



CONSORTIUM PARTNERS

STRATEGIC PROJECT PROPOSAL

Connected the Silence

An On-Device AI Interactive Kiosk Ecosystem for Museum ITB

Scoped as a Proof-of-Concept (POC) / sandbox research trial



PREPARED FOR

Museum Institut Teknologi Bandung

STRATEGIC ALLIANCE

KIIP · Textway Inc. · PT Cita Lintas Arunika · PT Mediasi Sarana Nusa

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Executive Summary

The digital transformation of Museum Institut Teknologi Bandung (Museum ITB) represents a pivotal milestone in preserving and democratizing 105 years of intellectual heritage. Originating in 1920 as Technische Hoogeschool te Bandoeng, ITB has continually served as a premier cradle of scientific innovation and engineering excellence in Indonesia.

This proposal introduces the “Connected the Silence” AI Ecosystem — scoped for this phase as a Proof-of-Concept (POC) / sandbox research trial — an interactive digital intervention designed to turn static historical exhibits into dynamic, conversational educational experiences, including sign-language and accessibility support for Deaf, hard-of-hearing, Blind, and low-vision visitors. Deployed via a single industrial-grade AI Kiosk unit on Floor 3 of the Sabuga building, the ecosystem bridges physical artifacts with artificial intelligence while adhering to ITB's MAREM institutional values: Edukatif, Reflektif, Inspiratif, Interaktif, and Inklusif.

The initiative is delivered through a cross-border consortium: KIIP (Korea Indonesia Innovation Partnership) as funding and liaison hub, Textway Inc. as the AI core engine provider, PT Cita Lintas Arunika as the local system integrator, and PT Mediasi Sarana Nusa coordinating local governance — with Museum ITB as host institution and end-user environment.

This document consolidates the project background, technical architecture, data governance approach, visitor experience design, implementation roadmap, and the risk, intellectual property, and commercial terms proposed by the consortium, so that ITB's academic and legal stakeholders can review the complete picture in one place before any commitment is made.

1. Strategic Background & Institutional Alignment

1.1 Historical Context

Museum ITB holds a unique place in Indonesian higher education. From its founding in 1920 as Technische Hoogeschool te Bandoeng to its modern status as a research university, ITB has cultivated generations of scientists, engineers, and cultural leaders.

Museum ITB is transitioning from a traditional repository into an interactive “lighthouse of knowledge,” and this project is proposed as one contribution toward that transition.

1.2 The MAREM Strategic Values Framework

To ensure the technology reinforces rather than overshadows institutional identity, the proposal frames the AI deployment around ITB's five MAREM principles:

- **Edukatif (Educational):** translating scientific and engineering history into accessible narratives.
- **Reflektif (Reflective):** encouraging visitors to reflect on ITB's role in national development.
- **Inspiratif (Inspirational):** sparking curiosity among students and young researchers.
- **Interaktif (Interactive):** replacing static display cards with responsive, animated dialogue.
- **Inklusif (Inclusive):** supporting sign language, regional accents, and adaptive communication for Deaf and hard-of-hearing visitors.

MAREM STRATEGIC VALUES FRAMEWORK	
Educational	Textway's AI Engine translates complex engineering history into accessible, meticulously verified narratives.
Reflective	Immersive interfaces encourage visitors to reflect on ITB's historical role in Indonesia's national development since 1920.
Inspirational	AR re-creations of dinosaur fossils and VR 360-degree projections of ancient Egypt spark curiosity in future innovators.
Interactive	Touchscreens and dynamic avatar dialogues replace static text labels and traditional displays.
Inclusive	Dedicated BISINDO sign language AI and adaptive multi-lingual UX ensure the museum is truly accessible to all.

Figure 1. MAREM Strategic Values Framework.

1.3 Consortium Structure

The project is structured as a cross-border partnership bringing together a Korean funding and technology hub, Korean and Indonesian technology providers, and ITB as the hosting institution:

