include:

- **Insufficient Practical AI Training:** The current programs lack extensive practical AI training that includes case studies. This gap makes it challenging for officers to grasp how AI can be applied effectively in their daily roles. Practical training modules should incorporate hands-on experience with AI tools and technologies, enabling officers to manipulate data, run AI algorithms, and interpret the outcomes. Real-world case studies and scenarios should be integrated into the curriculum to contextualise AI applications in governance, providing a clearer picture of its potential benefits and challenges.
- **Limited Cross-Sector Collaboration:** Another significant gap is the lack of cross-sector collaboration, which is essential to understand the multifaceted impact of AI across various domains of governance. Programs should foster partnerships with different government departments, private sectors, and academic institutions to create a holistic learning environment. This collaboration can facilitate the exchange of knowledge, best practices, and innovative solutions that can be adapted to the public sector. Workshops and joint projects with these stakeholders can offer valuable insights into the practical implications of AI and foster a culture of continuous learning and adaptation.
- **Inadequate Focus on AI Ethics and Bias Mitigation:** AI ethics, transparency, and bias mitigation are critical areas that are not sufficiently addressed in the current training frameworks. Middle-level government officials need to be well-versed in the ethical considerations of AI deployment, including data privacy, algorithmic bias, and the societal impact of AI

decisions. Comprehensive training modules on AI ethics should cover global standards and regulations, ethical AI frameworks, and case studies highlighting the consequences of unethical AI use. This will equip officials with the knowledge to implement AI responsibly and ensure that AI systems are fair, transparent, and accountable.

- **Lack of Continuous and Adaptive Learning Opportunities:** The ever-evolving nature of AI technologies necessitates continuous and adaptive learning opportunities. Current capacity-building programs often lack mechanisms for ongoing education and skill enhancement. To address this, programs should introduce periodic assessments to measure AI competency improvements and identify areas needing further development. Additionally, establishing online learning platforms with updated resources, tutorials, and courses can provide flexible and accessible learning opportunities for government officials.
- **Sector-Specific AI Training**: At present, AI training being imparted appears to be generic. The various capacity building programs should focus on specific sector being addressed in governance and accordingly create course content, e.g. personnel of traffic department should be trained specifically for traffic management apart from generalised AI training. In addition, cross-sectoral training should also be imparted, i.e. departments who's work are overlapping should be cross trained. Municipal functions like garbage collection, road maintenance may have resultant impact on traffic management and hence both the departments should share data and be cross trained on the basics of the other department.

- **Lack of AI Implementation Exposure**: Most programs lack real-world projects. e.g: A hands-on AI lab for governance applications isn't available.
- **Lack of Cross-Departmental AI Learning**: AI training isn't shared across ministries e.g. Use of AI in agriculture policy planning isn't shared with rural governance officials.

By incorporating these elements into capacity-building programs, middle-level government officials will be better equipped to harness AI's full potential in improving public service delivery and governance. Enhanced technical training, effective interpretation of AI insights, addressing the fear of redundancy, and a strong focus on data ethics and privacy will collectively contribute to building a robust AI competency framework within the government sector.

4.3 Thematic Analysis of the Questionnaire

4.3.1 Role of AI in Public Service Delivery

Majority (72.4%) of the respondents to the questionnaire have fair knowledge as to how AI is going to play a pivotal role in various fields of governance in future. They believe that AI in public service delivery is likely to grow in future and assist in many aspects of governance.

Table 4.1: Role of AI in Public Service Delivery (PSD)

Does AI Assist in PSD	Percentage(%)
Yes	72.4
No	15.5

4.3.2 AI Awareness and Experience in Mid Level Government Officers

65% of the respondents were never exposed to any AI related projects in their ministries or departments. Approximately 75% of the respondents viewed that their awareness on AI was low. Only 10% respondents graded themselves with high level of awareness in AI concepts. A majority of respondents 53%, rarely or never encountered AI related discussions in their official role. A low level of awareness on AI related issues is thus indicated in mid-level government official. It can thus be inferred that AI related governance has not been completely infused in governance. The processes might have commenced but at present it still at the initial stages of inception.

Table 4.2: Awareness of Respondents in AI Concepts and Application in Governance

Response	No. of Respondents	Percentage (%)
Very High	6	10.3
High	9	15.5
Moderate	32	55.2
Low	10	17.2
Very Low	1	1.7

Table 4.3: Respondents involvement AI-Related Projects or Policy Decisions

Response	No. of Respondents	Percentage (%)
Yes	20	34.5
No	38	65.5

Table 4.4: Frequency of Respondents Encountering AI-related Discussions or Implementations in Official Role

Response	No. of Respondents	Percentage (%)
Daily	5	8.6
Weekly	10	17.2
Monthly	12	20.7
Rarely	25	43.1
Never	6	10.3

4.3.3 Knowledge of AI Concepts

Majority of mid level government officials had a fair idea of the fields in which AI could be exploited to improve public service delivery. However their levels of awareness of AI concepts were quite basic or even lower level as shown in the charts below. As the awareness levels were low, the middle-level government officials were also not very confident or confident in using AI tools for public service delivery.

Table 4.5: Integration of AI for Effective Public Service Delivery

Field	Percentage (%)	No. of Respondents
Health care	60.30	35
DBTs	48.30	38
Process automation	79.30	46
AI-assisted policymaking	53.40	31
Fraud detection	70.70	41
Other	17.20	10

Table 4.6: Respondents Understanding of the AI Concepts

AI Concept	No Knowledge	Basic	Intermediate	Advanced
Machine Learning	13	26	18	1
Data Security and Privacy	4	29	20	5
Predictive Analytics	12	24	18	4
Natural Language Processing	20	23	11	4
AI Governance	11	28	16	3
Ethical concerns of AI	8	20	23	7
Data Privacy & Security Risks	7	28	17	6

Table 4.7: Confidence of Respondents in using AI-based Decision-Making Tools in Administrative Functions

Responses	No. of Respondents	Percentage (%)
Very Confident	8	13.80
Somewhat Confident	18	31
Neutral	21	36.20
Not Very Confident	11	19
Not at All Confident	0	0

4.3.4 Capacity Building Programs of GoI on AI

AI Training to Middle-Level Government Officials

Maximum respondents 81% never received any formal training on AI related issues for governance through GoI capacity building initiatives. As most had not received any form of formal training on the subject, they preferred to stay neutral wrt to their response on assessing such programs. Maximum respondents also felt that these programs have not assisted them in their day to day work or public service delivery. This however could have been a biased response as most had not undergone any AI related formal training through GoI initiatives.

Table 4.8: Training of Respondents on AI Capacity Building Program through GoI Initiatives

Attended AI CB Program	Percentage (%)
Yes	15.50
No	81
Seminar	2.5
iGoT	1

Table 4.9: Assessing AI Training Programs of GoI

Responses	No. of Respondents	Percentage (%)
Very Adequate	5	8.60
Somewhat Adequate	10	17.20
Neutral	27	46.60
Inadequate	10	17.20
Highly Inadequate	6	10.30

Table 4.10: AI Training Programs and Specific Needs of Government Officials

Responses	No. of Respondents	Percentage (%)
Yes	09	15.5
No	22	37.9
Maybe	27	46.6

Table 4.11: Role of AI Capacity Building Programs in Day to Day Work and Public Service Delivery

Has AI CB programs assisted in day to day work	No. of Respondents	Percentage (%)
Yes	23	39.7
No	35	60.3

4.3.5 Requisite Areas of AI training Challenges to AI Training

Most of the respondents felt that lack of hands on training was the biggest challenge that they faced in gaining AI competency. Lack of time awareness and access to training programs were also specified as challenges to training by respondents.

Table 4.12: Key Challenges Faced in Gaining AI Competency

Field	Percentage (%)	No. of People
Lack of awareness	46.6%	27
Lack of access	41.4%	24
Insufficient hands-on training	74.1%	43
Workload constraints (time)	44.8%	26
Lack of policy emphasis	37.9%	22
Other	5.2%	3

Training Aspects/ Modules and Incentives

Most of the respondents preferred in person workshops as the most preferred format of training on AI. Middle- level government officials also preferred integrated learning modules as a mode of training on AI. Most also felt that AI training should be mandatory and AI competency should be mandatory for technical related roles of government officials. A staggering 95% of the respondents were willing to participate in AI related training of GoI. Respondents also agreed that AI training should be incentivized. AI training certification emerged as the biggest incentive while financial incentive was preferred by the least number of respondents.

Table 4.13: Format of AI Training

Responses	No. of Respondents	Percentage (%)
Online self-paced	09	15.5
Instructor-led online	06	10.3
In-person workshops	29	50
Integrated learning modules	14	24.1

Table 4.14: Measures to be taken by GoI to Strengthen AI Competency

Field	Percentage (%)	No. of People
Mandatory AI training	81%	47
Academic/ Industry collaborations	62.1%	36
AI policy frameworks	44.8%	26
Dedicated budget	34.5%	20
Skill certification	53.4%	31
Other	0%	0

Table 4.15: AI Competency being a Mandatory Requirement for Promotions

Responses	No. of Respondents	Percentage (%)
Yes	25	43.1
No	17	29.3
Maybe	16	27.6

Table 4.16: Willingness to Participate in AI Capacity Building Programs

Responses	No. of **Respondents**	Percentage (%)
Yes	55	94.8
No	-	0
Maybe	03	5.2

Table 4.17: Incentives to Encourage Officers to Undergo AI Training

Field	Percentage (%)	No. of **Respondents**
Certification	65.5	38
Financial incentives	46.6	27
Career growth	72.4	42
AI tool access	48.3	28
Other	3.4	2

4.4 Summary of Findings

Review of literature, interviews with various stakeholders and results of survey questionnaire indicate that there are gaps in the field of AI competency of middle-level government officials. As India moves ahead with adoption of AI in governance, it needs to align AI competency of middle- level government officials to enhance public service delivery. The gaps identified and that need to be further focused on to build the capacities in middle-level government officials are:

- Basic Understanding of AI and Machine Learning Concepts.
- Data Analysis and Interpretation Skills.
- Knowledge of AI-driven Decision Support System.
- Ethical and Regulatory Awareness Related to AI Implementation.
- Change Management and Digital Transformation Strategies.
- Project Management & AI Integration.
- Cybersecurity Awareness.

Review of literature and interviewees opinioned that various capacity building programs like CB Phase III, iGOT Mission Karamayogi and FutureSkills Prime all have indentified the necessity to develop futuristic competencies in middle-level

government officials. All these programs have recognised emerging technologies as the area where competency needs to be built in government officials. AI also forms a part of these emerging technology competencies.

As discussed in the literature review, the capacity building programs as mentioned above run these programs to enhance competencies of middle-level government officials. Most of these courses are run online with certifications but are not compulsory or mandatory for government officials to undertake such programs. As per the latest directives of DoPT, government officials have to undertake six capacity building programs to enhance capabilities on the iGOT platform out of which one on emerging technologies is mandatory.

Interviewees believe that though most of the programs have identified AI and area where competency needs to be built up, these however fall short in delivering the requisite training.

Review of literature of highlights inadequacies of the current training programs on AI competencies in which the course being generic emerges as one of the main drawbacks. The programs do not focus on the sector specific requirement in public service delivery. In addition, the programs fail to cater for the role the middle-level government officials likely to play in AI related e-governance initiatives. The courses are available online and do not really cater for the specific job that a certain level of government official likely to paly in AI related e-governance issues. It sticks to a formula of ‘One Size Fits All’ which may not be the correct approach.

Review of FutureSkills Prime by NASSCOM brings out that the B2C model does not cater for imparting training of middle-level government officials. Though middle-level government officials may undertake such program on their own initiative to upskill themselves and for self development. These would however have no

government validity for governments' requirements of gaining AI competencies for e-governance schemes.

The course content and the methods of imparting training as highlighted in the literature reviewed and stakeholders interviewed, are not aligned to the requirements of the trainees and thus often fail to interest them. The courses are theoretical in nature and lack practical training. In addition, while most of middle-level government officials want to undertake such AI related competency courses, but lack of incentives also detests them from undertaking such courses.

CHAPTER V: RECOMMENDATIONS

5.1 Introduction

The integration of AI in public governance presents significant opportunities for enhancing efficiency, transparency, and citizen-centric service delivery. However, the successful adoption of AI in government operations is contingent upon the AI competency levels of middle-level government officials, who play a crucial role in policy execution and administrative decision-making. This research has identified critical gaps in AI literacy, training accessibility, and practical application within the existing capacity-building programs of the GoI. Addressing these gaps are imperative to ensure that government officials are equipped with the necessary AI skills to leverage emerging technologies for evidence-based policymaking, process automation, and improved public service delivery. Bridging these gaps requires a revamp of existing capacity-building programs under the GoI to ensure officials receive targeted AI training, practical exposure, and continuous learning opportunities. By adopting these measures, the GoI can equip middle-level government officials with the necessary AI skills and confidence to navigate an increasingly digital governance landscape, ultimately leading to more efficient, transparent, and citizen-centric public service delivery. Based on the research and findings, this chapter outlines a set of actionable recommendations aimed at bridging AI competency gaps through enhanced capacity-building programs, structured AI training modules, policy interventions, and strategic collaborations with academic institutions and industry leaders. By implementing these recommendations, the GoI can create a future-ready, AI-empowered administrative system, capable of driving digital transformation in public services while maintaining accountability, inclusivity, and efficiency.

