TRANSFORMING THE RESEARCH FOR DEVELOPMENT ECOSYSTEM

ReImagining the ReSearch for DEvelopment Landscape of WEst and Central Africa for Equitable and Transformative Impact (RISE-WECA)

Report on the Research Landscape Study of West and Central Africa

African Technology Policy Studies Network (ATPS)

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1. Introduction

A research system refers to a dynamic network of institutions, actors, policies, funding mechanisms, infrastructures, and practices that collectively generate, disseminate, and apply knowledge to address societal challenges and advance development. This reflects the interconnected and multi-stakeholder nature of research systems, encompassing universities, government agencies, donors, civil society organizations, the private sector, and local communities. These actors interact in both formal and informal ways, and their level of influence varies depending on the national context. A functional research system ensures that research is ethically conducted, relevant, and responsive to national challenges, findings are disseminated widely through open-access platforms, media, and policy dialogues, and there is two-way engagement between researchers and users (policymakers, communities, businesses).

The International Development Research Centre's (IDRC) initiative on transformative research ecosystems builds on this foundation by emphasizing that research systems must not only produce knowledge but also transform themselves to be more Equitable: inclusive of diverse voices and power-sharing, Open: transparent, accessible, and participatory, Capable: equipped with skilled people and infrastructure, Connected: locally grounded and globally linked, as well as on the African Technology Policy Studies Network's (ATP) initiative on Regulated: guided by effective policies and governance. A well-functioning research system enables the production of relevant, high-quality, and inclusive knowledge, supported by robust governance, effective collaboration, adequate capacity, equity, and transparency.

The overall purpose of the study was to assess the research for development landscape of West and Central Africa. Specifically, the study sought to:

1. Assess how transformative the research landscape of the participating countries is in terms of being Equitable, Open, Capable, Connected, and Regulated research.
2. Identify the key stakeholders, their roles, power, influence, and positioning in the research for development landscape of the participating countries.
3. Assess the structures and flows of funding and resources in the research landscapes.
4. Examine the innovations and initiatives that promote transformative research in the countries.
5. Identify the barriers and enablers to transformative research in the participating countries.

2. Analytical Framework and Methods

Eight countries were randomly selected for the study. Five (5) countries were selected from West Africa, while three (3) countries were selected from Central Africa. From West Africa, Cote d'Ivoire, Ghana, Nigeria, Sierra Leone, and Senegal were selected, while the Democratic Republic of Congo, the Republic of Congo, and Cameroon were selected from Central Africa. This selection was to ensure a proportionate representation of about 30% from each of the sub regions which could be managed within the time and resources available for the research. The landscape study was conducted using desk review, online key informant interviews (KIIs) and focus group discussions (FGD) with participants targeting key stakeholders from the government, research institutions and universities, non-governmental organizations/civil society, community-based organizations, the private sector, and the media. The KII was conducted in all the countries, while the FGD was conducted in the DRC and Ghana. While the KIIs targeted 30 from each of the participating countries, the FGD targeted 15 national participants in person, with international participants joining online. The national participants comprised representatives from the government/council/relevant ministries, research institutions, universities, nongovernmental organizations, civil society organizations, community-based organizations, the private sector, and the media. The transformative research ecosystem was assessed by requesting participants to identify and rate their key

institutional practices based on the five pillars of Equitable, Open, Capable, Connected, and Regulated research. The rating scale used was a five-point scale where 1 was the lowest and 5 was the highest score. Power and influence were assessed by asking participants to rate the power and influence of the respective stakeholders in the transformative research ecosystem on a 5-point scale, where 1 represented the least power/influence and 5 represented the highest power/influence. Other variables, such as structures and flows of funding and resources, innovations and initiatives that promote barriers and enablers to transformative change were identified and rated based on participants' perceptions.

3. Research Findings

The research findings are presented for the two sub-regions studied as well as pooled together to reveal the entire landscape of the transformative research ecosystem of the whole region. This was to ensure context specific and nuanced findings which would inform tailored recommendations and subsequent interventions while also presenting a holistic perspective for the entire region, to ensure regional cooperation and coordination of efforts. For each of the Central and West African regions, the results are organized around key themes including the historical development of research systems, the actors that support or resist transformative change within the research ecosystem (including the effects of power and influence), the ideas, initiatives, and innovations driving transformation, and the broader barriers and enablers to change. The research findings are presented below:

3.1. The Central and West African Research Ecosystem

3.1.1. Historical Background of the Development of the Research System in Central and West Africa

The historical development of research systems in Central and West Africa reveals both shared trajectories and notable divergences, shaped by differing socio-political and economic realities. In both regions, the evolution of national research ecosystems has unfolded across four broad phases: the post-independence foundational era, the structural adjustment-induced decline, a period of policy reform and international re-engagement, and, more recently, a phase marked by aspirations for transformative and inclusive systems.

