Technology Transformation Policy Recommendation

Ghana Agenda 2046 – From Consuming Technology to Harnessing It

Prepared by

Black Star Summit 2026

Submitted to:

Ministry of Communications and Digitalisation

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EXECUTIVE SUMMARY

Problem Statement

Ghana is a nation that uses technology, but does not yet fully benefit from it. This distinction – drawn sharply by the Black Star Summit Technology Breakout Session is the founding diagnosis of this policy. Ghanaians use mobile phones, social media, digital payment platforms, and internet services in growing numbers. Yet the country has not harnessed these tools to solve its most pressing national challenges: unemployment, governance failures, agricultural inefficiency, healthcare gaps, and educational underperformance. The root cause, the session concluded, is the education system. Ghana's education system does not adequately develop young people into practical problem-solvers, technology creators, or innovative thinkers. It produces graduates who can consume technology but not create, apply, or deploy it to solve real problems. The system is too rigid, too theoretical, too fear-oriented, and too disconnected from industry, practical application, and the rapidly evolving technological landscape – including the transformative challenge of artificial intelligence. Until education is reformed to be progressive, passion-driven, and practically oriented, Ghana will continue to use technology as a consumer nation rather than benefit from it as a creator and innovator nation.

Vision

Vision Statement

A Ghana where technology is not merely consumed but harnessed – where every young Ghanaian is trained to think, create, innovate, and solve problems through technology. A nation where education is the engine of technological transformation: progressive, passion-driven, practically oriented, and responsive to the demands of a rapidly changing world. A Ghana where technology improves governance, creates meaningful employment, advances healthcare and agriculture, and positions the country as a competitive, sovereign digital nation by 2046.

Proposed Solution

Ghana Agenda 2046: Technology Transformation deploys $100 million as catalytic capital across four integrated strategic pillars: (1) Education System Reformation for Technology – the foundational reform without which all other pillars fail; (2) Technology Infrastructure and Access – ensuring young Ghanaians have the tools, connectivity, and spaces to learn and create; (3) Technology for Governance and Public Administration – deploying digital systems to improve transparency, service delivery, and accountability; and (4) Industry Partnerships, Innovation Ecosystems, and Sustainability – connecting the education-to-technology pipeline to real economic value through partnerships with organizations such as ALX, MTN, and AmaliTech. The implementation architecture is built on the Learn, Play, Build methodology: learn the theory, play with the tools, build the solutions. This approach makes technological education practical, interactive, and problem-solving focused at every level of the system.

Funding Request

Total Funding Request: $100,000,000 (Catalytic Investment Framework)

This proposal requests $100 million as catalytic capital to seed structural technology education reform and digital infrastructure investment. The investment is designed to trigger co-financing from industry partners, international development partners, the private technology sector, and

increased domestic investment in digital infrastructure as Ghana's technology economy grows. The $100 million is the spark; Ghana's growing technology sector must sustain the transformation.

Expected National Impact

If fully implemented over 20 years (2026–2046), this policy will deliver:

- Achieve 90% of Ghanaian students at all levels receiving practical, technology-integrated education by Year 15
- Reduce the theory-practice gap in technology education: 100% of public secondary and tertiary institutions with functional technology labs and practical learning infrastructure by Year 12
- Train 500,000 young Ghanaians as technology problem-solvers, creators, and innovators by Year 20
- Achieve 80% digital literacy among the working-age population by Year 15
- Create 200,000 technology-related jobs by Year 20 through the national innovation and entrepreneurship ecosystem
- Digitize 80% of public administration services, improving governance transparency and reducing service delivery times by 50%
- Establish 50 functional university-based technology labs with active industry partnerships by Year 15
- Position Ghana as a top-five technology education hub in Sub-Saharan Africa by Year 20

BACKGROUND & CONTEXT

Current Situation in Ghana

Ghana has made measurable progress in technology access and digital connectivity over the past decade. Mobile money penetration is among the highest in Africa. Internet access is expanding. Government digitization initiatives have been launched across multiple sectors. Yet the Technology Breakout Session surfaced a consistent, troubling pattern: Ghana is using technology without benefiting from it. The following structural challenges were identified:

The Use-Benefit Gap

The breakout session drew a critical distinction between using technology and benefiting from technology. Using technology – owning a smartphone, scrolling social media, accessing a payment app – may bring convenience and inner satisfaction. Benefiting from technology means applying it to solve real problems: diagnosing disease, optimizing agriculture, automating governance, creating employment, building software products. Ghana is a technology user. It is not yet a technology beneficiary at national scale. Closing this gap is the central mandate of this policy.

An Inadequate Education System

The session reached a strong consensus: education is the root cause of Ghana's technological underperformance. Ghana's education system does not adequately develop learners into practical problem-solvers or technology creators. It is overly theoretical, insufficiently connected to real-world application, and structured around fear and compliance rather than passion, creativity, and purpose. The evolution of artificial intelligence was cited as a stark example – Ghana has not yet successfully

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integrated AI into any level of the education system, while the technology is already reshaping global economies and labour markets.

Disconnection Between Theory and Practice

A recurring insight from the session was that theory and practice must work together: theory informs practice, while practice shapes and improves theory. Ghanaian education tends to privilege theoretical instruction while starving practical application of resources, time, and institutional support. University-based technology labs, where students could gain real-world experience through equipment, projects, and industry exposure, are insufficiently resourced and rarely connected to industry.