As highlighted in the findings, for effective AI integration, middle level government officials should develop competencies in:

- AI Fundamentals & Ethics: Understanding AI applications, ethical considerations, and responsible AI use in governance.
- Data Analytics & Interpretation: Utilizing AI-driven dashboards for informed policy decisions and trend analysis.
- Project Management & AI Integration: Overseeing AI implementation in governance initiatives and ensuring alignment with policy goals.
- Cyber security Awareness: Ensuring data security, protecting sensitive citizen information, and addressing cyber security challenges.

In the present format, the GoI undertakes these programs through various CB Programs. These programs particularly in the field of building AI competencies are yet to take off in its full formats. CB Phase III is yet to address such AI related CB programs and likely to do so by mid/ end 2025. iGOT under Mission Karmayogi also a platform where development of AI competencies is focused on has 25 such capacity building programs and still developing. *FutureSkills Prime*, a B2C model also focuses on developing AI competencies. It however focuses on technical skills of individuals. It does not cater to the governments' requirement to train middle-level government officials. There is thus a need that the government refocuses and realigns its AI competency programs for building AI competencies in all government and then upskilling as officials rise to middle-level as per their role and tasks at hand. Certain recommendations which have emerged as part of the research are listed as under.

5.2 Step Based Approach to AI Training

As brought out in the findings, the most of the government officials haven't yet received training in AI related competencies. It is also known that CB Phase III,

and iGOT platform focus in developing such capacities and competencies. These programs are however yet to gather momentum. As AI is likely to play an important role in future governance, it is thus imperative that middle-level government officials are well trained in AI right from their initial stages of inception into the civil services and thereafter regular and timely upgradations through refreshers. The research thus recommends a *Step Based Approach to AI training* for middle-level government officials which will ensure that they have basic requisite AI competency at all times and are also upskilled from time to time as part of mandatory training programs as per their role/ task/ need.

Table 5.1: Steps Based Approach to AI Training

Steps	Concept	Constituents
Step I	Basic AI for All	• Mandated at the entry level for all government officials • Imparted at respective training academies • Focus should be to build basic essential AI competencies.
Step II	Sector-Specific AI Training	• Imparted to all officials for a specific department/ ministry where in AI-competency is a basic requirement for day to day work. • Responsibility of the specific ministry/ department, which can have dedicated pool of professionals for imparting that • Focus on sector specific training.
Step III	Mandatory AI Upskilling	• Mandatory for all government officials particularly middle-level • Upgrade and upskill in AI competencies to keep up with the ever evolving new age technologies • Based on the role the government official is likely to play. • Undertaken through the existing capacity building platforms.
Step IV	Need-Based AI Competency Building	• Based on the e-governance initiative that the government is likely to roll out • Specific need based AI competencies developed in middle-level government officials for managing that project. • Such training on an outsourced model, i.e. firms responsible for creating the digital platforms also imparts training to develop requisite AI competencies in middle-level government officials.

5.2.1 Step I: Basic AI for All

As India moves towards digital and e-governance, it is imperative that the basic AI competencies should be available and mandated for all government officials. Thus as government officials undergo inception training in various academies, AI training should be mandatorily imparted to them. The course content should be very basic and not technical. The aspects of AI fundamentals, ethics and security awareness could be focused at this stage. AI based data and predictive analytics could also form part of the program. The responsibility of building such competencies should rest with the respective academies. The course content like brought out should be very basic where the officials can be given the basic insights into how AI can boost governance. Practical training on existing e-governance platforms using AI should be focused on.

5.2.2 Step II: Sector-Specific AI Training

Some departments and ministries in the government require AI competencies at all stages for its day to day functioning and work. These ministries and departments are dependent on AI for data and predictive analytics. These ministries need such competencies in their officials at all times and at all levels e.g. Metrological Department may need AI competencies in its officials to predict the weather. The Department will thus want its officials to be geared up with such competencies at all times. Officials in such departments/ ministries thus need to be trained in such sector specific AI competencies to undertake day to day work. Such competencies in its officials are thus essential and non-compromisable. The AI training of such officials should thus be responsibility of The Department of Ministry/

department the official is getting posted to. The ministry could have a set of qualified instructors to impart such training. The competency should also be built up according to the role and task of the official rather thatn making him proficient all the competencies required in that ministry.

5.2.2 Step III: Mandatory AI Upskilling

As government official rise to middle-level, apart for the mandated entry level AI training, upskilling in AI competencies should be made mandatory. This should be based on the role the government officials is likely to play in their departments/ ministries. These should be done through the existing capacity building platforms. These programs should act as refreshers for middle-level government officials. This will ensure that middle-level government officials remain updated and upskilled at all times in the fast evolving technological and AI environments. The periodicity of such upgradation should be specified by DoPT. The middle-level government officials should have the flexibility to undertake these programs as per their convenience within a specified period. A time to time evaluation will also assist in assessing the retention of AI competencies.

5.2.4 Step IV: Need Based AI Competency Building

As was noticed in the survey questionnaire not every government official is exposed to AI related jobs on a day to day basis. The frequency of such exposures at present is low though it may increase with time as focus on e-governance initiatives increases further. Development of such AI specific competencies may thus be project based. It is thus prudent that the AI related competency is built in middle-level government officials as and when required in a specific department or ministry based on the e-governance projects being

rolled out. To further qualify this, the government officials may be given basic AI training on joining the service in the respective academies as brought out earlier as part of Step I. Thereafter as part of Step III, through various capacity building programs, the middle-level government officials must stay updated and upskill themselves on AI at specific periodicity. Specific AI competencies required by the government official based on of e-governance programs being rolled out should be built up as and when such programs are executed. These competency programs should be project based. As digital content of most of such e- governance initiatives are generally outsourced, the responsibility of building such AI competencies in middle-level government official should be the responsibility of the firm taking on the creation of digital content.

The *Four Step Approach* to training will ensure:

- All government officials possess basic AI competencies at all times, at all levels and in all ministries.
- Basic AI competencies are build up in an official right at the initial stages of inception into the civil services.
- Sectors (Departments/ Ministries) where AI plays a pivotal role in day to day functioning, have their officials trained in the sector specific AI competency as part of Step II.
- Such Ministries as mentioned above requiring day to day AI management have a set of qualified personnel to impart training to personnel getting posted in on such AI related issues.
- The middle-level government officials undertake mandatory upskilling and upgradations in AI competency through existing capacity

building programs available on online at regular intervals which should be made compulsory as Part of Step III.

- Specific AI competencies are built up in the officials of a specific ministry or department only based on requirement as Part of Step IV i.e. for implement specific e-governance projects being rolled out by the ministry or department. AI training for such specific projects should thus be outsourced.
- Specific AI competencies in middle-level government officials should be built depending upon the specific job/ task of the official rather than building generic competencies at all times.

5.3 Role Based AI Competencies. Review of literature of various capacity building programs highlights that AI competency programs run on a generic course i.e. it has no correlation to the task and role the middle level government official is likely to play. As the courses are not tailored for the role and task of the middle-level government official, it does not interest the officials. In addition, many of these also have technical orientation thus detesting middle-level government officials. It is thus recommended that while basic AI competencies are built in all government officials at the inception stage, further AI competencies should be based on the role the middle-level government officials are likely to play. It is inferred that middle level government officials are more likely to be involved in management of projects and thus should be trained in:

5.3.1 AI related project management

5.3.2 AI related data analysis

5.3.3 AI based predictive analysis

5.3.4 AI based policy making

5.4 Technical versus Task Based Competencies The literature review indicates that most of the capacity building programs focus on technical skills related to AI. These might not be the skill requirements for middle level government officials. Such technical skills may be the requirement at lower level government officials who are more involved in basic implementation and execution of e-governance projects. In many cases, the digital platforms for such projects are genrally outsourced to private vendors for implementation and execution. In such cases the requirement of technical competencies in government officials will be minimal, more so for middle-level government officials who are likely to just manage such projects. The AI competencies of middle-level government officials should thus be built according to role and task they are likely to perform in a specific e-governance project rather than building up technical AI competencies.

5.5 Suggestions for Capacity Building Programs Analysis of available literature, interviews and questionnaire has reflected major inadequacies in various capacity building programs either run by the GoI or privately with respect to its AI competencies. The government programs are generic and do not focus on task/ role based AI competencies. The ones run by NASSCOM is more technically oriented. Both the government and the industry run programs based on the rule of 'one size fits all' which may not be the correct approach. The programs thus need to revamp and refocus on the initiatives so that meaningful AI competencies can be built up in middle-level government officials. The following can thus be recommended:

5.5.1 Government run programs even though through collaboration should be sector specific to cater for the requirement of various departments/ministries rather than being generic.

5.5.2 Competencies being built up in middle-level government officials should be based on the specific task and role that they are likely to play in a specific ministry/ department rather than creating generic AI competencies.

5.5.3 As highlighted earlier, technical AI competencies should only be focused on in departments/ ministries requiring such skills for day to day functioning. It should rather be avoided in middle-level government officials where competencies related to project management could be more important. In addition, ethical practices related to AI should also be a focus area.

5.5.4 FutureSkills Prime needs to realign and refocus with the government initiatives. It needs to make specific AI related programs according to the requirement of the government so as to upskill middle level government officials. In it's present format it is is a consumer oriented initiative rather than a government oriented initiative. It may thus be prudent to add a Business to Government (B2G) model to cater for the government requirements to train middle-level government officials on AI competencies. The existing platforms could be realigned to cater for government requirements to build AI competencies middle-level government officials with minimum turbulence.

5.6 B2G Model, Collaboration with NASSCOM and GoI for Operating AI Capacity Building Programs for Middle-Level Government Officials.

As analysed earlier, at present many of the AI capacity building programs are being outsourced to the industry. The programs on iGOT platform are indicative of such programs. These however run under the government umbrella. Similarly the industry like NASSCOM could also run AI capacity building programs on its platforms. A B2G model, a step forward from the existing B2C could be thought of. NASSCOM being the lead on such initiatives in the industry could provide latest and most updated

training contents. NASSCOM in collaboration with GoI could tailor courses for middle-level government officials to develop their AI competencies depending on their role and task as part of Step II and III of the *Steps Based Approach to AI Training* mentioned in Paragraph 5.2

5.7 Mandatory AI training

As seen and brought out in survey questionnaire, most of the respondents have not undergone any type of training on AI. Though the role in AI and governance may still be in its infancy, but competencies of middle-level government officials still need to be built up at all times. Though as per the latest directives of DoPT, government officials are to undertake 6 mandatory capacity building programs out of which one on emerging technologies to include AI is mandatory. It is thus recommended that the courses on AI, should be made mandatory for middle-level goverment officials to make them future ready. This should be in addition to the course suggested at the inception stage as part of step I which also is also a compulsory in nature. The upskilling intervals as part of Step III should be specified by the DoPT.

5.8 Method of Training on AI Competencies

Literature review and interviews indicates that most of the capacity building programs are online. In addition, these courses are more theoretical in nature and lack practical training which is essential for such programs. Lack of practical case studies based training makes these programs uninteresting. It is thus recommended that these courses should be a mix of online and offline content. The course should have a practical hand on training capsule which is an important aspect. To keep the interest of middle-level government officials, a mix of online and offline content for various programs should act as a good catalyst to create interest.

5.9 AI Competencies and Incentives

At present there is no incentive for gaining AI competencies by government officials. It is more pronounced in middle-level government officials don't find gaining such competencies interesting as it really does not assist them in any ways in career progression or any such incentives. It is thus imperative that gaining of such competencies should be incentivised. The incentives could be inform of certification, career growth or monetary which should be promulgated by the DoPT.

5.10 Hands-on AI Training with Case Studies.

As highlighted in the findings, at present online training remains as the primary mode of imparting AI training. It's a complex subject and needs hand on training. In addition, online training is not so interesting as offline or a mix of both. AI capacity-building programs should be designed to include hands-on experiences. This can be achieved by integrating case studies and AI applications in governance. This approach will enhance their technical skills and provide a clearer picture of AI's potential benefits and challenges in public service delivery.

5.11 Developing AI Literacy Modules Tailored for Governance Applications.

It's essential to create AI literacy modules specifically tailored to the needs of governance applications. These modules should cover the basics of AI technologies, their capabilities and limitations, and their application in different areas of public service. By aligning the training content with the specific governance demands, officials will be better equipped to leverage AI tools effectively and make informed decisions that enhance public service delivery.

5.12 Evaluations to Measure AI Competency.

Given the ever-evolving nature of AI technologies, continuous assessment and improvement of AI competencies are vital. Capacity-building programs should introduce periodic evaluations to gauge the progress of government officials in understanding and applying AI. These assessments can help identify areas that require further development and tailor subsequent training sessions to address these gaps. Additionally, setting up a feedback loop where officials can share their experiences and challenges will contribute to a more dynamic and responsive training program. At present the evaluations after undertaking a course are primarily online. Such assessment may not correctly evaluate the competencies gained by a middle-level government official.

5.13 Role of Government

The government should play a vital role in promoting AI in governance, thus automatically motivating middle level government officials to undertake such AI competency building programs. The government should:

- **Leveraging Culture of AI-Driven Decision-Making to promote Competency Building**

  To embed AI in the decision-making processes of government agencies, it's essential to promote a culture that embraces digital transformation and AI-driven solutions. Pilot projects showcasing successful AI applications in governance can be powerful demonstrations of AI's potential. These projects can also provide practical learning opportunities for officials, allowing them to see firsthand how AI can improve efficiency and effectiveness. Furthermore, incorporating AI-driven decision-making into broader digital transformation

initiatives can help create a more integrated and forward-thinking approach to governance.

