DIGITAL ECONOMY POLICY AND STRATEGY FOR GHANA

June 2023

MINISTRY OF COMMUNICATIONS AND DIGITALISATION

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Foreword

Statement from the Honourable Minister

Executive Summary

Following the adoption of the ICT for Accelerated Development (ICT4AD) policy in 2003, Ghana has advanced legislative reforms and a supporting regulatory environment, leading to investments in and adoption of ICTs through various sectors of the economy. These initiatives have ushered the country into the digital economy with its attendant opportunities and challenges, including those uncovered by the recent COVID-19 pandemic.

A new policy and strategy have become expedient to set the direction for the new realities of the digital economy, further accelerated by the emerging fourth industrial revolution (4IR), to harness these technologies, tools, and platforms for the delivery of relevant services with efficiency for economic and social benefit.

As the pace of the introduction of new technologies accelerates, creating change in societal outcomes beyond the span of existing norms and laws, an agile and adaptive approach to regulation is required. In the light of consistent and radical changes driven by technology, effective regulation should be inclined to guard against adverse outcomes, and not overly focused on regulating specific technologies and processes. Thus, an approach that leads to regulating the ends rather than the volatile means.

A collaborative regulatory environment should ensure that technologies that emerge in one sector but have an impact in other sectors do not face constraints resulting from a lack of coordination across sector regulators.

It is as important for policy to foster an environment in which innovation thrives in order to keep up with the fast pace of change that permeates all sectors of an increasingly connected society, at the individual, household, community, national and global levels.

A focus on inclusion calls for urgent action via policy instruments to avert or minimize the effects of potential dislocation and to manage negative externalities from the introduction into a society of disruptive new technologies.

It would be remiss, while targeting policy on grappling with present challenges and foreseeable opportunities, to fail to account for future unknowns that result from both home-grown and imported technological innovations.

Ultimately the policy addresses the problem statement on how to increase the contribution of the digital economy to the growth of national GDP, addressing national priorities such as job creation, and unlocking value in high-potential sectors, while strengthening inclusion, safeguarding national interests, and augmenting efficiency in public service delivery.

Glossary of Key Terms

4IR – Fourth Industrial Revolution

A4AI – Alliance for Affordable Internet

AfCFTA – African Continental Free Trade Area

AI – Artificial Intelligence

AU – African Union

CDO – Chief Digital Officer

CNDA - Common National Digital Architecture

DE4A -- Digital Economy for Africa

DFS – Digital Financial Services

EdTech – Educational Technology

E-GIF – E-government Interoperability Framework

ESO – Entrepreneur Support Organisation

GDP – Gross Domestic Product

GDEP – Ghana Digital Economy Policy

GEA – Ghana Enterprises Agency

GET Fund – Ghana Education Trust Fund

GES – Ghana Education Service

Ghana CARES – Ghana COVID-19 Alleviation and Revitalization of Enterprises Support

GIFEC – Ghana Investment Fund for Electronic Communications

GIDTB – Ghana Integrated Digital Transformation Blueprint

GSMA – Global System for Mobile Communications Association

GSS – Ghana Statistical Services

GVC – Global Value Chain

ICT – Information and Communication Technology

ICT4AD – ICT for Accelerated Development

ITU – International Telecommunications Union

IXP – Internet Exchange Points

MDA – Ministries, Departments and Agencies

MTEF – Medium Term Expenditure Framework

MoE – Ministry of Education

NCCE – National Commission for Civic Education

NEIP – National Entrepreneurship and Innovation Programme

NFIDS – National Financial Inclusion and Development Strategy

NDSP – National Data Sharing Policy (2019 draft)

P4P – Pathways for Prosperity Commission

PIAD – Public Investment Assets Division

PPP – Public-Private Partnership

PRAAD – Public Records and Archives Administration Department

QoS – Quality of Service

RTI – Right to Information Act, 2019 (Act 989)

SLTC – Student Loan Trust Fund

TBI – Tony Blair Institute for Global Change

ToR – Terms of Reference

TVET – Technical and Vocational Education and Training

UAF – Universal Access Fund

VCTF – Venture Capital Trust Fund

WB – World Bank

1 Introduction

1.1 Scope of Policy

This policy seeks to address opportunities and set the direction for the evolving digital economy following developments since the ICT4AD policy was adopted in 2003. It identifies key priorities as pillars upon which digital economy capabilities can be built on a national level to enable inclusive economic growth. The broad categories addressed by the policy include but are not limited to:

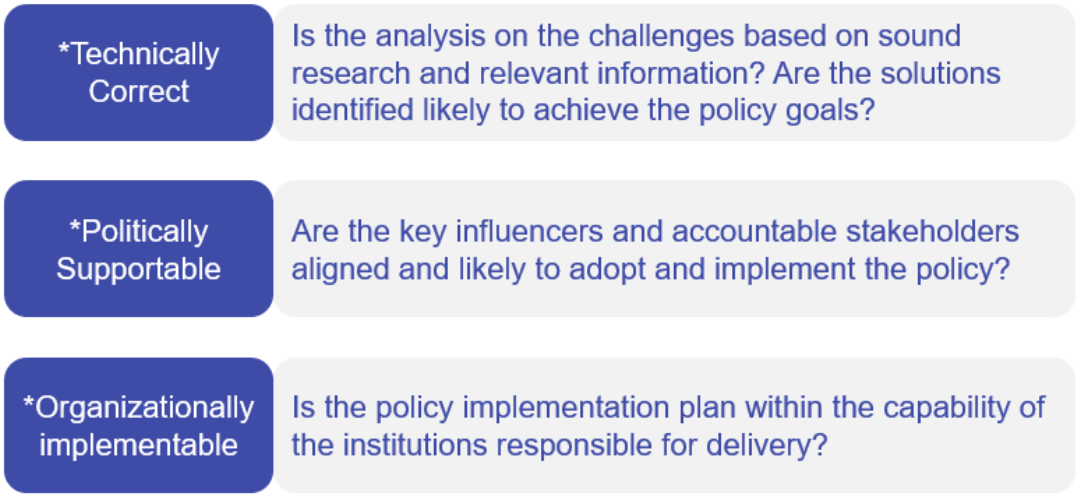
1. Digital Infrastructure
2. Data-driven Innovation and Entrepreneurship
3. Data Protection, User Privacy, Cybersecurity, Trust
4. Digital literacy and skills

The strategy further addresses these capabilities to target economic sectors where digital technologies are most likely to have a significant impact in delivering on national priorities including sustainable job creation and accelerated economic growth.

1.2 Policy Development and Review Process

Important features addressed in the policy development:

For the policy to be effective and achieve success in delivering its objectives, the process must involve accurate problem diagnosis, resulting recommendations must be aligned with key stakeholders and the deliverables must be consistent with institutional capabilities or new arrangements thereof for delivery.



**Source: Moore, Mark Harrison. Strategic Triangle*[i]

The approach utilized in formulating this policy followed the guidelines of the National Development Planning Commission which include the conducting of systematic research and analysis and the determination of corresponding policy options and recommendations through stakeholder consultations to refine the policy focus.

In structuring the analysis, several broad as well as sector-specific digital economy policy frameworks were consulted, together with key policy statements, and a multi-stakeholder process of dialog to determine priorities that represent essential capabilities for Ghana's digital economy advancement. The corresponding strategy leverages the capabilities that the priorities (pillars) render to unlock and enable the target outcomes of the policy.

'Mature' versus 'Open' policy positions

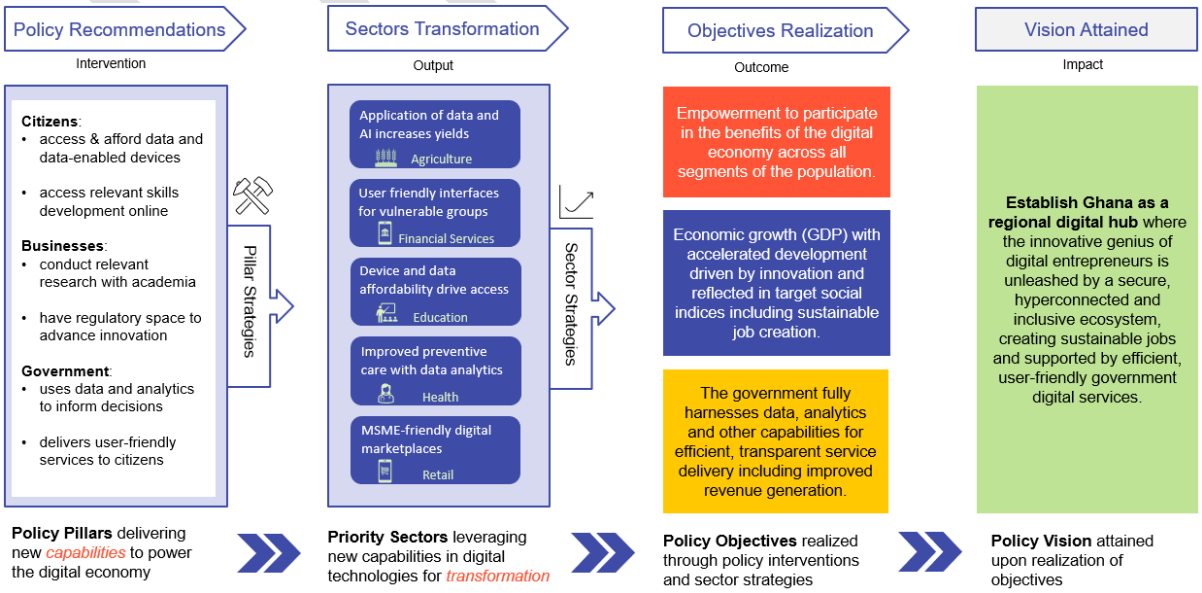
In the process of reviewing the focus areas under the policy pillars, some items were identified as relatively mature from the point of view of existing programmes and corresponding derived policy direction. The approach taken with regards to mature but informal policy positions was to ensure that policy options and recommendations were formalized in consistency with broader policy direction.

Other items were identified as relatively novel in the context of Ghana's digital economy, or not yet defined from a policy point of view and thus requiring deeper analysis and engagement with key stakeholders for the development of well-considered policy options based on the corresponding inputs, analysis, and international best practice relevant to the Ghanaian situation.

Theory of Change

The policy seeks to address the question: "*What is the effect of fast-track digitization on economic sector transformation, growth, and sustainable job creation?*"

This problem statement is addressed using a *Theory of Change* model thus:



2 Policy Context

2.1 Background

2.1.1 Background on Digital Economy

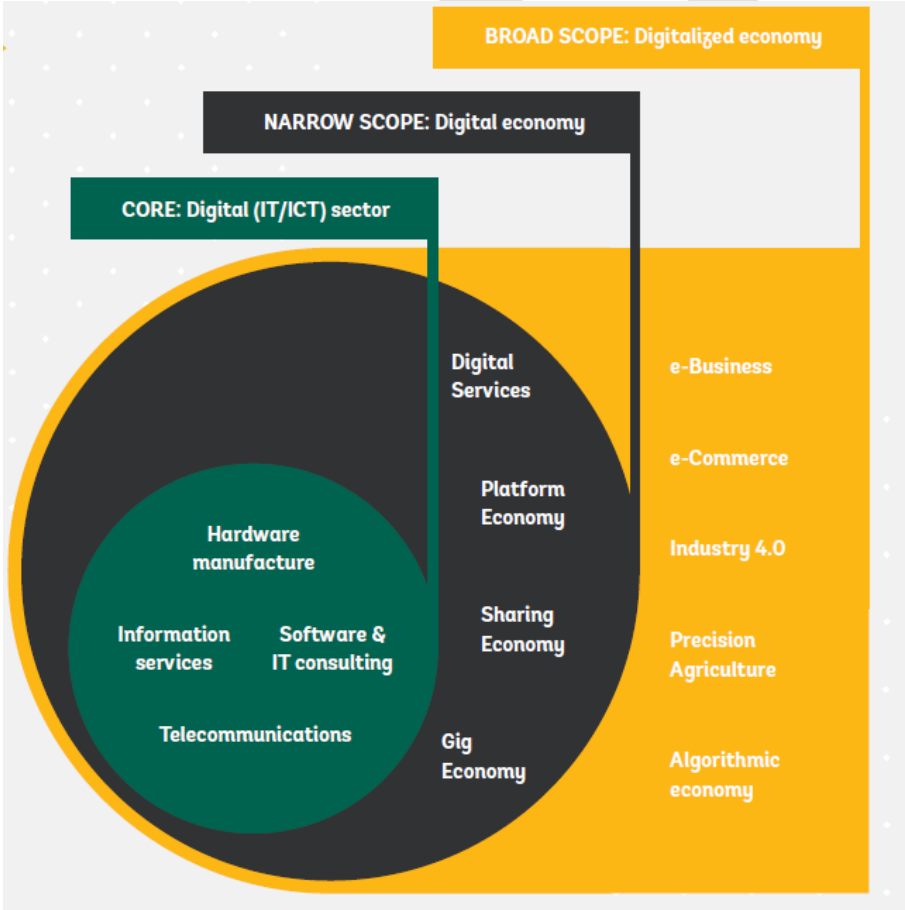
The Digital Economy brings forth both risks and opportunities

Digital economies provide a unique opportunity for countries to accelerate economic growth and connect citizens to services and jobs. The digital economy is equivalent to 15.5% of the global GDP, growing two and a half times faster than the global GDP over the past 15 years[ii].

A digital economy has the potential to enhance productivity and gains in multiple ways. A digital economy can change the way economies of scale are achieved, as the incremental cost of offering an additional product or service may become negligible[iii].

Digital economies introduce new risks and disruptions – to consumers, creditors, or firms, through technology-led strategic shifts, data, and cyber threats, in ways systemic or otherwise – and require safeguards and strategies to mitigate this and ensure a robust digital economy[iv].

Fostering digital inclusion and averting the risk of exclusion is key to ensuring that the transformational impact is beneficial to all.



Source: Bukht R and Heeks R, 2017

2.1.2 Evolution of ICT Policy in Ghana

Integration of ICT into mainstream socio-economic Development

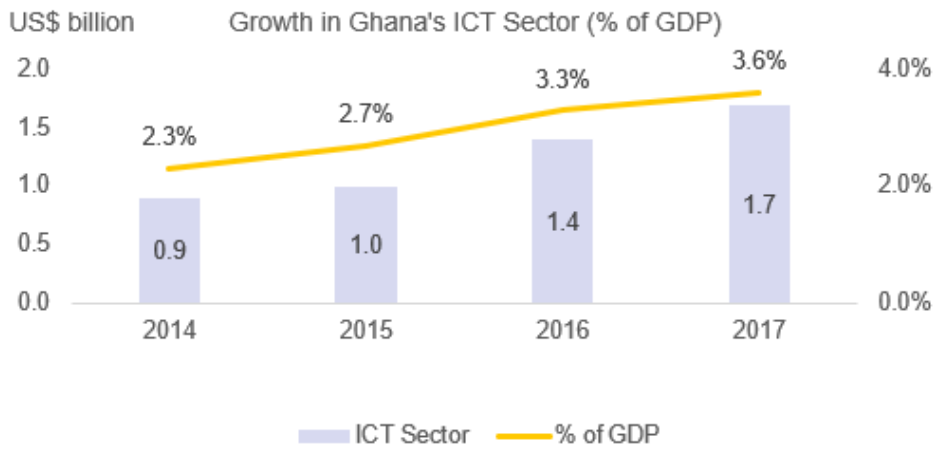
1994 - 2000: Accelerated Development Programme. Telecoms sector deregulation was initiated, with cellular providers having launched in 1991 and 1993, and the creation of the National Communications Authority in 1996.	**Policy Goals**: • achieve a density of up to 2.5 lines per 100 people; • improve public access (rural & urban) via payphones; • create a public regulatory agency
2003: ICT for Accelerated Development Policy. A focus on the role of information, knowledge, and technology as key socio-economic enablers, thus integration of ICT policy into the overall development objectives of the country. **2008**: Implementation of legislative reforms. Promulgation of key legislation - Electronic Communications Act, Electronic Transactions Act, National IT Agency (NITA) Act. **2012**: Legislative focus shifts beyond infrastructure to data, content, and services: Data Protection Act is passed. **2019/20**: Global trends, maturing digital economy. Payment Systems & Services Act, Cybersecurity Act passed.	**Overall Objective of the Policy**: To engineer an ICT-led socio-economic development process with the potential to transform Ghana into a middle-income, information-rich, knowledge-based and technology-driven economy and society. **Strategies 2003 - 2022**: ICT literacy → deployment & exploitation of ICT within the economy →leveraging ICT in education → R&D capacity → globally competitive local industry → regional destination for ICT FDI → private sector as the key driver of development.
2021: Post-COVID-19 & Ghana CARES Fast Track Digitisation. Pandemic lockdowns accelerate and emphasize the need for broad and inclusive access to digital economy capabilities and infrastructure for economic and social resilience.	**Areas of focus**: Expedite implementation of Government digital initiatives; digitize fiscal revenue collection; expand fibre network backbone; increase digital literacy and online education.