Infrastructure Deficit

Young Ghanaians who want to learn, experiment, and build with technology frequently lack the basic infrastructure to do so: devices, reliable internet access, functional laboratories, mentors, and safe creative spaces. The free tablets initiative in Senior High Schools was noted by the session, but critically – some students used the devices for social media rather than learning, pointing to the deeper problem: provision of technology without orientation, purpose, and a passion-driven learning environment produces distraction, not development.

Weak Industry-Education Linkage

Ghana's technology industry and its education institutions operate largely in parallel rather than in partnership. Organizations such as ALX, MTN, and AmaliTech have developed successful blueprints for technology integration, skills development, and industry-ready training – but these models have not been systematically connected to the formal education system. The result is a dual system: a small, talented technology workforce trained outside the formal system, and a large, theoretically educated graduate population that is not technology-ready.

Technology and Governance Gap

The session also explored how technology could support governance through local digital systems, data platforms, and tools that improve public administration. Ghana's public sector remains predominantly paper-based and manual in its service delivery, creating inefficiency, opacity, and corruption risk. The potential of technology to transform governance – through e-government platforms, open data systems, digital public services, and accountability dashboards – is largely unrealized.

Why This Matters Now

The Fourth Industrial Revolution is not approaching – it is already here. Artificial intelligence, automation, blockchain, biotechnology, and advanced manufacturing are reshaping every sector of every economy. Nations that equip their citizens – particularly their young people – to understand, create, and deploy these technologies will benefit from them. Nations that do not will be left to consume the products of others' innovation at the prices others set. Ghana's demographic structure – with one of the youngest populations in the world – represents an extraordinary opportunity to build a generation of technology problem-solvers[1]. But

[1] Ghana Statistical Service. (2021). *2021 Population and Housing Census: Age and sex profile*. GSS. https://census2021.statsghana.gov.gh. Children (0–14) made up 35.3% and young

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this opportunity has a closing window. The reforms must begin now, while Ghana's technology education deficit is bridgeable, before the gap between Ghana and global technological leaders becomes permanent.

> **Voices from the Session**
> "The idea of technology is to make life better." – Nikon "Theory informs practice, and practice shapes theory. We must appreciate the theoretical foundation and pair it with practicals to improve knowledge." – Amoah Sarfo Kwarteng "A less rigid and more passion-driven education system is needed to prepare young people for the future." – Amoah Sarfo Kwarteng "Young people must be trained not just to consume technology, but to create, apply, and benefit from it." – Session Participant

VISION FOR GHANA IN 20 YEARS

By 2046, Ghana will be a nation where technology is not a luxury or a convenience – it is a tool for solving the nation's problems and building its future. The vision is structured across five dimensions:

Economic Transformation

Technology will be a primary driver of Ghana's economic diversification and growth. A thriving technology sector – built on a pipeline of practically trained, innovative Ghanaian graduates – will generate hundreds of thousands of quality jobs, produce exportable software products, digital services, and technology solutions, and attract foreign investment to Ghana as a regional technology hub. The informal economy will be progressively formalised and made more productive through digital tools, mobile platforms, and data-driven decision-making.

Human Capital Development

Ghana will produce a generation of technology creators, not merely technology consumers. The Learn, Play, Build methodology will be embedded across all levels of the education system, from primary school through to university. Every Ghanaian student will graduate with practical digital skills and a problem-solving orientation. TVET institutions will be equipped with technology labs and industry partnerships that connect learning to employment. AI literacy will be a core competency for all graduates, not an optional module for a privileged few.

Governance and Accountability

Ghana's public administration will be digitized, transparent, and citizen-centred. Digital public service platforms will reduce bureaucratic friction, eliminate opportunities for corruption, and make government data accessible to all citizens. National data platforms will enable evidence-based policymaking at every level – local, regional, and national. A digitally capable civil service will govern with the tools of the twenty-first century, not the filing systems of the twentieth.

Technology and Innovation

University-based technology labs will be functional, well-equipped, industry-connected centres of innovation where students gain real-world experience through

people (15–35) a further 38.2% of the population in 2021, with a median age of about 21 years – among the youngest age structures globally.

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live projects, industry mentorship, and entrepreneurial incubation. A national network of innovation hubs – linked to strategic partners including ALX, MTN, and AmaliTech – will nurture Ghana's technology start-up ecosystem, providing the infrastructure, mentorship, and market access that young technology entrepreneurs need to grow.

Inclusion and Equity

Technology opportunity will reach every Ghanaian regardless of geography, gender, or socioeconomic background. The digital divide – between urban and rural, between rich and poor, between those who can afford devices and connectivity and those who cannot – will be systematically closed. Girls and women will be specifically targeted for inclusion in technology education and the technology workforce. Persons with disabilities will benefit from assistive technology programmes integrated into the national education system.

POLICY OBJECTIVES

Ghana Agenda 2046: Technology Transformation is anchored in eight SMART strategic objectives:

1. Reform Ghana's education system to be less rigid, less fear-oriented, and more passion-driven, integrating practical technology education and the Learn, Play, Build methodology across all levels by Year 10.
2. Achieve 100% of public secondary and tertiary institutions with functional, industry-connected technology labs and practical learning infrastructure by Year 12.
3. Integrate AI literacy and emerging technology curricula into 100% of secondary and tertiary educational institutions by Year 10.
4. Train 500,000 young Ghanaians as technology problem-solvers, creators, and innovators through formal education and strategic partnerships (ALX, MTN, AmaliTech, and others) by Year 20.
5. Achieve 80% digital literacy among the working-age population by Year 15.
6. Digitise 80% of public administration services, reducing service delivery times by 50% and measurably improving transparency and accountability by Year 15.
7. Create 200,000 technology-related jobs by Year 20 through the national technology innovation and entrepreneurship ecosystem.
8. Establish Ghana as a top-five technology education hub in Sub-Saharan Africa by Year 20, attracting regional talent, investment, and technology partnerships.