- **Budget**

The government and various ministries should allocate a specific budget for AI capacity-building programs. This will ensure AI competency development is included in annual training budgets.

- **Establishment of AI Learning Labs in Government Institutions**

The government must build up infrastructure like creating AI learning labs in training academies to allow officers to experiment with AI tools. This will also provide hands-on experience with AI-powered administrative solutions.

- **Development of an AI Knowledge Portal for Government Officials**

The government through various ministries should create an AI knowledge-sharing platform with case studies, webinars, and best practices. It should also maintain an up-to-date repository of AI applications in governance.

- **AI-Enabled Performance Dashboards for Officers**

Government should introduce AI-powered dashboards that assess officers' training progress and suggest AI competency improvement plans. It should also provide real-time analytics on the impact of AI training on governance.

5.14 Tabulated Summary of Findings and Recommendations

Table 5.2: Summary of Finding

FINDINGS

SECONDARY RESEARCH

REVIEW OF LITERATURE

No definition of AI is universally accepted.

MeitY characterizes AI as "the ability of machines to perform cognitive tasks like thinking, perceiving, learning, problem solving and decision making," highlighting its role in India's digital transformation

AI plays a significant role in improving the efficiency and effectiveness of public service delivery

AI competence is no longer a luxury but a requirement for modern governance

Many digital governance initiatives have been launched by the GoI

AI competency gaps exist in middle level government officials, lack of technical skills, lack of awareness of ethical and security issues, resistance to change, project management competencies are a few to name

CB program Phase III, Mission Karmayogi iGoT platform and Futureskills Prime are few initiatives to build AI initiatives in middle level government officials.

These programs though have identified AI as area to develop competencies of middle-level government officials, however these programs suffer from the following drawbacks:

- ✓ Standardised Curriculum: 'One size fits all approach'
- ✓ Inadequate competency mapping
- ✓ AI competency programs need to be incentivized
- ✓ Time allocation Pedagogical limitations, lacks case base and practical learning essential for AI capacity building

Emphasis on technical skill development

PRIMARY RESEARCH

INTERVIEWS

AI in governance enhances its efficiency, decision making and streamlines Public Service delivery

Healthcare, Law Enforcement, Public Finance, E-Governance & Citizen Services, Predictive Analytics for Policy Planning, Agriculture & Rural Development, Law Enforcement & Judiciary are few sectors that benefit max from AI integration into governance

Suggestions to Ensure Smooth AI Integration in Governance

- ✓ Expanding AI Expertise & Training
- ✓ Optimizing Budget Allocation
- ✓ Strengthening Data Privacy & Cyber security Measures
- ✓ Encouraging a Culture of Innovation

AI Competencies Required in Middle-level Government Officials

- ✓ Basic Understanding of AI and Machine Learning.
- ✓ Data Analysis and Interpretation Skills.
- ✓ Knowledge of AI-driven Decision Support System.
- ✓ Ethical and Regulatory Awareness.
- ✓ Change Management Strategies.
- ✓ Project Management & AI Integration.
- ✓ Cybersecurity Awareness.

Effectiveness of AI Training Programs is inconsistent due to:

- ✓ Insufficient Practical Training.
- ✓ Limited cross-sectoral collaboration and training.
- ✓ Inadequate focus on AI Ethics and Bias Mitigation.
- ✓ Lack of continuous and adaptive learning opportunities.
- ✓ Lack of Sector specific training.
- ✓ Lack of AI implementation exposure

Addressing these drawback in various CB programs is essential to build competencies in middle-level officials

QUESTIONNAIRE

AI Awareness and Experience in Middle-Level Government Officers

- ✓ 65% of the respondents never exposed to any AI related projects in their ministries or departments.
- ✓ 75% of the respondents have low AI awareness.
- ✓ 53%, rarely AI related discussions in their official roles.

Knowledge of AI Concepts

- ✓ Majority of the officials had a fair idea AI applications in governance to improve public service delivery.
- ✓ Levels of awareness of AI concepts were quite low and hence were also not confident in using AI tools for public service delivery.

Challenges to AI Training

- ✓ Lack of hands on training was the biggest challenge in gaining AI competency.
- ✓ Lack of time, awareness and access to training programs are also challenges to training.

Suggestions for AI Training Modules

- ✓ 81% of the respondents never received any formal AI training.
- ✓ 95% of the respondents were willing to participate in AI related training.
- ✓ In person workshops emerged as the most preferred format of training on AI followed by integrated learning modules.
- ✓ Most felt that AI training should be mandatory and should be incentivized. Certification emerged as the biggest incentive while financial incentive the least.

Table 5.3: Summary of Recommendations

SUMMARY

FINDINGS	RECOMMENDATIONS
Identified AI gaps that needs to be developed in middle-level government officials are: ✓ Basic Understanding of AI and Machine Learning Concepts. ✓ Data Analysis and Interpretation Skills. ✓ Knowledge of AI-driven Decision Support System. ✓ Ethical and Regulatory Awareness Related to AI Implementation. ✓ Change Management and Digital Transformation Strategies. ✓ Project Management & AI Integration. ✓ Cyber security Awareness.	**Steps Based Approach to AI Training**: Four Steps AI training will ensure that the middle-level government officials have requisite AI competencies at all times ✓ Step I: Basic AI for All ✓ Step II: Sector-Specific AI Training ✓ Step III: Mandatory Upskilling ✓ Step IV: Need-Based AI Competency Building
Capacity building programs like CB Phase III, iGoT Mission Karamayogi and FutureSkills Prime identify emerging technologies to include AI as a focus area to develop competencies in middle- level government officials.	**B2G Model, Collaboration with NASSCOM and GoI**. A B2G model, a step forward from the existing B2C by NASSCOM could be thought of toprovide latest and most updated training contents to middle-level government officials
Most of AI CB Programs are not compulsory or mandatory for middle-level government officials.	**Role Based AI Competencies**. AI competencies should be developed in middle-level government officials based on the role that they are likely to play in a e-governance
These capacity building programs fall short in delivering the requisite training. Few of the drawbacks are: ✓ AI competencies programs are generic in nature ✓ CB Programs follow a 'One Size Fits all' approach. ✓ Do not focus on the sector specific requirements for AI related training. ✓ Fail to cater for the role the middle- level government officials likely to play in AI related e-governance initiatives.	**Technical versus Task Based Competencies**. The need for technical competencies in middle-level government officials may be less in comparison to task/role based competencies and hence, should be less focused on by various capacity building programs
FutureSkills PRIME by NASSCOM B2C model does not cater for imparting training of middle-level government officials on AI competencies.	**Approach of Capacity Building Programs** Capacity building programs need to re-align and refocus the initiatives to enhance the competencies in middle-level government officials as per the requirements of the department/ ministry rather than having a 'One Size Fits All' approach.
The technical nature of course content and online training method fails to interest middle- level government officials to undertake such programs.	**Mandatory AI training** As AI is going to play a major role in future governance initiates, building AI competencies in middle-level government officials should be mandatory
The courses are theoretical in nature and lack practical training.	**Training Methods for Building AI Competencies** The training modules should be a combination of online and offline modes with emphasis on practical case studies to keep the middle level government officials interested in such initiatives.
Such programs lack of incentives which detests middle-level government officials from undertaking such programs	**AI Competencies and Incentives** The government needs to incentivise these programs in form of certifications, career growth or monetary to interest of middle-level government officials
	Role of GoI. GoI take spets to further promote the AI capacity building programs by allocating dedicated budget, creating AI infrastructure etc

5.15 Conclusion

In conclusion, this study "Exploring Gaps in Artificial Intelligence (AI) Competency of Middle Level Government Officials for Effective Public Service Delivery" highlights the need to bridge the widening gap in AI competencies among middle-level government officials, an essential cadre responsible for implementing and monitoring policy directives, managing service delivery mechanisms, and interpreting complex data-driven decisions. The research reveals that despite the rapid integration of AI in governance and the increasing reliance on data-centric tools for improving efficiency and transparency, there is a significant mismatch between the ever evolving technological landscape and the competencies of the middle-level government officials. The GoI has taken numerous initiatives such as CB Program Phase III, and iGOT Mission Karmayogi, which aim to create a future-ready civil services. However, these initiatives often remain aspirational and officials remain unprepared to leverage AI's potential in Public Service Delivery.

The research brings out gaps in AI competency among middle-level government officials. These officials are expected to interpret AI-generated insights, oversee decision-making systems, incorporate data-driven approaches and manage AI driven e-governance projects. However, limited exposure to AI applications, insufficient hands-on training, and lack of domain-specific AI cases tailored to administrative functions create a knowledge gap. Middle-level government officials often demonstrate superficial understanding of AI terminology without grasping the underlying potential for administrative transformation. Many remain unaware of how machine learning algorithms, predictive analytics, or natural language processing can streamline functions to enhance public service delivery. In addition, disjointed capacity-building programs, disconnect between training content and practical governance scenarios, and minimal follow-up support undermine skill development.

Current training initiatives offer generalised awareness on AI rather than real-life application knowledge. Officials also demonstrate limited awareness of AI's ethical implication, data privacy considerations, and possible socioeconomic impacts of AI which creates vulnerability in use of AI systems.

AI education is thus not a specialised technical skill but as a core competency toady, akin to financial management or human resource development. The research underscores that addressing these competency gaps requires a systemic and imaginative realignment of capacity-building approaches. It necessitates moving beyond the current isolated training modules toward an integrated, continuous and adaptive learning ecosystem that evolves with technological advancement and administrative needs. A *Step Based Approach to Training* which revolves around such continuous learning eco-system with regular refresher modules to ensure that middle-level government officials keep pace with rapidly evolving AI technologies is thus suggested in the research. Structured, role-based AI competency frameworks that differentiate between awareness, application, and advanced levels of proficiency based on administrative functions is the need of the hour. These frameworks should be integrated into career progression pathways with clear assessment criteria. Learning methodologies featuring real-world governance cases, problem-based simulations, and cross-departmental collaborative projects will assist learning. The research findings suggest such paradigm shifts from basic digital literacy toward comprehensive AI fluency among middle-level government officials.

India stands at a critical juncture in its digital governance journey. As AI increasingly becomes embedded in public administration, from predictive resource allocation to automated citizen interfaces, the competency of its middle-level government officials will determine whether technology serves as an enbaling force or magnifies existing

inequities. By investing in holistic AI capacity building, the GoI can transform its middle-level officials into digitally empowered change agents, capable of harnessing AI's potential while mitigating its risks. Thus, reducing AI competency gaps in middle-level government officials is not just a matter of choice, but a compulsion. By investing in holistic and future ready capacity building programs, the GoI can ensure that AI becomes a tool of empowerment for middle-level government officials rather, enhancing efficiency, equity, and accountability in public administration at all levels.

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Appendix 1

INTERVIEW MS CHARRU MALHOTRA

PROFESSOR, IIPA

Exploring Gaps in Artificial Intelligence (AI) Competency of Middle Level Government Officials for Effective Public Service Delivery: Challenges and Recommendations for Capacity Building Programs of Government of India (GoI)

Question 1) **Role of Artificial Intelligence (AI) in Public Service Delivery**. AI is revolutionizing the world and also the government services by enhancing efficiency, automation, and decision-making. AI-powered tools can analyze large datasets, predict trends, and improve citizen engagement. How do you see AI transforming public service delivery in the next five years? What specific areas do you think will benefit the most from AI? Do you foresee any major disruptions or challenges in implementing AI-driven governance?

Answer 1) Artificial Intelligence (AI) transforms public service delivery by enhancing efficiency, automating processes, and improving decision-making. A 2021 report by the World Economic Forum highlights that AI adoption in governance can increase operational efficiency by up to 40% while significantly reducing administrative burdens. AI is expected to play a crucial role in predictive governance, fraud detection, public grievance redressal, and intelligent infrastructure management in the next five years.

Specific sectors that stand to benefit the most include:

- **Healthcare**: AI-driven diagnostics, remote consultations, and predictive analytics to anticipate disease outbreaks (Harvard Medical School, 2023).
- **Law Enforcement**: Predictive policing, facial recognition, and AI-powered surveillance systems to enhance security (National Crime Records Bureau, 2022).

- **Public Finance**: Automated auditing and fraud detection mechanisms to curb financial irregularities (Reserve Bank of India, 2023).

However, implementing AI in governance presents challenges such as ethical concerns, algorithm bias, and public trust issues. A McKinsey report (2022) highlights that 65% of AI adoption failures in governance stem from a lack of stakeholder trust. Addressing these disruptions requires a balanced approach that combines technological advancements with strong regulatory frameworks.

Question 2) **Challenges in Integrating AI in Governance**. Despite AI's potential, many government agencies struggle with AI adoption due to budget constraints, lack of AI expertise and training, resistance to change, and data security concerns. Addressing these barriers is crucial for seamless AI integration. What are the biggest barriers to AI adoption in government agencies, and how can they be addressed?

Answer 2) Several barriers hinder the adoption of AI in government agencies, and addressing these is crucial for seamless AI integration.