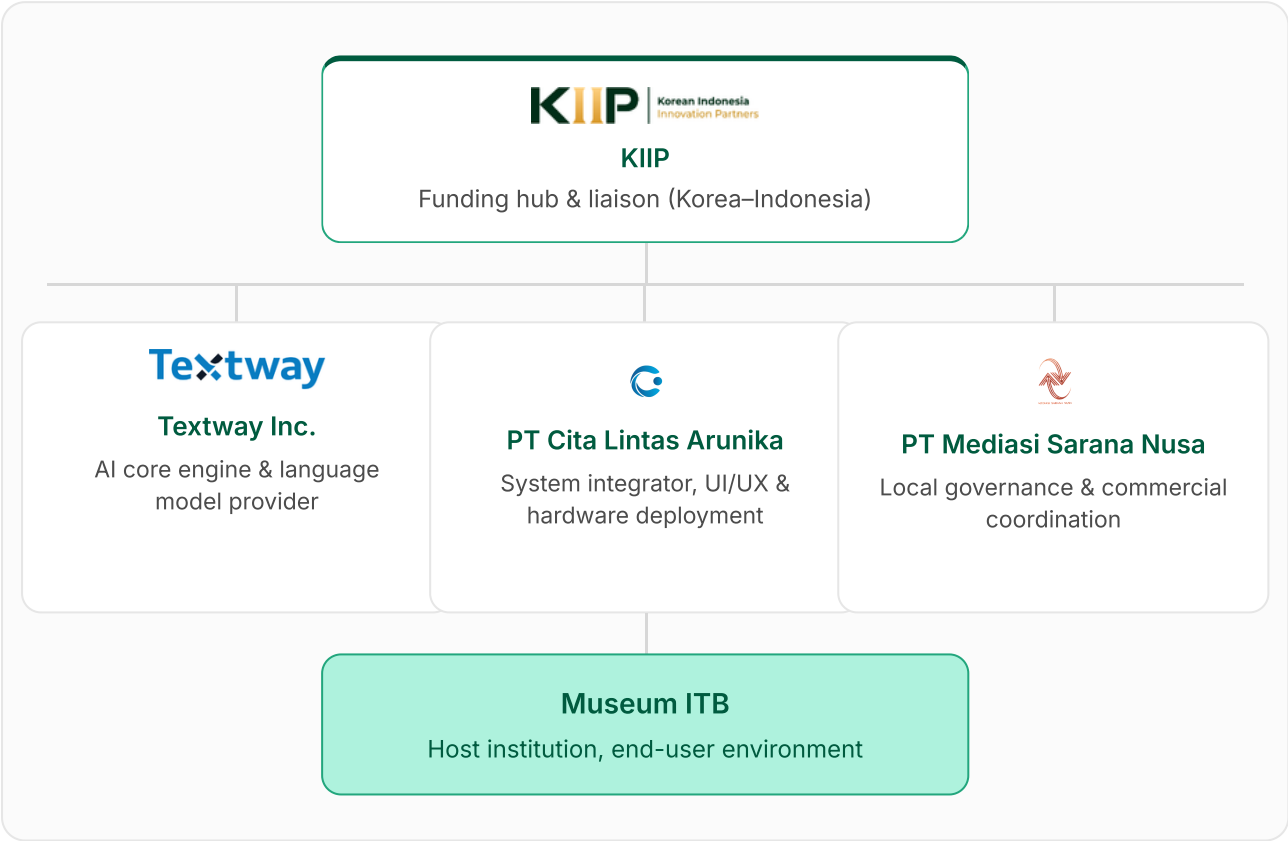


Figure 2. Proposed consortium and funding relationships.

ENTITY	ROLE
KIIP (Korea Indonesia Innovation Partnership)	Funding hub and liaison between Korean partners and ITB
Textway Inc. (South Korea)	AI core engine and language model / avatar technology provider
PT Cita Lintas Arunika (Indonesia)	Local system integrator: hardware, UI/UX, on-site deployment
PT Mediasi Sarana Nusa (Indonesia)	Local governance and commercial coordination
Museum ITB	Host institution, co-researcher, and end-user environment

2. Technical Architecture & Hardware Infrastructure

2.1 Secure Hybrid On-Device Architecture

The proposed system runs the AI core natively inside an on-premise container on local hardware, with the internet connection restricted to software updates and remote patches. The stated aim is to reduce latency, avoid cross-border data transfer, and support compliance with Indonesian data protection regulation.