Additional system-level targets:

- Achieve 90% of students at all levels receiving practical, technology-integrated education by Year 15
- Establish 50 functional university-based technology labs with active industry partnerships by Year 15
- Achieve 90% reliable internet access in all public schools and TVET institutions by Year 10
- Deploy responsible technology use orientation programmes in 100% of schools receiving digital devices by Year 5

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PROPOSED STRATEGIC INTERVENTIONS

The policy organizes its $100 million catalytic investment across four strategic pillars. Each pillar addresses a distinct but interconnected dimension of the technology transformation challenge, building a coherent pipeline from early childhood digital exposure through to industry-ready technology creation and governance digitalization.

Strategic Pillar	Key Interventions	Target Group	Expected Outcome
1. Education System Reform for Technology ($40M)	Curriculum reform embedding Learn, Play, Build at all levels; passion-driven, less rigid learning models; AI and emerging technology integration; practical lab infrastructure; teacher/instructor retraining; responsible technology use orientation; early digital learning at primary level	Students from primary through tertiary; teachers; curriculum developers; GES; GTEC	100% schools with practical tech education by Year 12; AI literate graduates; problem-solvers not just knowledge absorbers
2. Technology Infrastructure & Access ($25M)	University-based technology labs (50 institutions); internet connectivity in all public schools; devices with responsible use orientation; rural technology access centres; assistive technology for persons with disabilities	Students; rural communities; persons with disabilities; TVET institutions; universities	90% internet access in all public schools by Year 10; 50 functional university tech labs by Year 15; digital divide systematically closed
3. Technology for Governance & Public Administration ($20M)	e-Government platform development; open data systems; digital public service delivery; national accountability dashboard; local digital governance systems; civil service digital capacity building	Public institutions; government ministries; citizens; civil service	80% public services digitized by Year 15; 50% faster service delivery; transparent, data-driven governance
4. Industry Partnerships, Innovation Ecosystem & Sustainability ($10M)	Strategic partnerships with ALX, MTN, AmaliTech and others; national innovation hub network; technology entrepreneurship incubation; industry mentorship programme; start-up funding mechanism; job creation through technology sector development	Youth entrepreneurs; technology graduates; start-ups; industry partners; civil society	200,000 tech jobs by Year 20; Ghana as top-5 tech education hub in Sub-Saharan Africa; self-sustaining innovation ecosystem
5. Monitoring, Evaluation & Contingency ($5M)	National Technology Performance Dashboard; independent annual reviews; 5-year and 6-year comprehensive evaluations; adaptive implementation and contingency reserve	NTTC; Parliament; implementing agencies; civil society; citizens	Evidence-based course correction; public accountability; system resilience against unforeseen challenges

The plan makes four deliberate strategic exclusions:

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- Not distributing devices without orientation: the SHS tablets experience demonstrated that technology provision without purpose, training, and passion-driven context produces distraction, not development
- Not reforming only one level of education: technology transformation requires a connected pipeline from primary through tertiary – reforming only one level creates a system with a strong link and weak chains
- Not building technology labs without industry connectivity: labs without active industry partnerships produce theory-in-practice rather than real-world problem-solving
- Not pursuing governance digitalization without civil service capacity building: systems without skilled operators fail or are circumvented

IMPLEMENTATION FRAMEWORK

Ghana Agenda 2046: Technology Transformation adopts a four-phase implementation architecture with deliberately unequal year intervals, calibrated to the natural rhythm of education system reform and technology infrastructure development. The logic of the Learn, Play, Build methodology that guides the policy's content also guides its implementation: Phase 1 learns through pilots and foundations, Phase 2 plays at scale, Phase 3 builds the full system, and Phase 4 sustains and competes globally.

Why Four Phases with Unequal Intervals?

Technology education reform cannot be rushed without producing the exact problem it is trying to solve: theory without practice. Phase 1 (3 years) moves fast to establish legal frameworks, pilot the Learn, Play, Build curriculum, and begin infrastructure investment – because early wins build political will and public confidence. Phase 2 (5 years) is the primary scaling period: rolling out reformed curricula, connecting labs to industry, and deploying governance digitalization. Phase 3 (6 years) embeds and deepens reforms across the entire system. Phase 4 (6 years) achieves self-sustaining global competitiveness and positions Ghana as a continental technology leader. Each phase is longer than the last because the deeper the reform, the more time it takes to take root.

PHASE 1 Years 1–3 (2026–2028)	**Learn – Foundations, Pilots, Policy Reform & Institutional Architecture**

Phase 1 is the most policy-intensive period of the transformation. In three years, the legislative, institutional, and curricular foundations must be established. The Learn, Play, Build curriculum must be designed and piloted. Responsible technology use orientation programmes must be deployed alongside any device distribution. The first wave of university-based technology labs must be established with active industry partners. Phase 1 is deliberately short and intensive: it creates the momentum and evidence base that Phases 2, 3, and 4 will scale.