Budget Constraints

A major hurdle for AI adoption is the lack of sufficient funding. According to a 2022 NASSCOM report, only 25% of Indian government agencies have allocated budgets for AI implementation. This limited financial allocation restricts the scope of AI projects and slows their deployment. To overcome this, government bodies need to priorities AI in their financial planning and seek partnerships with private sector entities that can offer technological investments.

Lack of AI Expertise

Another significant barrier is the shortage of skilled professionals with AI expertise. A 2023 Centre for Digital Governance study revealed that approximately 70% of government officials lack foundational AI knowledge. This gap in expertise hinders the effective utilization of AI technologies. Addressing this requires comprehensive training programs, upskilling initiatives, and hiring AI specialists who can guide and mentor existing staff.

Resistance to Change

Many government officials view AI as a potential threat to job security, leading to reluctance in its adoption. The World Bank's 2022 report highlights that resistance to change is a common barrier across various levels of government. To mitigate this, it is essential to foster a culture of innovation and continuous improvement. Providing clear communication about how AI can enhance job roles rather than replace them, and involving employees in the AI integration process can help in reducing resistance.

Data Security Concerns

Ensuring data privacy and security is paramount when implementing AI models that require large datasets. The Indian Data Protection Bill of 2023 underscores the importance of safeguarding citizen data. Government agencies must establish robust data governance frameworks that ensure compliance with data protection regulations and build public trust. Implementing advanced encryption methods and regular security audits can also mitigate data security risks.

Addressing the Challenges

These barriers can be addressed through a multi-faceted approach:

- Targeted AI Training Programs: Developing and deploying comprehensive training programs tailored to the needs of government officials can bridge the expertise gap and enhance their AI competencies.
- Increased Investment in Digital Infrastructure: Allocating adequate financial resources and investing in cutting-edge digital infrastructure will provide the necessary foundation for AI initiatives.
- Clear AI Policies: Formulating and implementing clear AI policies that address ethical concerns, fairness, and transparency will promote responsible AI adoption.
- Public-Private Partnerships: Collaborating with private sector entities can bring in technological expertise and financial support, accelerating AI integration in public services.

By addressing these challenges with targeted strategies, government agencies can effectively integrate AI into their operations, thereby enhancing public service delivery and achieving greater efficiency and innovation.

Question 3) **AI Competencies Required in Middle-level Government Officials**. What specific AI competencies are primarily required by middle-level government officials to effectively facilitate public service delivery? Do you think that officials of GoI particularly Middle level officers, Joint Secretaries and Directors are geared up to take on aspects of AI to further boost the delivery of public services?

Answer 3) Middle-level government officials, such as Joint Secretaries and Directors, need a combination of technical and managerial AI competencies to facilitate efficient public service delivery. Essential competencies include:

- **Basic Understanding of AI and Machine Learning Concepts**: As noted in the MIT AI Governance Report of 2022, officials must have

foundational knowledge of AI algorithms, data processing, and the potential applications of machine learning to understand how these technologies can be utilised in government operations.

- **Data Analysis and Interpretation Skills**: According to the Harvard Kennedy School (2023), the ability to analyze and interpret data is essential for leveraging AI in decision-making processes. This includes understanding data patterns, statistical methods, and predictive modeling.
- **Knowledge of AI-driven Decision Support Systems**: The OECD AI Policy Observatory (2022) emphasizes that officials should be familiar with AI tools that support decision-making, such as automated decision systems and recommendation engines, to improve efficiency and accuracy in public service delivery.
- **Ethical and Regulatory Awareness Related to AI Implementation**: With the European Union AI Act of 2023 setting the precedent, officials must understand the ethical implications and regulatory frameworks governing AI use to ensure that AI technologies are deployed responsibly and transparently.
- **Change Management and Digital Transformation Strategies**: The McKinsey Digital Transformation Report (2023) highlights the importance of change management skills for overseeing the integration of AI technologies, including managing organizational change, fostering a digital culture, and steering digital transformation initiatives.

Currently, most middle-level government officials lack these competencies, as AI adoption is still in its early stages in governance. To bridge this gap, comprehensive AI training programs tailored for government officials are necessary. These programs should focus on practical applications, case studies, and hands-on

training to build proficiency in AI tools and techniques. Additionally, continuous learning and professional development opportunities should be provided to keep pace with the rapidly evolving AI landscape.

Question 4) **AI Training Programs and It's Effectiveness**. The availability and effectiveness of AI training programs vary across government departments. Can you list a few of such programs and the intended outcomes? How would you assess the current AI training programs available for middle-level officers in the GoI?

Answer 4) Government of India has initiated several AI training programs to build AI competency among officials. Notable programs include:

- **Mission Karmayogi**: This program is designed to provide continuous learning and upskilling for government officials. It covers a wide array of topics, including AI-related modules. By incorporating AI training, Mission Karmayogi aims to create a future-ready workforce that can leverage AI to enhance public service delivery. The program includes both online and offline training sessions, focusing on theoretical knowledge and practical applications of AI.

- **Capacity Building Program III**: This NeGD program aims to enhance the digital skills of government employees. It provides specialized training in emerging technologies, including artificial intelligence. The program seeks to equip officials with the skills needed to utilize AI in various aspects of governance, thereby improving efficiency and effectiveness. The training includes workshops, seminars, and hands-on projects that help officials apply AI concepts to real-world problems.

- **FutureSkills Prime**: A collaborative initiative between the Indian government and NASSCOM, FutureSkills Prime offers comprehensive training in AI and other emerging technologies. The program is designed to build a robust talent pool to drive digital transformation within the public sector. It provides a mix of online courses, certification programs, and industry-led projects that give officials practical experience with AI tools and techniques.

While these programs have made significant progress in raising awareness about AI, their effectiveness remains inconsistent across departments. The World Bank (2022) notes that 60% of training programs lack practical AI applications, leading to a knowledge gap between theoretical learning and real-world governance applications.

To address these gaps, enhancing the practical components of AI training programs is essential. This could involve integrating more hands-on projects, case studies, and live demonstrations of AI applications in governance. Additionally, providing continuous learning opportunities and updating the curriculum to reflect the latest advancements in AI technology will ensure that government officials remain proficient and up-to-date. By doing so, these programs can better prepare middle-level officers to harness the full potential of AI in improving public service delivery.

Question 5) **AI Competency Gaps in Middle Level Officers**. Have the gaps in AI competency in middle level officers been identified by various capacity building programs like Mission Karmayogi, Capacity Building Program III and FutureSkills Prime? Primarily what would be these gaps be? To rephrase, what are the specific AI skills a middle-level government official should have for effective delivery of public services?

Answer 5) AI Competency Gaps in Middle-Level Officers

Several competency gaps regarding AI implementation have been identified among middle-level officers. These gaps hinder the effective use of AI technologies in governance and public service delivery. Key gaps include:

- **Lack of Technical Understanding of AI Frameworks**: Many middle-level officers lack a thorough understanding of AI frameworks, algorithms, and how these technologies can be integrated into existing systems. This gap limits their ability to make informed decisions about AI deployment and utilization. According to the McKinsey AI Readiness Report (2023), this technical deficiency is a significant barrier to successful AI adoption.

- **Inability to Interpret AI-Driven Insights for Policy Formulation**: Another critical gap is the inability to interpret and utilize AI-driven insights for effective policy formulation and decision-making. The Harvard Digital Governance Study (2022) highlights that while AI can provide valuable data and predictive analytics, many officials struggle to translate these insights into actionable policies that benefit the public.

- **Resistance to AI Adoption Due to Fear of Job Redundancy**: There is a notable resistance to AI adoption among middle-level government officers due to fear of job redundancy. The World Economic Forum (2022) reports that this fear stems from concerns about AI replacing human roles, leading to job losses. This resistance can slow down AI initiatives and reduce their overall effectiveness.

- **Limited Knowledge of Data Ethics and Privacy Laws**: With the increasing use of AI, understanding data ethics and privacy laws is crucial. However, many officers have limited knowledge in this area. The Indian IT Ministry (2023) emphasizes the importance of data governance, ethical AI use, and compliance with privacy regulations. Without this knowledge, officials risk mishandling sensitive data and facing legal repercussions.

While beneficial, capacity-building programs like Mission Karmayogi, Capacity Building Program III, and FutureSkills Prime do not fully address these gaps. More hands-on training and AI literacy programs are required to build confidence and capability among middle-level officials.

To bridge these gaps, it is essential to:

- **Enhance Technical Training**: Provide in-depth technical training on AI frameworks and algorithms, ensuring that officers understand the underlying principles of AI technologies and their practical applications in governance.

- **Interpret AI Insights**: Develop modules focused on interpreting AI-driven insights and translating them into practical policies. This could include case studies, simulations, and real-world examples of AI in policy-making.

- **Address Fear of Redundancy**: Implement programs that address the fear of job redundancy by showcasing how AI can augment human roles rather than replace them. Highlighting success stories where AI has enhanced job functions can help alleviate these concerns.

- **Focus on Data Ethics and Privacy**: Offer comprehensive training on data ethics, privacy laws, and responsible AI use. This training should cover

data protection regulations, ethical considerations in AI deployment, and best practices for maintaining transparency and accountability.

By incorporating these elements into capacity-building programs, middle-level government officials will be better equipped to harness AI's full potential in improving public service delivery and governance.

Question 6) **Gaps in Capacity Building Programs to Address AI Competencies Required by Middle-level Government Officials** . Do these capacity building initiatives like Mission Karmayogi, Capacity Building Program III and FutureSkills Prime address the AI competency required by middle-level government officials as identified earlier? What are the gaps in these programs with regard to the development of AI competency in middle-level government officials? How are these being addressed?

Answer 6) While existing capacity-building programs such as Mission Karmayogi, Capacity Building Program III, and FutureSkills Prime aim to enhance AI competencies among middle-level government officials, they often fall short in providing the necessary practical exposure and comprehensive understanding required to implement AI technologies in governance effectively. The identified gaps include:

- **Insufficient Practical AI Training**

  The current programs lack extensive practical AI training that includes real-world use-case demonstrations. This gap makes it challenging for officers to grasp how AI can be applied effectively in their daily roles. Practical training modules should incorporate hands-on experience with AI tools and technologies, enabling officers to manipulate data, run AI algorithms, and interpret the outcomes. Real-world case studies and scenarios should be

integrated into the curriculum to contextualize AI applications in governance, providing a clearer picture of its potential benefits and challenges.

- **Limited Cross-Sector Collaboration**

Another significant gap is the lack of cross-sector collaboration, which is essential to understand the multifaceted impact of AI across various domains of governance. Programs should foster partnerships with different government departments, private sectors, and academic institutions to create a holistic learning environment. This collaboration can facilitate the exchange of knowledge, best practices, and innovative solutions that can be adapted to the public sector. Workshops and joint projects with these stakeholders can offer valuable insights into the practical implications of AI and foster a culture of continuous learning and adaptation.

- **Inadequate Focus on AI Ethics and Bias Mitigation**

AI ethics, transparency, and bias mitigation are critical areas that are not sufficiently addressed in the current training frameworks. Middle-level government officials need to be well-versed in the ethical considerations of AI deployment, including data privacy, algorithmic bias, and the societal impact of AI decisions. Comprehensive training modules on AI ethics should cover global standards and regulations, ethical AI frameworks, and case studies highlighting the consequences of unethical AI use. This will equip officials with the knowledge to implement AI responsibly and ensure that AI systems are fair, transparent, and accountable.

- **Lack of Continuous and Adaptive Learning Opportunities**

The ever-evolving nature of AI technologies necessitates continuous and adaptive learning opportunities. Current capacity-building programs often lack mechanisms for ongoing education and skill enhancement. To address

this, programs should introduce periodic assessments to measure AI competency improvements and identify areas needing further development. Additionally, establishing online learning platforms with updated resources, tutorials, and courses can provide flexible and accessible learning opportunities for government officials.

By incorporating these elements into capacity-building programs, middle-level government officials will be better equipped to harness AI's full potential in improving public service delivery and governance. Enhanced technical training, effective interpretation of AI insights, addressing the fear of redundancy, and a strong focus on data ethics and privacy will collectively contribute to building a robust AI competency framework within the government sector.

Question 7) <u>Suggestions for Further Improvement of AI related Capacity Building Programs</u>.

Suggestions for Further Improvement of AI-Related Capacity Building Programs

- **Incorporate More Hands-on AI Training with Real-World Case Studies**

To bridge the gap in practical AI training, capacity-building programs should be designed to include extensive hands-on experiences. This can be achieved by integrating real-world case studies and scenarios demonstrating practical AI applications in governance. By doing so, officers can better understand how to manipulate data, run AI algorithms, and interpret the outcomes in the context of their everyday roles. This approach will enhance their technical skills and provide a clearer picture of AI's potential benefits and challenges in public service delivery.

- **Develop AI Literacy Modules Tailored for Governance Applications**

It's essential to create AI literacy modules specifically tailored to the needs of governance applications. These modules should cover the basics of AI technologies, their capabilities and limitations, and their application in different areas of public service. By aligning the training content with the specific governance demands, officials will be better equipped to leverage AI tools effectively and make informed decisions that enhance public service delivery.

- **Establish Partnerships with Leading AI Institutions for Up-to-Date Knowledge Transfer**

Another crucial step is to foster partnerships with leading AI research institutions, technology companies, and academic entities. These collaborations can facilitate the transfer of up-to-date knowledge, best practices, and innovative solutions that can be adapted to the public sector. Joint workshops, conferences, and collaborative projects can provide valuable insights into the latest developments in AI and help build a network of experts who can support ongoing learning and adaptation.