2.1.3 Digital Economy in Ghana

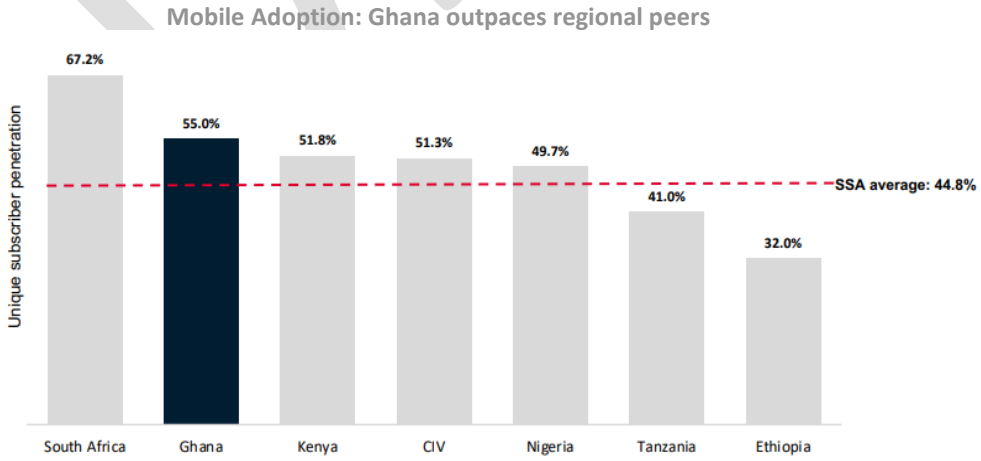
The Government has made significant efforts in digitisation

The government has made significant efforts in public sector digitisation and investments that are expected to position the country as a regional hub for digital services. These followed from the indication of digital transformation at the centre of the Ghana Beyond Aid agenda to stimulate jobs, improve productivity, and accelerate growth.

The government undertook a series of policy and infrastructure-related reforms over three decades during which the ICT sector, with telecom services as the main contributor, achieved growth contributing to about 3.6% of the country's GDP as of 2017, though somewhat lower than regional peers.
These initiatives unlocked economic pathways leveraging the mobile phone as a tool for connectivity, then information and digital financial services and emerging opportunities with big data, supported by key pillars including national biometric & digital ID, digital property addressing, mobile money interoperability with cross-sectorial impact including education, health, agriculture, and financial services.



Source: Integrated Business Establishment Survey, Ghana Statistical Service (2017)



Source: GSMA Intelligence

3 Framework for a Digital Economy

3.1 Vision & Objectives

Establish Ghana as a regional digital hub where the innovative genius of digital entrepreneurs is unleashed by a secure, hyperconnected and inclusive ecosystem, creating sustainable jobs and supported by efficient, user-friendly government digital services.

The vision driving this policy is influenced by developments following the implementation of the ICT for Accelerated Development (ICT4AD) Policy, as well as by events that transpired through and post the COVID-19 pandemic with the resulting Ghana CARES programme of fast-tracking digitalisation to achieve economic transformation.

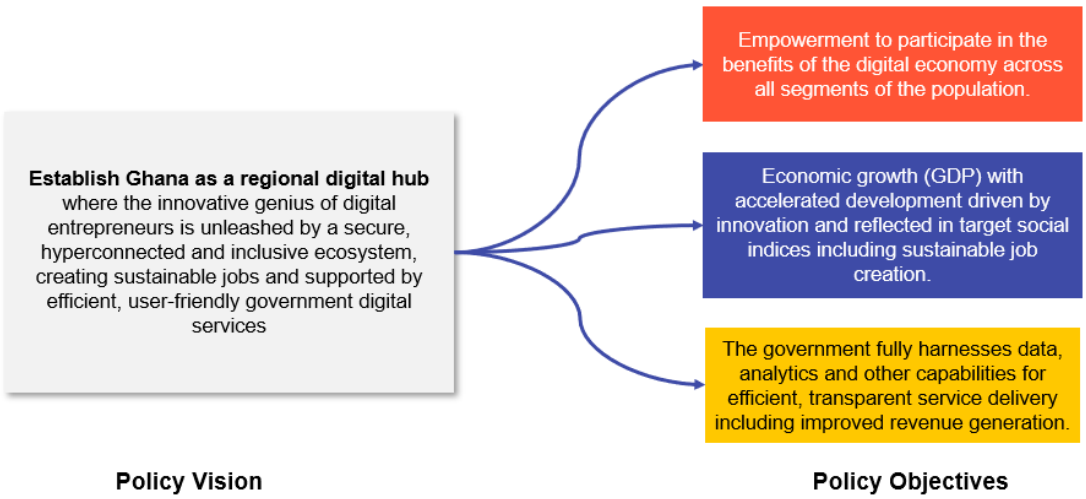
The vision importantly draws on the President's imperative to achieving the 2030 Agenda for Sustainable Development and emphasizing the need "*to transform the digital economy to promote inclusive growth and prosperity*". It was also influenced by the Ghana Integrated Digital Transformation Blueprint and its recommendation on anchoring digital government transformation on a robust Common National Digital Architecture (CNDA).

The vision aligns with a common refrain from the Minister of Communications and Digitalisation and from the Vice President to the effect that the next stage of digitalisation is to be characterized by big data analytics and artificial intelligence[v]. This is underscored by the Coordinated Plan of Economic and Social Development Policies, 2017 – 2024 on "*entrenching ICT, and especially data science, (including analytics), at the centre of the national development agenda*"[vi].

The policy vision further draws inspiration from continental and regional initiatives such as the AU Digital Transformation Strategy for Africa (2020 – 2030) which stipulates people-centred goals such as ensuring that every African is digitally empowered equipped and enabled[vii].

This vision speaks to readiness, leadership and relevance in the evolving digital economy characterized by emerging technologies of the fourth industrial revolution (4IR).

Policy Vision → Policy Objectives



3.2 Guiding Principles

Inclusion:

This principle speaks to the need to leverage digital technologies to bridge access to all forms of marginalisation that persist in society and to ensure that no one is left behind. The idea is also to proactively anticipate, account for and to mitigate risks accompanying technology transformation such as exclusion, negative externalities, and disempowerment[viii].

Furthermore, it is crucial to recognise that the digital divide is not limited to mere access to technology, but also encompasses the skills and knowledge necessary to effectively utilize these tools. To truly bridge the gap, efforts must be directed towards promoting digital literacy and empowering individuals with the necessary digital skills. By providing equitable access to technology and fostering digital literacy, societies can empower marginalized communities, enabling them to participate fully in the digital era and reap the benefits it offers.

Entrepreneurship and Innovation:

This principle focuses on growing economic value and achieving breakthroughs in relevant areas of national concern through innovative efforts delivered by digitally enabled entrepreneurial ventures.

By fostering an environment conducive to entrepreneurial ventures, governments can encourage the emergence of innovative solutions that leverage digital tools. These efforts can lead to breakthroughs in priority economic sectors, providing opportunities for job creation, economic advancement, and social progress. Through targeted support for digital entrepreneurship and fostering a culture of innovation, the power of technology can be harnessed to address pressing challenges and foster sustainable development.

Openness and Interoperability:

Advancing the data economy and the realisation of value from data as an asset requires supporting various entities to generate, share and exchange data in both government and the private sectors.

By establishing frameworks that enable various entities in both government and private sectors to generate, share, and exchange data, we can unlock its full potential. Emphasizing openness ensures transparency and equal access to data, fostering innovation, collaboration, and informed decision-making. Moreover, interoperability standards facilitate seamless integration and compatibility among different systems, allowing for efficient data exchange and utilisation across diverse platforms and sectors.

Trust, Privacy and Security:

To encourage participation in electronic and digital services, citizens and organisations alike must be assured and have confidence that relevant standards are complied with to guard their assets and exchanges, as well as adequate remedies in place to provide resolution in the case of breaches in trust, privacy, or security.

Trust, privacy, and security form the bedrock of a successful digital ecosystem. By prioritizing trustworthiness, protecting privacy, and bolstering security measures, stakeholders can instill confidence in users, fostering a thriving digital environment that benefits everyone.

People-centred Development:

As a complement to the inclusion principle, there must be a focus on ensuring that digital services are designed to facilitate people from all walks of society to access services according to their choices in language and engagement channels, and their levels of literacy or disability.

People-centered development is a fundamental aspect of leveraging digital technologies. It emphasizes the importance of designing digital services that are inclusive and accessible to individuals from diverse backgrounds. By prioritizing user-centric design, societies can ensure that digital services are accessible to everyone, regardless of their unique needs and circumstances.

Collaborative Regulation:

The digital economy by definition reaches beyond ICT to encapsulate other sectors, some of which have regulatory supervision including financial services, health services and other areas. To enable coherent cross-sector supervision, regulation needs to be collaborative as various sectors undergo digitalisation.

By fostering collaboration among different sectors, regulatory authorities can ensure a comprehensive approach that addresses the challenges and opportunities arising from digital transformation, facilitating the development of policies that promote innovation, consumer protection, and overall societal well-being.

Sustainability:

Considering social, environmental and economic impacts, the digital economy must meet the present needs of citizens without compromising the ability of future generations to meet their own needs.

Sustainability in a digital economy refers to the notion of creating a balance between economic growth, environmental protection, and social well-being in the context of the increasing use of digital technologies across various industries [ix]. While there are sizable potential economic and social benefits to be gained in advancing the digital economy, there are also negative environmental impacts.

Given Ghana's current level of development, the focus on economic growth is likely to encounter certain environmental and social risks, requiring careful consideration in making trade-offs and mitigation strategies to maintain a healthy balance.

Therefore sustainability strategies in the context of Ghana's digital economy policy must recognise the need to integrate sustainable development principles into economic growth strategies, to mitigate adverse environmental and social impacts.

3.3 Imperatives for the Policy Framework

Policy imperatives since ICT4AD in 2003

The ICT4AD, 2003 policy set out a vision:

"*To transform Ghana into an information-rich knowledge-based society and economy through the development, deployment and exploitation of ICTs within the economy and society*".

Following the implementation of this policy realized through the promulgation of legislation, public programmes, private investments, and other initiatives over more than a decade, the 2017 Coordinated Programme of Economic and Social Development Policies framed the position of ICT in section 4.4.11 as follows:

"*The policy direction will focus on entrenching ICT, and especially data science, (including analytics), at the centre of the national development agenda*"'

The COVID-19 pandemic highlighted the need for digital capabilities to support social and national economic resilience, leading to the Ghana CARES programme which targeted digital technologies thus in Phase 2-D:

"*Expedite implementation of Government digital initiatives such as the National ID, digital address systems, land records digitisation, Ghana.Gov, etc. and consolidate them for synergistic improvements in economic productivity and service delivery*".

The evolution of ICT and the digital technologies at the heart of the country's economic programme as prioritised in these policy statements sets the scope for the policy framework.

Identifying foundational pillars of the policy framework

The World Bank 2019 Ghana Digital Economy Diagnostic Report[x] which is a part of the Digital Economy for Africa (DE4A) programme indicates 5 pillars of digital readiness covering:

- Digital Infrastructure
- Digital Platforms
- Digital Financial Services
- Digital Entrepreneurship
- Digital Skills

A review of developments in Ghana's digital economy supports aligning with a number of these pillars while identifying some as having gained progress or even matured and calling for a set of new or next-stage priorities.

Pillars of Digital Readiness:

To provide a bridge from capabilities to economic outcomes, the Pathways for Prosperity (P4P) Commission's Digital Economy Toolkit[xi] provides a framework for assessing opportunity in the digital economy. A mapping of the two frameworks shows how the capabilities in the World Bank DE4A pillars can enable outcomes framed in the P4P framework.

In general, they align closely, with the P4P model extending Policy and Regulation as well as Finances for implementing the policy.

Pathways for Prosperity Commission	World Bank
Infrastructure	• Digital Infrastructure • Digital Financial Services • Digital Platforms
People	• Digital Skills • Digital Entrepreneurship
Finances	• Digital Financial Services*
Policy / Regulation	

The ultimate composition of the pillars of focus in this policy is aligned with foundational national policies and relevant national objectives. **Thus, five digital economy pillars of the policy**:

- Universal Access and Connectivity
- Digital Skills and Research
- Digital Entrepreneurship and Innovation
- Digital Government
- Data and Emerging Technologies

3.4 Collaborative Regulatory Framework for the Digital Economy

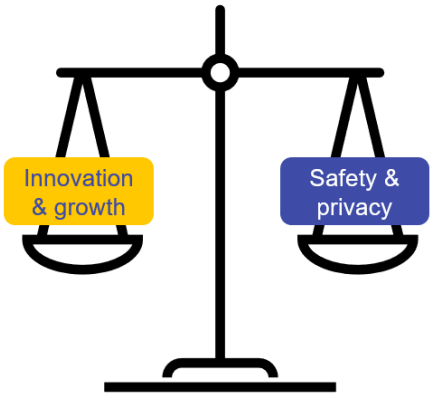
> *"If technological advancement became the cause of increasingly evident inequalities, it would not be true and real progress," he warned. "If mankind's so-called technological progress were to become an enemy of the common good, this would lead to an unfortunate regression to a form of barbarism dictated by the law of the strongest."* – Pope Francis, "The Common Good in the Digital Age Conference". Vatican, 2019.

The recommended strategies are towards a framework for effective regulation of the digital economy that achieves a cross-sector collaborative approach, that drives innovation and growth while preserving trust, privacy and safety in a fast-changing technology environment.

Consistent with the principles of this policy, the direction is for regulatory structures that encourage innovation while ensuring consumer protections, thus a framework with three key elements:

1. A risk-based approach
2. Fostering innovation and competition
3. Collaboration between stakeholders

The strategy thus is to seek a balance between "Innovation & Growth" on the one hand, with "Safety & Privacy" on the other.

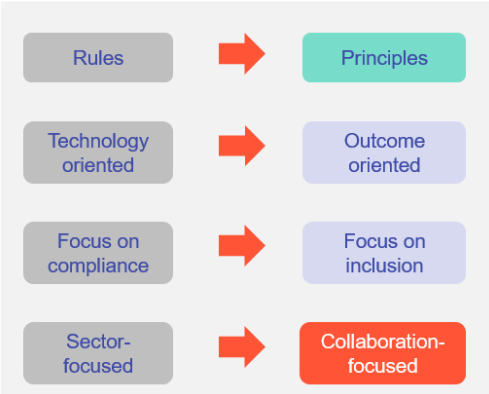


This regulatory model aims to be collaborative, flexible, responsive and adaptive, and must overcome traditional challenges such as uncertainty, fear and blind spots:

Regulatory uncertainty	"the result of outdated regulations unable to catch up with innovation" Ref: Dan Quan, Adjunct Scholar, Center for Monetary and Financial Alternatives, Cato Institute	Stifles investment
Regulatory fear	"caused by risk-averse regulators unwilling or unable to green-light novel products that may be perfectly compliant with regulations." Ref: Dan Quan...	Stifles innovation
Regulatory blind spots	Novel products/services delivered in contexts that fall in between or transcend single regulatory sectors	Fails safeguards and controls against adverse impacts

To achieve a regulatory framework for the digital economy that supports these outcomes, an evolution of existing norms is required.

Evolution in regulatory approach



3.4.1 Innovation & Growth

The following are recommended strategies for supporting and driving innovation and growth within regulatory limits for the digital economy:

Regulatory Sandbox	**Establish regulatory sandboxes that allow businesses to experiment** with new technologies and business models within a controlled environment where relevant regulators may also observe and learn what areas of consumer and other interests may require monitoring and safeguarding. An AI governance testing framework and toolkit should be introduced for compliance with ethical guidelines.
Agile Regulatory Approaches	**Adopt agile regulatory approaches that can adapt to the fast-paced nature** of the digital economy. Implement flexible and responsive regulatory frameworks that can accommodate emerging technologies and business models while still addressing potential risks and protecting the interests of consumers and stakeholders.
Proportionate Regulation	**Implement proportionate regulation that takes into account the size, nature, and risks** associated with different digital business models. Avoid burdening startups and small businesses with excessive regulatory requirements that could stifle innovation. Target regulation to specific risks or concerns, but where appropriate adopt a "monitor, wait and see" approach to innovation.
Regulatory Certainty & Predictability	**Provide regulatory certainty and predictability to foster investment and growth** in the digital economy. Clearly communicate regulatory requirements, guidelines, and expectations to businesses, allowing them to make informed decisions and allocate resources effectively.
Collaboration & Engagement	**Foster collaboration and engagement among regulators**, industry players, and other stakeholders. Establish channels for dialogue and consultation to better understand the needs and challenges of the digital economy. Encourage open discussions and partnerships to develop regulations that support innovation and growth while ensuring compliance with legal and ethical standards

A reference case for regulation that is sensitive to innovation and growth is the emergence of generative AI tools that enable people across different sectors to improve their productivity in areas such as instantaneous information analysis, task automation, language assistance, multi-lingual support, creative inspiration, learning/education and decision support.