SMART Work Plan – Phase 1 Milestones:

Ref	Milestone / Activity	Responsible Party	Target Deadline
1.1	Enact the National Technology Education and Digital Transformation Act, establishing the legal framework for curriculum reform, technology	Parliament / Ministry of Education / Ministry of Communications	By Year 2

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	infrastructure investment, and industry-education partnerships		
1.2	Design and pilot the Learn, Play, Build technology curriculum in 100 primary and 50 secondary schools across 5 regions, incorporating practical application, problem-solving, and passion-driven learning models	Ghana Education Service / MoE / Curriculum Research & Development Division	By Year 3
1.3	Deploy responsible technology use orientation programmes in 100% of schools receiving digital devices, linking device provision to clear learning objectives and supervised structured use	GES / MoE / NITA	By Year 2
1.4	Establish 10 university-based technology labs in partnership with industry (ALX, MTN, AmaliTech), each equipped with hardware, software, high-speed internet, and active industry mentorship programmes	Ghana Tertiary Education Commission / NITA / Industry Partners	By Year 3
1.5	Launch the National AI Literacy Initiative: integrate AI awareness and foundational AI literacy into secondary and tertiary curricula in pilot institutions across all 16 regions	GTEC / MoE / GES	By Year 3
1.6	Commence instructor retraining programme: retrain 2,000 teachers and TVET instructors in practical technology education, the Learn, Play, Build methodology, and responsible technology use facilitation	COTVET / GES / GTEC	By Year 3
1.7	Launch e-Government Platform Pilot: digitize 5 high-volume public services (birth registration, business registration, driver licensing, health insurance enrolment, land registry) in 3 regions	NITA / Ministry of Communications / Ministry of Local Government	By Year 3
1.8	Commission National Technology Education Baseline Assessment to establish verified data on digital literacy rates, technology lab coverage, industry-education linkages, and AI curriculum integration	Ghana Statistical Service / NITA / MoE	By Year 1
1.9	Establish the National Technology Transformation Council (NTTC): independent oversight body with government, academia, industry, and civil society representation, meeting quarterly	Office of the President / MoE / Ministry of Communications	By Year 1
1.10	Sign formal partnership agreements with ALX, MTN, AmaliTech, and at least 2 additional technology organizations, defining co-financing, training, mentorship, and infrastructure commitments	Ministry of Communications / GTEC / NITA	By Year 2

PHASE 2 Years 4–8 (2029–2033)	**Play – National Scale-Up, Infrastructure Rollout & Ecosystem Building**

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Phase 2 takes the pilots of Phase 1 and scales them nationally. The Learn, Play, Build curriculum is rolled out across all public schools. University technology labs expand to 30 institutions. Internet connectivity is delivered to all public schools. The e-Government platform is extended across all major public services. The national innovation hub network begins to produce technology entrepreneurs and jobs. Phase 2 is the 'play' phase: Ghanaian students and young professionals are now experimenting, iterating, and building with technology at scale.

SMART Work Plan – Phase 2 Milestones:

Ref	Milestone / Activity	Responsible Party	Target Deadline
2.1	Roll out the Learn, Play, Build technology curriculum to 100% of public primary schools and 80% of public secondary schools nationally	GES / MoE / Curriculum Research & Development Division	By Year 7
2.2	Achieve 90% reliable internet connectivity in all public schools and TVET institutions through a national school connectivity programme	NITA / Ministry of Communications / ISPs	By Year 7
2.3	Expand university-based technology labs to 30 institutions, each with active industry partnerships, live student projects, and innovation incubation facilities	GTEC / NITA / Industry Partners	By Year 8
2.4	Integrate AI literacy and emerging technology curricula into 100% of secondary and tertiary educational institutions, with assessed, credited modules	GTEC / GES / MoE	By Year 7
2.5	Train 100,000 young Ghanaians as technology problem-solvers and creators through the combined pipeline of reformed formal education and strategic industry partnerships	COTVET / GTEC / ALX / AmaliTech / MTN	By Year 8
2.6	Launch 10 National Innovation Hubs in regional capitals, each providing technology workspace, mentorship, incubation, and seed funding access to young technology entrepreneurs	NITA / Ministry of Communications / NBSSI	By Year 7
2.7	Extend the e-Government platform to cover 50% of all public administration services, with accessible interfaces for low-literacy and rural users	NITA / Ministry of Communications / MDA	By Year 8
2.8	Conduct independent 5-Year Comprehensive Technology Education Review at end of Phase 2; publish findings publicly; use to recalibrate Phase 3 priorities	Independent Evaluators / NTTC / Parliament	Year 8
2.9	Achieve 60% digital literacy among the working-age population, measured through annual Ghana Statistical Service Digital Skills Survey	Ghana Statistical Service / NITA	By Year 8
2.10	Establish a Technology and Education Gender Equity Programme ensuring 50% female participation in all technology labs, innovation hubs, and AI literacy programmes	MoE / GES / Gender Focal Points	By Year 6

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PHASE 3 Years 9–14 (2034–2039)	**Build – System Integration, Deep Reform & Governance Digitalization**

Phase 3 is the 'build' phase in the fullest sense. The reforms initiated in Phase 1 and scaled in Phase 2 are now embedded across the entire education system. University-based technology labs reach 50 institutions. The national e-Government platform covers 80% of public services. The innovation hub network is producing measurable technology jobs. Ghana's technology workforce begins to reach sufficient critical mass to attract regional and international investment. Phase 3 also addresses the most deeply embedded cultural and institutional change: moving Ghana's education system from fear-oriented and rigid to passion-driven and innovative.