- **Implement Periodic Assessments to Measure AI Competency Improvements**

Given the ever-evolving nature of AI technologies, continuous assessment and improvement of AI competencies are vital. Capacity-building programs should introduce periodic evaluations to gauge the progress of government officials in understanding and applying AI. These assessments can help identify areas that require further development and tailor subsequent training sessions to address these gaps. Additionally, setting up a feedback loop where officials can share their experiences and challenges will contribute to a more dynamic and responsive training program.

- **Promote a Culture of AI-Driven Decision-Making Through Pilot Projects and Digital Transformation Initiatives**

  To embed AI in the decision-making processes of government agencies, it's essential to promote a culture that embraces digital transformation and AI-driven solutions. Pilot projects showcasing successful AI applications in governance can be powerful demonstrations of AI's potential. These projects can also provide practical learning opportunities for officials, allowing them to see firsthand how AI can improve efficiency and effectiveness. Furthermore, incorporating AI-driven decision-making into broader digital transformation initiatives can help create a more integrated and forward-thinking approach to governance.

By incorporating these elements into capacity-building programs, middle-level government officials will be better equipped to harness AI's full potential in improving public service delivery and governance. Enhanced technical training, practical interpretation of AI insights, addressing the fear of redundancy, and a strong focus on data ethics and privacy will collectively contribute to building a robust AI competency framework within the government sector.

Appendix 2

INTERVIEW MR RAJNISH COO, NEGD

Exploring Gaps in Artificial Intelligence (AI) Competency of Middle Level Government Officials for Effective Public Service Delivery: Challenges and Recommendations for Capacity Building Programs of Government of India (GoI)

I am Brig Osiris Das, undergoing Advanced Professional Program in Public Administration (APPPA) Ser-50 at the Indian Institute of Public Administration (IIPA), New Delhi. As part of the course curriculum, I am doing my research on the a/m topic. As a policy maker and also into capacity building programs of GoI, I would like to interview you to get insights into the envisaged role that AI is likely to play now and in future in delivery of public services. Through the interview I would also like to know if government officials particularly middle level officers (JS and Directors) are geared up to infuse AI into governance. Do they have the requisite capacities and if they are adequately trained to take on this challenge? In addition, the GoI has undertaken many capacity building programs to train government officials in various aspects. Are these capacity building programs catering for the growing need to infuse AI in public service delivery by training government officials?

May I request you to answer the questions that I have listed below as part of the interview or incase you are able to give me some time I will like to interview you in person. Look forward to your response. I would like to assure you that your response will not be misquoted in my research and the final extracts of the interview will be shared with you prior to publishing it.

Question 1) **Role of Artificial Intelligence (AI) in Public Service Delivery**. AI is revolutionizing the world and also the government services by enhancing efficiency, automation, and decision-making. AI-powered tools can analyze large datasets,

predict trends, and improve citizen engagement. How do you see AI transforming public service delivery in the next five years? What specific areas do you think will benefit the most from AI? Do you foresee any major disruptions or challenges in implementing AI-driven governance?

Answer 1) AI is set to play a pivotal role in enhancing public service delivery by increasing efficiency, transparency, and accessibility. Over the next five years, AI-driven solutions will make a substantial impact in key areas:

- **E-Governance & Citizen Services:** AI-powered chatbots like My Gov Helpdesk assist citizens in accessing government services efficiently. Aadhaar-based AI has streamlined subsidy distribution in schemes like PM-KISAN, improving efficiency and reducing delays.

- **Predictive Analytics for Policy Planning:** AI tools like Aarogya Setu have demonstrated their potential in tracking public health trends. AI-driven infrastructure planning, such as the Rural Road Planning model, optimizes resource allocation and enhances decision-making.

- **Agriculture & Rural Development:** AI is transforming agricultural decision-making, with tools like IBM's AI Krishi Mitra offering real-time weather insights and precision farming techniques.

- **Law Enforcement & Judiciary:** AI-enabled facial recognition and case file summarization tools like SUPACE enhance decision-making processes in law enforcement and the judiciary.

Key Considerations for Implementation:

- **Ensuring AI Fairness:** Ensuring unbiased AI models to promote equitable service delivery.
- **Strengthening Data Privacy Frameworks:** Aligning AI adoption with the DPDP Act, 2023.
- **Developing a Skilled Workforce:** Empowering officials with AI literacy and practical knowledge for seamless adoption.

Question 2) <u>Challenges in Integrating AI in Governance</u>. Despite AI's potential, many government agencies struggle with AI adoption due to budget constraints, lack of AI expertise and training, resistance to change, and data security concerns. Addressing these barriers is crucial for seamless AI integration. What are the biggest barriers to AI adoption in government agencies, and how can they be addressed?

Answer 2) To ensure smooth AI integration in governance, the following areas should be strengthened:

- Expanding AI Expertise & Training: Upskilling government officials to bridge knowledge gaps and ensure AI literacy.
- Optimizing Budget Allocation: Investing in AI infrastructure such as cloud computing, AI labs, and data centres to facilitate widespread adoption.
- Strengthening Data Privacy & Cybersecurity Measures: Ensuring secure and lawful data sharing across ministries while maintaining compliance with privacy regulations.
- Encouraging a Culture of Innovation: Promoting digital adoption through structured change management initiatives and awareness campaigns.

Strategies for Advancement:

- Capacity Building: Integrating AI modules into Mission Karmayogi and providing hands-on AI exposure.

- Public-Private Partnerships: Collaborating with AI industry leaders to introduce best practices and scalable AI solutions.
- Pilot Testing & Gradual Rollout: Implementing AI in phases to maximize effectiveness and learn from early implementations**.**

Question 3) **AI Competencies Required in Middle-level Government Officials**. What specific AI competencies are primarily required by middle-level government officials to effectively facilitate public service delivery? Do you think that officials of GoI particularly Middle level officers, Joint Secretaries and Directors are geared up to take on aspects of AI to further boost the delivery of public services?

Answer 3 For effective AI integration, government officials should develop competencies in:

- AI Fundamentals & Ethics: Understanding AI applications, ethical considerations, and responsible AI use in governance.
- Data Analytics & Interpretation: Utilizing AI-driven dashboards for informed policy decisions and trend analysis.
- Project Management & AI Integration: Overseeing AI implementation in governance initiatives and ensuring alignment with policy goals.
- Cybersecurity Awareness: Ensuring data security, protecting sensitive citizen information, and addressing cybersecurity challenges.

Strengthening these competencies will empower officials to leverage AI effectively for governance transformation.

Question 4) **AI Training Programs and It's Effectiveness**. The availability and effectiveness of AI training programs vary across government departments. Can you list a few of such programs and the intended outcomes? How would you assess the current AI training programs available for middle-level officers in the GoI?

Answer 4) Key AI training programs include:

- **Mission Karmayogi (iGOT Platform):** Introduces AI concepts but would benefit from more hands-on implementation and real-world application.
- **FutureSkills Prime (NASSCOM & MeitY):** Supports AI reskilling and offers structured learning but could be tailored further for governance applications.
- **AI for Government Leaders (NITI Aayog & Microsoft):** Provides policy insights and leadership training but could be enriched by practical exercises.
- **IIM & IIT AI Leadership Programs:** Offers AI strategy training with potential for more immersive, real-world learning experiences.
- **Enhancement Opportunities:** Introducing AI labs, hackathons, and real-time project simulations to provide experiential learning opportunities.

Question 5) **AI Competency Gaps in Middle Level Officers**. Have the gaps in AI competency in middle level officers been identified by various capacity building programs like Mission Karmayogi, Capacity Building Program III and FutureSkills Prime? Primarily what would be these gaps be? To rephrase, what are the specific AI skills a middle-level government official should have for effective delivery of public services?

Answer 5) Key focus areas include:-

- **Expanding AI Knowledge:** Increasing exposure to AI-driven policy tools and their applications in governance.
- **Hands-on Training:** Enhancing experiential learning in AI projects through practical workshops and real-world problem-solving scenarios.

- **Encouraging AI-Driven Decision-Making:** Promoting AI adoption through case-based learning, simulations, and structured competency assessments.

Focused training interventions will bridge competency gaps and enhance governance efficiency.

Question 6) **Gaps in Capacity Building Programs to Address AI Competencies Required by Middle-level Government Officials** . Do these capacity building initiatives like Mission Karmayogi, Capacity Building Program III and FutureSkills Prime address the AI competency required by middle-level government officials as identified earlier? What are the gaps in these programs wrt to development of AI competency in middle-level government officials? How are these being addressed?

Answer 6) Despite various training programs, gaps remain:-

- **Sector-Specific AI Training Lacking**:
  - ✓ AI use cases vary (e.g., law enforcement vs. healthcare), but training is generic.
  - ✓ **Example**: **AI in traffic management (Delhi & Mumbai)** isn't covered in capacity-building programs.
- **Lack of AI Implementation Exposure**:
  - ✓ Most programs lack **real-world projects**.
  - ✓ **Example**: A **hands-on AI lab** for governance applications isn't available.
- **No Cross-Departmental AI Learning**:
  - ✓ AI training isn't shared across ministries.
  - ✓ **Example**: AI use in agriculture policy planning isn't shared with urban governance officials.

Recommendations:

- **Develop sector-specific AI training** (health, law, taxation, etc.).
- **Introduce AI sandbox environments** for real-time problem-solving.

Question 7) <u>Suggestions for Further Improvement of AI related Capacity Building Programs</u>. How can Capacity Building Programs be further improved to enhance the AI competency of middle-level government officials to address the identified gaps and align more closely with the demands of public service delivery?

Answer 7) Recommendations for strengthening AI capacity building include:

- **Making AI Training Integral:** Embedding AI modules into Mission Karmayogi to ensure continuous learning.
- **Launching AI Governance Fellowships:** Establishing structured AI learning initiatives in collaboration with leading academic institutions.
- **Introducing AI Labs & Practical Learning:** Developing real-world AI applications for governance to improve policy execution.
- **Encouraging Public-Private Collaboration:** Facilitating joint research programs between government and industry leaders to leverage best practices.
- **Conducting Regular AI Competency Assessments:** Periodically evaluating AI proficiency among officials to track progress and identify areas for growth.

By implementing these measures, AI adoption in governance will be more effective, impactful, and sustainable.

Appendix 3

INTERVIEW MR RAJESH. ACADEMIC COUNSELOR, IGNOU

Exploring Gaps in Artificial Intelligence (AI) Competency of Middle Level Government Officials for Effective Public Service Delivery: Challenges and Recommendations for Capacity Building Programs of Government of India (GoI)

I am Brig Osiris Das, undergoing Advanced Professional Program in Public Administration (APPPA) Ser-50 at the Indian Institute of Public Administration (IIPA), New Delhi. As part of the course curriculum, I am doing my research on the a/m topic. As a policy maker and also into capacity building programs of GoI, I would like to interview you to get insights into the envisaged role that AI is likely to play now and in future in delivery of public services. Through the interview I would also like to know if government officials particularly middle level officers (JS and Directors) are geared up to infuse AI into governance. Do they have the requisite capacities and if they are adequately trained to take on this challenge? In addition, the GoI has undertaken many capacity building programs to train government officials in various aspects. Are these capacity building programs catering for the growing need to infuse AI in public service delivery by training government officials?

May I request you to answer the questions that I have listed below as part of the interview or incase you are able to give me some time I will like to interview you in person. Look forward to your response. I would like to assure you that your response will not be misquoted in my research and the final extracts of the interview will be shared with you prior to publishing it.

Question 1: Role of Artificial Intelligence (AI) in Public Service Delivery. AI is revolutionizing the world and also the government services by enhancing efficiency, automation, and decision-making. AI-powered tools can analyze large datasets,

predict trends, and improve citizen engagement. How do you see AI transforming public service delivery in the next five years? What specific areas do you think will benefit the most from AI? Do you foresee any major disruptions or challenges in implementing AI-driven governance?

Answer: Artificial Intelligence (AI) is altering public service delivery by reformation processes, advanced accuracy and offering personalized services to citizens. It is even expected to be more involved into government operations in coming years, leading to smarter governance, proactive service delivery, and improved resource management. In the next five years AI is expected to transforming public service delivery in following manner:-

- Citizens will get 24/7 support through AI-driven virtual assistants which is expected to enhance customer improving satisfaction.
- It will help the government to know essential public needs and proactively allocate resources to it.
- AI will help in timely processing of time-consuming processes like issuing certificates, licenses and approvals through chatbots.
- It will even help recognizing any anomalies in transactions, subsidies, and welfare programs, reducing corruption and leakage of public funds.

Some of the specific areas which will benefit the most are:-

- It will assists in getting early disease detection, telemedicine, patient record analysis, and resource optimization.
- AI will play a crucial role in developing Smart city management, traffic flow optimization, waste management, and pollution control.

- Personalized learning, student performance tracking and automated administrative tasks will be also dependent on advancement of AI in coming years.

Some of the major disruptions or challenges in implementing AI-driven governance are as following:-

- Managing sensitive citizen data securely and ensuring compliance with data protection laws.
- Public sector employees may lack the necessary skills to implement and manage AI systems.
- Bureaucratic inertia and fear of job displacement could slow down AI implementation.
- Developing countries may struggle with the digital infrastructure required for large-scale AI adoption.