While there are sensitivities such as the impact on the future of work, proportionate regulation would target specific risks while adopting a wait-and-see approach towards harnessing the benefits.

3.4.2 Safety & Privacy

The following are recommended strategies for ensuring that principles of safety and privacy are preserved through digital economy regulation:

Data Protection	Empower the Data Protection Commission (DPC) to protect individuals' data rights under Act 843, with compliance enforcement capabilities including expertise, technology tools, audit and investigative resources, public awareness campaigns, and continuous evaluation and improvement. DPC should collaborate closely with NITA for public institutions regulation and compliance.
Cybersecurity	Prioritize capacitation and enablement of the Cybersecurity Authority, and collaboration via the Joint Cybersecurity Committee in threat intelligence gathering mechanisms, incident response and recovery, public awareness campaigns, and enforcement of compliance with cybersecurity regulations and standards across public and private sector institutions.
Safety Standards	Define relevant safety standards to address sensitive areas including an AI regulatory framework that defines levels of risk to determine levels of controls. Prioritize industry participation to encourage adoption, establish certification programs and auditing mechanisms with compliance enforced via the CNDA for government digital services.
Ethical Considerations	In addition to strategies addressing data protection, safety standards, transparency and accountability, a particular focus on inclusion as a guiding principle of this policy requires that the specific needs of the marginalized, and the vulnerable are considered. This includes ensuring that data-driven solutions are fair, equitable and respectful of human dignity.
Transparency and accountability	Ensure use of personal data in algorithm-based decisions such as machine learning models be interpretable to provide transparency for the data subjects, consistent with DPA (Act 843) section 41. Adopt an algorithm transparency framework for public and regulated sectors aligned to the 5 principles of the UK Algorithm Transparency Framework.

A reference case for regulation would be the introduction of semi-autonomous or autonomous vehicles to public roads. Concerns applicable would include safety standards, ethical considerations such as the moral agency of machine-based decisions in the case of vehicular accidents resulting in injury to persons or damage to properties as well as transparency to review the decision basis of traffic incidents and outcomes.

3.4.3 Cross-Sector Collaboration

The need for collaborative regulation for the digital economy is based on the broad nature of the impact on society from digital transformation, across sectors and industries, in public and private spheres as well as on individual lifestyles and livelihoods. Advances in technologies such as large language models (LLM) in machine learning and related generative AI lead to general and broad applications that cut across sectors. These technologies exceed the scope and impact of previous generation convergent technologies and thus require a regulatory response with multi-sectoral coordination.

The goal is to attain a regulatory model based on the ITU stipulated Generation 5 ("G5") level of regulation in which cross-sector regulatory collaboration is considered the watermark[xii].

Digital Economy regulation in Ghana in 2022 could be characterized as between Generation 3 and 4 per the ITU model as depicted below:

Specification	Generation 3	Ghana ICT Reg - 2022	Generation 4
Regulatory authority	Separate agency, autonomous in decision making	NCA, NITA, DPC, CSA	Separate agency, with enforcement power
Regulatory mandate	Advanced liberalization of ICT sector	Telecoms liberalized; Fintech regulation defined	Adjacent issues become core mandate
Regulatory regime	Doing the right things	Evolving regulatory response to emerging tech and biz models	Doing the right things
Competition framework	Partial competition	SMP regulation in telecoms, competition bill development	Full competition

To attain Generation 5 ICT regulation, Ghana would need to evolve in the following direction:

Specification	Generation 5	Ghana Digital Economy Regulation – Evolution to Generation 5
Regulatory authority	Separate agency as part of network of partner regulators	*Coordinating agency* + sector regulators: telecoms, financial svcs, health, security,…
Regulatory mandate	**Active collaboration across the board**	Legal statute for cross-sector regulatory collaboration
Regulatory regime	Doing things together	Cross-sector policy coherence and consistency, cross-border cooperation
Competition framework	Intra-modal competition	Addresses inter & intra-modal competition for healthy competition & consumer welfare
	G5 focuses on regulation of advanced and converging digital technologies	* NITA as an existing agency is a candidate for the apex digital economy coordinating regulator

3.4.4 Steps to Achieve Collaborative Regulation

To evolve the regulation of ICTs and ultimately the digital economy in Ghana, several best practices are recommended that include regulatory independence and accountability, transparency and predictability, expertise, proactivity and future orientation[xiii].

To achieve these, several steps must be undertaken including:

i. Multi-stakeholder engagement: fostering a collaborative approach including government agencies, regulatory bodies, industry, academia, civil society, consumer groups and technical experts to reflect on challenges in the current sectoral regulatory regimes and to define desired outcomes for the future regulation of the digital economy

ii. Policy coherence and alignment: identify the various policies and regulatory frameworks that intersect with or are impacted by the digital economy. Define a coordinating framework to facilitate coordination and collaboration among relevant government agencies including but not limited to those with oversight of telecommunications, broadcasting, data protection, cybersecurity, competition and trade to ensure consistent and complementary policies and regulations. Where necessary, legislation should be introduced to support the collaboration framework.

iii. Information sharing and best practice exchange: setup mechanisms for sharing information, best practices, and lessons learned among regulatory bodies, industries stakeholders and other relevant actors with knowledge-sharing platforms and other channels of engagement.

iv. International cooperation and partnerships: regulatory harmonization with regional digital economy protocols and standards such as the AU Data Policy Framework as well as cooperation with regional and international bodies in areas most sensitive to cross-border engagement including cybersecurity and data governance.

v. Data sharing and interoperability: ensure data sharing and interoperability standards among different stakeholders, particularly regulators and government agencies with oversight of sectors impacted by the digital economy, to facilitate collaboration and innovation.

3.4.5 Institutional Arrangements to Support Collaborative Regulation

Achieving a G5 regulatory structure requires institutional reform and rearrangements that will support the delivery of the goals. The following structures are recommended towards this end:

i. Multi-stakeholder governance bodies: these bring together representatives from government agencies, regulatory bodies, industry and other relevant stakeholder groups to create a platform for dialogue, decision-making and coordination to ensure a collaborative approach to regulation. An example of this is the Joint Cybersecurity Committee established under section 13 of the Cybersecurity Act, 2020 (Act 1038).

ii. Collaborative policy development committees: these are working groups with multi-stakeholder representation to facilitate the collaborative development of policies and regulatory frameworks based on research and analysis to formulate evidence-based and consensus-driven policies for the evolving needs of the digital economy.

   The work of these committees should lead to collaboration agreements and memoranda of understanding among regulatory bodies, government agencies and other relevant stakeholders in areas including data sharing and capacity building to enhance collaborative regulation across common challenges.

iii. Regional / International collaboration platforms: to foster alignment with regional bodies such as ECOWAS and the AU on cross-border issues in digital economy regulation, as well as the exchange of best practices, sharing of experience and harmonizing regulatory approaches.

3.5 Policy Pillars

3.5.1 Pillar 1: Universal Access and Connectivity

Context: Universal digital access is a prerequisite for leveraging the digital economy

Closing the digital divide is a priority to unlock digital economic opportunities. This is reliant on well-developed infrastructure including electricity, backbone and last mile connectivity, data centres and cloud platforms.

Affordable internet connections and access to devices are critical requirements for individuals and businesses to access digital services. Major portions of the population will be excluded from income-generating opportunities if the infrastructure is available but not affordable to them.

Extensive reliable electricity access is foundational for a digital economy

Initiatives to improve the quality of electricity in Ghana have aggressively expanded installed generation capacity, rising to almost twice the peak electricity demand, though power interruptions continue to be more frequent than desired[xiv].

Backbone Connectivity

Ghana needs to further enhance and consolidate its national backbone infrastructure

While there have been significant investments in national backbone infrastructure from both private and public sector organisations, there are gaps in the efficiency of utilization due to missing links. There is also a need for guidelines on infrastructure sharing to improve the pooling of network capacity from various sources[xv].

The presence of high-quality submarine cables supports broadband in Ghana. There are five submarine cable landings in the country providing over 340 Gbps in available capacity (Source: NCA). Private companies continue to make significant investments in terrestrial backbone and last-mile infrastructure.

Policy recommendation	Support investments in the national backbone to bridge missing links in existing infrastructure towards more efficient utilization. Provide regulatory guidelines for consolidation and sharing network infrastructure.

Last Mile Connectivity

Ghana has made extensive progress in mobile network coverage and internet access

Ghana has achieved a strong position in global rankings and is among the best in Africa for international bandwidth per internet user[xvi], enabling technology adoption by firms and individuals.

Extensive coverage of mobile networks is an important means of connectivity, particularly for individuals and micro-entrepreneurs. Mobile data penetration was at 74.99% in June of 2022 which includes a mix of 2G, 3G and 4G connections, with 5G services to be licensed soon [xvii]. During the COVID-19 pandemic in 2020, the government regulator released additional spectrum to mobile carriers to support increasing demands, addressing what is reported as the "biggest inhibiting factor" to delivering high-quality mobile data services according to the A4AI and GSMA[xviii].

Initiatives such as the Rural Star Programme have been undertaken to increase communication coverage from 83 percent to 95 percent [xix]. Universal access fund (1% of telecommunication revenues) goes to GIFEC for rural connectivity and last-mile solutions.

Policy recommendation	Define minimum threshold speeds for broadband services in line with international standards, to support the growth of the digital economy while maintaining a technology-neutral approach to last-mile infrastructure to increase penetration and affordability, especially for rural communities.

Device Affordability

A significant gap exists between urban and rural areas in device affordability

The cost of hardware and devices must be accessible to Ghanaians across income groups and gender. **Significant gaps exist between rural and urban mobile phone ownership**. **A lack of affordability is the key reason for not owning a mobile phone** [xx].

Analysis performed in 2015 by Deloitte and the GSMA suggest that Ghana could make significant gains in key economic indicators over the mid to long term through the removal of 20% customs duties on mobile handsets, including an increase in GDP, in tax revenues and jobs[xxi].

Policy options	Improve affordability of devices by enabling conditions favorable to device credit financing, as well as seeking import duty waivers on devices distributed to certain targets including for educational, medical, and rural applications, in the absence of globally comparable locally manufactured data-enabled devices.
	Create conditions to support the local manufacture or assembly of globally comparable data-enabled devices with support for credit financing and at costs considered affordable by rural and less-advantaged communities.

Data Access Affordability

Broadband data should be affordable across income groups

Improved international connectivity has resulted in relatively cheaper retail prices for end-users. Data in Ghana is much more affordable than in its regional peers. Ghana has endorsed the A4AI target of "1 for 2"— defined as 1 GB of data for no more than 2% of national monthly income[xxii]. For lower-income groups and rural communities, continued expansion of broadband data services by initiatives such as through GIFEC may improve affordability. The 2012 National Broadband Policy includes a target to ensure last-mile connectivity to communities and homes by 2020.

Policy recommendation	Ensure no one is left behind by designating certain digital public services to be data-free, including but not limited to services requiring a national ID to access and especially public platforms delivering education, health, and agricultural services, financed through means such as the Universal Access Fund.

Regulatory and Licensing

Infrastructure licensing regime not harmonized with important tenets in telecommunications policy

A review of the processes and costs for acquiring and operating communications licenses could provide opportunities for investment, growth, and improved access. According to the GSMA in a 2019 report, technology-neutral spectrum licenses which enable frequency bands to be used simultaneously for several technologies allow the phasing in of new technologies to meet increasing mobile broadband demand without prejudice to legacy users [xxiii].

The National Telecommunications Policy (2005) appears to support technology-neutral standards "…allowing licensed operators to deploy any combination of technologies that they choose to serve their customers…".

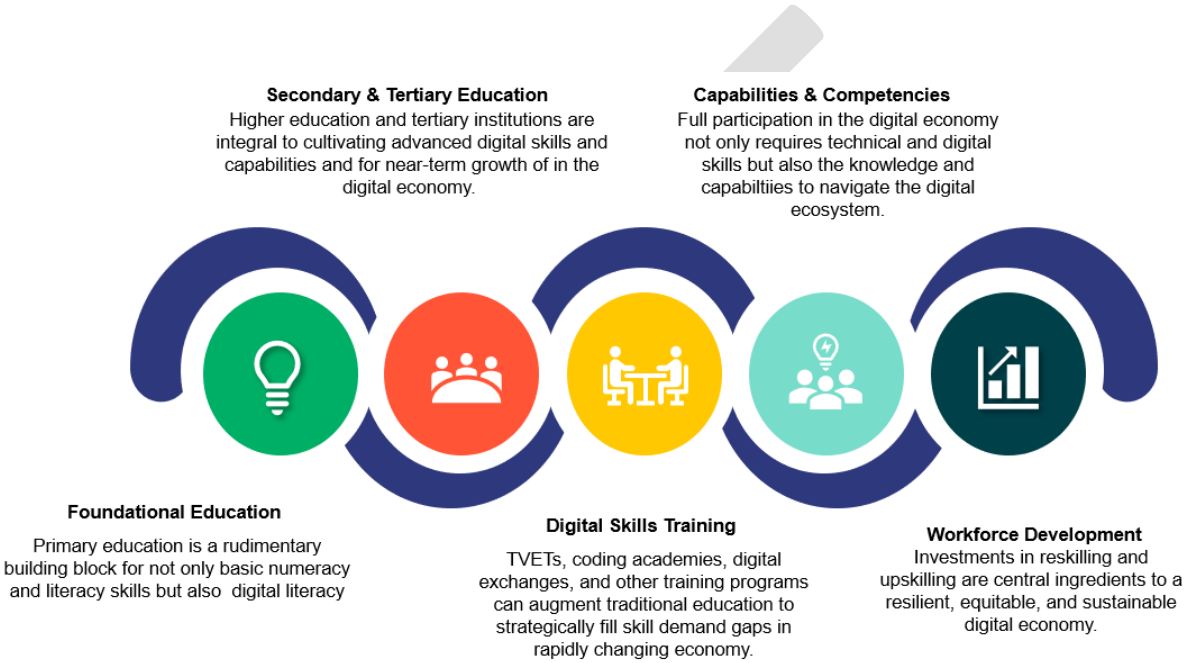
Policy recommendation	Set relevant conditions including revenue considerations to transition to technology-neutral spectrum licensing (including for existing allocations) to enable opportunities to boost capacity with new technologies over the existing spectrum.

3.5.2 Pillar 2: Digital Skills & Research

Context: Human capital is central to inclusive and sustainable economic growth

To successfully cultivate a skilled 21st-century workforce, national education curriculums must integrate 21st-century skills, including digital skills, critical thinking, leadership, problem-solving and entrepreneurship[xxiv].

Nearly 50% of subject knowledge acquired during the first year of a four-year technical degree will be outdated by the time students graduate[xxv]. And about 65% of children entering primary school today will end up working in a job that doesn't exist[xxvi].



Foundational Education

Country	Literacy Rates (age 15-24)	Literacy: Gender Parity Index
Egypt	88%	0.97
Ghana	92%	0.99
Morocco	98%	0.99
Mauritius	98%	1.01
Nigeria	75%	0.84
South Africa	98%	1.01
Kenya	88%	1.01

Higher & Tertiary Education

Country	Grads in science and engineering (tertiary)	Global Ranking
Egypt	11.2%	105
Ghana	16.4%	92
Nigeria	16.5%	91
Mauritius	18.3%	84
Morocco	19%	79
South Africa	23.3%	51
Kenya	N/A	N/A

Source: World Bank, UNESCO; Global Innovation Index 2021

Digital Literacy

Improving digital skills is fundamental for a robust digital economy

Ghana falls in the middle of its regional peers on global digital skills readiness rankings. Between 2017-2019, Ghana improved its global ranking from 75th to 69th, one of three countries amongst regional peers to improve ranking.