In the foundational phase, from the colonial era to independence (1960s), both sub-regions prioritized the creation of national universities and public research institutions as state-led instruments for development. These universities were fundamentally the centre for research and knowledge generation. Central African countries, notably the Democratic Republic of the Congo (DRC), the Republic of the Congo, and Cameroon, established institutions such as the University of Kinshasa and Marien Ngouabi University (UNESCO, 2005; Universite Marien Ngouabi, 2020). These universities were largely modeled on French and Belgian academic traditions. These institutions were characterized by centralized structures with limited institutional autonomy and a lack of linkage to grassroots innovation. In contrast, West African countries such as Ghana, Nigeria, Senegal, Côte d'Ivoire, and Sierra Leone also established flagship institutions like the University of Ghana, the University of Ibadan in Nigeria, and Université Cheikh Anta Diop (UCAD) in Senegal, but with relatively more diversified support mechanisms and stronger international engagement, even in this early phase. Research in both regions initially focused on core development sectors, including agriculture, health, and education. However, West Africa's foundational systems demonstrated a broader decentralization and connection to bilateral and South-South cooperation frameworks. In both sub-regions, research was primarily envisioned to serve colonial interests, with little to no effort to engage with and/or address real local challenges. Dedicated national research Councils were yet to be established, and the funding structure was not streamlined. A common feature of both West and Central Africa is the recent establishment of their research organizations, which emerged from the 1970s, as seen in the cases of Ghana (1979), Senegal (1983), and Cameroon (1984) (Gaillard et al., 2015).

The onset of the 1980s marked a period of institutional deterioration in both regions, triggered by economic crises and the widespread adoption of Structural Adjustment Programmes (SAPs). In Central Africa, the effects were more acute. Public research funding virtually collapsed, infrastructure decayed, and governance weakened. This was particularly evident in the DRC, where political instability and protracted conflict further decimated research capacities. Cameroon and the Republic of Congo fared slightly better but remained hamstrung by under-resourced institutions. In West Africa, while the SAP period also resulted in a marked brain drain and infrastructural neglect, the research systems managed to retain some adaptive resilience. The emergence of civil society organizations and NGOs, particularly in Ghana and Nigeria, introduced new actors into the research space, laying early groundwork for the eventual diversification of knowledge production and dissemination.

A new era of policy reform began in the early 2000s across both regions, with governments revisiting the strategic importance of science, technology, and innovation (STI) to national development. In Central Africa, STI policy frameworks emerged in countries like Cameroon, the DRC, and the Republic of Congo. However, implementation was often constrained by institutional fragmentation and poor regulatory coordination. Funding mechanisms remained largely donor-driven, and while international partnerships increased, particularly with organizations such as UNESCO and CAMES, they lacked local ownership and control. Conversely, West African countries made more substantial strides during this phase. Ghana launched and revised its STI policy, Nigeria established the Tertiary Education Trust Fund (TETFund), and Côte d'Ivoire operationalized dedicated funding mechanisms, including FONSTI and PASRES. Senegal established MESRI to coordinate national innovation strategies. These developments signaled a more proactive alignment between research policy and national development priorities in West Africa than was evident in Central Africa.

The current phase, which began in the mid-2010s, is characterized by an emerging commitment to transformation across both regions, although the pace and depth vary considerably. In Central Africa, countries are beginning to realign their research systems with the pillars of equity, openness, capability, connectedness, and regulation. For example, the DRC has developed inclusive platforms, such as the Annual Scientific Engineering Conclave, with the main objective of identifying Congolese inventors and innovators, both domestic and from the diaspora, whose research could contribute to the country's development and improve socioeconomic conditions for the Congolese population (SRTI, 2024). Digital platforms such as the Politoscope and the Peace Observatory have also been developed to promote knowledge democratization and public engagement. Institutions like CERDAS and LACDEV are partnering internationally to build human capital. The Republic of Congo is leveraging public health-oriented institutions, including the Louis Pasteur City and the Professor TOUMI Foundation, to drive local innovation. At the same time, Cameroon emphasizes researcher mobility and capacity development. Yet, across the region, open science adoption remains nascent, and systemic challenges, such as weak infrastructure, donor dependence, and fragmented stakeholder networks, continue to hinder transformative progress.