Question 2: Challenges in Integrating AI in Governance. Despite AI's potential, many government agencies struggle with AI adoption due to budget constraints, lack of AI expertise and training, resistance to change, and data security concerns. Addressing these barriers is crucial for seamless AI integration. What are the biggest barriers to AI adoption in government agencies, and how can they be addressed?

Answer: While AI offers enormous potential for governance, its adoption faces several challenges. Understanding these challenges is vital to ensure successful, ethical and sustainable AI integration within government systems. Some of the biggest barriers to AI adoption in government agencies & suggestive ways to address them are as following:-

- Financial Constraints: As Implementing AI involves significant costs such as: infrastructure upgrades, talent acquisition, software licenses and ongoing maintenance which can strain public budgets. But in order to deal with these challenges we should Prioritize cost-effective, scalable AI solutions with open-source tools where possible & Promote Public-Private Partnerships (PPPs) to share costs and expertise.
- Gaps of Ethical & Legal Framework: There is no clear policies governing AI accountability and transparency in the public sector. In order to deal with this we should develop some ethical guidelines on AI specific to government use & even establish a regulatory body to oversee AI implementation and prevent misuse.

Question 3: AI Competencies Required in Middle-level Government Officials. What specific AI competencies are primarily required by middle-level government officials to effectively facilitate public service delivery? Do you think that officials of GoI particularly Middle level officers, Joint Secretaries and Directors are geared up to take on aspects of AI to further boost the delivery of public services?

Answer: When we talk about middle-level government officials, it will comprise of such as Joint Secretaries, Directors, and equivalent officers. They will play a pivotal role in policy execution, program management, and service delivery. To effectively facilitate AI-driven public services, they need a balanced understanding of AI's capabilities, limitations, and implementation strategies. Some of the key AI competencies for middle-level government officials are as following:-

- Demonstrating a comprehensive understanding of fundamentals of AI concepts and classifications. It includes machine learning & natural language

processing with a focus on their applicability to governance and public sector operations.

- Possess in-depth knowledge of privacy and data protection legislation, bias mitigation methodologies, and the ethical considerations essential to the responsible deployment of AI in public service delivery.
- Exhibit the capability to strategically plan, supervise, and evaluate AI projects, ensuring effective vendor management and facilitating coordination across relevant governmental departments.

Question 4: AI Training Programs and It's Effectiveness. The availability and effectiveness of AI training programs vary across government departments. Can you list a few of such programs and the intended outcomes? How would you assess the current AI training programs available for middle-level officers in the GoI?

Answer: Several AI training programs have been introduced to build the capacity of government officers in India. Some of them are as following:-

- Responsible AI for Public Servants (Conducted by NITI Aayog): Designed to promote awareness of ethical AI practices, bias mitigation strategies, and the responsible deployment of AI technologies in governance.
- National Programme on AI (NPAI) Workshops (Conducted by the Ministry of Electronics and Information Technology): Aims to develop strategic competencies in AI project planning, implementation, and risk management within public sector initiatives.

Some of the observations on key areas of concern regarding the effectiveness of existing AI training programs are as following:-

- Absence of Formal Impact Assessment: There is a lack of structured frameworks to evaluate how training outcomes translate into improved AI project implementation and policy innovation.
- Limited Depth and Specialization: Most programs remain introductory in nature, with significant gaps in advanced, domain-specific AI applications, particularly in critical sectors such as healthcare, agriculture, and law enforcement.
- Insufficient Practical Exposure: The majority of courses emphasize theoretical knowledge, offering limited opportunities for hands-on learning through case studies, simulations, or live project work.

Question 5: AI Competency Gaps in Middle Level Officers. Have the gaps in AI competency in middle level officers been identified by various capacity building programs like Mission Karmayogi, Capacity Building Program III and FutureSkills Prime? Primarily what would be these gaps be? To rephrase, what are the specific AI skills a middle-level government official should have for effective delivery of public services?

Answer: Capacity-building initiatives such as Mission Karmayogi, Capacity Building Program III, and FutureSkills Prime have made initial progress in identifying AI-related competency gaps among middle-level government officers. While these programs have emphasized the importance of digital literacy and awareness of emerging technologies, a comprehensive and systematic assessment of AI-specific competency gaps is still in its early stages.

Some of primary AI competency gaps identified are as following:-

- Limited understanding of fundamental AI concepts, including machine learning, natural language processing, and data-driven decision-making.
- Insufficient awareness of ethical considerations, such as privacy, data protection, bias mitigation, and the legal and regulatory frameworks governing the use of AI in public services.
- Gaps in the capacity to conceptualize, plan, manage, and evaluate AI-driven projects, particularly in the areas of interdepartmental coordination and vendor management.
- Inadequate proficiency in interpreting and utilizing large datasets to support AI applications in policymaking and service delivery.

Some of the key AI skills required for middle-level government officials to enhance public service delivery are as following:-

- A sound understanding of core AI technologies, their capabilities, limitations, and applications within the context of governance.
- The ability to apply relevant data protection laws and uphold principles of fairness, transparency, and accountability in the deployment of AI systems in public administration.
- Competence in identifying suitable use cases for AI, developing project plans, managing cross-functional teams, and overseeing the successful implementation of AI initiatives.
- The capacity to identify public service challenges that can be addressed through AI solutions and collaborate effectively with technical experts to design and implement appropriate interventions.

- The ability to evaluate the impact of AI deployments on public service delivery, operational efficiency, and citizen satisfaction.

Question 6: Gaps in Capacity Building Programs to Address AI Competencies Required by Middle-level Government Officials . Do these capacity building initiatives like Mission Karmayogi, Capacity Building Program III and FutureSkills Prime address the AI competency required by middle-level government officials as identified earlier? What are the gaps in these programs wrt to development of AI competency in middle-level government officials? How are these being addressed?

Answer: Although multiple initiatives have been launched to enhance digital skills and raise awareness of emerging technologies, only a few have made meaningful progress in building the specific AI competencies required by middle-level government officials. The existing programs primarily introduce officers to general concepts of digital transformation, including basic knowledge of AI.

However, when assessed against the competencies necessary for the effective delivery of public services through AI, several critical gaps remain:-

- Most programs are limited to introductory-level content on AI, with insufficient focus on advanced concepts and sector-specific applications relevant to critical areas such as health, agriculture, urban governance, and law enforcement.
- Training remains predominantly theoretical, with limited opportunities for hands-on experience, practical problem-solving, and real-time project work utilizing actual government datasets.

- Current modules often lack emphasis on essential project management skills required for successful AI project execution, including interdepartmental coordination and vendor management.

In order to address these challenges, we should follow below steps:-

- Ongoing efforts under Mission Karmayogi and associated platforms aim to broaden course offerings to include specialized AI modules covering ethical considerations, project management, and sector-specific use cases.
- Collaborations with leading academic institutions and industry bodies are being pursued to integrate advanced learning tracks, real-world case studies, and practical project-based learning opportunities.
- Development of progressive, competency-based learning journeys designed to help middle-level officers advance from foundational AI literacy to applied, domain-specific expertise.

Question 7: Suggestions for Futher Improvement of AI related Capacity Building Programs. How can Capacity Building Programs be further improved to enhance the AI competency of middle-level government officials to address the identified gaps and align more closely with the demands of public service delivery?

Answer: To effectively enhance the AI competencies of middle-level government officials and address the existing gaps, capacity-building programs must evolve to deliver not only foundational knowledge but also practical, sector-specific expertise that aligns with the growing demands of public service delivery.

Following measures are recommended for strengthening these programs:-

- Introduce specialized courses focusing on the application of AI in key public service sectors such as healthcare, agriculture, urban governance, education, and law enforcement.
- Encourage knowledge exchange forums where officers can share their AI project experiences, challenges, and lessons learned.
- Integrate live projects, hackathons, and problem-solving workshops using actual government datasets to provide experiential learning.
- Design modules focused on the end-to-end management of AI projects, including needs assessment, vendor and contract management, interdepartmental coordination, risk mitigation, and performance evaluation.
- Provide continuous learning options through micro-credentials and certifications that encourage upskilling over time.

Appendix 4

INTERVIEW MR CARALYN KHONGWAR DESHMUKH ADDITIONAL SECRETARY, DEPARTMENT OF SOCIAL JUSTICE AND EMPOWERMENT, GOI

Exploring Gaps in Artificial Intelligence (AI) Competency of Middle Level Government Officials for Effective Public Service Delivery: Challenges and Recommendations for Capacity Building Programs of Government of India (GoI)

I am Brig Osiris Das, undergoing Advanced Professional Program in Public Administration (APPPA) Ser-50 at the Indian Institute of Public Administration (IIPA), New Delhi. As part of the course curriculum, I am doing my research on the a/m topic. As a policy maker and also into capacity building programs of GoI, I would like to interview you to get insights into the envisaged role that AI is likely to play now and in future in delivery of public services. Through the interview I would also like to know if government officials particularly middle level officers (JS and Directors) are geared up to infuse AI into governance. Do they have the requisite capacities and if they are adequately trained to take on this challenge? In addition, the GoI has undertaken many capacity building programs to train government officials in various aspects. Are these capacity building programs catering for the growing need to infuse AI in public service delivery by training government officials?

May I request you to answer the questions that I have listed below as part of the interview or incase you are able to give me some time I will like to interview you in person. Look forward to your response. I would like to assure you that your response will not be misquoted in my research and the final extracts of the interview will be shared with you prior to publishing it.

Question 1) **Role of Artificial Intelligence (AI) in Public Service Delivery**. AI is revolutionizing the world and also the government services by enhancing efficiency,

automation, and decision-making. AI-powered tools can analyze large datasets, predict trends, and improve citizen engagement. How do you see AI transforming public service delivery in the next five years? What specific areas do you think will benefit the most from AI? Do you foresee any major disruptions or challenges in implementing AI-driven governance?

Answer 1)

- With AI, we can have Faster, Quicker Public Service Delivery with targeted focused interventions .
- All sectors and especially Social Service sectors.
- There will be major disruptions with most field positions becoming irrelevant after some time.

Question 2) **Challenges in Integrating AI in Governance**. Despite AI's potential, many government agencies struggle with AI adoption due to budget constraints, lack of AI expertise and training, resistance to change, and data security concerns. Addressing these barriers is crucial for seamless AI integration. What are the biggest barriers to AI adoption in government agencies, and how can they be addressed?

Answer 2) One of the biggest barriers is the inadequacy of data, data fidelity, lack of SoP compliances and understanding of understanding of compliance issues.

Question 3) **AI Competencies Required in Middle-level Government Officials**. What specific AI competencies are primarily required by middle-level government officials to effectively facilitate public service delivery? Do you think that officials of GoI particularly Middle level officers, Joint Secretaries and Directors are geared up to take on aspects of AI to further boost the delivery of public services?

Answer 3)

- Understanding Data SoP and strict compliances to SoPs
- No. Huge capacity building is needed.

Question 4) **AI Training Programs and It's Effectiveness**. The availability and effectiveness of AI training programs vary across government departments. Can you list a few of such programs and the intended outcomes? How would you assess the current AI training programs available for middle-level officers in the GoI?

Answer 4)

- Capacity Building Programmes for AI for specific sectors need to factor in what kind of data systems are existing
- Not adequate

Question 5) **AI Competency Gaps in Middle Level Officers**. Have the gaps in AI competency in middle level officers been identified by various capacity building programs like Mission Karmayogi, Capacity Building Program III and FutureSkills Prime? Primarily what would be these gaps be? To rephrase, what are the specific AI skills a middle-level government official should have for effective delivery of public services?

Answer 5)

- Specific TNA for AI readiness is required
- It is not just a question of specific AI skills of individual middle-level government official but of the system too

Question 6) **Gaps in Capacity Building Programs to Address AI Competencies Required by Middle-level Government Officials** . Do these capacity building initiatives like Mission Karmayogi, Capacity Building Program III and FutureSkills

Prime address the AI competency required by middle-level government officials as identified earlier? What are the gaps in these programs wrt to development of AI competency in middle-level government officials? How are these being addressed?

Answer 6) Answer same as in Q 5

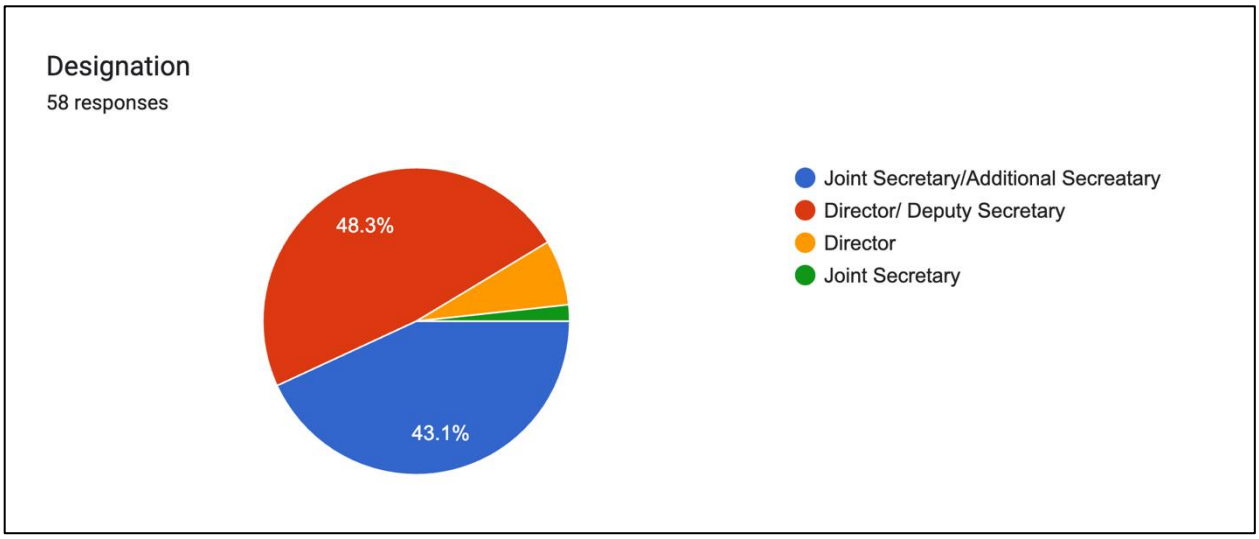
Question 7) <u>Suggestions for Futher Improvement of AI related Capacity Building Programs</u>. How can Capacity Building Programs be further improved to enhance the AI competency of middle-level government officials to address the identified gaps and align more closely with the demands of public service delivery?