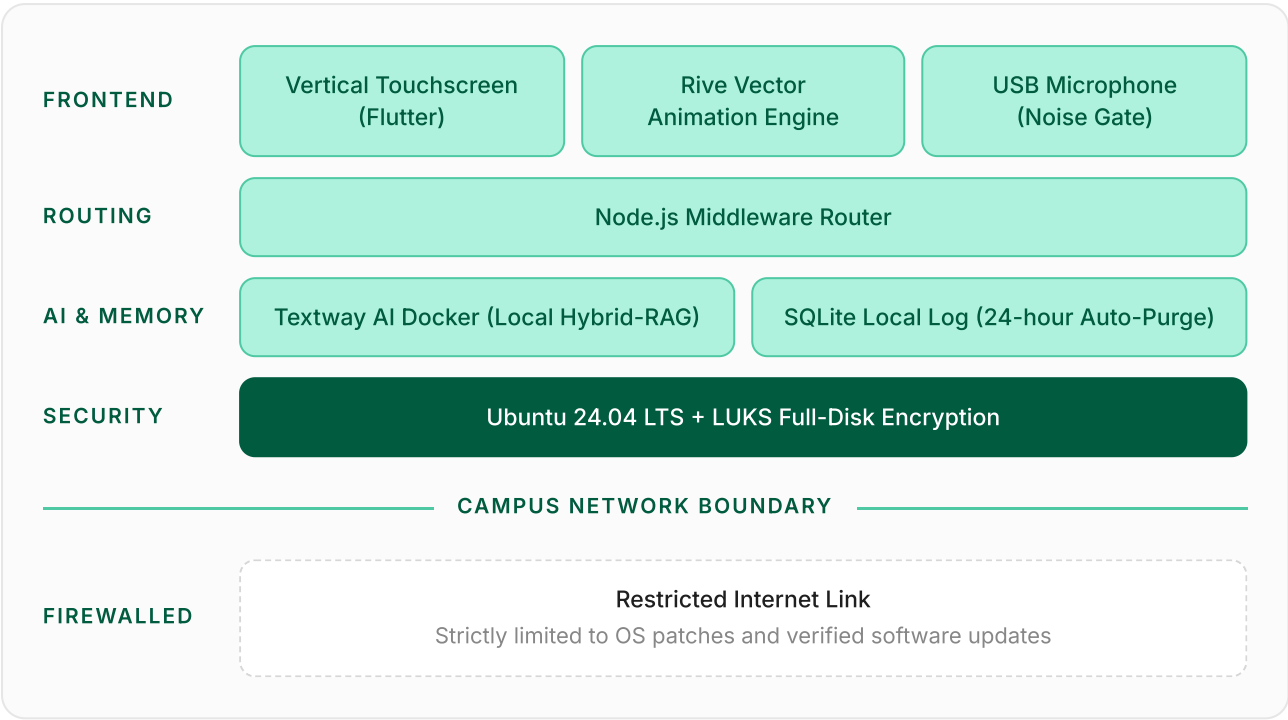


Figure 3. Secure hybrid on-device architecture overview.

2.2 Unified Data Pipeline & Multi-Modal Interaction Design

Visitor voice input is captured, filtered for ambient noise, processed through Textway's on-device language model, routed through a Node.js middleware layer, logged locally, and rendered as an animated response using the Rive vector engine on the kiosk display.