West Africa, in contrast, displays a more structured and mature transition toward a transformative research paradigm. Governments and institutions are actively promoting inclusive, policy-relevant, and interdisciplinary research practices. Ghana's coordination efforts, led by the Ghana Tertiary Education Commission (GTEC) and think tanks such as IMANI and ACET, have helped integrate research into public policy frameworks. Nigeria has invested in a thriving innovation ecosystem through hubs like Co-Creation Hub (CcHub) and is experimenting with governance mechanisms, such as the proposed National Research and Innovation Council (NRIC). Côte d'Ivoire is distinguished by its efficient alignment of national

research priorities with international collaborations, leveraging platforms like Horizon Europe and Erasmus+. Senegal's participatory models and regulatory advances through MESRI exemplify robust institutional engagement, while Sierra Leone, though emerging from conflict and crisis, is rebuilding a resilient system with international support and community-based approaches.

While both regions grapple with challenges of underfunding, inequitable access, and capacity gaps, West Africa's experience shows a more embedded and actionable commitment to transformation. National funding frameworks are more operational, policy implementation is better coordinated, and institutional partnerships, both domestic and international, are more robust. Central Africa, although rich in emerging innovations and localized experiments, still faces structural weaknesses in governance, inter-institutional collaboration, and regulatory enforcement.

In summary, the historical pathways of research system development in West and Central Africa reflect shared colonial legacies and economic disruptions, but diverge markedly in their adaptive responses and reform trajectories. West Africa is positioned further along the path of systemic transformation, supported by operational funding structures, engaged civil society, and regional integration. Central Africa, although increasingly embracing reform, remains in a foundational rebuilding phase, where transformative progress is contingent upon deeper institutional consolidation, enhanced coordination, and the localization of research priorities and governance.

3.1.2. Actors that support or oppose the vision of transformation, their power and influence in the ecosystem

The evolution of power and influence in the research ecosystem of West and Central Africa has witnessed significant shifts through distinct phases. Power in this context refers to the ability to control or make decisions, while influence refers to the ability to affect or sway those decisions. Power is often associated with formal authority, such as a position of leadership, while influence can be held by anyone, regardless of their formal role or position. Power is often used to achieve specific goals or outcomes, while influence is used to persuade or change the attitudes or behaviours of others. Stakeholders with high power can control or direct others, enforce their own interests, or influence outcomes. Those with high influence, on the other hand, have the capacity to shape the beliefs, attitudes, or actions of others without using coercion or force. During the colonial era, metropolitan governments and European research institutes held the highest power. They dominated the landscape, exerting top-down control over research priorities and institutions, with local academia playing a marginal role. In the independence period, power transitioned to national governments and newly established public universities, as states sought to nationalize research and use it as a tool for development. However, the Structural Adjustment era of the 1980s and 1990s saw a significant shift, as the World Bank, international financial institutions, and donor agencies, often working through NGOs and consultancies, took the lead in shaping research agendas, resulting in fragmented and externally driven systems. By the 2000s, donors remained powerful but began partnering more with local institutions through international collaborations and the emergence of national grant bodies, marking a gradual return of domestic influence. From the 2010s to the present, power has become increasingly plural and negotiated, shared among national science granting councils (SGCs), universities, regional organizations, donors, the private sector, and the African diaspora, reflecting a more complex and interconnected research governance landscape. Drawing on insights from the transformative research landscape in West and Central Africa, the actors who currently support or may oppose the vision of transformative change in the research ecosystem can be categorized into several groups. These actors play roles that either align with or challenge the five pillars of transformative research: Equitable, Open, Capable, Connected, and Regulated research as

presented below:

