

## **AI-Based Early Childhood Development (ECD) Innovation Challenge**

**Proposed by:** Women Development & Child Welfare Department (WD&CW), Government of Andhra Pradesh.

### **1. Background and Context**

Early Childhood Development (ECD) during the first 2,000 days of life (0–6 years) represents the most critical window for cognitive, physical, socio-emotional and language development. Evidence indicates that nearly 90% of brain development occurs before the age of six, and delays or deficits arising during this period are often irreversible if not addressed early.

The Integrated Child Development Services (ICDS) and Anganwadi system in Andhra Pradesh has achieved significant progress in ensuring child survival through nutrition, immunization, and health services. However, a major systemic gap persists in the early identification of developmental delays, disabilities, and neurodevelopmental risks, as well as in delivering personalized and sustained interventions at scale. These include defects at birth (such as congenital anomalies) and diseases (such as infections or metabolic disorders).

Recent pilots, including AI-based ECD screening initiatives, have demonstrated that technology—particularly AI and data-driven tools—can act as a force multiplier for Anganwadi Workers by enabling early risk detection, prioritisation and decision support without replacing human judgement.

In this context, the Women Development & Child Welfare Department proposes to launch an **AI-Based Early Childhood Development Innovation Hackathon**, in collaboration with RTIH, to source, test and scale cutting-edge, field-ready solutions for children aged 0–6 years across Andhra Pradesh.

#### **Evidence of Possibility:**

The AI-based screening for early identification of Developmental delays including disabilities in Early Childhood Development pilot implemented in **Kuppam constituency** has clearly demonstrated that **technology can bridge this invisible gap**.

Key learnings from the pilot include:

- **Early identification** of developmental risks that were previously undetectable.
- **Predictive analytics** enabling prioritization of high-risk children.
- **Personalized digital nudges** improving caregiver engagement.

The pilot establishes that **AI can act as a force multiplier**, augmenting the capacity of ICDS systems without replacing human judgment.

### **2. Rationale for Innovation Challenge**

Given the rapidly evolving nature of Artificial Intelligence, behavioural science and ECD research, a traditional RFP/EOI approach may limit innovation. A structured **Hackathon cum Innovation Challenge model**, executed as per the guidelines, enables:

- Open and competitive sourcing of diverse solutions
- Rapid prototyping and validation of ideas

- Outcome-oriented evaluation in real-world ICDS settings
- Selection of solutions with demonstrable impact for piloting and scale-up

This approach aligns with the Government of Andhra Pradesh's emphasis on innovation-led, data-driven and accountable governance.

### **3. Objectives of the Innovation Challenge**

The Hackathon aims to:

- Identify the “**second pair of Eyes**” AI-enabled solutions for the early identification of developmental delays and disabilities in children aged 0–6 years, including defects at birth (such as congenital anomalies) and diseases (such as infections or metabolic disorders).
- Enable personalised, age-appropriate and culturally contextualised interventions for caregivers and Anganwadi Workers
- Strengthen digital decision-support and performance monitoring for ICDS functionaries
- Create a scalable, interoperable and secure ECD digital ecosystem aligned with ICDS and Health systems.
- Foster collaboration among startups, academia, NGOs and technology providers

### **4. Scope of the Innovation Challenge**

Solutions proposed under the Challenge will address the following domains:

#### **4.1 AI-Based Screening & Assessment**

- a. Cognitive, motor, language and socio-emotional milestone tracking
- b. Behavioural and psychosocial screening
- c. Integration of anthropometric and health indicators
- d. Predictive risk scoring and early warning systems

#### **4.2 Personalized Intervention & Caregiver Support**

- a. AI-driven recommendations for caregivers and AWWs
- b. Age-appropriate stimulation activities
- c. Local language and low-literacy friendly interfaces with gender lens
- d. Inclusive design for children with special needs

#### **4.3 Capacity Building & Workforce Enablement**

- a. Digital tools for AWWs, Supervisors and CDPOs
- b. Embedded learning, mentoring and decision aids
- c. Performance feedback systems

#### **4.4 Monitoring, Dashboards & Analytics**

- a. Real-time dashboards from AWC to State level
- b. Automated alerts for developmental risks
- c. Program performance and outcome analytics

#### **4.5 System Integration & Data Governance**

- a. Interoperability with ICDS, health and education systems
- b. Secure, privacy-by-design architecture
- c. Compliance with Government of India data protection norms

## **5. PROBLEM STATEMENTS**

Participants shall develop solutions addressing one or more of the following problem areas:

### **A: AI-ENABLED EARLY IDENTIFICATION & RISK STRATIFICATION OF DEVELOPMENTAL DELAYS (0–6 YEARS)**

Early childhood developmental delays, disabilities in children, Defects at birth (such as congenital anomalies), diseases (such as infections or metabolic disorders) **cognitive, motor, speech- language, behavioural and socio-emotional domains**—often manifest subtly and are not immediately visible through conventional growth or health indicators.