Ghana leads its regional peers in digital skills readiness amongst secondary and university graduates. With a global ranking of #50, the country's higher education institutions are producing above-average levels of digital skills talent.[xxvii]

A shift is required for education systems to align with current and future digital skills

Requirements for digital skills over the next 10 years are expected to increase in Ghana's three largest economic sectors, in both the formal and informal spheres. Digital skills are expected to be a prerequisite for 50% of all jobs in Ghana and 75-80% of formal sector jobs by 2030[xxviii].

An undersupply of digital skills can pose challenges for foreign direct investment and attracting and cultivating large firms as well as undermine Ghana's ambition to be a regional digital hub.

Ghana will need to supply digital skills training for nearly 19 million people through 2030. This includes 5 million new people and four million who will require additional digital skills training (repeated every 4-5 years).

Skills affordability poses a challenge with an estimated 15% of Ghanaian households able to afford intermediate and advanced digital skills by 2030 [xxix].

Policy recommendation	Prioritise digital literacy, digital pedagogy, and instruction with ICT in secondary and tertiary institutions, with the support of EdTech platforms, addressing the capacity and affordability gaps with targeted scholarship programs, while aligning with industry on curriculum to improve preparedness for the job market.

Advanced Capabilities

Critical capabilities, knowledge and competencies are required for digital transformation

Intermediate and advanced digital skills are highly sought after by both the private and public sectors in Ghana. On advanced digital skills, cultivating greater numbers of software developers, coders, cybersecurity professionals, data scientists, machine learning engineers and project managers is essential to Ghana's progress towards establishing a successful and inclusive digital economy[xxx].

Demand for advanced digital skills far outpaces the availability of those skills in the market. Students with advanced skills often relocate to developed countries to pursue higher education and employment, affecting local markets in Ghana[xxxi].

Data competencies are central to a healthy digital economy. Beyond the statistical and analysis skills, this addresses data science broadly and various related capabilities, including the ability to read, work and develop analysis with big data[xxxii].

The government has a key role to play in building and strengthening collaboration between stakeholders across the public and private sectors to address skills in emerging technologies like artificial intelligence. Public-private partnership models for job readiness in the field of AI and cutting-edge technologies can be enhanced by offering industry-oriented curricula, training, internships, and project opportunities across technical/vocational education systems [xxxiii].

Building foundational competencies in intellectual property rights (IPRs) is essential for unlocking private sector growth and entrepreneurship and safeguarding ideas and innovations[xxxiv].

Policy recommendations	Prioritise the use of data-driven technologies such as AI in public digital services to drive demand for skills and applications based on minimum user experience requirements, including local language interfaces with NLP.
	Incentivise educational and private sector partnership models for job readiness in advanced digital skills, delivering industry-oriented curricula across secondary, tertiary and TVET systems.

Research & Development

Ghana has in place many of the individual components necessary for knowledge capital creation

The capacity of the overall R&D system in Ghana is limited in comparison to middle-income countries. This is a result of several factors, including[xxxv]:

- policies and institutions that are not aligned with the country's economic growth and human development goals
- weak links between and among institutions in higher education and research and the private sector; and
- a lack of incentives and mechanisms that encourage communication and collaboration among organisations that can benefit from joint endeavours

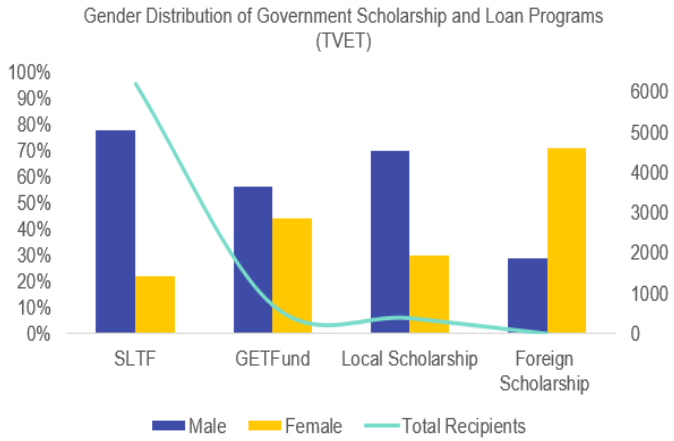
Policy recommendations	Encourage collaboration between companies focused on emerging technologies such as AI and research institutions through sponsorship of joint research projects targeted on national priorities.
	Support the establishment and incorporation of technology centres of excellence focused on data, AI, and other emerging technologies across existing academic institutions and in digital incubation hubs.

Inclusion in ICT

The gender gap in ICT and STEM education undermines goals for an all-inclusive digital economy

Increased effort is required to bridge the gender gap in STEM. In Ghana, only 14% of all students attending university are women, and less than 20% of students graduating from STEM-related academic disciplines are women. On average globally, about 30% of all university students are women.[xxxvi]

Despite a rise in the overall number of women beneficiaries of the SLTC, only 16.89% were female, and about 41% of all GET Fund recipients were women. Local and foreign scholarships have also seen a rise in the total number of women recipients; however, the overall proportion is well below gender parity.[xxxvii]



Source: Scholarship Secretariat; Ministry of Education (2021)

More needs to be done to improve the inclusion of vulnerable groups in education. The affordability of TVET programs poses challenges to equity and inclusion. In addition, the distribution of accredited TVET institutions across Ghana's regions is uneven, excluding vulnerable populations. Of 183 accredited TVET providers in the country, 38.6% are in Greater Accra.[xxxviii]

Policy recommendations	Prioritise actions to close the gender gap in ICT and STEM education based on the results from a comprehensive study to identify underlying causes.
	Incentivise industry and private training and educational institutions to meet set targets on closing the gap for gender and vulnerable groups in digital skills qualifications and related job placements.

Workforce Development

Constant reskilling and upskilling are required for workforce enablement in the digital economy

Technological advancement will require more complex skills and retraining of the workforce. The average employee in Ghana will need to reskill or upskill every 4-5 years to keep pace with the rate of technology.[xxxix] The drive towards efficiency and transparency in public service delivery involving automation and AI technologies will also replace some routine tasks and job functions.

Reskilling: As technology transforms Ghana's economy and spurs the growth and decline of economic sectors, government investments in reskilling will help increase human capital and drive inclusive and equitable growth.[xl]

Upskilling: Relying on educational institutions for training the next generation of workers is not sufficient. Private sector employers and training institutes are central figures in the digital skills ecosystem.[xli]

Many private sector organisations and the non-profit sector have undertaken training programmes to contribute to and improve the labour force in Ghana, particularly among young people. The key focus of youth employment initiatives in Ghana is skills development and training, entrepreneurial training, apprenticeship, employment services, and direct employment.[xlii]

Policy recommendation	Maintain a people-centred approach through embedding reskilling and upskilling programmes in public institutions and major employment sectors of the economy to ensure the workforce remains relevant and competitive in a fast-changing technology-enabled environment.

3.5.3 Pillar 3: Digital Government

Context: Digital government can enable and enhance public service delivery

Digital government represents a fundamental shift in the way in which governments operate and goes beyond having online services and investing in new technologies. The nature of a digital government is digital by design – driven by the needs of users and utilizing data for the betterment of citizens.

Change Management

Technology can enable transformation in organisational culture, processes, and delivery performance

Effective digital transformation requires changes to processes, IT systems, staffing, and budgeting [xliii]. **At present, Ghana does not have an inter-ministerial digital governance framework with a clear definition of the roles and responsibilities of each institution**, particularly with regards to MoCD and NITA[xliv].
A clearer mandate for policy coordination and implementation responsibility, with improved institutional operational capacity would lead to outcomes aligned to change management.

Policy recommendations	Centralize the coordination of digital initiatives across government, supported by institutional arrangements, collaboration frameworks, standards, and platforms, with a clear definition of roles and responsibilities in implementing the digital transformation agenda.
	Empower NITA to lead the coordination of digital initiatives with a centre-of-government approach and enhanced operational capacity to build trust in the delivery and management of digital shared services.

Digital Service Delivery

The digital transformation agenda is experienced by citizens through efficient service delivery

The growing desire to achieve greater efficiency, transparency, and accountability has driven Ghana's continued investment in public sector digital platforms.

The uptake of e-services remains low, partly because of limited trust in and awareness of services. The lack of awareness of digital services and the challenge of overcoming it is most acute in rural regions [xlv].

The establishment of the Cyber Security Authority (CSA) provides an opportunity to improve citizen trust in e-services, while other efforts may be required to address awareness.

Policy recommendations	Support the Cyber Security Authority in its mandate to promote the development of cybersecurity in the country to ensure a secure and resilient digital ecosystem.
	Encourage automation of processes through public digital platforms as a vehicle to improve efficiency and transparency in service delivery.

Citizen-Centric Design

Digital government platforms should be designed to be inclusive and responsive to user needs

Much of Ghana's existing digital services are supply-driven, with insufficient attention paid to user experience or resident input and priority needs[xlvi]. Failure to adopt a human-centred approach to digital government will hinder the adoption and use of digital services and undermine trust.

Ghana's existing digital public services do not accommodate different access needs of citizens, including marginalized groups and people with disabilities[xlvii]. Investments in connectivity, digital literacy, and digital accessibility leverage technologies like AI natural language processing (NLP) are essential to address this challenge.

Ghana lacks a common framework or government-as-a-platform approach to guide the expansion of digital service delivery platforms consistently and homogeneously[xlviii]. The proposed Common National Digital Architecture (CNDA) would help facilitate greater collaboration and sharing amongst the public and private sectors, increasing transparency and trust, and enabling more responsive, user-centric digital public service platforms.

Policy recommendations	Enforce Electronic Transactions Act, 2008 (Act 772) Section 1(e) which stipulates that electronic transaction services should be "*responsive to the needs of consumers*" and Section 1(f) which states that "*the special needs of vulnerable groups and communities and persons with disabilities are duly taken into account*"
	Adopt a standardized user-centric delivery framework for digital public services with strict standards that all new digital government services must adhere to, enabled, and enforced through the implementation of the CNDA.

Public Sector Skills and Capacity

Public sector upskilling and reskilling are essential for digital transformation

The public sector skills and capacity gap hinders the adoption of digital tools and systems and limits the opportunity to leverage data-enabling technologies (e.g., big data analysis, machine learning, AI) and software licensing agreements (e.g., open source) in public service planning, emergency response, and service delivery[xlix].

The government has insufficient in-house technical capacity and skills and is over-reliant on contractors for the requirements definition, design, development, maintenance, and upgrades to digital systems[l].

The government faces acute challenges in attracting the right talent and competing with the private sector to retain that talent, which is perpetuating the digital skills demand gap in the public sector[li].

Policy recommendations	Prioritise developing technical skills which are core to the delivery of public sector digital services such as project management, IT audit, cybersecurity, data protection and standards setting, to enable effective supervision and oversight of projects implemented by or outsourced to commercial vendors.
	Create incentives and structures for technology talent within the country and in the Ghanaian diaspora to transition to public sector digital transformation jobs and opportunities, including through remote work platforms.

Interoperability

Whole-of-government interoperability is critical for digital transformation

System interoperability is yet to be fully adopted across the public sector. Without shared standards and frameworks, the country's MDAs cannot quickly respond to changing business needs, cybersecurity incidents, non-transactional e-services, and inefficient overall service delivery [lii].

The GIDTB recommends the implementation of a CNDA to address the interoperability gaps and "facilitate secure and efficient data sharing across public and private sector services and entities" [liii].

Government enterprise architecture (GGEA) and interoperability framework (eGIF) are designed to drive principles of shared infrastructure services, service-oriented and event-driven architecture. **However, the framework is yet to be universally adopted and implemented across MDAs** [liv].

Digital IDs simplify interoperability across private and public services

A digital ID provides the credentials necessary to show that a person is who he or she claims to be online. They provide the ability to simplify interactions between individuals, governments, and businesses by building trust and seamless interactions.[lv]

While the National ID in Ghana has digital components, its reimagination and extension to enable a digital ID are not stipulated in the current law and regulations.

Policy recommendations	Formalize the adoption of CNDA / e-GIF to provide the building blocks for coherence, innovation, transparency, efficiency, and interoperability of public and designated private sector digital platforms and services.
	Establish a digital ID based on the national biometric ID for a single sign-on service across public digital services embedded in the implementation of the CNDA with the E-GIF, ensuring seamless and secure access to digital services and applications.

Cloud Infrastructure

Cloud technologies provide more accessible, secure, and cost-effective public services

Cloud computing can offer more efficiency, scalability, processing power and flexible real-time service to employees, customers, and citizens. [lvi]

MDAs and private companies use the public cloud for certain services, which provides significant opportunities to scale products and services.

However, locating government data and services in the cloud raises the question of readiness to handle issues that are inherent in the technology, including data sovereignty, security, availability, and the scope of control that might be exercised by the owners of the cloud platform and related connectivity.[lvii]

Policy recommendation	Adopt cloud standards that are aligned to the Cyber Security Act, Data Protection Act and a National Data Governance Framework which defines data and online service sovereignty stipulations.

3.5.4 Pillar 4: Digital Entrepreneurship

Context: A thriving entrepreneurship ecosystem can generate jobs, drive economic growth

Technological innovation and the digitalisation of the economy across public and private sectors in Ghana provide a unique opportunity for start-ups and SMEs to unlock access to markets, improve operational efficiencies and deliver new technologies that address national challenges.

Incubation Hubs

Ghana has recorded significant growth and development of entrepreneurship hubs

An Incubation Hub is a collaborative and entrepreneurial facility that supports the development of ideas from basic concepts, into viable business ventures. **According to Ghana Tech Lab (GTL), there are approximately 145 innovation and tech hubs across Ghana as of 2021.**

Entrepreneur Support Organisations (ESOs) and a handful of government entities such as GEA and NEIP provide targeted support.

Strengths and weaknesses of ESOs in Ghana	
Access	There is access regardless of the industry
Support	ESOs are unable to adequately support businesses past the start-up stage through to growth and maturity
Rural/Urban Divide	ESOs are primarily relegated to urban centres. Insufficient efforts to broaden beyond urban centres
Facilities Access to Capital	The ecosystem facilitates access to capital with ecosystem participants more likely to access funding than non-participants
Mentorship	ESOs are highly valued as mentors to startups

Policy recommendations	Support alignment of digital technology incubation hubs with industry and academia to drive focus and capacity building in relevant problem areas with opportunity for economic scale.
	Support incubation hub development in rural areas to address the rural-urban divide and encourage the development of innovations that are relevant to rural settings.

Access to Capital

Start-ups face a gap in early-stage risk capital funding

Some of the most valuable (by market capitalization) firms in the world were nurtured through a system of venture capital at multiple stages from concept through global expansion. [lviii] While the practice represents a healthy [risk] appetite for innovation, it is also backed by an organised capital allocation structure and opportunity pipeline development across various sectors.

The government has tried to stimulate venture capital funding through the Venture Capital Trust Fund (VCTF), however important challenges persist. **There are lower levels of asset ownership for** women which leads to a lack of access constraining their ability to obtain finance.

Demand-Side Constraints	Supply-Side Constraints
• The risk involved in investing in start-ups • Challenges in collaboration between organisations such as JVs and M&As. • Previous failures have discouraged the institutions from investing or offering credit to start-ups/entrepreneurs • Poor managerial skills • Low capacity of start-ups in managing funds provided There are market impediments specific to private equity/venture capital in Ghana: • Valuations challenged by lack of preparedness for financial and legal due diligence • Investors' exit opportunities are limited via typical routes such as acquisition or IPO. • Domestic institutional investors are not comfortable with the PE/VC asset class in general. • Pension funds and insurance companies are limited by regulatory guidelines on investing in the asset class. [lix]	• The structure of most local financial institutions does not allow them to invest in entrepreneurs • Liquidity issues on the part of banks • Lack of adequate credit information and high-interest rates are barriers to accessing credit for SMEs. According to the 2019 World Bank Doing Business Rankings, only 22.4% of Ghanaian adults are covered by a credit reference bureau.

Policy recommendations	Target a specific allocation with institutions such as the Venture Capital Trust Funds to support early-stage digital innovations in incubators and entrepreneurial support programmes that are aligned with national priorities.
	Provide incentives to private equity financing programmes that support digital economy projects owned or co-owned by women.

Scaling Local Technology Ecosystem

Improving access to markets will help scale the local technology ecosystem

Unlocking market access for the local tech ecosystem will enhance the development of innovative, relevant technology-enabled products and services, which in turn will build the capabilities required to position Ghana as a regional digital hub.

There is an opportunity to position the government as a strategic digital purchaser and thereby incentivise local digital entrepreneurship investment. Countries such as South Africa and Zambia have utilized their digital policies to use the public sector to drive investment.