SMART Work Plan – Phase 3 Milestones:

Ref	Milestone / Activity	Responsible Party	Target Deadline
3.1	Achieve 100% of public secondary and tertiary institutions with functional, industry-connected technology labs and practical learning infrastructure	GTEC / GES / NITA / Industry Partners	By Year 12
3.2	Expand university-based technology labs to 50 institutions with active industry partnerships, live project pipelines, and graduate-to-employment tracking	GTEC / NITA / Industry Partners	By Year 13
3.3	Train 300,000 young Ghanaians (cumulative) as technology problem-solvers and creators through the combined formal education and strategic partnership pipeline	COTVET / GTEC / ALX / AmaliTech / MTN	By Year 14
3.4	Achieve 80% digital literacy among the working-age population	Ghana Statistical Service / NITA / MoE	By Year 13
3.5	Digitize 80% of public administration services and deploy national accountability dashboard accessible to all citizens, tracking service delivery performance in real time	NITA / Ministry of Communications / MDAs	By Year 13
3.6	Create 100,000 technology-related jobs (cumulative) through the national innovation ecosystem, industry partnerships, and technology entrepreneurship incubation	Ministry of Employment / NITA / NBSSI	By Year 14
3.7	Achieve 90% of students at all levels receiving practical, technology-integrated education, with the Learn, Play, Build methodology fully embedded and assessed	GES / GTEC / MoE	By Year 13
3.8	Deploy rural technology access centres in all districts more than 30 minutes from a functional technology lab, ensuring geographic equity in access to practical technology education	NITA / District Assemblies / Ministry of Communications	By Year 14
3.9	Conduct independent 6-Year Comprehensive Technology System Evaluation; table before Parliament; publish Government response within 90 days	Independent Evaluators / Parliament / NTTC	Year 14

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3.10	Integrate technology for governance programmes into 100% of district assemblies: digital reporting, citizen feedback systems, and open data publishing at local government level	Ministry of Local Government / NITA / District Assemblies	By Year 14

PHASE 4 Years 15–20 (2040–2046)	**Sustain & Lead – Global Competitiveness, Sovereignty & Continental Leadership**

Phase 4 achieves the full vision of Ghana Agenda 2046: Technology Transformation. By Year 20, Ghana will be a nation that does not merely use technology – it benefits from technology at national scale. Its graduates will be technology creators. Its government will be digitally governed and publicly accountable. Its innovation ecosystem will produce exportable technology products and global-calibre talent. Ghana will be positioned as a continental technology education leader, attracting regional talent, investment, and partnerships, and exporting its technology governance model to peer nations.

SMART Work Plan – Phase 4 Milestones:

Ref	Milestone / Activity	Responsible Party	Target Deadline
4.1	Train 500,000 young Ghanaians (cumulative) as technology problem-solvers, creators, and innovators across formal education and strategic partnership channels	COTVET / GTEC / MoE / Industry Partners	By Year 20
4.2	Create 200,000 technology-related jobs (cumulative) through Ghana's national innovation ecosystem, industry partnerships, and exportable technology products	Ministry of Employment / NITA / NBSSI	By Year 20
4.3	Position Ghana as a top-five technology education hub in Sub-Saharan Africa, attracting regional students, faculty, and technology investment	GTEC / Ministry of Foreign Affairs / MoE	By Year 20
4.4	Achieve full e-Government coverage: 95% of public administration services digitized, with real-time accountability dashboards accessible to every citizen	NITA / Ministry of Communications / MDAs	By Year 19
4.5	Ghana's technology education system financially self-sustaining: industry co-financing, technology lab commercialization revenues, and an expanded technology tax base cover operational costs without donor dependency	Ministry of Finance / MoE / Industry Partners	By Year 20
4.6	Launch the Ghana Technology Education Export Programme: partner with 5 African countries to implement the Learn, Play, Build curriculum and technology lab model	MoE / Ministry of Foreign Affairs / GTEC	By Year 18
4.7	Achieve 95% AI and emerging technology literacy among all tertiary graduates, with Ghana producing globally competitive AI researchers, developers, and practitioners	GTEC / MoE / Research Institutions	By Year 20

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4.8	Achieve greater than 85% satisfaction with public digital services nationally, measured through annual independent citizen survey	NITA / Ministry of Communications / Independent Evaluators	By Year 20
4.9	Establish the Ghana Institute for Technology and Innovation (GHITI) as a continental research and development institution, attracting international partnerships and funding	GTEC / Research Institutions / Ministry of Finance	By Year 20
4.10	Publish the Final 20-Year Technology Transformation Impact Assessment; table before Parliament; launch the post-2046 Ghana Digital Sovereignty Strategy	Independent Evaluators / Parliament / NTTC	Year 20

BUDGET ALLOCATION FRAMEWORK

USD 100 Million Investment Plan

The $100 million is deployed as catalytic capital across four strategic pillars. Education System Reform receives the largest single allocation because the session was unambiguous: education is the root cause of Ghana's technological underperformance. Without reformed education, infrastructure investment produces distracted device users rather than technology problem-solvers. Every other pillar depends on the quality of the human capital the education system produces.