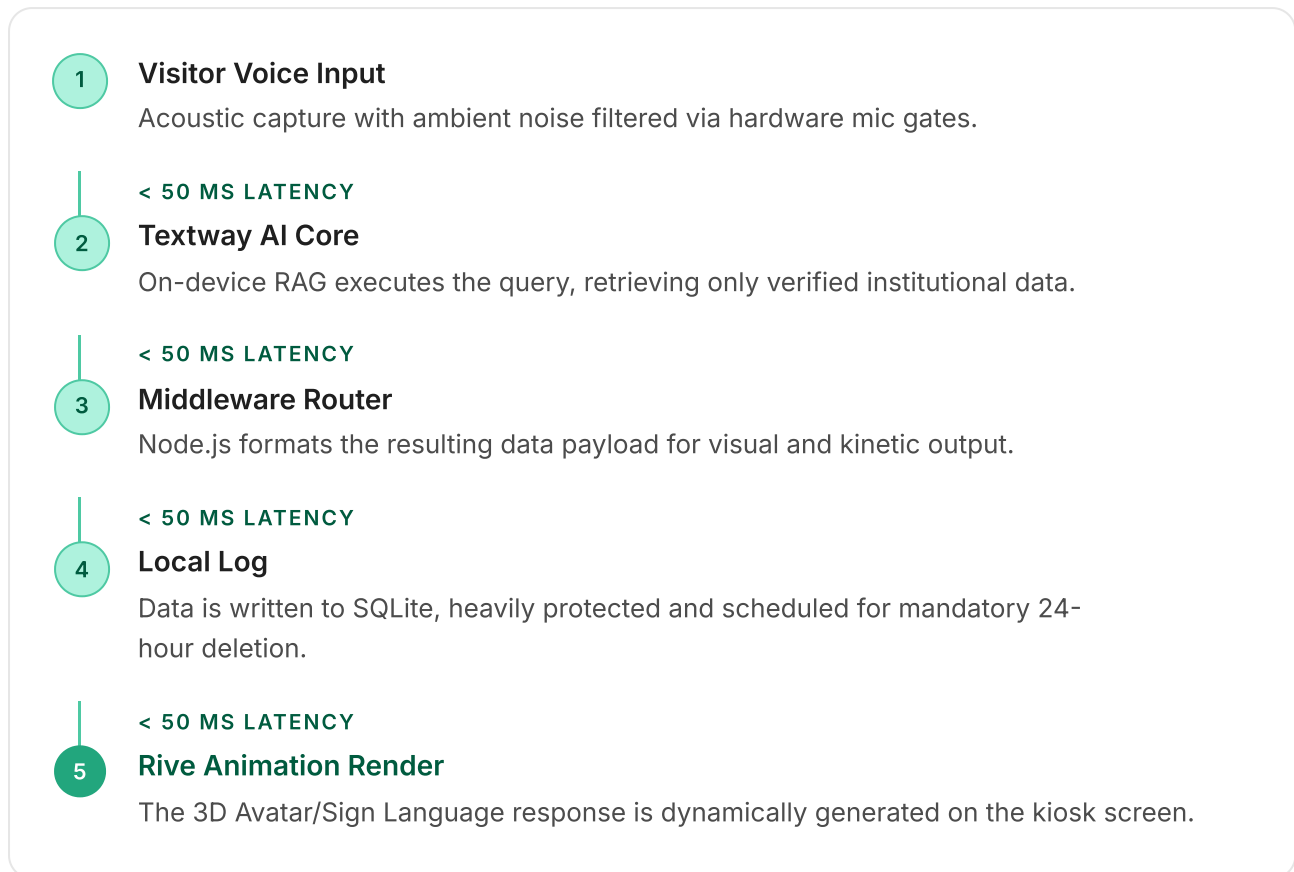


Figure 4. On-device interaction pipeline, from voice input to animated response.

For this POC/sandbox phase, the single shared AI/RAG backend is exposed through four distinct, purpose-built interaction pathways rather than one generic voice interface. This distinction matters for a genuine accessibility trial: a Deaf visitor cannot be expected to speak into a microphone for voice recognition, and a Blind visitor cannot be expected to read on-screen text, so each persona is given an input and output mode that actually matches their access need.

MULTI-MODAL INTERACTION DESIGN BY VISITOR PERSONA			
Proof-of-Concept (POC) scope — four bounded interaction pathways			
PERSONA	INPUT MODE	PROCESSING	OUTPUT MODE
Museum Operator Pathway A — greeting	Spoken greeting script (bounded word count)	Speech-to-Animate (sign-language avatar)	Animated sign-language greeting
Hearing Visitor Pathway B — general query	Spoken question	Speech-to-Text → AI / RAG	Answer in text + sound
Deaf / Hard-of-Hearing Visitor Pathway C	Typed text or on-screen buttons	AI / RAG (text only)	Answer displayed as on-screen text
Blind / Low-Vision Visitor Pathway D	Spoken question	Speech-to-Text → AI / RAG	Answer converted to sound (TTS)

Figure 5. Multi-modal interaction pathways by visitor persona (POC scope).

Pathway A — Operator-Led Greeting (Speech-to-Animate). A museum operator delivers a fixed, word-count-bounded greeting script (e.g., a controlled 40–60 word script defined for the POC) into the microphone. This is converted directly into an animated sign-language avatar greeting for Deaf and hard-of-hearing visitors entering the exhibit zone. Bounding the script length keeps this pathway measurable for the evaluation plan in Section 5 (e.g., testing comprehension against script length as a controlled variable), and keeps the animation vocabulary within a scope the system can reliably render.

Pathway B — Hearing Visitor / General Query. A hearing visitor asks a spoken question. This is transcribed via speech-to-text, passed to the on-device AI/RAG engine, and answered with a combined text-on-screen and synthesized-voice response — the baseline flow described in the original vendor materials.

Pathway C — Deaf & Hard-of-Hearing Visitor. Rather than routing this persona through voice recognition, the visitor types a question or selects from a set of pre-defined on-screen quick-reply buttons (e.g., common exhibit questions). The AI/RAG engine processes the text query directly — no speech-to-text step is needed — and the answer is returned strictly as on-screen text (optionally alongside a sign-language avatar rendering of the same answer), with no dependency on the visitor hearing audio output.