Policy recommendations	Designate restricted sectors for government digital services that may be supplied only by national and locally run establishments.
	Provide incentives to major sectors and industry to source digital services, solutions and components that are developed by local firms.
	Encourage modular designing and breaking up of digital government service tenders to increase access for local firms in scaling up and building their capacity and structures to become more attractive to sources of capital.
	Prioritise joint ventures among digital firms for selection in tenders for digital government services.

Innovation Culture

A culture of innovation is fostered by supporting new approaches to challenging areas

Relentless innovation, especially in emerging 4IR technologies including cloud computing, artificial intelligence, blockchain, the internet of things, 3D printing, digital sequencing, nanotechnology and sensors among others, are driving change at a staggering pace.

Innovation challenges may inspire new solutions to address national challenges in health care, education, agriculture, and other sectors. Successful innovations that can scale may be adopted by sectors with an interest in the related outcomes to drive economic and social transformation.

Policy recommendations	Establish a government digital marketplace that enables local technology companies to develop and showcase innovative products and services that meet the needs of the public sector.
	Create incentives for collaboration among academic institutions, private sector organisations and government bodies to develop innovative digital solutions to address major public challenges and opportunities.

3.5.5 Pillar 5: Data and Emerging Technologies

Context: Harnessing the data economy for efficiencies and transformational outcomes

Data-related technologies are rapidly changing the world in unpredictable ways, and in recent years have become increasingly important growth drivers across a wide swathe of sectors.

Ghana has a unique opportunity to leverage data, analytics, and emerging digital technologies to enhance decision-making, boost productivity through the automation of routine tasks, improve access to finance, optimize service delivery, revenue collection and various beneficial uses in both private and public sectors of the economy.

Data Governance

A governance framework enables maximizing the benefits of a data-driven economy

Recognising data as an asset requires the governance of principles such as integrity, availability, accuracy, security, and confidentiality over the lifecycle management of data from creation to disposal.

Data is generated from multiple sources including individuals, organisations, and devices (internet-of-things) and across various sectors and technologies, requiring standard protocols for advancing different value propositions based on data harmonization.

Ghana's draft National Data Sharing Policy (2019) espouses general governance standards and principles for the use of data within public and private spheres of society and the economy.

The African Union Data Policy Framework (2022) sets out a common vision, principles, strategic priorities, and recommendations towards free and secure data flows across the continent to pave the way to the achievement of the Digital Single Market[lx]. Alignment with this framework will strengthen Ghana's efforts to be a regional digital hub.

To realize the value of data as an asset, the **government needs to strike a balance between effective data exchange that feeds innovation while addressing the need for security and privacy for different groups across a range of different contexts** [lxi].

Policy recommendation	Develop a National Data Governance Framework based on the principle of data-as-an-asset, aligned to tenets of the draft National Data Sharing Policy (2019) and the AU Data Policy Framework, and conformity with the Data Protection Act, 2012 (Act 843).

Data classification

Classification is an important consideration in storing, processing, sharing, and securing data

Different types of data generated have varying sensitivity levels, and classification helps determine what amount of safeguarding and security controls are necessary for various datasets. It also determines various categories of data, the levels of encryption and the types of storage required.

Policy recommendations	Implement a whole-of-government data classification system based on the National Data Governance Framework, and in alignment with the E- GIF, the Ghana Statistical Services Act, 2019 (Act 1003) and the Right to Information Act, 2019 (Act 989).
	Provide a platform to facilitate standards and oversight of government and private organisations across various sectors including healthcare, involved in the generation and processing of data that falls under the data classification system, through a duly mandated institution such as NITA.

Open Data

Open data enhances transparency and engagement between citizens and the government

In 2012, NITA launched the Ghana Open Data Initiative (GODI), the country's first open data initiative. GODI has struggled to deliver on its aims leading to legacy data sets that have not been updated persisting at the reference website data.gov.gh for several years due to resource challenges within Ghana's open data ecosystem.

Policy recommendation	Establish and provide capacity and support for government-wide open data standards under the National Data Governance Framework, aligned with the GSS, the PRAAD and other data-oriented institutions.

Data Sharing

Public-private initiatives have promoted big data generation, sharing and reuse

Large amounts of data are being generated daily from increasingly digitised processes.

The GIDTB recommends the implementation of a Common National Digital Architecture (CNDA) to address the interoperability gaps and "**facilitate secure and efficient data sharing across public and private sector services and entities**." This would provide building blocks for coherence, innovation, transparency, efficiency, and interoperability of digital platforms to enable public and private sector digital services.

Efficient and value-based data sharing requires classification standards, quality standards and other features to enable interoperability while preserving security.

Policy recommendation	Implement a data-sharing regime, with support for data exchanges or marketplaces, that leverages the CNDA to maintain and provide assurance of compliance with data governance principles.

Emerging Technologies & Regulation

Regulation should balance the risks of emerging technologies with creating an enabling environment

Support for emerging technologies in Ghana's digital economy should address the need for innovation to bridge the development gap and the digital divide. Data-driven technologies such as AI and machine learning should be harnessed to improve decision-making, drive productivity and other benefits.

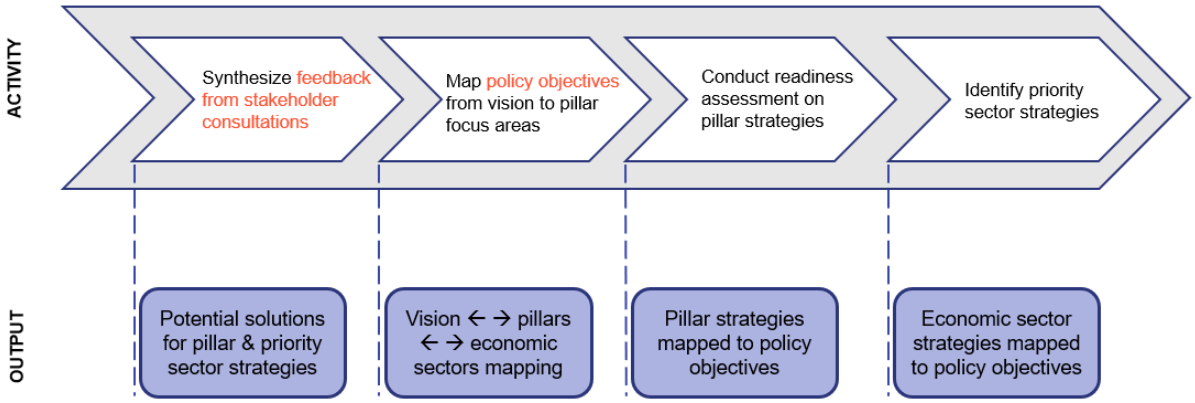
An externality of the evolution of the digital economy is the emergence and growth of local e-commerce activity on non-resident commercial digital platforms leading to a growing gap in the visibility of economic activity to regulators and authorities in the national jurisdiction.

While an orientation for "soft" regulation is necessary to encourage adoption and innovation with emerging technologies for beneficial economic outcomes, known and unknown risks require policy and institutional arrangements that are sensitive to and can evolve in response to the impacts of emerging technologies.

Policy recommendation	Create structures and arrangements to ensure full visibility of economic activity in the digital economy that falls under regulation to close the gap in regulatory oversight and consequent impacts like the potential loss of tax revenue.

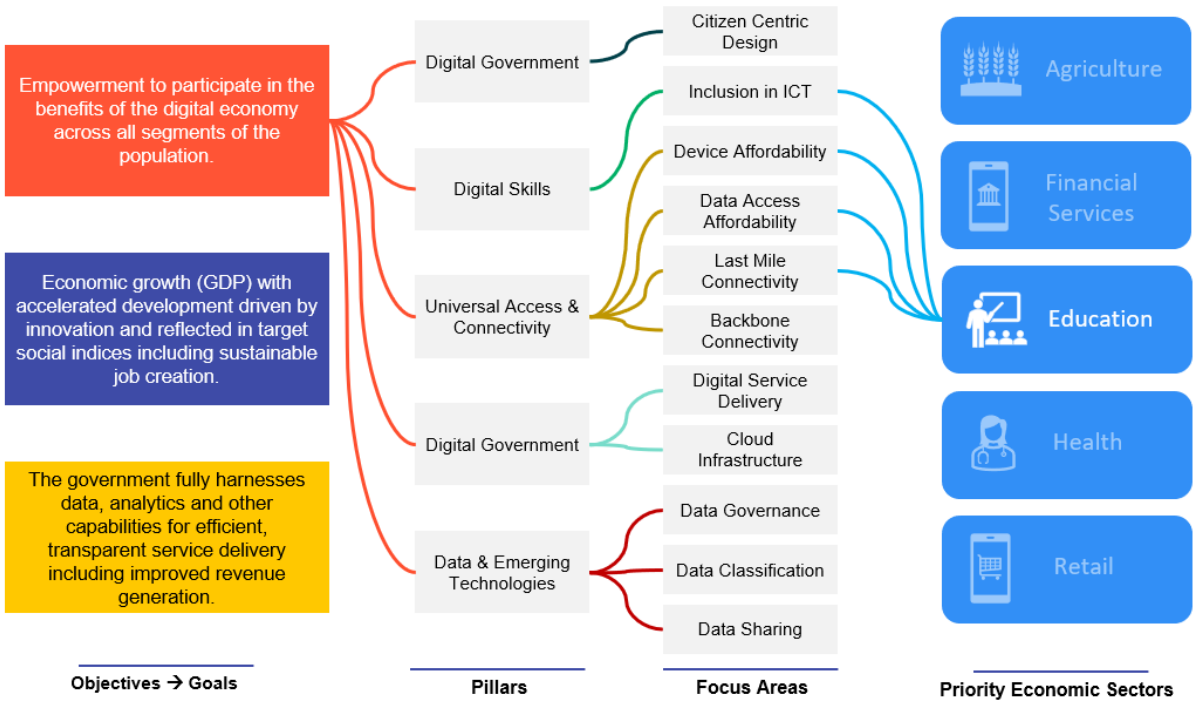
4 Strategies to Achieve the Policy Objectives

The development of strategies followed a rigorous process depicted below, which included identifying goals and targets from existing policies related to the pillars and priority economic sectors. Well-referenced strategy frameworks including the *Pathway for Prosperity Commissions Digital Economy Kit* were leveraged for best practices in framing national digital economy strategies.



The interconnected policy objectives are realised by strategies for developing the capabilities specified by each policy pillar and the application of digital technologies to advance opportunities in the priority economic sectors.

The scenario below represents capabilities from the policy pillars driving priority economic sectors:



4.1 Strategies for Development of the Policy Pillars

4.1.1 Strategies for Universal Access & Connectivity

The following strategies have been identified for achieving the policy objectives by leveraging the Universal Access & Connectivity pillar:

Policy Objectives	Strategies
Empowerment to participate in the benefits of the digital economy across all segments of the population	• New or renewal issuances of broadband provider licenses and technology deployments should prioritize deprived rural areas • Utilise data to build a case for reducing taxes and import duty on specific devices coming into the country • Establish waivers and subsidies for setting up local assembly plants • Establish a framework for national terrestrial fibre sharing and consolidation • Prioritize and incentivise investments to fill in missing links in terrestrial fibre especially for rural access including extension of aerial fibre • Support alternative technologies such as satellite-based internet for hard-to-reach terrains. • Allocate a portion of the Universal Access Fund to support zero-rating for a class of services in targeted sectors such as healthcare and education • Implement technology neutrality in spectrum use to improve network capacity and rural access • Implement spectrum sharing to improve economic viability of network coverage expansion to less-profitable areas
Economic growth (GDP) with accelerated development driven by innovation and reflected in target social indices including sustainable job creation.	
The government fully harnesses data, analytics and other capabilities for efficient, transparent service delivery including improved revenue generation.	

4.1.2 Strategies for Digital Skills & Research

The following strategies have been identified for achieving the policy objectives by leveraging the Digital Skills & Research pillar:

Policy Objectives	Strategies
Empowerment to participate in the benefits of the digital economy across all segments of the population	• Conduct comprehensive studies on the underlying causes of gender inequality in ICT and STEM education • Undertake a comprehensive study to understand the barriers to entry that a percentage of people living with disabilities (PLWD's) face when applying for TVET, in addition to the challenges faced by PLWD's looking to enter TVET • Provide financial incentives to industry and training institutions that demonstrate commitment to closing the gender and vulnerability gap • Collaborate with tertiary institutions to embed reskilling and upskilling programs into their offerings • Provide comprehensive training and professional development for teachers in digital literacy and pedagogy, including incorporating digital resources into lessons. • Adopt UNESCO's ICT Competency Framework for Teachers to ensure that all teachers can harness technology for education
Economic growth (GDP) with accelerated development driven by innovation and reflected in target social indices including sustainable job creation	• Engage industry experts to provide input on curriculum design to align with the needs of the job market in advanced digital skills. • Facilitate internship and apprenticeship programs for TVET students within the tech industry • Conduct a comprehensive skills assessment to identify the current and future skills gaps within the workforce • Assess the mismatch between demand for and supply of the digital workforce on a year-to-year basis • Allocate funding from the target R&D % of GDP to the setup and operation of tech centres of excellence. • Develop specialized curricula and training programs to ensure the centres of excellence address specific opportunities in the digital economy
The government fully harnesses data, analytics and other capabilities for efficient, transparent service delivery including improved revenue generation.	• Map out priority use cases across public service institutions that can harness AI with significant impact.

4.1.3 Strategies for Digital Government

The following strategies have been identified for achieving the policy objectives by leveraging the Digital Government pillar:

Policy Objectives	Strategies
Empowerment to participate in the benefits of the digital economy across all segments of the population	• Develop a user centric design framework which will ensure digital government services are responsive to various citizen demographics. • Enforce the user centric framework for all digital government services via compliance infrastructure of a CNDA platform
Economic growth (GDP) with accelerated development driven by innovation and reflected in target social indices including sustainable job creation	• Develop and adopt a public sector digital skills competency framework with emphasis on themes which are core to the delivery and oversight of public sector digital services • Empower a central training agency that acts as a centre of excellence for the technical skills and competency framework across government • Review and update digital career pathways within the public sector to set clear structures for technology talent within the sector • Create incentives to attract Ghanaians with specialized international experience into public sector digital transformation jobs
The government fully harnesses data, analytics and other capabilities for efficient, transparent service delivery including improved revenue generation.	• Establish an inter-ministerial digital transformation team • Empower a Chief Digital Officer at the centre of government to coordinate delivery from the inter-ministerial digital transformation team • Empower NITA to implement the inter-ministerial digital transformation team directives across government. • Implement and enforce standards set by the Cyber Security Authority for government services via a CNDA platform • Leverage shared services infrastructure via a CNDA platform for standardization in automation of government digital services • Enforce adoption of the updated e-Government Interoperability Framework via CNDA infrastructure • Standardize digital ID interfaces based on the Ghana Card including single sign-on for government services via CNDA platform shared services • Set a whole-of-government interoperability roadmap with CNDA-enabled National Digital Infrastructure
	• Develop a framework for government cloud services and infrastructure aligned to the Cybersecurity Act (1038), Data Protection Act (843), and pending Data Governance framework • Ensure compliance of all government cloud services with new framework leveraging CNDA infrastructure • Implement and enforce standards set by the Cyber Security Authority for government services via a CNDA platform • Leverage shared services infrastructure via a CNDA platform for standardization in automation of government digital services

4.1.4 Strategies for Digital Entrepreneurship

The following strategies have been identified for achieving the policy objectives by leveraging the Digital Entrepreneurship pillar:

Policy Objectives	Strategies
Empowerment to participate in the benefits of the digital economy across all segments of the population	• Initiate digital innovative challenges on topical areas such as health, education and agriculture coordinated with the NEIP, responsible state institutions and academia. • Create a special fund for the development of digital innovation rural incubation hubs. • Identify and prioritize rural areas with significant potential for digital economy development opportunities to target for the setup of model incubation hubs. • Provide incentives or matching funds to encourage private equity financing programs to invest in women-owned digital businesses
Economic growth (GDP) with accelerated development driven by innovation and reflected in target social indices including sustainable job creation	• Promote the work of incubation hubs and the development of joint innovation projects between the public and private sectors • Establish a specific allocation in the GVCTF or similar sources dedicated to early-stage digital innovations aligned with national priorities. • Formulate and implement a local content and participation policy for the ICT and Digital sector that offers incentives such as tax waivers for sourcing locally developed digital solutions. • Implement a procurement strategy that designates sensitive and restricted national digital services to locally owned and run organisations. • Pursue procurement approaches that break up public digital service tenders to be more accessible for smaller but competent local firms. • Implement procurement models that prioritize joint ventures for digital government services. • Formulate and implement a local content and participation policy for the ICT and Digital sector that offers incentives such as tax waivers for sourcing locally developed digital solutions. • Implement a procurement strategy that designates sensitive and restricted national digital services to locally owned and run organisations.
The government fully harnesses data, analytics and other capabilities for efficient, transparent service delivery including improved revenue generation.	• Extend an agile procurement framework based on the PPA (Act 663) to enable establishment of a government digital marketplace. • Set technical standards for qualification to the government digital marketplace with CNDA enabled policy compliance. • Create structures for public sector agencies to source products and services via the government digital marketplace. • Incentivise venture funding support for innovations targeting the government digital marketplace that have potential for high impact and scalability • Create funding mechanisms and grants targeted at collaborative projects for innovative digital solutions between academic institutions, private sector and government bodies • Create environments such as sandboxes to enable collaborative testing and validation of innovative digital solutions in real-world environments