1. **Government Ministries and Agencies:** In both Central and West Africa, government ministries hold the formal authority to shape national research agendas, implement STI policies, and coordinate funding flows. However, their effectiveness and integration differ significantly. In Central Africa, ministries such as the Ministry of Scientific Research and Technological Innovation (DRC) and counterparts in Cameroon and the Republic of Congo have formulated STI policies, but weak enforcement, limited cross-sectoral coordination, and bureaucratic inertia remain pervasive. For example, in the DRC, ministries operate in silos and suffer from politicized appointments and non-operational regulations. In West Africa, ministries tend to be more functionally aligned. For instance, Ghana's Ministry of Environment, Science, Technology and Innovation (MESTI) and the Ghana Tertiary Education Commission (GTEC) demonstrate higher policy coordination. Similarly, Senegal's MESRI provides structured support to national innovation and research. However, even in countries like Nigeria, inter-ministerial fragmentation persists, often leading to overlapping mandates and duplication of efforts. While both regions struggle with policy enforcement, West African ministries exhibit greater institutional coordination and stronger vertical linkages with research institutions and donors, particularly in Ghana and Senegal, unlike the more fragmented and underpowered counterparts in Central Africa.
2. **Research Institutions, Universities and Think Tanks:** Universities, research centers and think tanks are the core knowledge engines across both regions. However, their roles in transformation differ based on their embeddedness in governance structures and level of operational autonomy. In Central Africa, institutions like UNIKIN, CERDAS, and Marien Ngouabi University lead research production and international partnerships. Their influence is often externally amplified through collaborations with global actors like UNESCO, UCL, or Maryland University. Despite strong interest in transformation, they remain highly donor-dependent and under-resourced domestically. In West Africa, research institutions display greater diversity of funding, more policy engagement, and deeper regional collaboration. Ghanaian institutions (University of Ghana, KNUST) and Nigerian universities (e.g., UI, UNILAG) drive research outputs and policy discourse, albeit constrained by limited funding. Institutions like INP-HB and CSRS in Côte d'Ivoire, and UCAD in Senegal, are engaged in open science and regional research integration. Central African institutions are technically strong but structurally isolated, whereas West African institutions, especially in Ghana, Côte d'Ivoire, and Senegal, are more embedded in national policy ecosystems and exhibit a higher level of institutional connectivity.
3. **Development Partners and International Donors:** In both regions, donors play critical roles as funders, agenda-setters, and capacity-builders, but the balance of influence versus alignment with local priorities varies. In Central Africa, donors (e.g., USAID, AFD, UNICEF, EU) are often the dominant enablers, particularly in fragile contexts like the DRC. However, their support is often top-down, imposing research themes and methods that undermine local ownership and relevance. For example, DRC respondents noted that donor-driven research often sidelined national needs. In West Africa, donor involvement is similarly significant but exhibits greater contextual alignment. In Ghana, development partners received the highest influence rating (4.7/5) and actively engage with government actors to support coordinated policy frameworks. In Sierra Leone, donors such as UNESCO and Irish Aid play a catalytic role in rebuilding post-Ebola systems, aligned with national recovery priorities. Donor dependence is a structural constraint in both regions, but donor-local alignment is stronger in West Africa, particularly in Ghana, Côte d'Ivoire, and Senegal, where funding flows are better harmonized with national research priorities.
4. **Civil Society Organizations (CSOs), NGOs, and Community-Based Organizations:** Across both

regions, CSOs play critical roles in promoting equity, transparency, and grassroots inclusion, though their institutional integration differs. In Central Africa, actors like RODHECIC and the Peace Without Borders Consortium (DRC) drive inclusive research through observatories and public platforms. They advocate for the participation of marginalized groups and community-based data collection. Despite high transformative interest, their influence is constrained by poor access to policymaking and structural underfunding. In West Africa, CSOs are better integrated into national policy discussions. For instance, in Ghana, think tanks like IMANI and ACET not only promote evidence-based advocacy but also influence policy formulation. In Nigeria, CSOs increasingly promote gender equity and ethical research. While CSO influence is growing in Côte d'Ivoire and Senegal, they still face barriers to inclusion in formal research governance. However, Civil society actors in Central Africa are deeply engaged but structurally excluded as they are not formally embedded in the national research system. Their West African counterparts, especially in Ghana, are more institutionally recognized and policy relevant.

5. **Private Sector and Innovation Hubs:** The private sector is an under-leveraged actor in both regions, though its potential is more visible in West Africa. In Central Africa, private sector involvement is mostly transactional and sporadic. Examples like Congo Agriculture Partners indicate isolated engagements with little systemic impact or policy input. In West Africa, the private sector is increasingly connected to innovation ecosystems. For instance, CcHub (Nigeria) and Orange Fab CI (Côte d'Ivoire) are integrating research with entrepreneurship and digital innovation. Ghana's Impact Investing Ghana serves as a bridge between research and markets. Still, overall integration into national research frameworks remains weak. West Africa is more advanced in leveraging tech hubs and entrepreneurship platforms for research translation, whereas Central Africa lacks institutional incentives or frameworks to formalize private sector engagement.
6. **Media and Knowledge Brokers:** Media actors are emerging as potential amplifiers of open research in both regions, but their roles remain limited. In Central Africa, outlets like Top Congo FM engage in dissemination but suffer from weak scientific literacy and editorial capacity. In West Africa, media engagement is more advanced in Ghana and Nigeria, where science communication is increasingly linked to transparency and accountability. Nonetheless, formal power and structural involvement in the research ecosystem remain low. Both regions underutilize the media in research dissemination; however, West Africa shows greater experimentation with public engagement tools and the promotion of open data through media.