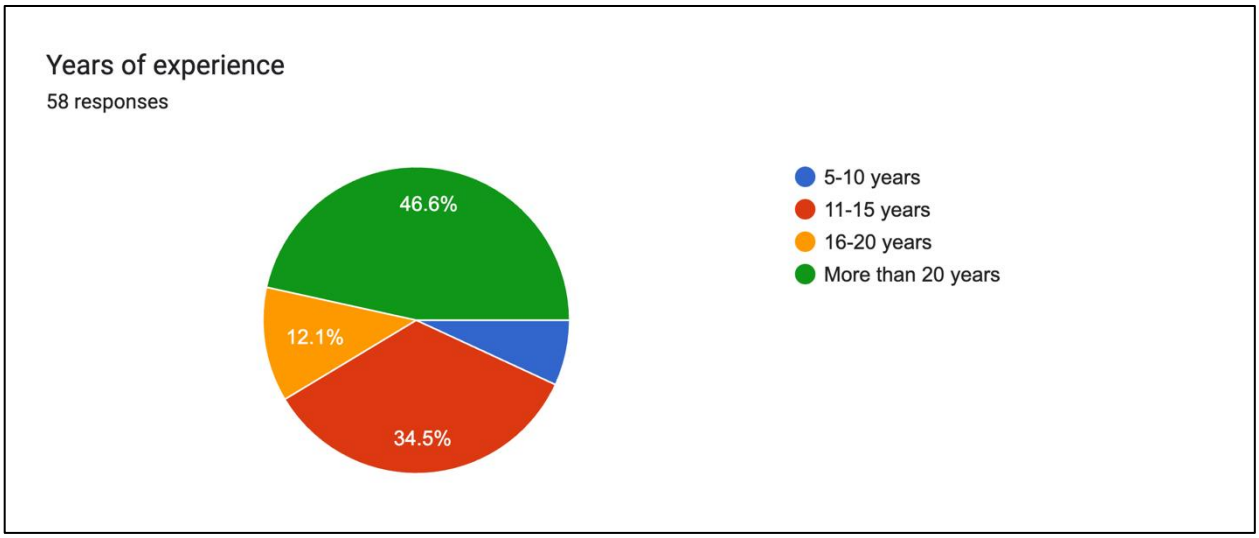
Answer 7) Same as in Answer 5

Appendix V

Exploring Gaps in Artificial Intelligence (AI) Competency of Middle Level Government Officials for Effective Public Service Delivery: Challenges and Recommendations for Capacity Building Programs of Government of India (GoI)

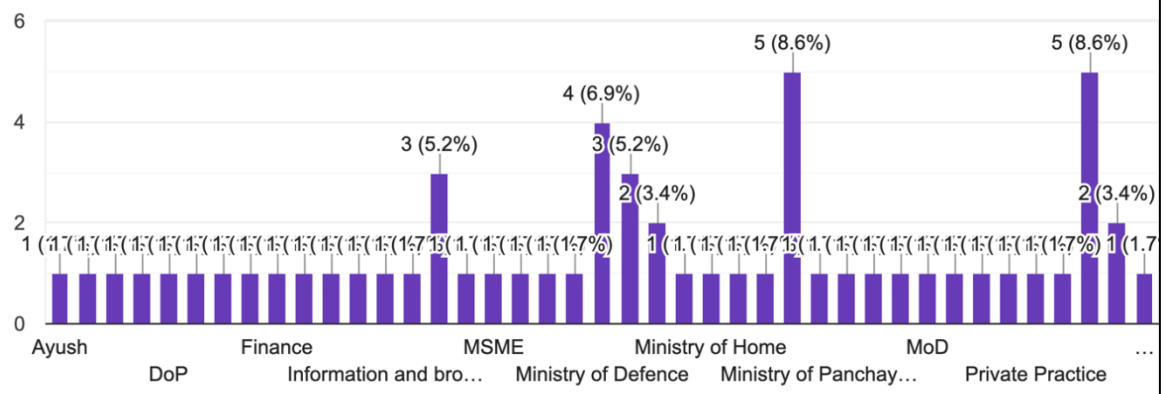
58 Responses





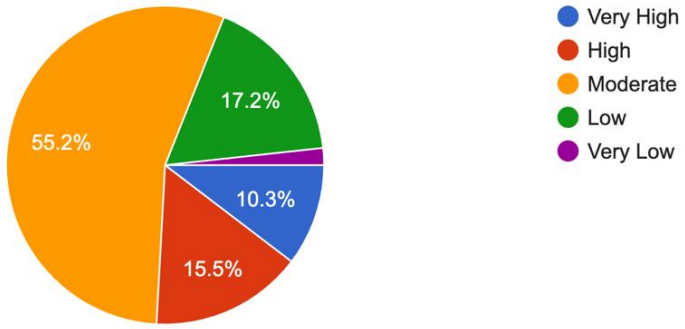
Department/Ministry

58 responses



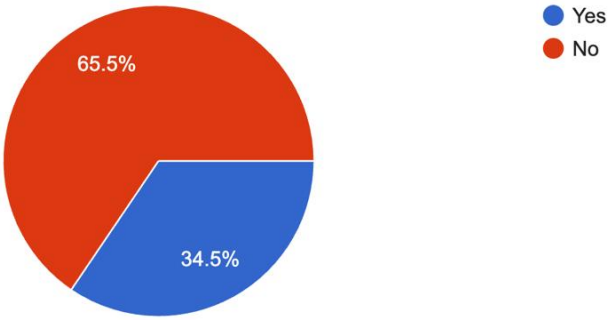
How would you rate your awareness of AI concepts and applications in governance?

58 responses



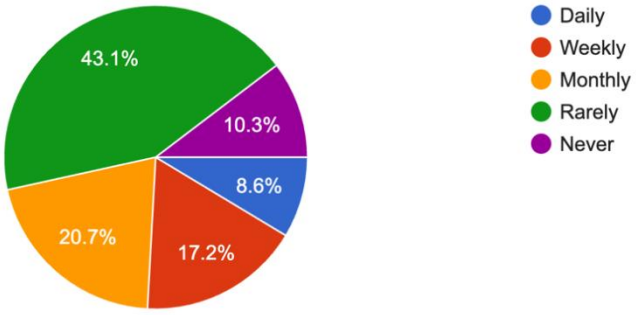
Have you been involved in any AI-related projects or policy decisions in your department?

58 responses



How frequently do you encounter AI-related discussions or implementations in your official role?

58 responses

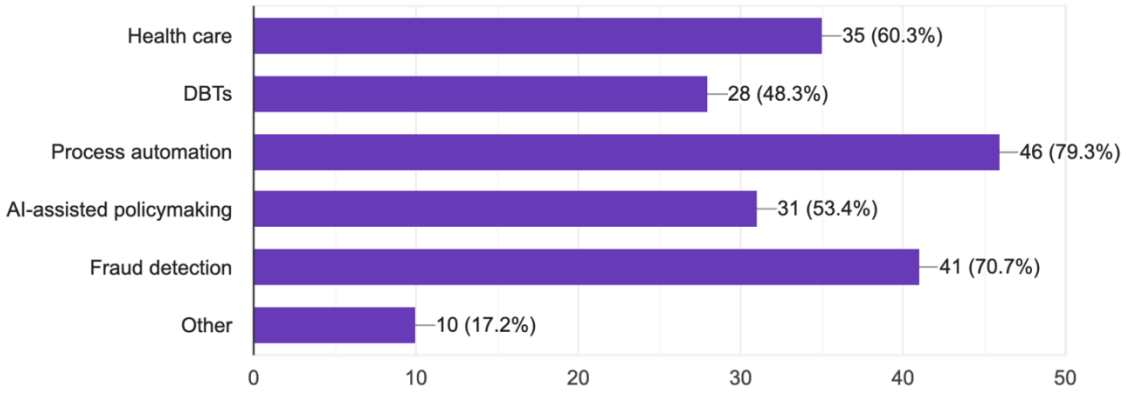


Can AI assist your Department/ Ministry in Public Service Delivery? If Yes, How?

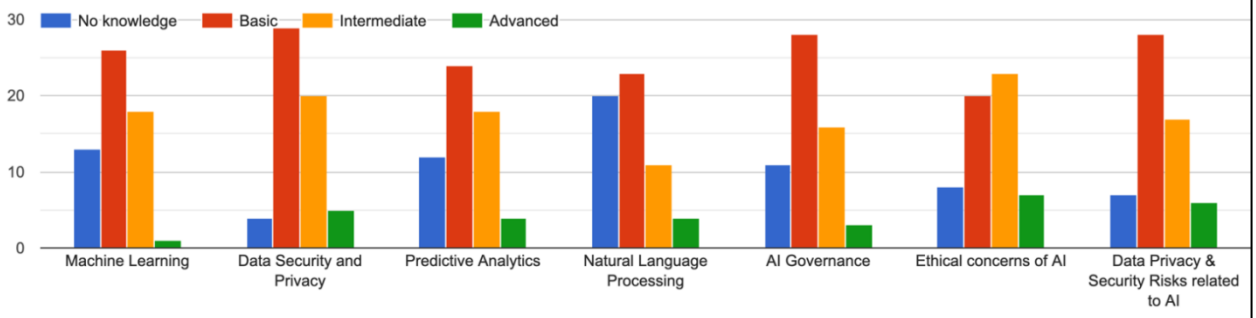
58 responses

In which fields can AI be used for effective public service delivery? (Can select more than one)

58 responses

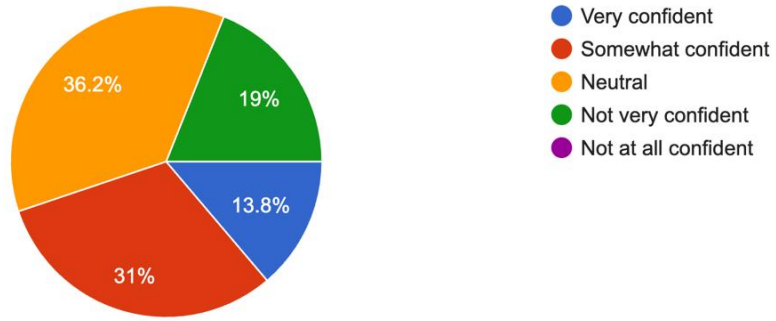


Rate your understanding of the following AI concepts



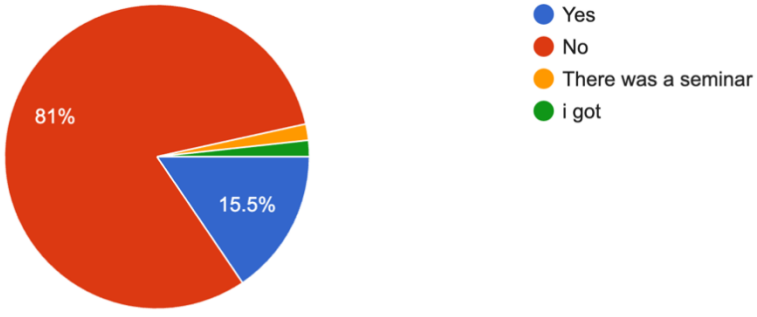
How confident are you in using AI-based decision-making tools in your administrative functions?