4.1.5 Strategies for Data and Emerging Technologies

The following strategies have been identified for achieving the policy objectives by leveraging the Data and Emerging Technologies pillar:

Policy Objectives	Strategies
Empowerment to participate in the benefits of the digital economy across all segments of the population	• Establish collaborative regulatory principles for inclusion, innovation and security • Define standards for data collection for regulatory safeguarding and compliance addressing technologies such as IoT
Economic growth (GDP) with accelerated development driven by innovation and reflected in target social indices including sustainable job creation	• Define standards and guidelines for data marketplaces and exchanges • Support regulators with R&D capabilities to keep up with tech evolution
The government fully harnesses data, analytics and other capabilities for efficient, transparent service delivery including improved revenue generation.	• Determine objectives for data governance through broad consultations, aligned to the AU Data Policy Framework including sovereignty stipulations, stewardship, classification, and sharing • NITA to issue guidelines and provide support and systems for adoption of data governance framework • NITA to monitor policy compliance for all public data assets with the data governance framework • Establish a data classification framework that categorizes public data as Open, Shareable or Restricted (aligned to the draft NDSP 3.0) • Define criteria used to determine classification of data • Deploy AI-enabled data classification capability across government digital infrastructure to ensure compliance • Define and provision for specialists across public institutions to update and maintain the open data catalogue / data.gov.gh • Capacitate RTI units across public institutions to contribute to and leverage open data catalogues

Special Emphasis on Artificial Intelligence (AI) as an Emerging Technology:

> *"In no other field is the ethical compass more relevant than in artificial intelligence. These general-purpose technologies are re-shaping the way we work, interact, and live. The world is set to change at a pace not seen since the deployment of the printing press six centuries ago. AI technology brings major benefits in many areas, but without the ethical guardrails, it risks reproducing real world biases and discrimination, fueling divisions and threatening fundamental human rights and freedoms."*
>
> – Gabriela Ramos, Assistant Director-General for Social and Human Sciences of UNESCO.

Ghana is developing strategies to harness AI for inclusive growth, economic transformation through capabilities and an enabling environment to be competitive in the global digital economy. As a member of the UN, Ghana adopted the UNESCO Recommendation on the Ethics of Artificial Intelligence in November 2021 (along with all 193 member states of the UN) which emphasizes the protection of human rights and dignity.

This policy recognizes AI as one of the emerging technologies that have significant potential for both opportunity and risk. The data governance imperatives in the policy are intended to provide the infrastructure and baseline guardrails to enable a safe environment for the advancement of data science and AI as a power for good. The data-oriented definition for AI provided by UNESCO is consistent with the data-driven application focus of this policy, where the Recommendation interprets AI broadly as: "*systems with the ability to process data in a way which resembles intelligent behaviour*"[lxii].

The following are recommended to set the pace towards a more comprehensive national AI strategy:

Capabilities	• Improve public and institutional awareness of AI and encourage responsible experimentation for beneficial adoption throughout public and private spheres. • Formalize the adoption of online instruction for data science and AI to bridge the instructor availability gap. • Create incentives to encourage investment in AI and AI-related startups
Enabling Environment	• Create an enabling environment supported by a comprehensive data governance framework fostering an open data environment with necessary safeguards. • Make cloud storage and computing resources available and accessible to support education, research and priority nationally sensitive public and commercial applications
Ethical Considerations	• Adopt principles that ensure algorithmic transparency through model explainability and ultimate human oversight to address concerns including bias, and potential discrimination in AI systems outcomes.. • Reassess education curriculum and upskilling programs to equip the workforce for the impact on jobs due to AI.

4.2 Strategies for Transformation of the Priority Sectors

The objectives for the development of strategies for the priority sectors are drawn from the corresponding Medium-Term Expenditure Frameworks (MTEF) of government institutions with oversight of the target sectors. The selected objectives per sector are the ones most likely to be impacted by the development of the Digital Economy Policy pillars and thereby attaining transformative economic outcomes in the priority sectors.

In a 2013 report by McKinsey titled "Lions go digital: The Internet's transformative potential in Africa" (LGD), several economic sectors were highlighted as having the potential to harness digital technologies (such as the Internet) for transformation. Key outcomes from digital technology interventions identified per sector include:

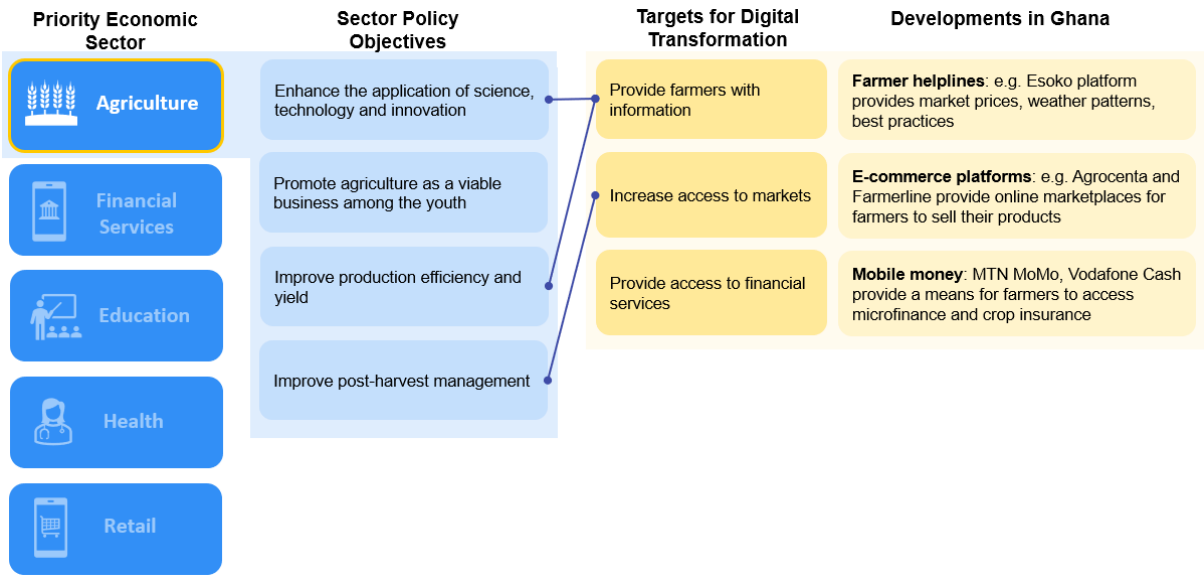
- **Financial services**: reducing transaction costs and increasing access to financial services
- **Education**: improved access to learning content leading to productivity gains
- **Health**: improved access through remote diagnosis and treatment and resulting social impact
- **Retail**: eCommerce boosting retail sales
- **Agriculture**: improved yields from access to information, markets and financial services

The report further highlights target areas in each sector that digital technologies have the potential to transform.

The strategies that follow identify opportunities for digital transformation aligned to objectives set by the corresponding government institutions that have oversight for the priority sectors.

4.2.1 Strategies for Agriculture

The sector policy objectives for agriculture are drawn from the Ministry of Food & Agriculture MTEF for 2022 – 2025 and the NDPC, and mapped to targets for digital transformation.



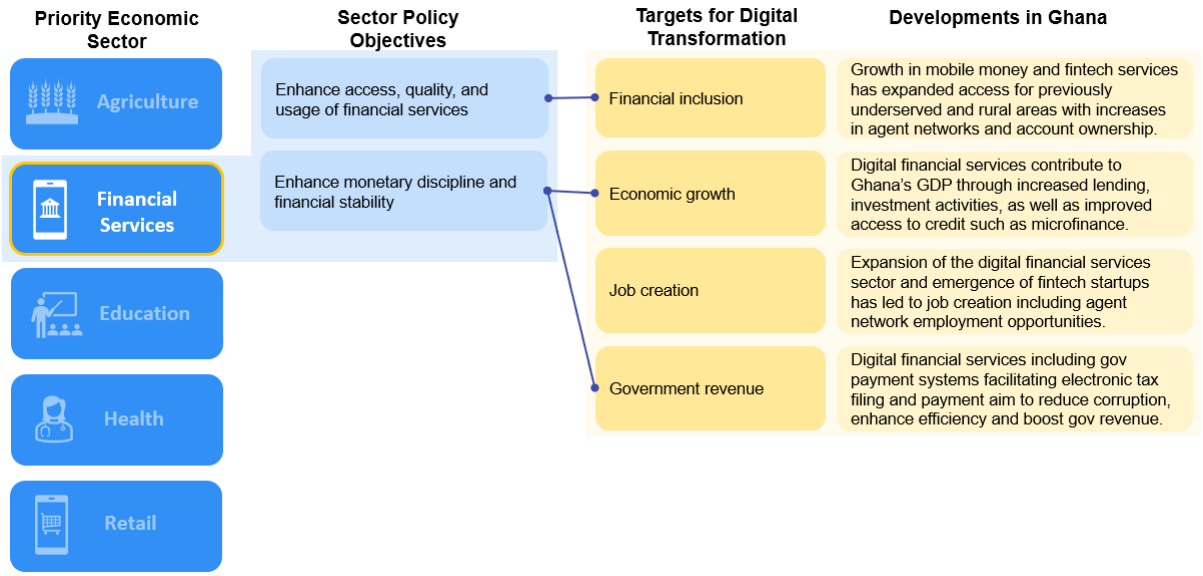
The indicated strategies leverage relevant policy pillars to drive transformative outcomes aligned with the sector objectives:

Strategies enabled by the Policy Pillars

Agric Sector Objectives	Universal Access & Connectivity	Digital Skills & Research	Digital Entrepreneurship	Data & Emerging Technologies
❖ Enhance the application of science, technology, and innovation		Support research and development for home-grown modern & advanced farm mechanization tools and services	Provide agri-tech solutions in indigenous languages and user-centric designs to improve usage and adoption	Create open datasets to help identify farm mechanization providers and services
❖ Improved post-harvest management	Provide last mile connectivity to underserved farming communities to attract & support smart warehousing opportunities		Source and support storage and transport solutions from local entrepreneurs to scale local agri-tech ecosystem	Leverage emerging technologies such as climate control and monitoring systems in storage and warehouses to prevent post-harvest losses
❖ Promote agriculture as a viable business among the youth		Align training in advanced digital skills for youth with technologies that drive agri-business opportunities	Leverage digital financial platforms to provide capital to young farmers and entrepreneurs	Encourage sharing of relevant data sets that can help de-risk and unlock credit access to agri-businesses
❖ Improve production efficiency and yield	Extend affordable data to farmers for access to online farm advisory and extension services to improve production yield	Equip rural farmers with digital literacy to access mobile farm advisory and extension services	Create incubation hubs dedicated to agriculture technology solutions to improve production and yield	Leverage emerging technologies such as AI, IoT to manage pests and improve yield

4.2.2 Strategies for Financial Services

The objectives for the Financial Services sector are drawn from the Ministry of Finance MTEF for 2022 – 2025, the NDPC, the NFIDS Report, Ghana Cash-lite Roadmap and the Ghana DFS Document. These objectives are mapped to targets for digital transformation.



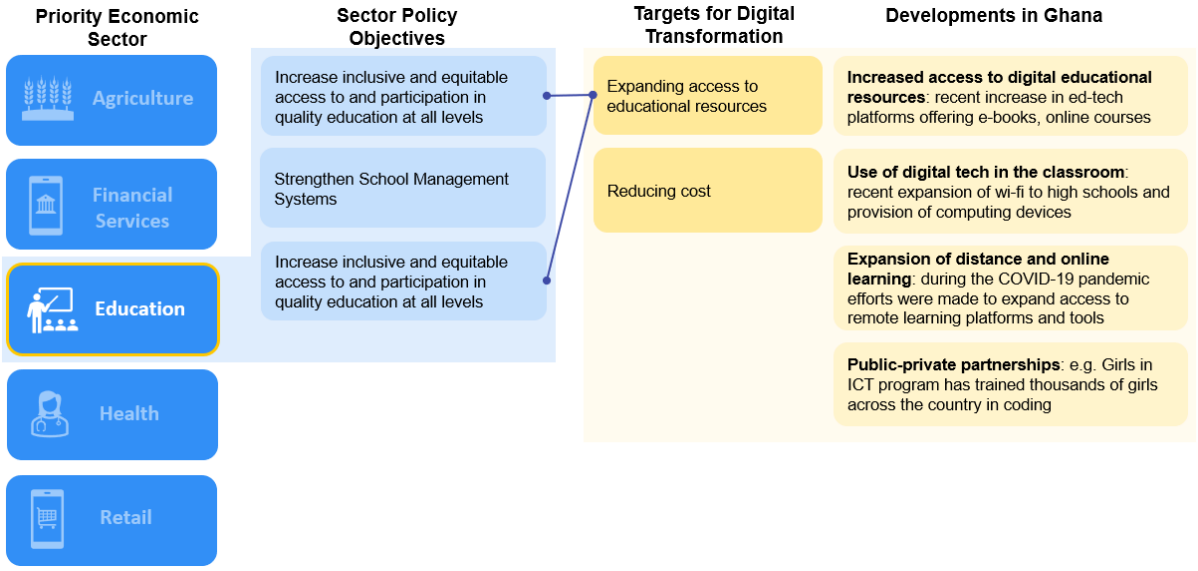
The indicated strategies below leverage relevant policy pillars to drive the next stage of transformative outcomes to drive the sector objectives:

Strategies enabled by the Policy Pillars

Financial Services Sector Objectives	Digital Government	Digital Entrepreneurship	Data & Emerging Technologies
❖ Enhance monetary discipline and financial stability	Enhance interoperability across the public and private sector to facilitate secure and efficient flows of finance		Define data governance standards to support financial sector data harmonization
			Open Data reporting protocols to be set for public financial data to be available to the market
❖ Enhance access, quality, and usage of financial services	Establish a Digital ID as a single sign-on capability for financial services to improve ease of access and security for citizens	Provide support for fintech startups to leverage the regulatory sandbox for innovative solutions that improve financial access	Institute data governance standards and protocols to address the need for security and privacy of citizens when engaging with financial services
	Ensure all government digital financial services are designed to be responsive to vulnerable groups including persons with disabilities		

4.2.3 Strategies for Education

The objectives for the Education sector are drawn from the Ministry of Education MTEF for 2022 – 2025 and the NDPC, and mapped to targets for digital transformation.