Sector / Activity	Amount (USD)	Share (%)	Phases	Strategic Rationale
Education System Reform for Technology	**$40,000,000**	40%	1–4	Root cause intervention: without reformed, practical, passion-driven education, all other technology investment is built on sand. Highest leverage and longest-duration reform.
Technology Infrastructure & Access	**$25,000,000**	25%	1 & 2	University tech labs, school internet connectivity, rural access centres, and devices with responsible use orientation – the physical infrastructure of practical learning.
Technology for Governance & Public Administration	**$20,000,000**	20%	2 & 3	e-Government platforms, open data systems, digital public services, and civil service digitalization – direct governance dividends from technology investment.
Industry Partnerships, Innovation Ecosystem & Sustainability	**$10,000,000**	10%	2–4	ALX, MTN, AmaliTech and others; innovation hubs; entrepreneurship incubation; job creation; sustainability beyond donor funding.
Monitoring, Evaluation & Contingency	**$5,000,000**	5%	1–4	National Technology Performance Dashboard; independent annual reviews; 5-year evaluations; adaptive implementation reserve.
TOTAL	**$100,000,000**	**100%**	–	

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Financial Justification

Investment in technology education and digital infrastructure yields compound returns over time. UNESCO and World Bank evidence demonstrates that each additional year of quality, practically-oriented education generates an average 8–10% increase in individual earnings[2]; at scale, this translates to significant GDP growth and tax revenue expansion. Digital public service delivery reduces the cost of government service provision by an estimated 30–50% compared to paper-based equivalents[3]. The $100 million catalytic investment is designed to trigger a self-reinforcing cycle: better-educated technology graduates create more productive enterprises; more productive enterprises generate more tax revenue; more tax revenue funds better infrastructure and education.

Co-financing is projected from four streams: (i) industry co-investment from strategic partners (ALX, MTN, AmaliTech) in training, infrastructure, and mentorship; (ii) development partner contributions from World Bank, USAID, GIZ, and bilateral partners with technology education mandates; (iii) progressive government budget increases to education and digitalization as fiscal space grows; and (iv) commercialization revenues from technology labs and innovation hubs as they mature. The goal is full financial self-sustainability of the technology education ecosystem by Year 20, funded by industry partnerships, commercialized innovation, and the expanded tax base of a more productive, technology-capable economy.

STAKEHOLDER ENGAGEMENT

The breakout session emphasised the critical role of partnerships: government, schools, universities, industry, NGOs, communities, and international partners all have defined and essential roles. The Technology Transformation Policy cannot be delivered by any single actor. The following stakeholder framework makes this partnership architecture explicit and operational.

Stakeholder	Category	Role	Engagement Mechanism
Ministry of Education	Government	Lead policy authority for curriculum reform and education system transformation	Cabinet steering committee; quarterly programme reviews
Ministry of Communications & Digitalization	Government	e-Government platforms; national connectivity; digital infrastructure policy	Digital Transformation Task Force
Ghana Education Service (GES)	Government	Primary and secondary curriculum implementation;	GES Technology Education Working Group

[2] Psacharopoulos, G., & Patrinos, H. A. (2018). Returns to investment in education: A decennial review of the global literature. *Education Economics, 26*(5), 445–458. https://doi.org/10.1080/09645292.2018.1484426. The global private return to an additional year of schooling averages about 9–10%, rising to roughly 13.5% in Sub-Saharan Africa.

[3] United Nations Department of Economic and Social Affairs. (2022). *E-Government Survey 2022: The future of digital government*. United Nations. https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2022. Digitalization of public services is widely associated with substantial reductions in transaction and administrative costs relative to paper-based delivery.

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		teacher retraining; school technology rollout	
Ghana Tertiary Education Commission (GTEC)	Government	University-level technology curriculum; tech lab oversight; AI literacy integration; industry partnership mandates	GTEC Innovation and Technology Committee
National Information Technology Agency (NITA)	Government	e-Government development; national connectivity; rural access; digital governance	e-Government Platform Steering Committee
Parliament – Education & Technology Committees	Government	Legislation; budget oversight; accountability reviews; National Technology Act	Bi-annual briefings; committee submissions
ALX Africa	Industry	Technology skills training; curriculum partnership; lab co-investment; mentorship	Formal partnership agreement; annual joint review
MTN Ghana	Industry	Connectivity infrastructure; digital skills programmes; innovation hub co-financing	Formal partnership agreement; quarterly dialogue
AmaliTech	Industry	Technology talent development; internship pipelines; industry mentorship	Formal partnership agreement; graduate placement tracking
Additional Technology Companies (Google, Microsoft, local start-ups)	Industry	Lab equipment; software licensing; mentorship; graduate employment	National Technology Industry Forum
Development Partners (World Bank, USAID, GIZ)	International	Co-financing; technical assistance; technology education expertise	Annual Technology Sector Coordination Meeting
Universities and Research Institutions	Academic	Technology lab management; applied research; curriculum content; graduate output	University Technology Lab Network
Civil Society & Youth Organisations	Civil Society	Accountability; youth voice; gender equity advocacy; community technology adoption	Youth Technology Platform; public scorecards
Communities and Traditional Leaders	Community	Local mobilization for technology adoption; support for rural access centres	Community Technology Councils; regional forums

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GOVERNANCE & ACCOUNTABILITY STRUCTURE

The session raised the critical question: what do you do with a person who does not want to learn? The governance response is to focus resources and accountability on the majority who are willing to learn and benefit, while designing systems that progressively bring the reluctant along through demonstrated success and peer influence. The governance architecture is built for transparency, public accountability, and institutional independence.