The comparative analysis of actor dynamics in Central and West Africa highlights both structural similarities, such as donor dependency, underfunded institutions, and limited private sector engagement, as well as systemic differences in governance maturity, coordination, and institutional integration. While both regions aspire to build equitable, open, capable, and regulated research ecosystems, West Africa is further along the path, supported by more coherent policies, functional funding mechanisms, and diversified actor engagement. In contrast, Central Africa continues to grapple with fragmentation, limited autonomy, and exclusionary governance structures, despite strong local interest and innovative potential. The path to transformation in both regions thus hinges not only on actor participation but also critically on the depth of their interconnection and institutional alignment with the five transformative pillars.

3.1.3 Ideas and Innovations that are enabling the system to transform

The findings of the research landscape study provide detailed information on the ideas and innovations driving transformation in the research ecosystems of Central and West Africa. The results highlight how both regions are responding to the need for more equitable, open, capable, connected, and regulated research systems; yet, they differ significantly in scope, institutional maturity, and innovation infrastructure as presented below:

1. **Equitability: Inclusion and Participatory Research:** Both regions are increasingly recognizing the importance of equitable research that includes marginalized groups, but the mechanisms and institutional frameworks supporting this differ. In Central Africa, the Democratic Republic of the Congo (DRC) leads with inclusive platforms, such as the Annual Scientific Engineering Conclave, and targeted STEM access programs for women, youth, and persons with disabilities. These initiatives are coordinated by institutions like CERDAS and supported by civil society actors. The Republic of Congo, through partnerships with UNICEF and the French Development Agency (AFD), promotes social inclusion in research related to child protection and the development of productive safety nets. However, equitability remains primarily donor-driven and is not yet systemically embedded. In West Africa, equity is more deeply institutionalized. For instance, Senegal's participatory research engages farmers and pastoralists in co-developing agricultural knowledge, while Côte d'Ivoire leverages youth and women's networks in grassroots research dissemination. Ghana benefits from policy-engaged CSOs such as IMANI and ACET, which champion equity-focused evidence generation. These engagements reflect broader inclusion across both formal and informal structures, making West Africa's progress more systemic than Central Africa's donor-dependent model. However, West Africa exhibits more structurally integrated equity mechanisms via CSO engagement and policy-driven inclusion; Central Africa relies on isolated or donor-supported initiatives.
2. **Openness: Open Science, Data Sharing, and Public Engagement:** Open science remains a developing domain across both regions, but uptake and institutionalization vary. In Central Africa, the DRC has introduced several digital platforms, such as Politoscope and the Peace Observatory, which provide real-time access to research data on governance and development. Organizations like CRIIC and IRS host open-access libraries, while partnerships with institutions like the French Institute support public engagement. These reflect an emergent yet fragmented open science ecosystem, heavily reliant on donor funding and not yet widely adopted across institutions. By contrast, West African countries demonstrate broader systemic adoption of open science. Ghana and Nigeria have introduced institutional repositories, open-access publishing policies, and collaborative platforms within universities and innovation hubs. For example, KNUST and the University of Ghana lead in expanding open publishing, while Nigeria's Co-Creation Hub (CcHub) supports tech-enabled open data practices. In Côte d'Ivoire, research institutions like CSRS and INP-HB are connected to global data-sharing platforms such as Horizon Europe, supporting international collaboration and transparency. West Africa's open science practices are more institutionalized and policy-aligned, whereas Central Africa's initiatives are promising but remain isolated and experimental.
3. **Capability: Research Skills, Infrastructure, and Human Capital Development:** Capacity-building is a central pillar for both regions, but with differing levels of coordination and scale. Central Africa's capacity-development efforts are spearheaded by institutions like CERDAS and LACDEV in the DRC, which run local and international training programs in collaboration with UCL (Belgium) and Canadian institutions. The Republic of Congo relies heavily on health-focused institutions such as Louis Pasteur City and the Professor Toumi Foundation for technical upskilling. Cameroon places a high premium on workforce training, although infrastructure gaps remain a major constraint. West Africa, on the other hand, benefits from larger, more integrated institutional ecosystems. TETFund in Nigeria provides sustained infrastructure and research training funding across tertiary institutions. Universities in Ghana and Senegal offer high-quality postgraduate programs linked to international networks. Côte d'Ivoire has developed a structured approach via FONSTI, PASRES, and PASET RSIF, creating dedicated pipelines for early-career researchers and academic mobility. However, West Africa supports capacity development through institutionalized, nationally funded mechanisms (e.g., TETFund, FONSTI), while Central Africa relies more on project-based international partnerships.