Within the ICDS system, identification of such delays currently relies on:

- Manual observation by Anganwadi Workers
- Non-standardized checklists
- Limited time availability and high caseloads

This results in **significant inter-worker and inter-location variability**, leading to delayed or missed identification of children requiring early support. Importantly, the absence of **predictive or risk-based prioritisation** means that children who are likely to develop delays in the near future remain unidentified until delays become severe. Predictive risk scoring and early warning systems suitable for field deployment for developmental delays, disabilities in children, Defects at birth (such as congenital anomalies), diseases (such as infections or metabolic disorders)

The lack of **objective, scalable and technology-assisted screening mechanisms** limits the State's ability to act within the most neurologically effective intervention window.

### **What is Required?**

The Department seeks **AI-enabled solutions** that can function as a **decision- support layer** for ICDS systems by:

- Digitally capturing age-appropriate developmental indicators
- Analysing multiple data points to detect deviations from typical development trajectories
- Stratifying children based on **current and predicted developmental risk**

The solution must **augment frontline workers**, not replace them, and must be suitable for deployment at scale across diverse socio-economic and geographic contexts.

## **Expected Outcomes**

The proposed solution should clearly demonstrate the following outcomes during pilot and scale-up phases:

- 1. Objective and Standardised Screening**
  - a. Consistent developmental assessments aligned with national ECD frameworks
  - b. Reduction in subjectivity and variation across AWCs
- 2. Risk Stratification and Prioritisation**
  - a. Clear classification of children into low, medium and high developmental risk categories
  - b. Automated triggers for follow-up, referral or intensified intervention
- 3. Predictive Insights**
  - a. Ability to flag children who may not yet show visible delays but are at elevated future risk
  - b. Identification of early warning patterns at individual and cohort levels
- 4. Field-Level Usability**
  - a. Minimal additional burden on Anganwadi Workers
  - b. Offline functionality and adaptability to low-connectivity environments

## **B: PERSONALIZED, AI-DRIVEN INTERVENTION PLANNING & CAREGIVER ENGAGEMENT**

### **Expanded Problem Context**

Identification of developmental risk alone does not translate into improved outcomes unless followed by **timely, age appropriate and sustained intervention**. Currently, interventions tend to be:

- Generic rather than child-specific
- consistently followed up
- Dependent on specialist availability, which is limited

Caregivers—especially in low-literacy and resource-constrained settings—often lack **clear, actionable guidance** on how to support their child's development through everyday interactions. As a result, even when risks are identified, **intervention effectiveness remains uneven**.

## **What is Required?**

The Department seeks solutions that convert developmental insights into **personalised, practical and culturally appropriate intervention pathways**, supporting both caregivers and Anganwadi Workers.

The system should translate complex developmental data into **simple daily actions**, enabling continuous stimulation and reinforcement beyond the Anganwadi centre.

## **Expected Outcomes**

The solution should deliver:

- 1. Individualised Intervention Pathways**
  - a. Child-specific activity recommendations based on developmental coefficient
  - b. Dynamic adjustment of interventions as the child progresses or regresses
- 2. Caregiver Empowerment**
  - a. Easy-to-understand guidance in local languages
  - b. Use of audio, visual and nudging mechanisms suitable for low-literacy households
- 3. Frontline Worker Support**
  - a. Clear guidance for AWWs on what activities to reinforce during centre- based and home visits
  - b. Reduced dependency on external specialists
- 4. Demonstrable Developmental Gains**
  - a. Measurable improvement in targeted developmental domains during the pilot period

## **C: DIGITAL ENABLEMENT, DECISION SUPPORT & PERFORMANCE MONITORING FOR ICDS SYSTEMS**

### **Expanded Problem Context**

While ICDS generates extensive data across nutrition, health and service delivery, much of this data remains **descriptive rather than actionable**. Decision-making at various administrative levels is constrained by:

- Fragmented data sources
- Lack of real-time visibility
- Absence of prioritization logic

Frontline supervisors and administrators require **decision-support tools**, not just reports, to enable timely interventions, targeted monitoring and efficient resource deployment.

## **What is Required?**

The Department seeks a **role-based digital enablement platform** that converts raw data into **actionable intelligence**, supporting decision-making at AWC, Block, District and State levels.

## **Expected Outcomes:**

The solution should ensure:

- 1. Role-Specific Decision Support**
  - a. Dashboards tailored to the responsibilities of AWWs, Supervisors, CDPOs, DW&CW&EO's and senior officials
  - b. Clear visibility into child-level risks and intervention status
- 2. Alert and Prioritisation Mechanisms**
  - a. Automated alerts for high-risk children, underperforming centres or emerging trends
  - b. Suggested action pathways for each user role
- 3. Performance and Outcome Monitoring**
  - a. Tracking of intervention delivery and workforce performance
  - b. Identification of systemic bottlenecks
- 4. High Adoption and Ease of Use**
  - a. Minimal additional data entry requirements
  - b. High usability and sustained adoption by ICDS staff

## **D: INTEGRATED IMPACT MEASUREMENT, DATA GOVERNANCE & SCALABLE ECD DIGITAL ARCHITECTURE**

### **Expanded Problem Context**

A statewide AI-enabled ECD system must be **trusted, secure and sustainable**.