Pathway D — Blind & Low-Vision Visitor. This persona uses a full speech-to-speech loop: a spoken question is transcribed to text, processed by the AI/RAG engine, and the resulting text answer is converted to synthesized speech (TTS) for audio output, since on-screen text is not an accessible output channel for this persona.

2.3 Core Hardware & Software Stack

COMPONENT	SPECIFICATION
Processor (CPU)	Intel Core i7 (12th Gen or later) or AMD Ryzen 7 series
Memory (RAM)	Minimum 16 GB DDR4/DDR5
Storage	512 GB NVMe M.2 SSD
Display	43–55 inch industrial-grade portrait touchscreen (9:16 or 10:16)
Operating System	Ubuntu 24.04 LTS, hard-locked kiosk mode
Data Hardening	Full-disk LUKS encryption; locked BIOS; disabled USB boot
AI Core	Textway on-device engine (Hybrid-RAG) in Docker container
Middleware	Node.js orchestration layer (WebSockets, state routing)
Local Data	SQLite, with scheduled log purging
Frontend	Native Linux Flutter application with Rive vector animation
Text Input (Pathway C)	On-screen virtual keyboard plus configurable quick-reply button set
Text-to-Speech (Pathway D)	On-device TTS engine for Blind/low-vision audio output

3. Data Governance & Privacy Compliance

3.1 UU PDP (Law No. 27 of 2022) Considerations

The proposal positions on-device edge processing as a way to support compliance with Indonesia's Personal Data Protection Law (UU PDP), since voice data is processed locally rather than transmitted to overseas cloud servers. This is a design intention stated by the technology providers; ITB's data protection officer and legal counsel should independently verify the specific compliance claims before deployment, particularly regarding consent, retention, and any residual data transmitted for "updates and patches."

3.2 Data Hardening Measures

- Full-disk encryption using LUKS at the root level.
- BIOS/firmware locked with unique hardware passwords; external USB boot disabled.
- Automated log purge cycle (proposed at 24 hours) for locally stored interaction logs.
- Kiosk mode operating environment with no exposed desktop access.

4. Visitor Experience (VX) Journey

4.1 Deployment Location

The pilot kiosk is proposed for Floor 3 (Exhibition Floor) of the Sabuga building, mapped against the museum's major legacy exhibition zones, with an onboarding gateway guiding first-time visitors through voice and touch interaction.

4.2 Interaction Model

Consistent with the four persona-specific pathways defined in Section 2.2, the visitor journey branches at the point of first contact rather than assuming one universal interaction style:

- On approach, the museum operator delivers the bounded greeting script, rendered as a sign-language avatar animation (Pathway A) — this is the primary accessible welcome for Deaf and hard-of-hearing visitors.
- A hearing visitor proceeds directly to voice interaction (Pathway B), asking questions and receiving combined text/audio answers.

- A Deaf or hard-of-hearing visitor proceeds to type a question or select an on-screen quick-reply button (Pathway C), and reads the answer as on-screen text, without needing to speak or hear.
- A Blind or low-vision visitor uses the speech-to-speech pathway (Pathway D), asking a question aloud and receiving a spoken answer, without depending on the touchscreen display.

Static multimedia modules — videos, infographics, and text briefs — remain available for direct touchscreen browsing across all pathways, with responses to AI/RAG queries rendered through animated vector characters (Rive state machines) where the pathway calls for a visual/animated response.

5. Research Framework & Evaluation Plan

5.1 Proof-of-Concept (POC) & Sandbox Scope

This research is scoped explicitly as a Proof-of-Concept (POC) / sandbox trial, not a production rollout. The sandbox is bounded by: a single kiosk unit, a fixed exhibition zone (Floor 3, Sabuga building), a defined trial duration, and — critically for measurement — controlled, word-count-bounded interaction scripts rather than open-ended free-form dialogue. Framing the trial this way keeps every interaction pathway in Section 2.2 testable: the operator's greeting script length is fixed and known, the AI/RAG answer scope is limited to a defined knowledge base, and the quick-reply button set for Deaf visitors is a closed, enumerable list. This bounded design is what allows the evaluation methodology below to produce comparable, analyzable results rather than anecdotal impressions.