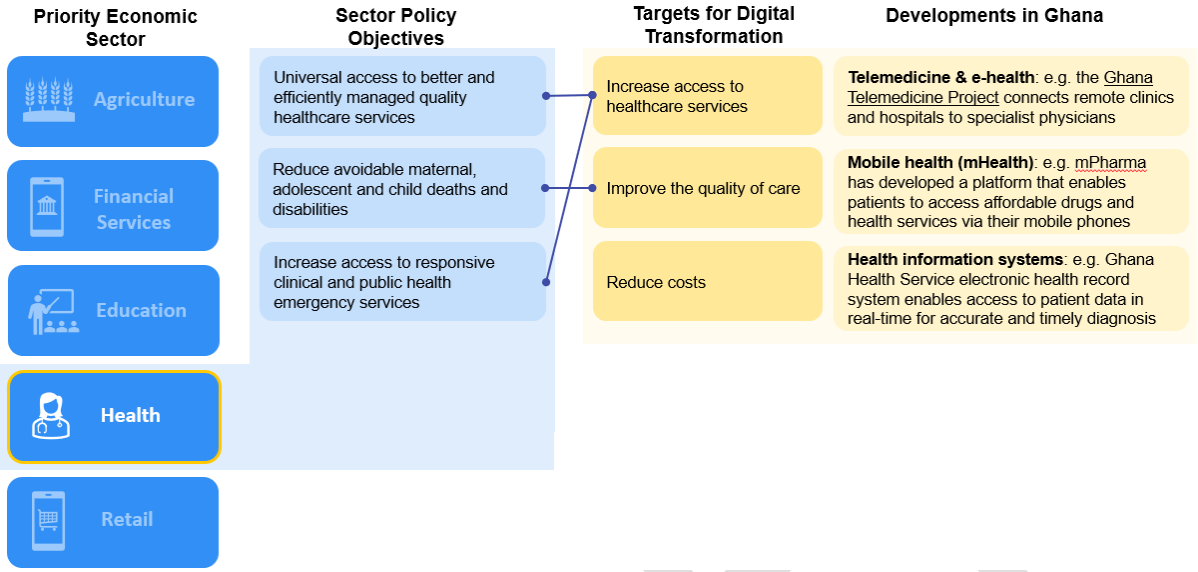
The indicated strategies below leverage relevant policy pillars to drive the next stage of transformative outcomes to drive the sector objectives:

Strategies enabled by the Policy Pillars

Education Sector Objectives	Universal Access & Connectivity	Digital Skills & Research	Data & Emerging Technologies
❖ Increase inclusive and equitable access to and participation in quality education at all levels	Implement data access and device affordability programs for learners to improve access and participation through e-learning	Develop digital literacy skills to increase engagement with EdTech platforms which improves access to education	
❖ Strengthen School Management Systems	Extend internet connectivity to schools in rural and vulnerable communities to ensure participation in the Ed Mgt Info System (EMIS)	Invest in digital skills training for staff to empower them in the use and application of the Education Management Information System (EMIS)	Promote Open data and data sharing to improve the accessibility and availability of education statistics

4.2.4 Strategies for Health

The objectives for the Health sector are drawn from the Ministry of Health's MTEF for 2022 – 2025 and the NDPC, and mapped to targets for digital transformation.



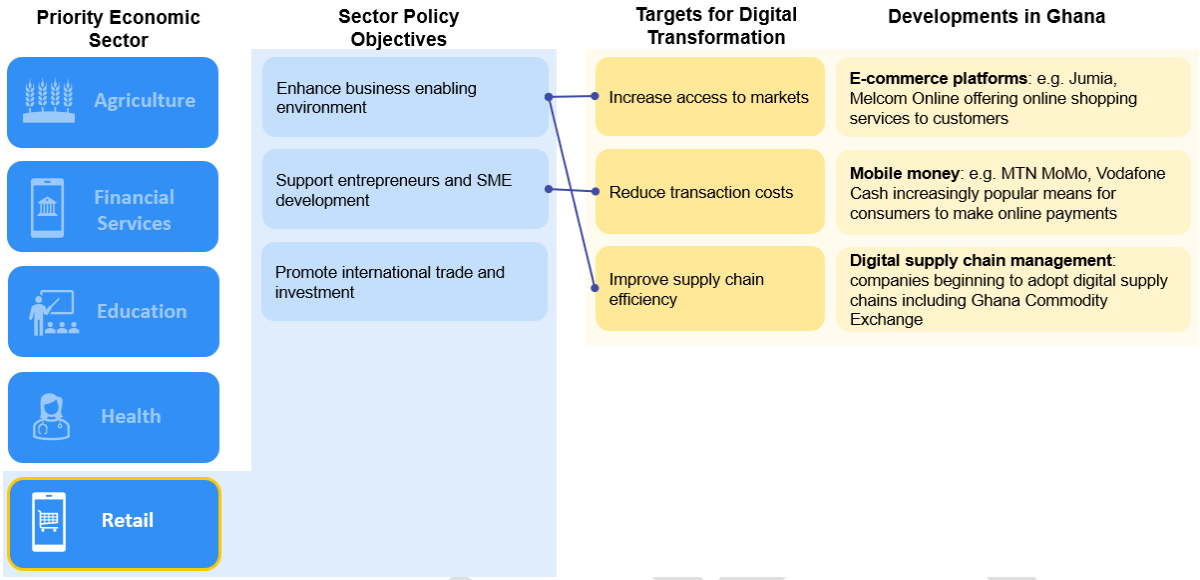
The indicated strategies leverage relevant policy pillars to drive transformative outcomes aligned with health sector objectives.

Strategies enabled by the Policy Pillars

Health Sector Objectives	Universal Access & Connectivity	Digital Government	Digital Skills & Research	Data & Emerging Technologies
❖ Universal access to better and efficiently managed quality healthcare services	Provide last mile connectivity to all district hospitals plus remote consultation facilities	Ensure interoperability of Ghana card-based digital ID with electronic medical records to enhance portability goals	Invest in workforce development to upskill health workers in use of digital technologies	
❖ Reduce avoidable maternal, adolescent and child deaths and disabilities			Leverage digital skills to improve diagnostics for improved clinical outcomes	Apply data analytics to track prevalent conditions and improve preventive care
❖ Increase access to responsive clinical and public health emergency services	Deploy location based services (LBS) and other relevant technologies for efficient medical emergency services response			

4.2.5 Strategies for Retail

The objectives for the Health sector are drawn from the Ministry of Trade and Industry's MTEF for 2022 – 2025 and the NDPC, and mapped to targets for digital transformation.



The indicated strategies leverage relevant policy pillars to drive transformative outcomes aligned with retail sector objectives.

Strategies enabled by the Policy Pillars

Retail Sector Objectives	Digital Government	Digital Skills & Research	Digital Entrepreneurship	Data & Emerging Technologies
❖ Enhance business enabling environment	Develop a supportive regulatory framework that encourages the growth of e-commerce including the protection of consumer rights and promotion fair competition		Foster partnerships between e-commerce platforms and logistics companies for efficient delivery and last-mile connectivity including in rural and underserved areas.	
❖ Support entrepreneurs and SME development	Publish citizen-centric design guidelines and provide support for adoption by digital platforms to empower MSE businesses	Establish digital literacy programs for MSMEs to improve access to and use of digital services	Encourage the development and adoption of digital marketplaces and digital retail technologies tailored for MSMEs	Provide support to programs like GEA Business Support Schemes to develop MSME credit data profiles to improve their access to lending
❖ Promote international trade and investment	Implement digital platforms and services to streamline government processes related to international trade and investment, as a digital one-stop-shop to facilitate a favourable business environment.			

5 Implementation Framework & Plan

To deliver on the objectives of this policy, a sound implementation framework and plan are crucial for the identification and assignment of delivery activities and the corresponding allocation of resources.

The implementation framework addresses:

- Clear direction of how the policy should be implemented: this is captured through strategic actions based on the various strategies mapped to the policy objectives
- Step-by-step actions to be taken during implementation: this is set out using a short, medium and long-term strategic action delivery model
- Assigning responsibility to each department or individual involved: this is captured through the indication of "lead" and "participating" institutions assigned to each strategic action

Important note: implementation of strategies for priority economic sectors will be led by the oversight institutions and it is expected that progress in building capabilities in the policy pillars will improve transformative outcomes with digital technology interventions in the sectors.

5.1 Institutional Arrangements for Implementation

The outcomes for each policy objective will be delivered through the implementation of corresponding strategies phased and synchronized over the short, medium, and long term.

For each policy objective, the corresponding strategies that have been identified are road mapped for progress to be staged thus:

- Quick Wins: within 6 months of approval and adoption/launch of the policy
- Medium Term: 6 to 18 months post approval of policy
- Long Term: 18 to 48 months post approval of policy

The target timeline anticipated for the attainment of the policy objectives is 2028. An agile approach will allow iteration, learning and refinement along the implementation journey, thus a gestation cycle between the execution of strategies and the realisation of policy goals.

5.2 Resource Mobilisation

The policy implementation anticipates various resources especially funding to achieve the goals. Funding is targeted at developing the capabilities required by the policy pillars as well as executing the various strategies to achieve the policy objectives. Sources of funding include:

- GoG budgetary support
- Development partner(s) support
- Public-private partnerships

5.2.1 Policy Objective 1: Participation & Inclusion

The strategic actions indicated below are consolidated from the larger set of strategies captured under the five policy pillars focused on building capabilities towards the policy objective:

"*Empowerment to participate in the benefits of the digital economy across all segments of the population.*"

	Strategic Action	Lead Institution	Participating Institutions
Quick wins *Actions in the next 6 months*	Utilise data to build a case for reducing taxes and import duty on specific devices coming into the country	GIFEC	GSS, Ghana Chamber of Telecommunications, GES…
	Implement technology neutrality in spectrum use to improve network capacity and rural access	NCA	
	Develop a user centric design framework for responsive digital government services	NITA	
	Initiate digital innovation challenges in health, education and agriculture, coordinated by NEIP and responsible institutions	NEIP	MESTI, MoH, MoE, MoFA
Medium *Actions in the next 6 to 18 months*	Prioritize rural and deprived areas in license issuances	NCA	GIFEC
	Support the use of alternative tech solutions to improve network access in hard to reach areas		
	Provide zero-rate data access for targeted services with the UAF	GIFEC	GHS / MoH, GES / MoE
	Invest in programs to improve inclusivity for people with disabilities in TVETs	COTVET	MoCD, MOFEP, NCPWD, Development Partners, OIC
	Provide incentives for private investment in women-owned digital businesses	MoCD	MOFEP, Min of Gender, GEA, Gh Hubs Ntwk, GIPC, Financial Institutions, GVTCF
	Adopt UNESCO's ICT Competency Framework for Teachers to ensure all teachers can harness technology for education	MoCD	MOFEP, Min of Gender, GEA, Gh Hubs Ntwk, GIPC, Financial Institutions, GVTCF
Long-term *Actions in the next 18 to 36 months*	Establish waivers and subsidies for setting up local assembly plants	MOTI / MOFEP	GRA
	Incentivise investments to fill in missing links in terrestrial fibre	NCA	GIFEC, Telecoms Chamber, GISPA

5.2.2 Policy Objective 2: Economic Growth

The strategic actions indicated below are consolidated from the larger set of strategies captured under the five policy pillars focused on building capabilities towards the policy objective:

"*Economic growth (GDP) with accelerated development driven by innovation and reflected in target social indices including sustainable job creation.*"

	Strategic Action	Lead Institution	Participating Institutions
Quick wins *Actions in the next 6 months*	Map out priority use cases across public service institutions that can harness AI with significant impact.	MoCD	MOE, MOFA, MOFEP, MOTI, MOH
	Facilitate internship and apprenticeship programs for TVET students within the tech industry	COTVET	MoCD, AGI, Gh Employers Assoc., Gh Hubs Ntwk, GDCL, NYA, Min. of Labour, OIC
	Review and update digital career pathways within the public sector	KACE/PSC	OHCS, CSTC, HR Units with public agencies, Professional Associations.
	Promote the work of incubation hubs and joint innovation projects between public and private sectors	MoCD	GDCL,GHN, MOE, MOFEP, MOFA, MOH, MOTI
Medium *Actions in the next 6 to 18 months*	Empower teachers with comprehensive digital literacy and pedagogy training	GES	MOE, NACCA, GNAPS, GNAT, NAGRAT, Colleges of Education.
	Conduct a comprehensive skills assessment to identify the current and future skills gaps within the workforce	MoCD	Mini. of Employment, Civil Svc Training Ctr, Gh Employers Assoc., AGI, TUC, ILGS,
	Establish funding dedicated to early-stage digital innovations aligned with national priorities.	MoCD	Natl Dev. Banks and GVCTF, NEIP, MOE, MOH, MOFA, MOFEP, MOTI, GEA
Long-term *Actions in the next 18 to 36 months*	Create funding mechanisms and grants targeted at collaborative projects for innovative digital solutions between academic institutions, private sector and government bodies	MoCD	MOE, MOFEP, CSIR, Universities, Research Institutions, Telecoms Chamber, Technology Chamber, Donor Coordination Committee
	Allocate funding from the target R&D % of GDP to the setup and operation of tech centres of excellence	MoCD, MOFEP	

5.2.3 Policy Objective 3: Efficient Government Service Delivery

The strategic actions indicated below are consolidated from the larger set of strategies captured under the five policy pillars focused on building capabilities towards the policy objective:

"*The government fully harnesses data, analytics and other capabilities for efficient, transparent service delivery including improved revenue generation.*"

	Strategic Action	Lead Institution	Participating Institutions
Quick wins *Actions in the next 6 months*	Establish an inter-ministerial digital transformation team	MoCD	MOE, MOH, MOF, MOTI, MOFA, Office of the President & VP Secretariat
	Develop and adopt a public sector digital skills competency framework	KACE	Civil Service Training Centre, Institute of Local Government Studies
	Set data governance objectives, aligned to the AU Data Policy Framework, and collaborative regulatory oversight	NITA	DPC, Min. of Foreign Affairs, AfCFTA, MOTI, CSA, National Security, GSS
	Establish a data classification framework aligned to the draft NDSP 3.0	NITA	DPC, CSA, National Security, GSS, GSA
Medium *Actions in the next 6 to 18 months*	Empower a Chief Digital Officer to coordinate delivery per the inter-ministerial digital transformation team	Office of the President	MOCD,MOE, MOH, MOF, MOTI, MOFA, Office of President – VP Secretariat
	Develop a framework for government cloud services	NITA	CSA, DPC, National Security
	Define and adopt standards for data formats and APIs to enable interoperability of data	NITA	DPC, CSA, National Security, GSS, GSA
	Provision specialists in public institutions to update and maintain the open data catalog / data.gov.gh	NITA	Public Institutions
	Extend an agile procurement framework upon PPA (Act 663) to establish a whole of government digital marketplace.	NITA	PPA, MOFEP, MOJAGD
Long-term *Actions in the next 18 to 36 months*	Extend digital ID based on the Ghana Card with single sign-on for government services enabled via CNDA platform	NITA, NIA	
	Implement and enforce standards set by the Cyber Security Authority for government services via a CNDA platform	NITA	CSA, DPC
	Create structures for public sector agencies to source products and services via the government digital marketplace.	NITA	CSA, DPC

5.3 Enabling International Programmes

5.3.1 Ghana Digital Acceleration Programme

The Ghana Digital Acceleration Programme (GDAP) is supported by a $200 million facility from the World Bank with the purpose to:

- expand access to broadband,
- enhance the efficiency and experience of selected digital public services, and
- strengthen the digital innovation ecosystem.

These three objectives are delivered through delivery components as follows:

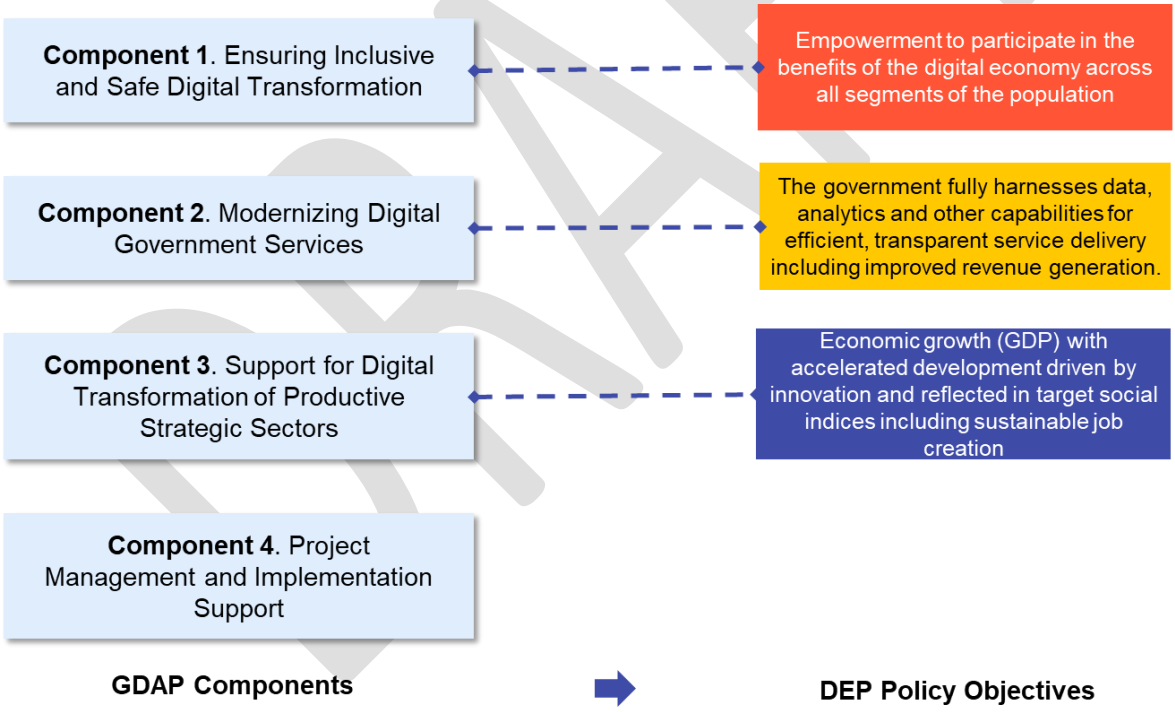
Component 1. Ensuring Inclusive and Safe Digital Transformation

Component 2. Modernizing Digital Government Services

Component 3. Support for Digital Transformation of Productive Strategic Sectors

Component 4. Project Management and Implementation Support

The delivery components are aligned with the objectives of this policy as depicted in this mapping:



The delivery of the GDAP thus presents one of the key implementation platforms through which the goals of this policy will be realised.