Fragmented pilots or vendor-specific platforms risk creating:

- Data silos
- Privacy vulnerabilities
- Limited long-term usability

Further, without a structured impact measurement framework, it becomes difficult to justify scale-up, optimise interventions or inform policy decisions.

## **What is Required?**

The Department seeks an **integrated digital architecture** that ensures:

- Robust impact measurement

- Strong data governance and privacy safeguards
- Interoperability with existing Government platforms

## **Expected Outcomes**

The solution must demonstrate:

- 1. Longitudinal Impact Measurement**
  - a. Tracking of developmental outcomes over time at individual and cohort levels
  - b. Evidence generation for program effectiveness
- 2. Strong Data Governance**
  - a. Consent-based data collection and role-based access controls
  - b. Compliance with Government of India data protection and cybersecurity norms
- 3. Interoperability and Government Ownership**
  - a. API-based integration with ICDS and health systems
  - b. Full ownership of data and system with WD&CW
- 4. Scalability and Institutional Sustainability**
  - a. Ability to scale seamlessly across all districts
  - b. Capacity building and knowledge transfer to government teams

## **6. Target Participants and Eligibility**

The Hackathon shall be open to:

- DPIIT-recognised startups
- AI, HealthTech, EdTech and data analytics companies
- Academic and research institutions
- Non-profits and NGOs with demonstrated ECD expertise

## **7. Evaluation Criteria**

Proposals shall be evaluated by an expert committee based on:

- |  |   |     |
|--|---|-----|
| • Problem–Solution Fit                         | — | 15% |
| • Innovation and Use of AI                     | — | 15% |
| • Feasibility and Scalability                  | — | 15% |
| • Impact on Child Development Outcomes         | — | 40% |
| • Implementation Capability and Sustainability | — | 15% |

## **8. Innovation Challenge Structure & Stages**

Stage 1: Open Call & Concept Submission (4 weeks)

Stage 2: Evaluation & Design Refinement (2 weeks)

Stage 3: Pilot Implementation (3 months)

Stage 4: Scale-Up & Institutionalization (6–8 months)

## **9. Solutions may be submitted at:**

- Idea / Concept Stage
- Prototype / MVP Stage
- Pilot-ready / Deployed Stage

## **10. Funding and Support**

Financial rewards, pilot funding and implementation support for selected solutions shall be borne by the Women Development & Child Welfare Department, as per approved administrative and financial sanctions.

## **11. Governance & Oversight**

WD&CW Department of Andhra Pradesh shall provide problem ownership, domain guidance, access to field settings for pilots, and budgetary support

## **12. Awards & Government Procurement Opportunities**

Under **G.O.Ms.No.33 (Govt. of A.P.)** - Winning teams eligible for **direct government work orders/contracts up to ₹2 crores.**

## **13. Proof of Concept (PoC) Scope**

- Implement the model as Decision support layer of ICDS systems for one pilot Mandal/Block as identified by the department.
- The proof-of-concept should be tested with participation of field staff like AWWs, Supervisors, CDPOs, DW&CW&EO's to validate model accuracy and usability
- Design role based Digital Enablement platform which supports decision making of field staff
- API integration mechanism

## **14. Proof of Concept (PoC) Success Criteria**

- Generation of actionable models and platforms with more than 95% accuracy in early childhood developmental delays.
- Multi-lingual systems that supports field level staff with complete accuracy which converts developmental insights into actionable guidance.
- Seamless integration with state dashboards for visualization and reporting.

## **15. Data Privacy and Compliance**

The solution must ensure full compliance with the Digital Personal Data Protection (DPDP) Act, 2023, anonymize information provided by the department and adhere to sensitive children data handling protocols. Data storage and model training must occur within secure, government-approved environments.

## **16. Post-Demonstration Opportunity:**

Following successful demonstrations before senior government officials and key stakeholders, selected applicants will be invited for further deliberations focusing on practical aspects of integration, training requirements, and regulatory compliance. Based on these discussions, a structured roadmap will be developed to facilitate pilot testing and potential large-scale adoption of the most promising innovations across the system.

## 17. Standardized Timeline and Process Flow

DESCRIPTION	TIMELINE
Launch of Hackathon and Applications starting Date	22-01-2026
Clarification/Query Session on Problem Statements	02-02-2026
Last Date for Submissions	22-02-2026
Pre-screening and validation of applications	26-02-2026
Evaluation by Subject Matter Experts & Shortlisting	02-03-2026
Demo/Pitch Day before Evaluation Committee	10-03-2026
Final Results and Announcement of Winners	16-03-2026
Post-event handholding and ground implementation support	To be Announced

## 18. Conclusion

Transitioning from a conventional EOI/RFP to an **Innovation Challenge model** positions Andhra Pradesh at the **forefront of technology-driven child development governance**.

This approach ensures that **only solutions that demonstrate real-world impact are scaled**, balancing innovation with accountability, transparency and sustainability—fully aligned with the Hon’ble Chief Minister’s vision and national priorities.