4. **Connectivity: Regional and International Collaborations:** Both regions recognize the importance of being globally linked and locally grounded, but they differ in how connectivity is operationalized. In Central Africa, the DRC has built connections with international academic institutions like Maryland University, UNESCO, and IVA, leading to joint research projects and academic mobility. The Republic of Congo collaborates with WFP, UNHCR, and regional networks like CAMES, primarily in public health. Cameroon maintains moderate engagement with USAID, WHO, and SIDA, though connections are often donor-initiated and not sustained through formal research diplomacy. West Africa's connectivity is deeper and more systematic. Côte d'Ivoire links national research to international platforms like Horizon Europe, Erasmus+, and PASET RSIF, providing structured researcher mobility and co-funded programs. Ghana and Senegal foster multi-stakeholder collaboration, connecting government, academia, and civil society through policy frameworks. Nigeria's innovation hubs (e.g., Andela, CcHub) serve as brokers between global tech ecosystems and national R&D. West Africa exhibits higher-density, policy-embedded international collaborations, whereas Central Africa's connectivity remains episodic and donor-mediated.
5. **Regulation: STI Policies, Legal Frameworks, and Institutional Governance:** Regulatory reform is a shared priority, but enforcement capacity is a key differentiator. In Central Africa, the DRC has adopted an STI policy and proposed legal reforms aimed at promoting merit-based leadership and developing a researcher network, yet enforcement remains weak. The Republic of Congo has a national scientific strategy with partial implementation, and Cameroon's STI policy, though present, lacks coordination across sectors. In West Africa, regulatory systems are more robust and operationally aligned with national research strategies. Senegal's Research and Innovation Strategy supports interdisciplinary collaboration, backed by funding from MESRI, Côte d'Ivoire's operational frameworks (FONSTI and PASRES) link regulation to financing and performance monitoring. Ghana is currently reviewing its STI policy (2017–2022), reflecting an iterative, learning-based approach. Nigeria's NRIC (proposed) and TETFund reflect institutional reform processes, although execution challenges persist. While West Africa shows more coherent STI governance and institutional policy cycles, Central Africa is still struggling with weak enforcement and fragmented oversight.

Across both Central and West Africa, the pursuit of a transformative research ecosystem is progressing under the shared vision of the Transformative Research for Development framework. However, the maturity, institutional coherence, and systemic integration of transformative innovations vary widely. West Africa demonstrates greater institutionalization of inclusive practices, open science, coordinated capacity-building, and regulated funding mechanisms. Countries such as Ghana, Côte d'Ivoire, and Senegal demonstrate higher levels of strategic alignment, public-private-civil sector synergy, and donor harmonization. Central Africa, led by the DRC, is experimenting with promising digital and social innovations (e.g., Politoscope, Peace Observatory), but these remain project-based and donor-dependent. Governance, enforcement, and systemic connectivity are still emerging. The core challenge for Central Africa is to scale and embed its fragmented innovations into national research systems, supported by stronger governance and local funding structures. For West Africa, the imperative is to consolidate and deepen its advances, ensuring that progress reaches peripheral institutions and communities. Both regions share a growing commitment to transformation, but are at different stages of systemic readiness and institutional maturity.

West Africa's research ecosystem is systemically mature and policy-coherent, transitioning toward deepening and scaling transformation. Central Africa, while innovative and engaged, remains at a foundational stage, needing to institutionalize and integrate its emergent practices. Countries such as Ghana, Côte d'Ivoire, and Senegal serve as regional transformation nodes, while Cameroon and the DRC represent potential pivots in Central Africa if governance and coordination improve. In terms of country readiness

and maturity for transformative research, the selected countries can be presented in a gradient as follows:
Most Mature → Least Mature
Ghana → Côte d'Ivoire → Senegal → Nigeria → Cameroon → DRC → Congo → Sierra Leone

Table 1 below presents a detailed summary on systemic readiness and institutional maturity in both regions.

Table 1: Summary of the Typology of Systemic Readiness and Institutional Maturity Across the Two sub Regions

Region	Overall Systemic Readiness	Institutional Maturity	Key Traits/Characteristics
West Africa	High to Moderate readiness	Mature and structured institutions	• **Functioning and policy-aligned STI frameworks**, with strong national coordination mechanisms (e.g., Ghana's MESTI, Nigeria's TETFund, Côte d'Ivoire's FONSTI & PASRES, Senegal's MESRI). • **Institutionalized funding systems** that link research priorities with national development goals. • **Active civil society** and **private sector engagement**, promoting inclusivity and innovation. • **Open science and digital platforms** are increasingly mainstreamed in universities and national research networks. • **Regional connectivity** through ECOWAS, PASET, and the African Research Universities Alliance, supporting collaborative growth. • **Research is increasingly policy-relevant and demand-driven,** anchored by think tanks and innovation hubs (IMANI, ACET, CcHub).
Central Africa	Low to Emerging readiness	Nascent and fragmented institutions	• Early-stage STI frameworks (e.g., DRC, Congo, Cameroon) exist but with weak enforcement and donor dependence. • Institutions (e.g., CERDAS, LACDEV, Professor TOUMI Foundation) are innovative but project-based, lacking systemic integration. • High external dependence on donors for research funding, agenda-setting, and capacity development. • Limited policy coordination, ministries often operating in silos with overlapping mandates. • Civil society deeply engaged but structurally excluded, with minimal access to policymaking spaces. • Open science and digital innovations (e.g., Politoscope, Peace Observatory) show promise but remain fragmented. • Weak infrastructure and research funding ecosystems constrain transformation.