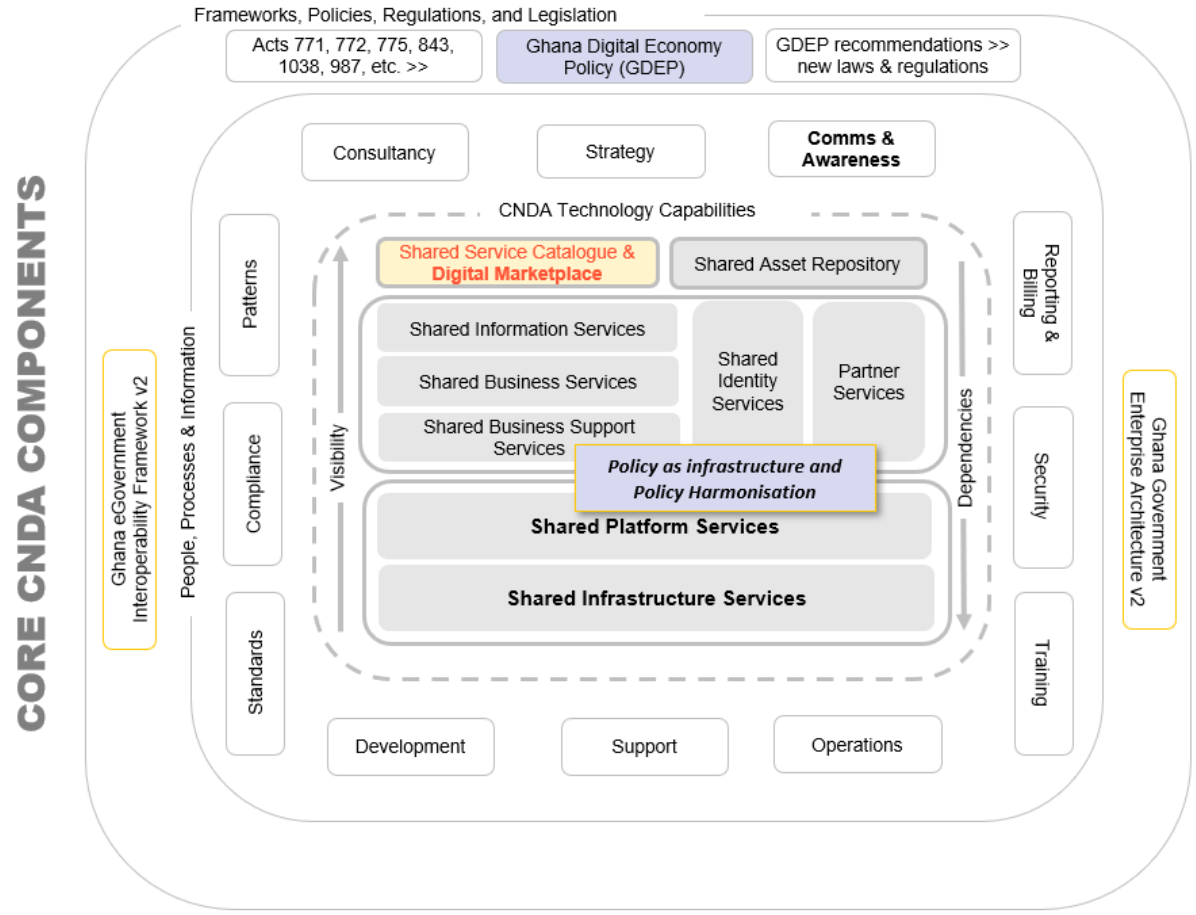
5.3.2 Development Partners - Donor Coordination

Other development partners have shown interest in various aspects of the advancement of Ghana's digital economy. This policy provides a platform for donor coordination for the coherent and concerted development of policy pillars and targeted digital technology interventions for priority sectors.

To streamline donor support and avoid duplication of interventions, the Ministry of Communications and Digitalisation should set up a Donor Coordination Secretariat to improve the structure of support from development partners towards the attainment of the policy objectives.

5.4 Key Implementation Artefacts

The success of implementation anticipates "policy-as-infrastructure" capability enabled by technology platforms and tools to be deployed. Chief among these is the Common National Digital Architecture that will not only enable effective government digital service delivery but will also drive local innovation through the government digital marketplace. The reference model for the CNDA is depicted in the diagram below, though this is expected to evolve and be refined further as the policy is being implemented:



6 Monitoring and Evaluation Arrangements

Monitoring the progress of the policy objectives and corresponding capability development of the policy pillars is intended to be a continuous, evidence-based process. The process will be led by the MoCD Policy, Planning, Monitoring & Evaluation (PPME) team, with support from the Ghana Statistical Service and other stakeholders.

For each policy objective, progress will be measured by movement from the *Baseline* to the *Target Values* for the *Indicator*s collectively, and ultimately reflect in the *Key Outcomes*.

The baseline values for the indicators are validated with references indicated in the appendix

6.1 Indicators for Policy Objective 1

>> **Objective 1**: Empowerment to participate in the benefits of the digital economy across all segments of the population:

Indicator	Baseline		Target	
	Year	Value	Year	Value
Percentage of mobile penetration	2021	75.5% mobile penetration in the country	2027	95+% mobile penetration in the country
Capacity of bandwidth available for ICT development	2021	1,640 Gpbs capacity	2027	3,280+ Gpbs capacity
Online Service Index (OSI) Score	2022	0.5361 OSI Score	2027	0.9 OSI Score
Extension of aerial fibre coverage to rural communities	2022	Absence of infrastructure sharing guidelines	2027	National backbone fibre consolidation and active network capacity pooling
Smartphone cost as a percentage of average monthly income	2021	45% average monthly income	2027	26% average monthly income
Percentage of mobile bundle cost per monthly GNI per capita	2022	1 GB < 1% of monthly GNI per capita	2027	10 GB < 2% of m-GNI
Adherence of government digital services to the CNDA user-centric delivery framework	2022	Gov digital services not accessible to broad demographics	2027	Gov digital services leverage CNDA platform for user-centric compliance
Percentage of people with disabilities graduating from TVETs	2022	2% of PWD enrolled in TVETs graduate		20% of PWD enrolled in TVETs graduate
Global ranking on digital skills readiness	2019	95th out of 134 countries	2027	A rank of 50 or better out of 134 countries
Percentage of women that graduate with STEM related degrees	2018	19.8% of graduates with STEM related degrees are women	2027	At least 40% of STEM graduates are women

Key Outcomes:

- Enhanced access to digital services by citizens.
- Enhanced access to digital infrastructure by businesses and government
- Increased collaboration between actors in the digital economy
- Strengthened data protection and cybersecurity in government.
- Enhanced digital inclusion of underserved and marginalized segments of the population
- Improved socio-economic outcomes of marginalized groups
- Increased access to services and information.

6.2 Indicators for Policy Objective 2

>> **Objective 2**: Economic growth (GDP) with accelerated development driven by innovation and reflected in target social indices including sustainable job creation:

Indicator	Baseline		Target	
	Year	Value	Year	Value
Number of innovation challenges set up in priority sectors per year.	2022	0 innovation challenges in the 5 priority sectors: health, education, agriculture, financial services and retail	2027	1 innovation Challenge per priority sector per year
Number of rural incubation hubs supported.	2022	0 rural incubation hubs supported	2027	Increased support to rural incubator hubs
Number of early-stage start-ups supported annually; Number of women-owned businesses support annually.	2022	30 Deals Equity Financing deals worth $202M	2027	Increased availability of funds that support early-stage digital innovations and women-owned businesses
Presence of an approved local content policy for the digital space	2022	Absence of local content policy for digital/ICT sector	2027	Local content policy for Ghana's Digital Economy implemented.
Existence of a procurement framework for local firms	2022	Absence of procurement framework that prioritises local firms.	2027	Established procurement framework that prioritises local firms.
Number of collaborative projects supported	2022	Absence of innovation fund that support collaborative projects	2027	Established innovation fund that support collaborative projects
Percentage of GDP allocated Research and Development	2022	0.38% of GDP spent on R&D	2027	1% of GDP spent on R&D
Presence of regulatory and legislative structures to govern emerging technologies	2022	Regulatory and legislative structures not evolving with new digital commerce models	2027	Harmonized regulatory oversight of emerging technologies to drive innovation, control risk and minimize legal non-compliance
Percentage of youth and adults with advanced digital skills	2022	2% of youth and adults	2027	6% of youth and adults
Presence of standard competency frameworks in major employment sectors	2022	No standard competency framework for all jobs in key sectors	2027	Major employment sectors have standard competency framework

Key Outcomes:

- Growth in digital start-ups and entrepreneurship
- Increased collaboration, innovation and entrepreneurial activity
- Increased economic growth reflected in targeted social indices such as sustainable job creation
- Highly skilled workforce qualified for jobs that require digital capabilities
- Increased access to advanced digital skills training

6.3 Indicators for Policy Objective 3

>> **Objective 3**: The government fully harnesses data, analytics and other capabilities for efficient, transparent service delivery including improved revenue generation:

Indicator	Baseline		Target	
	Year	Value	Year	Value
Existence of whole of government digital transformation framework	2022	Absence of whole of government coordination of digital transformation projects	2027	Whole of government coordination of digital transformation projects
Presence of a public sector technical skills framework across government offices	2022	No standard technical skills framework in public sector	2027	Technical skills and competency framework adopted across government
Validation and adoption of CNDA enabled E-Government Interoperability Framework	2022	No standardized government digital platform	2027	Government digital services hosted on CNDA platform
Whole of gov adoption and compliance with GoG standardized cloud Infrastructure	2023	Standards set for Government cloud Infrastructure	2027	Whole of government adoption and compliance with cloud standards
Whole-of-government adoption of a data governance framework	2022	Segmented approach to data governance	2027	Whole-of-gov adoption and compliance with data governance framework
Adoption and utilization of a data classification framework	2022	No government-wide system for data classification	2027	Whole-of-gov semi-automated, AI-enabled data classification system
Existence of policy compliant open data facilities	2022	GODI portal with limited databases and outdated	2027	Semi-automated, policy compliant open data facilities and useful data formats
Existence of standardized whole-of-government data exchange regime	2022	Data sharing within Government is through manual requests	2027	Standardized whole-of-government data exchange regime
Presence of a public sector technical skills framework across government institutions	2022	No standard technical skills framework in public sector	2027	Technical skills and competency framework adopted across government
Presence of a government digital marketplace	2022	Absence of a Government Digital Marketplace	2027	Ghana has implemented a digital marketplace

Key Outcomes:

- Digital transformation across all government offices
- Enhanced transparency and efficiency in delivering government services

7 Communications Strategy

7.1 Purpose

The purpose of this communication strategy for Ghana's Digital Economy Policy (GDEP), is to establish guidelines for creating awareness and effectively disseminating the critical success factors of the GDEP, its objectives, benefits and opportunities, to the identified target audience. This strategy aims to raise the awareness of the policy and its potential impact on Ghana's growth and development.

7.2 The Information, Education and Communication (IEC) Approach

An IEC approach for communicating the GDEP is to be adopted and tailored for the specific needs of the target audience identified. In a two-pronged delivery of awareness creation amongst stakeholders during policy formulation, and followed by the education of, and communication to, secondary stakeholders that being the public at large, the objectives and opportunities of the policy will be disseminated.

Phase One of this communication strategy kicks off during policy formulation; beginning with information gathering and collaborative/educative discussions with primary stakeholders: government officials, business leaders, entrepreneurs, investors and technology specialists. This is to ensure early buy-in of the policy, by creating a sense of ownership for the identified target audience; and directly feeding into the formulation of key messages to be used during the communication campaign, into the second part of this IEC approach.

Phase Two of this communication strategy is designed for post-policy approval; when clear and concise key messages that effectively communicate the GDEP's benefits are developed and deployed through multiple communication channels, with engaging and relevant content that addresses stakeholder's needs. The needs of the Five Pillars of the GDEP (Universal Access & Connectivity, Digital Government, Digital Skills & Research, Digital Entrepreneurship and Data & Emerging Technologies) will form the basis for these key messages that must resonate with the players found in the Priority Economic Sectors (Agriculture, Financial Services, Education, Health and Retail).

The Communication Tools to be used during these two phases will depend on each target audience's need(s) and/or interest(s). Delivery, therefore, will cut across multiple communication channels such as social media, events and engaging content, to reach a wider audience, and involve them in meaningful conversations, about the policy.

The communication strategy will be championed by the Ministry of Communications and Digitalisation and its institutions, with outreach coordination supported by the Ministry of Information, Information Services Department, the NCCE, and public institutions, especially in the priority sectors indicated under this policy.

7.3 Monitoring, Evaluation & Learning (MEL) of the Communication Approach

The need to monitor and evaluate the communication approach, determine its effectiveness and make any necessary adjustments, is a critical success factor for communication strategies. This will help to ensure that the communication efforts are achieving the intended goals. Post monitoring and evaluation, the key messages may be reframed, or new key messages may be developed, to ensure that they address any emerging needs or new target audiences the learnings may glean from the evaluation process.

These MEL insights will serve as critical resource materials for the collaborative regulatory committee/board/authority that stands to inherit the ownership of the GDEP.

8 Appendix – Monitoring & Evaluation Indicator References

Policy Objective	Indicator	Description	Indicator Baseline & Target Values	References
Empowerment to participate in the benefits of the digital economy across all segments of the population	Percentage of mobile penetration	Penetration of mobile data measuring the total mobile data subscriptions of the total population	75.5% mobile data penetration in 2021 → **95%+ by 2027**	MoCD MTEF 2022 - 2025
	ICT development bandwidth capacity	Bandwidth capacity available for ICT development	1,640 Gpbs capacity in 2021 → **3,280 Gpbs capacity by 2025**	MoCD Medium Term Expenditure Framework (MTEF) 2022 – 2025
	Online Service Index (OSI) Score	UN Online Service Index score: > 0.75 = high; between 0.5 and 0.75 = moderate; < 0.5 = low	OSI Score: 0.5361 in 2022 → **OSI Score 0.9 by 2027**	UN E-Government Knowledgebase
	Percentage of mobile bundle cost per monthly GNI per capita	UN Broadband Commission's target is to make entry-level data services less than 2% of monthly GNI per capita (m-GNI) by 2025	1 GB < 1% of m-GNI → **10 GB < 2% of m-GNI**	- ITU - A4Ai
	Smartphone cost as a percentage of average monthly income	Smartphone cost expressed as a proportion of monthly income	45% ave monthly income 2021 → **26% ave mthly income by 2027**	A4AI & ITU (Ghana data not available)
	Percentage of people living with disabilities who graduate from TVETs	Percentage of PLWDs enrolled in TVETs who graduate	2% of PLWD graduates → **20% of PLWD graduates by 2027**	Ghana TVET Report
	Percentage of women that are graduating with STEM-related degrees	Proportion of total STEM-related degree graduate population who are women	19.8% of graduates with STEM-related degrees are women (2018) **40% by 2027**	World Bank Gender Portal
	Global ranking on digital skills readiness	Ghana's global ranking out of 134 countries	Gh @ 95 out of 134 countries (2019) → **Ghana is at a rank of 50 or better by 2027**	Wiley, Global Digital Skills Gap Index
Economic growth (GDP) with accelerated development driven by innovation and reflected in target social indices including sustainable job creation	Value of early-stage start-ups' annual support	Increase in the number and value of financing deals for start-ups	30 deals @ $202M in 2022 → 100% increase in value and deals by 2027	Partech Partners
	Percentage of youth and adults with advanced digital skills	The proportion of youth and adults (15-65) with advanced digital skills	2% of youth and adults in 2022 → **6% by 2027**	WB, Digital Skills: Frameworks & Programs
	The proportion of GDP allocated to R&D expenditure	Government commitment to research and development per R&D expenditure as a proportion of GDP	0.38% of R&D of GDP in 2022 → **1% by 2027 [2.5% set in STI policy speech Jan '19]**	UNESCO Institute of Statistics, Statista

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