5.2 Research Problem Statement

The consortium's proposal frames "Connected the Silence" primarily as a technology deployment. ITB's role as a public research university creates both an opportunity and an institutional responsibility to treat this deployment as a genuine applied research initiative rather than a purely commercial installation. The underlying research problem: museum exhibits in Indonesia generally offer limited accessible engagement for Deaf and hard-of-hearing visitors, and there is limited empirical evidence — particularly in an Indonesian-language, Indonesian-museum context — on how on-device conversational AI and animated, sign-language-oriented interfaces affect visitor comprehension, engagement, and inclusion.

5.3 Research Questions & Objectives

- **RQ1:** To what extent does an AI kiosk with animated, sign-language-oriented output improve comprehension and engagement among Deaf and hard-of-hearing visitors, compared with standard exhibit signage?
- **RQ2:** What technical maturity level (per the TKT/TRL scale in Permenristekdikti No. 42/2016) does the proposed on-device architecture actually reach, as assessed by independent ITB reviewers rather than the vendor's self-reported classification?
- **RQ3:** What data-governance and consent practices are necessary to ethically collect visitor interaction data for research purposes, separate from the vendor's operational/product-improvement data?
- **RQ4:** Does modality choice (typed/button text for Deaf visitors vs. speech-to-speech for Blind visitors vs. speech/text/sound for hearing visitors) measurably affect comprehension, task completion, and satisfaction across personas, and does the length of the bounded greeting script (Pathway A) affect Deaf visitors' comprehension of the greeting?

Objectives: (1) produce an independently verified TKT assessment of the on-device AI system; (2) generate empirical evidence on visitor comprehension and accessibility outcomes, disaggregated by persona and interaction pathway; (3) establish a data-governance protocol that separates research data from commercial/operational data.

5.4 Context & Rationale

Interactive and multimodal accessibility technologies — including sign-language avatars, captioning, and conversational interfaces — are an active area of museum-accessibility practice internationally. Indonesian-language, on-device implementations of this kind remain comparatively under-documented, which is part of the rationale for treating this deployment as a research contribution rather than a routine equipment purchase. ITB researchers should ground the literature review in current, verifiable sources rather than relying on vendor marketing claims.

5.5 Proposed Evaluation Methodology

A mixed-methods design is proposed, led and controlled by ITB researchers rather than by the vendor consortium:

- **Quantitative:** task-completion time, comprehension quiz scores, and a standardized usability instrument (e.g., System Usability Scale) collected before and after kiosk interaction, recorded separately for each of the four pathways in Section 2.2.

- **Controlled variable:** the operator greeting script (Pathway A) should be tested at two or more fixed word-count lengths (e.g., ~40 words vs. ~60 words) to measure the effect of script length on Deaf visitors' comprehension and attention — this is only possible because the script is bounded, per Section 5.1.
- **Qualitative:** structured interviews and focus groups with Deaf and hard-of-hearing visitor representatives, Blind and low-vision visitor representatives, museum educators, and accessibility advocates.
- **Study design:** a baseline (pre-deployment) survey of current exhibit accessibility, followed by a before/after or comparison-zone evaluation once the pilot kiosk is live, with a minimum sample size and analysis plan defined by the ITB research team prior to data collection.
- **Governance:** raw research data should be collected, stored, and analyzed independently by ITB — not merged into the vendor's operational SQLite logs — to preserve research integrity and institutional ownership of findings.