3.1.4. Barriers and Enablers for Change

From the findings of the study, the key enablers and barriers to transformation across both regions were identified and are presented below:

1. **Enablers of Transformative Change**

a) ***Inclusion and Gender Equity:*** Inclusion is emerging as a strategic priority in both regions but varies in structure and depth. Central Africa promotes equity through initiatives like STEM programs for women and youth in the DRC and AFD-supported social research in Congo. However, these are project-based and lack enforcement frameworks. In West Africa, inclusion is more policy-aligned and systemic. Senegal engages farmers and marginalized groups in participatory research. Ghana and Côte d'Ivoire incorporate CSOs and youth into research priority-setting, while Nigeria supports gender-sensitive grantmaking via TETFund. West Africa embeds inclusion in national systems; Central Africa operates on donor-driven, ad hoc models.

b) ***Open Science and Knowledge Access:*** Open science is gaining traction across both regions but remains nascent and unevenly adopted. In Central Africa, the DRC's Politoscope, Peace Observatory, and CRIIC's open-access library represent pioneering tools for real-time research dissemination. However, these initiatives are donor-driven and lack system-wide uptake. Cameroon and Congo show low-to-moderate institutionalization of open science practices. In West Africa, open-access platforms and data repositories are integrated into university operations. Ghana and Nigeria have developed institutional repositories and support open publishing. Côte d'Ivoire's engagement with Horizon Europe reinforces data sharing standards, while Senegal and Sierra Leone prioritize open access in health and climate research. Central Africa's open science infrastructure is project-specific; West Africa supports broader system-level institutional adoption.

c) ***Human Capacity Development:*** Both regions prioritize human capital as a driver of system transformation. However, Central Africa leans heavily on external partnerships while West Africa benefits from nationally institutionalized training mechanisms. In Central Africa, the DRC's CERDAS and LACDEV provide researcher training through hybrid models, in collaboration with UCL and other international institutions. Cameroon stakeholders rated workforce development highest among enablers. The Republic of Congo's Louis Pasteur City and Professor TOUMI Foundation offer specialized technical training, particularly in health-related fields. In West Africa, Nigeria's TETFund funds research, training, and infrastructure development. Ghana's universities (e.g., KNUST, UG) offer postgraduate programs aligned with policy needs. Côte d'Ivoire's integration into global platforms such as PASET RSIF and Erasmus+ helps build a structured researcher pipeline. Central Africa's efforts are externally supported and fragmented, while West Africa demonstrates system-integrated, publicly financed capacity development.

d) ***International Collaboration:*** International engagement is an important enabler in both regions, but Central Africa is more donor-dependent and project-based, whereas West Africa aligns collaborations with national STI agendas. The DRC collaborates with UNESCO, UCL, and Maryland University, and Congo works with AFD, WFP, and UNHCR. Cameroon engages SIDA, USAID, and GTZ. These partnerships often drive innovative practices, but lack long-term institutional embedding. In West Africa, collaboration is more strategic. Ghana, Côte d'Ivoire, and Senegal are integrated into Horizon Europe, World Bank, and PASET consortia. In Sierra Leone, UNESCO and Irish Aid support system rebuilding aligned with government priorities. Central Africa shows episodic international linkages; West Africa demonstrates structured and policy-aligned partnerships.

e) ***STI Policy Commitment and Regulatory Frameworks:*** Policy commitment is evident in both regions, but operationalization differs. In Central Africa, STI policies in the DRC, Cameroon, and Congo exist on paper but suffer from poor implementation and regulatory fragmentation. For example, DRC stakeholders noted that research governance is often driven by political appointments, not merit-based criteria. In West Africa, STI policies are more functionally embedded. Ghana's policy (2017–2022) is under review with stakeholder input. Côte d'Ivoire and Senegal link STI policy to research funding

through agencies like FONSTI and PASRES, while Nigeria has proposed a National Research and Innovation Council (NRIC) to centralize governance. While West Africa exhibits policy maturity with active review and enforcement structures, Central Africa struggles with policy inertia and weak oversight.