58 responses



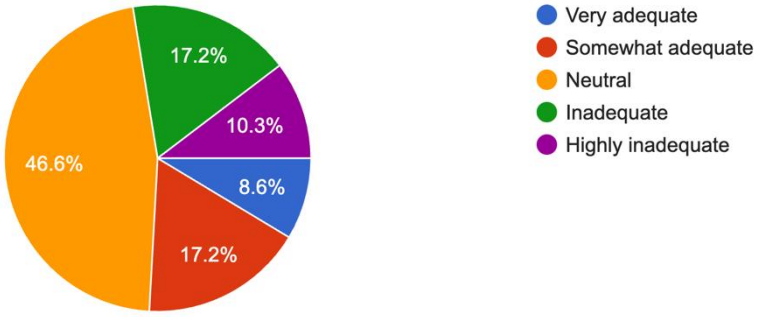
Did you receive formal training on AI through GoI capacity building initiatives? (if yes, please specify the initiative in the other)

58 responses



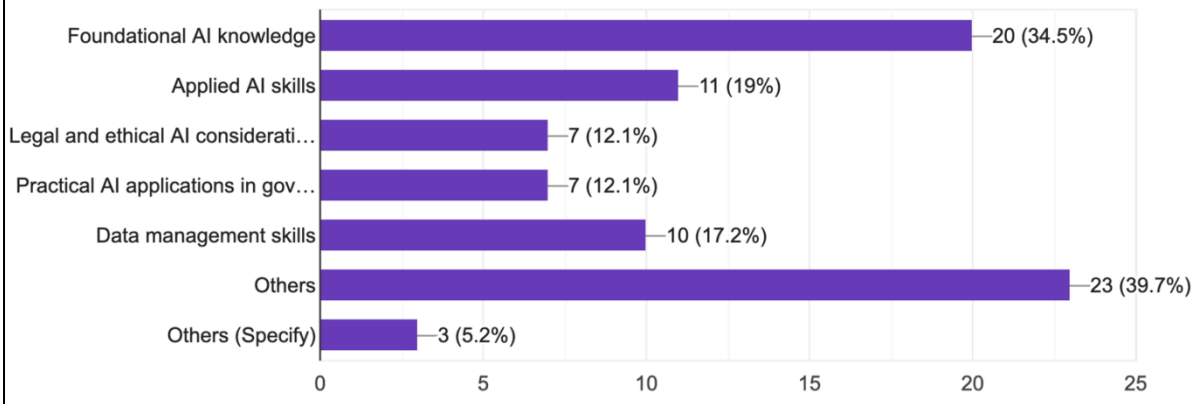
How would you assess these AI training programs in government?

58 responses



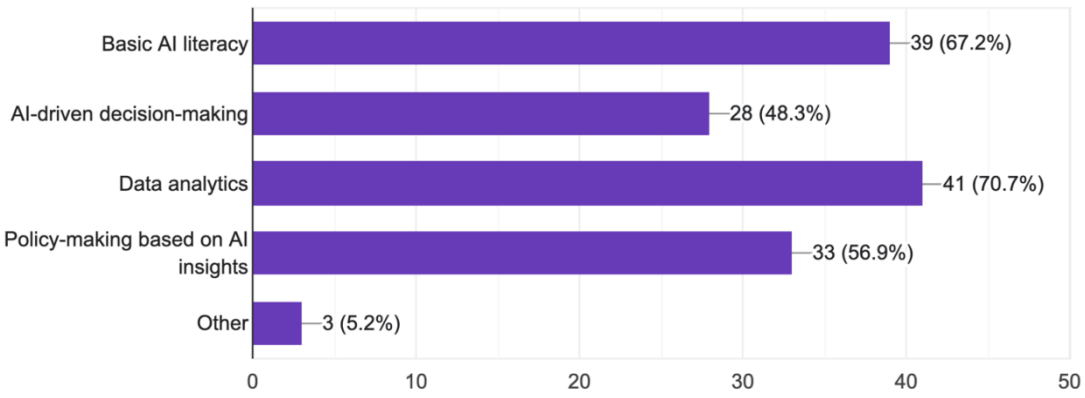
What aspects of AI were included your training programs? (Can select more than one)

58 responses



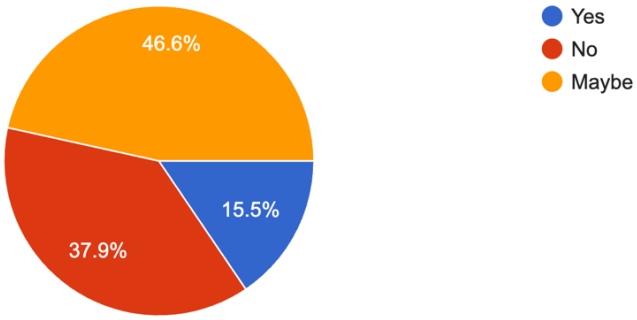
Which AI-related skills do you believe are essential for middle-level officers to enhance public service delivery? (Can select more than one)

58 responses



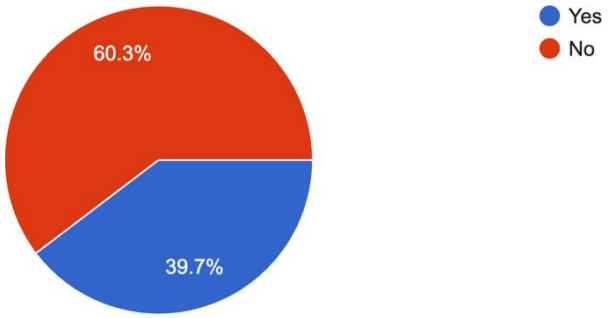
Do you think current AI training programs address the specific needs of government officials in India?

58 responses



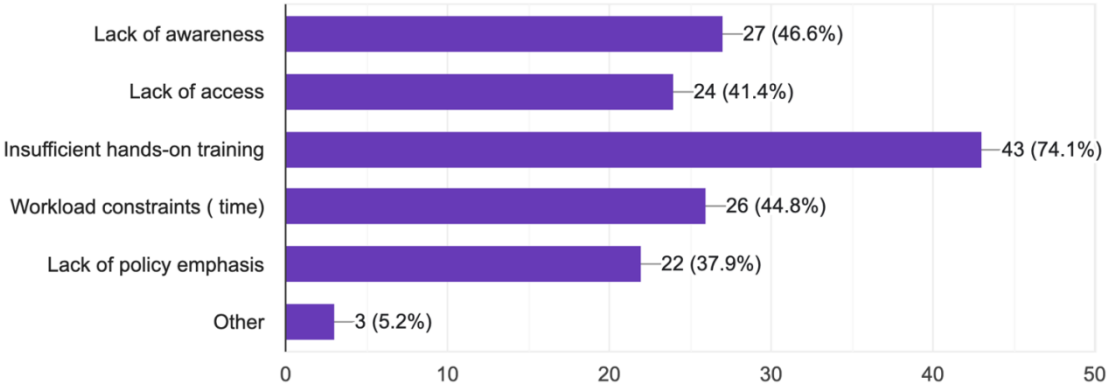
Have these programs assisted you in day to day work and public service delivery?

58 responses



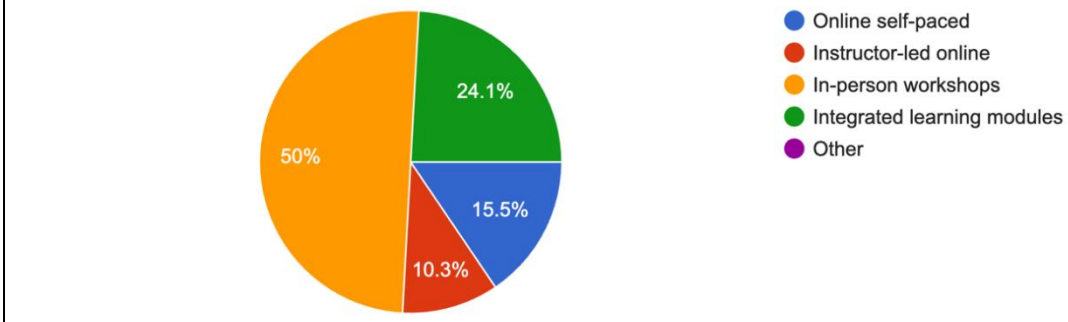
What are the key challenges that you faced in gaining AI competency? (Can select more than one)

58 responses



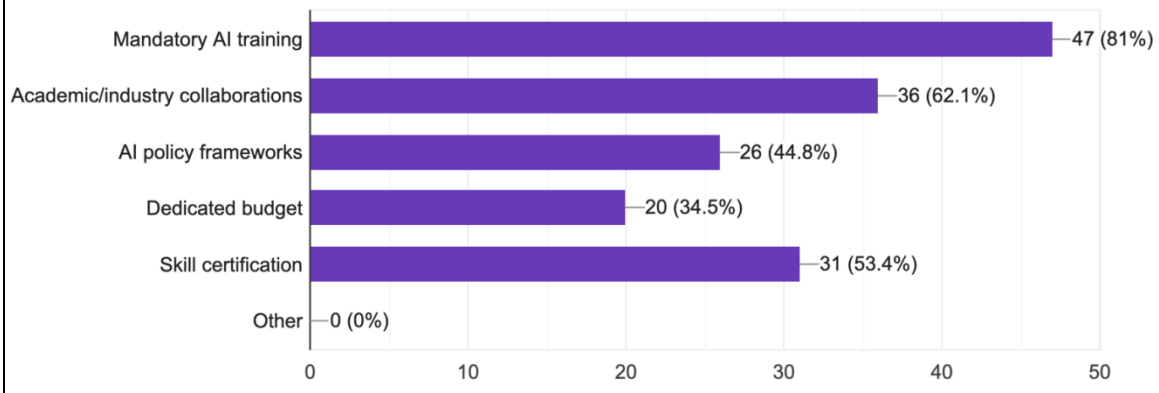
In your opinion, what format of AI training would be most beneficial for government officers?

58 responses



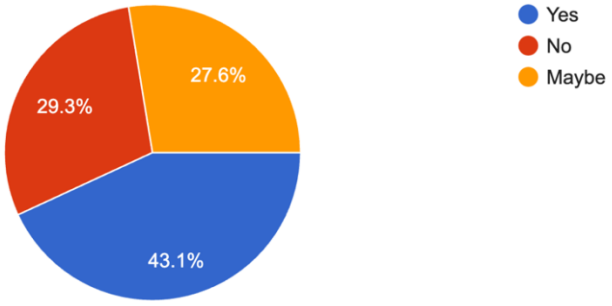
What measures should the Government of India take to strengthen AI competency among middle-level officers? (Can select more than one)

58 responses



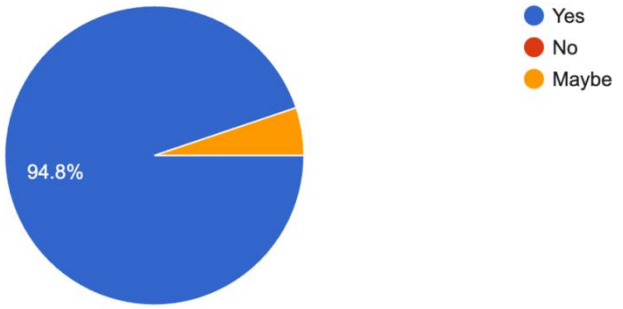
Do you think AI competency should be a mandatory requirement for promotions in policy or technology-related roles?

58 responses



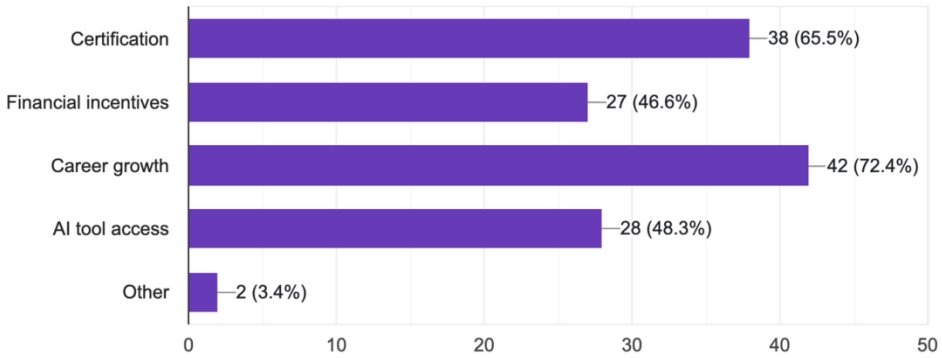
Would you be willing to participate in AI training programs?

58 responses



What incentives do you think should be provided to encourage officers to undergo AI training? (Can select more than one)

58 responses



Any additional suggestions or comments on improving capacity building programs to address the gaps in AI competency for middle-level officers of GoI?

58 responses

- 11 respondants did not provide any suggestions
- 6 respondants suggested that more training is required
- 3 respondants suggested that AI competency should be compulsory for government officials
- 2 respondants suggested that AI awareness through structured training in all departments
- 2 respondants suggested that Basic understanding and exposure to AI tools for mid-level officials
- 2 respondants suggested that Officers should receive offline training covering practical applications and conceptual clarity
- 2 respondants suggested that No mandated AI skill-building in governance; system should be put in place
- 2 respondants suggested that Compulsory AI training and certification with hands-on practice
- 2 respondants suggested that AI should be integrated into decision-making and skill improvement
- 2 respondants suggested that More AI workshops needed
- 2 respondants suggested that In-person training with hands-on experience
- 2 respondants suggested that Mandatory AI training for government officials
- 2 respondants suggested that AI-trained officers should receive financial incentives and career benefits
- AI should be viewed as a tool to enhance efficiency, not as a way to shirk work
- Government should first educate employees with computers
- AI should be used in public service delivery
- AI models should be prioritized to prevent information leaks
- AI policy for government officials should be released
- Government should identify areas where AI can be used
- Existing government IT systems should integrate AI for data analysis and fraud detection
- AI training should be part of pre-promotion courses
- Residential AI training will be helpful
- AI should be an integral part of governance
- Awareness modules, brainstorming sessions, and open discussions needed
- AI can improve efficiency and track official work pendency
- AI training should be conducted on a regular basis
- AI is a boon and a curse; it must be utilized effectively
- Standard AI program should be designed and delivered through NAIR
- Easy access to AI tools, guided training, and case studies on success/failure
- AI training should be mandatory in policymaking, outcome analysis, and ethical concerns
- Self-learning experience; department uses AI for tax administration