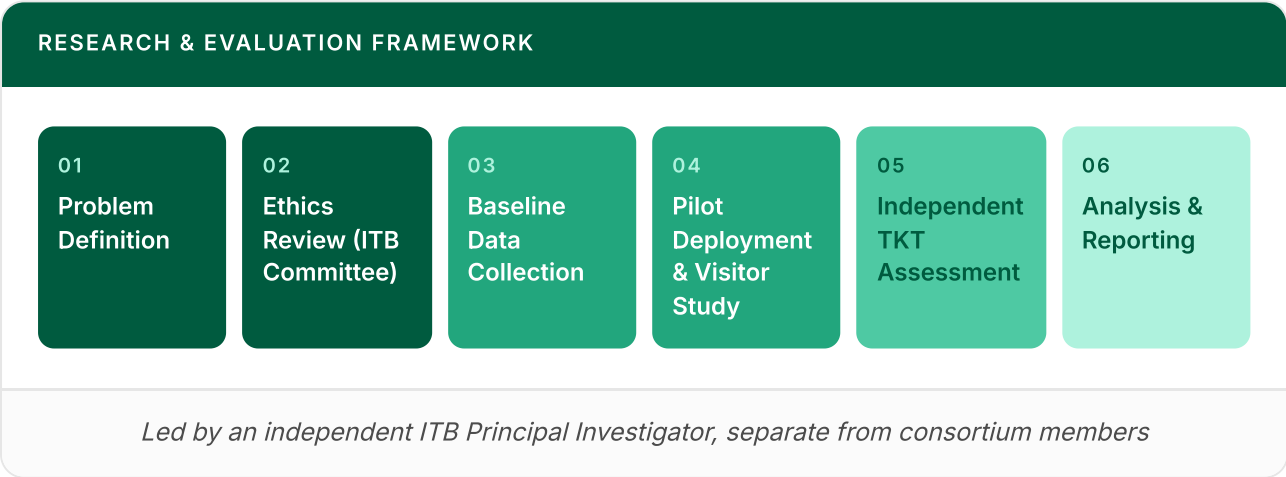


Figure 6. Proposed research and evaluation workflow, led by an independent ITB principal investigator.

5.6 Independent TKT/TRL Assessment Protocol

The TKT claims made in the vendor's source materials are self-reported and have not been independently verified. Before any TKT-based procurement or hibah pathway is invoked, ITB's internal reviewer team should assess the system directly against the Permenristekdikti No. 42/2016 criteria:

TKT LEVEL	VERIFICATION CRITERIA
Level 4	Component or subsystem validated in a laboratory environment only
Level 5	Component or subsystem validated in a relevant (but not fully operational) environment
Level 6	System/subsystem model or prototype demonstrated in a relevant environment

This assessment should be conducted by reviewers with no financial or contractual relationship to the consortium, using observed system behavior rather than vendor documentation alone, and should be completed and documented before it is cited as justification for any specific procurement pathway.

5.7 Research Ethics & Human Subjects Considerations

Because the kiosk collects visitor voice input and may indirectly capture disability-related information (e.g., visitors self-identifying as Deaf or hard-of-hearing for the study), this constitutes human-subjects research and should be treated accordingly:

- Review and approval by ITB's research ethics committee prior to any data collection for research purposes.
- A separate, explicit informed-consent process for visitors whose interactions will be used for research — distinct from ordinary use of the kiosk during a museum visit.
- Extra care in handling disability-related data given its sensitivity, including anonymization and minimization protocols.
- A clear opt-out mechanism so visitors can use the kiosk without their interaction being included in the research dataset.

5.8 Research Governance & Publication

- ITB should appoint an independent Principal Investigator, unaffiliated with the consortium companies, to lead the research component.
- Research data and findings should be owned by ITB, kept separate from the commercial application IP discussed in Section 7.
- A reporting plan should be defined in advance: an internal TKT/evaluation report to LPPM/LPIK, and where appropriate, an academic publication on the accessibility findings.