Oversight Mechanisms

- National Technology Transformation Council (NTTC) – independent body chaired by an eminent Ghanaian technology leader, with cross-party parliamentary membership, academic, industry, and civil society representation; meets quarterly; publishes Annual Technology State Report; has authority to compel implementing agency accountability
- Ministry of Education / Ministry of Communications Joint PMO – dedicated, professionally recruited programme management office coordinating implementation across both ministries, managing fiduciary oversight, industry partnership compliance, and public reporting
- Regional Technology Education Committees – in each of Ghana's 16 regions; monitor school technology lab status, digital connectivity, curriculum implementation, and innovation hub performance; submit quarterly reports to the national PMO

Transparency Systems

- National Technology Performance Dashboard – publicly accessible, real-time tracking of digital literacy rates, technology lab coverage, internet connectivity in schools, AI curriculum integration, e-Government service coverage, and innovation ecosystem job creation
- Annual Technology Education Quality Scorecard – ranking all public secondary and tertiary institutions on practical learning quality, technology lab functionality, industry partnership activity, and graduate technology employability
- Open Data Publication – all programme expenditures, lab establishment records, industry partnership agreements, and graduate outcome data published as open data, accessible to citizens, researchers, and journalists

Accountability Safeguards

- All technology lab establishment and device procurement above a defined threshold subject to public tender on GHANEPS with published specifications and selection outcomes
- Mandatory responsible technology use audit in all schools receiving devices, conducted annually by GES inspectors with published results
- Industry partner performance reviews published bi-annually: tracking partnership commitments (training numbers, lab investments, mentorship hours) against contractual obligations
- Whistleblower protection framework for reporting technology procurement corruption, device misuse, and curriculum reform sabotage

Public Reporting Systems

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- Annual Programme Review – led by the Joint PMO with civil society and industry participation; results published within 60 days; tabled before Parliament
- Independent Comprehensive Evaluations at Year 8 (end of Phase 2) and Year 14 (end of Phase 3) – external assessors; findings published publicly and tabled before Parliament with mandatory Government response within 90 days
- Final 20-Year Impact Assessment at Year 20 – full independent evaluation establishing the legacy of the reform, with forward-looking recommendations for the post-2046 Ghana Digital Sovereignty Strategy

MONITORING, EVALUATION & IMPACT MEASUREMENT

Key Performance Indicators (KPIs)

Indicator	Baseline (2026)	Year 3 (2028)	Year 8 (2033)	Year 14 (2039)	Year 20 (2046)
Students with practical tech-integrated education (%)	<15%	30%	60%	85%	90%+
Public schools with functional tech labs (%)	<10%	20%	60%	100%	100%
Schools with reliable internet connectivity (%)	~25%	50%	90%	98%	100%
AI literacy in secondary/tertiary institutions (%)	<5%	25%	100%	100%	100%
Young Ghanaians trained as tech problem-solvers (cumul.)	0	10,000	100,000	300,000	500,000
Digital literacy – working-age population (%)	~30%	40%	60%	80%	90%+
Public admin services digitised (%)	~15%	25%	50%	80%	95%
Technology-related jobs created (cumulative)	0	5,000	50,000	100,000	200,000
University tech labs with industry partnerships	~5	10	30	50	50+
Public service satisfaction – digital services (%)	~40%	55%	70%	82%	>85%

Evaluation Methods

- National Technology Performance Dashboard – publicly accessible, real-time; updated from GES school reports, GTEC lab audits, NITA connectivity data, and industry partner reports; all data published as open data
- Annual Digital Skills Survey (Ghana Statistical Service) – nationally representative survey measuring digital literacy across age cohorts, regions, gender, and income levels
- Learn, Play, Build Curriculum Quality Assessment – annual independent assessment of curriculum implementation quality and student practical skills attainment in a nationally representative sample of schools

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- Graduate Employment and Technology Outcome Tracking – annual survey of TVET and tertiary graduates to track technology-related employment, entrepreneurship, and practical skill application
- Industry Partner Performance Reviews – bi-annual assessment of strategic partner (ALX, MTN, AmaliTech) commitments versus delivery against signed partnership agreements
- Independent Comprehensive Evaluations at Year 8 and Year 14 – in-depth external assessments of system-wide performance, equity, value for money, and institutional integrity; published publicly and tabled before Parliament
- Final 20-Year Impact Assessment at Year 20 – comprehensive evaluation of the full reform, establishing Ghana's technology transformation legacy and launching the post-2046 strategy

RISKS & MITIGATION STRATEGIES

Risk	Likelihood	Potential Impact	Mitigation Strategy
Technology Provision Without Orientation	High	Devices used for social media and entertainment; learning objectives unmet; public confidence in programme erodes	Mandatory responsible technology use orientation programme deployed simultaneously with any device provision. Structured, supervised learning objectives attached to all device distribution. Annual school audits of device use quality published publicly.
Education System Inertia and Resistance to Reform	High	Teachers, administrators, and exam bodies resist curriculum change; Learn, Play, Build methodology superficially implemented	Co-design the curriculum reform with frontline teachers and schools, not only curriculum developers. Pilot before national rollout. Tie school funding increments to implementation quality. Retrain 2,000 instructors in Phase 1 as reform champions.
Political Discontinuity	High	Technology Education Act and digital infrastructure investment abandoned across election cycles	Anchor reforms in the National Technology Education and Digital Transformation Act. Establish the independent NTTC with cross-party membership. Publish annual Technology State Reports that make performance data public and reversal politically costly.
Infrastructure Failure and Connectivity Gaps	Medium	Technology labs without power or internet; rural areas excluded; equity gap widens	Prioritize solar-powered technology labs in off-grid areas. Negotiate national school connectivity contracts with mandatory rural coverage requirements. Deploy rural technology access centres in Phase 3 for areas beyond 30 minutes of a fixed lab.
Brain Drain of Technology Graduates	High	Ghana trains technology talent that immediately emigrates; investment benefits other countries	Build a compelling domestic technology economy through the innovation ecosystem and industry partnerships that makes Ghana competitive as a base. Diaspora engagement programme to attract returning Ghanaian technology professionals as mentors and investors. Create contractual domestic service