6. Implementation Roadmap

6.1 24-Week Phased Plan

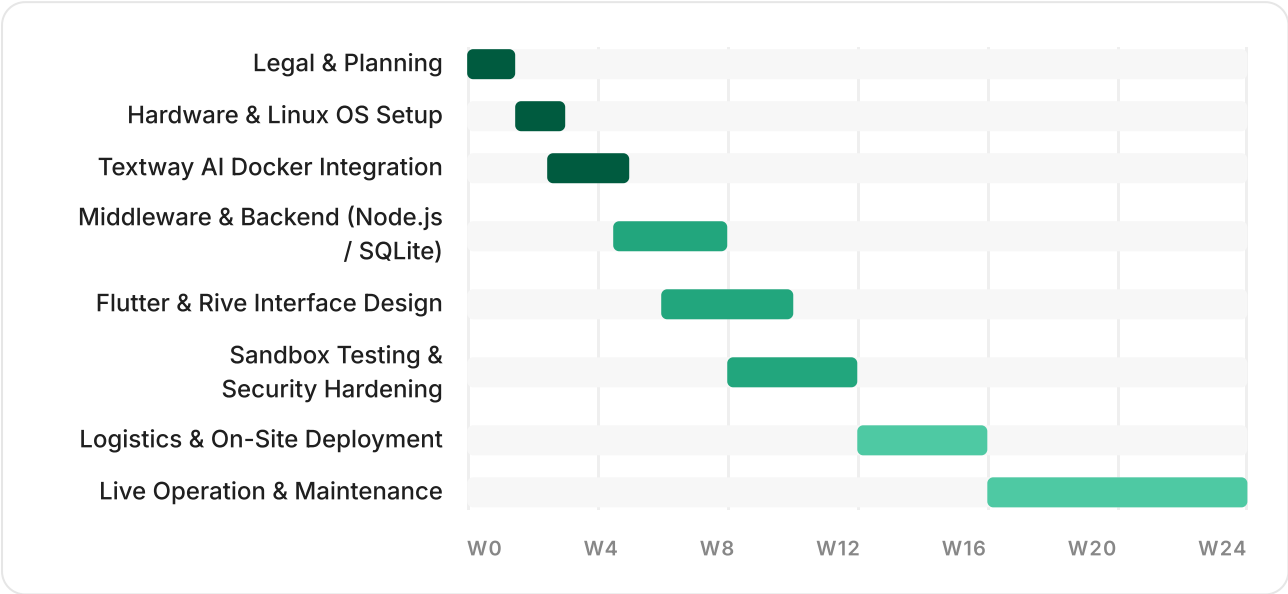


Figure 7. Proposed 24-week (6-month) implementation timeline.

7. Risk, Intellectual Property & Liability Framework

7.1 Intellectual Property Allocation (as proposed by the consortium)

ENTITY	IP OWNERSHIP (AS PROPOSED)	LICENSE TO MUSEUM ITB
PT Cita Lintas Arunika	100% of Flutter application code, Rive vector assets, and integration logic	License terms vary across source documents — see note below
Textway Inc.	100% of compiled AI engine binaries and RAG technology	Licensed for edge execution within the designated container only
Museum ITB	Historical archival content, museum branding, official datasets	Full sovereignty over its own historical/academic materials only

7.2 Liability & Indemnification

The source proposals place most operational liability on ITB/KIIP rather than the vendor: PT Cita Lintas Arunika is described as bearing no structural hardware warranty, no liability for AI misinterpretation of regional dialects or slang, and no liability for third-party media content supplied for the kiosk.

7.3 Non-Circumvention / Exclusivity Clause

The proposal includes a 24-month non-circumvention clause preventing Textway and KIIP from working with other Indonesian system integrators. The source documents frame this as protecting “institutional sovereignty,” but its operative effect is to lock the consortium's commercial exclusivity in the Indonesian market, not to protect ITB specifically.

7.4 Risk Register

RISK	LEVEL (VENDOR SELF-ASSESSED)	MITIGATION PROPOSED
Network instability	Low	On-device architecture reduces internet dependency
Data privacy breach	Low	LUKS encryption, 24-hour log purge
Acoustic/dialect misrecognition	Medium	Directional microphone, noise filtering
Thermal throttling	Low	Industrial cooling in kiosk chassis
Contractual/IP ambiguity	Not assessed by vendor	Recommend independent legal review — see 6.1
Procurement process compliance	Not assessed by vendor	Recommend review against ITB PTNBH and PBJP procedures

8. Resource Allocation & Roles

PT Cita Lintas Arunika	System integration, hardware deployment, Flutter/UI-UX design, on-site installation.
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Textway Inc.	AI core engine, on-device language model, natural language processing pipeline.
KIIP	Funding administration, strategic advisory, and coordination of the transition into a commercial phase.
Museum ITB	Hosting environment, subject-matter/content input, and academic oversight.

9. Summary & Recommended Next Steps

The “Connected the Silence” concept offers a genuinely valuable accessibility and engagement opportunity for Museum ITB — particularly the sign-language and inclusive-design elements aligned with the MAREM framework. At the same time, consolidating all three source documents side by side surfaces several terms that materially favor the vendor consortium and should be resolved in writing before any signature:

1. Reconcile the conflicting software license terms (temporary/revocable vs. perpetual) described across the three documents.
2. Clarify whether the “non-repayable grant” functions, in substance, as a standard paid vendor contract with milestone tranches — and assess it under ITB's normal procurement scrutiny if so.
3. Independently verify UU PDP compliance claims rather than relying on the vendor's self-description.
4. Evaluate the 24-month non-circumvention and Right of First Refusal clauses for their effect on ITB's future flexibility and on fair-market competition, not only on vendor protection.
5. Route the proposal through ITB's Satuan Pengawas Internal (SPI) and legal counsel before formal agreement, consistent with standard due-diligence practice for PTNBH research/hibah collaborations.
6. Approve and route the Research Framework in Section 5 through ITB's Research Ethics Committee and appoint an independent Principal Investigator before any visitor data collection begins.