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			obligations for graduates of fully-funded programmes.
Industry Partner Underdelivery	Medium	ALX, MTN, AmaliTech, or other partners fail to meet training, mentorship, or infrastructure commitments	Formalise all partnerships in legally binding agreements with clear deliverables, timelines, and performance penalties. Bi-annual partner performance reviews published publicly. Diversify across multiple partners to avoid single-partner dependency.
Equity and Gender Gaps in Technology Access	Medium	Technology labs and innovation hubs predominantly accessed by urban, male, higher-income youth; policy benefits concentrated rather than distributed	Mandatory 50% female participation targets in all technology labs and innovation hubs. Rural access centre programme specifically designed for geographic equity. Targeted scholarship and device access programmes for disadvantaged students.

EXPECTED NATIONAL IMPACT

The successful implementation of Ghana Agenda 2046: Technology Transformation will deliver a generational shift in Ghana's human capital, economic productivity, governance quality, and global technology positioning:

Economy

- 200,000 technology-related jobs created by Year 20, generating hundreds of millions of dollars in wages, tax revenues, and technology export earnings
- Ghana emerging as a regional technology hub, attracting continental talent, investment, and technology company headquarters
- An expanded, more productive, technology-enabled economy contributing an estimated additional 1.5–2% annual GDP growth through improved labour productivity and technology sector development
- A self-sustaining technology education ecosystem, financed through industry co-investment, innovation commercialization, and an expanded technology tax base

Education and Human Development

- 500,000 young Ghanaians trained as technology problem-solvers, creators, and innovators – a transformation in the quality and orientation of Ghana's human capital
- 100% of public secondary and tertiary institutions with functional, industry-connected technology labs – practical learning infrastructure available to every Ghanaian student
- AI literacy embedded in 100% of tertiary graduates – Ghana's workforce prepared for the Fourth Industrial Revolution rather than left behind by it
- A passion-driven, less rigid, more innovative education culture – producing thinkers and problem-solvers rather than rote learners

Governance and Accountability

- 95% of public administration services digitized – faster, cheaper, more transparent, and more accessible government services for every Ghanaian

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- A national accountability dashboard enabling real-time public oversight of government performance at national, regional, and district levels
- Ghana recognized as a continental leader in e-Government and technology-enabled public administration
- Significantly reduced corruption risk in service delivery through the elimination of discretionary human contact points in public administration

Innovation and Social Cohesion

- Ghana positioned as a top-five technology education hub in Sub-Saharan Africa, attracting regional students, faculty, and partnerships
- The Learn, Play, Build methodology exported to at least 5 African countries, establishing Ghana as a technology education knowledge exporter
- A generation of young Ghanaians who relate to technology not as consumers but as creators, builders, and problem-solvers – the cultural foundation for sustained technological sovereignty
- Gender equity in technology: 50% female participation in technology labs and innovation hubs, closing the gender technology gap that currently limits Ghana's innovation potential by half

CONCLUSION & CALL TO ACTION

The Black Star Summit Technology Breakout Session produced one insight that should anchor everything that follows: Ghana is using technology, but it is not yet benefiting from technology. This is not a small distinction. It is the difference between a nation of consumers and a nation of creators. Between a workforce that operates tools built elsewhere and a workforce that builds the tools the world uses. Between a government that digitizes paperwork and a government that uses data to serve its citizens better, faster, and more honestly.

The reform required to close this gap begins in the classroom – at every level, from the primary school child learning to code through play, to the university student building a solution to a real national problem in a technology lab co-funded by industry. It requires an education system that is less rigid, less fear-oriented, and more passion-driven. It requires teachers retrained to facilitate exploration rather than transmit information. It requires devices accompanied by purpose. And it requires the institutional courage to sustain this reform across the political cycles that will inevitably test it.

> *"The efficiency of labour can never be 100%. So we must focus on and invest in the majority who are willing to learn, while designing systems that make learning so compelling that the reluctant are brought along by the current of their peers' success."* – Black Star Summit Technology Breakout Session

The Milan Cathedral Principle Applied to Technology

The most consequential technology transformations are not built in one political term. They are built across generations of learners, each one equipped with better tools, better teachers, and a better understanding of what technology can do for their community. The graduates of Ghana's reformed technology education system in 2046 will have learned to code, create, and problem-solve in schools that do not yet exist, using tools that have not yet been invented, to solve

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challenges we cannot yet anticipate. That is exactly the kind of investment this policy makes: a foundation whose full reward will be harvested by those who come after us.

Call to Action

We call on the Ministry of Education to champion the National Technology Education and Digital Transformation Act as a legislative priority, making the Learn, Play, Build curriculum a legal mandate across all public schools. We call on the Ministry of Communications and NITA to accelerate school internet connectivity and deploy e-Government platforms that Ghanaians can actually use. We call on ALX, MTN, AmaliTech, and the private technology sector to formalise their partnerships, co-invest in technology labs, and open their internship and mentorship pipelines to Ghanaian students. We call on universities to make their technology labs open, active, and industry-connected centres of real-world problem-solving. And we call on every young Ghanaian to move beyond using technology – to building with it, creating from it, and solving with it the problems that Ghana needs solved.

Prepared by the Black Star Summit Technology Breakout Session Team
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