Besides these initial attributes, other pockets of change exist including the emerging partnerships between universities and the private sector. In Nigeria for instance, the University of Lagos partners with Nord Motors in an on-campus automobile assembly facility. In Ghana, Toyota is partnering with the University of Ghana. Also, there is a process of transferring scientific knowledge to faith-based organizations in Ghana. These innovative approaches are critical towards transforming the future of research in West and Central Africa.

2. Barriers to Transformation

a) ***Governance and Institutional Incoherence:*** Governance is the most cited barrier across both regions, but its manifestation differs. In Central Africa, institutional fragmentation is acute. The DRC has multiple overlapping ministries, politicized appointments, and non-functional regulations. Cameroon and Congo lack coordination and transparency in research governance. In West Africa, governance issues persist, particularly in Nigeria, but countries like Ghana and Senegal demonstrate iterative policy cycles, stakeholder engagement, and regulatory updates. While West Africa is evolving toward policy coherence, Central Africa remains trapped in institutional dysfunction.

b) ***Research Funding Constraints:*** Underfunding is a cross-cutting challenge, but West Africa shows more proactive responses. In Central Africa, research is largely externally financed, with limited access to national funding pools. Respondents in the DRC reported that domestic funding mechanisms are poorly advertised and inaccessible. In West Africa, countries like Nigeria (TETFund) and Côte d'Ivoire (FONSTI) operate national research funding institutions, though gaps persist in equitable disbursement and scale. Central Africa suffers from donor-dominated, opaque funding flows; West Africa has structured but under-resourced domestic financing.

c) ***Infrastructure and Digital Gaps:*** Infrastructure challenges persist, particularly in Central Africa. In the DRC, labs lack basic tools and AI systems. Foundational elements needed to leverage e-applications in government solutions and key sectors like health, education and agriculture are inexistent or weak in the DRC (World Bank 2020). Cameroon and Congo report similar deficiencies. Sierra Leone also faces infrastructure challenges, though rebuilding is ongoing. Ghana, Nigeria, and Côte d'Ivoire maintain better infrastructure in flagship universities, albeit with regional disparities. West Africa has partial infrastructure resilience; Central Africa exhibits critical deficits across digital and physical systems.

d) ***Fragmentation and Weak Networks:*** Weak coordination among actors is another shared barrier. Central Africa lacks national research networks, with stakeholders operating in silos. In contrast, West Africa has emerging collaborative platforms, including Ghana's think tanks, Senegal's innovation consortia, and Nigeria's tech hubs, although cohesion is still a work in progress. Central Africa operates in isolation; West Africa has growing but still uneven stakeholder integration.

3. Transformation Catalysts (TCs)

The Transformation Catalysts (TCs) are defined as actors, institutions, or platforms that drive or facilitate systemic change by connecting actors, promoting innovation, and championing the five pillars. From the study, the TCs identified in Central Africa include:

a) CERDAS (DRC): Serves as a research hub advancing capacity development and policy innovation, including inclusive STEM and hybrid training models.

b) CRIIC & Politoscope (DRC): Lead digital engagement for open science and governance.

c) Peace Without Borders Consortium (DRC): Facilitates inclusive peace research through civil society networks.
d) Professor TOUMI Foundation (Congo): Offers health-related training and acts as an interface between policy and research.

These TCs are influential but often project-based, externally financed, and not institutionally mainstreamed.

In West Africa, the following TCs were identified:
a) TETFund (Nigeria): A central catalyst funding infrastructure, training, and research grants.
b) FONSTI & PASRES (Côte d'Ivoire): Operate as research funding institutions embedded in STI frameworks.
c) IMANI & ACET (Ghana): Policy think tanks bridging civil society and government.
d) UCAD (Senegal): Champions participatory research and open science.
e) Innovation Hubs (CcHub, Orange Fab): Support digital inclusion and knowledge transfer.

In West African, TCs are institutionalized, often operating at a national scale, and are integrated into policy frameworks, thereby enabling sustainability. In contrast, Central African TCs are innovative but peripheral, whereas West African TCs are embedded and systemic, serving as vehicles for transformation across policy, funding, and practice. In both regions, the study revealed shared constraints including underfunding, infrastructure deficits, and governance gaps, interacting with divergent capacities and institutional maturity. West Africa is, however, better positioned for transformation, with more institutionalized enablers, functioning TCs, and policy-aligned coordination mechanisms. Central Africa, particularly the DRC and Cameroon, shows innovation potential but remains stymied by governance failure, policy fragmentation, and donor dependence. For Central Africa to catch up, greater emphasis must be placed on mainstreaming catalytic actors, building resilient funding systems, and strengthening coordination across stakeholders. West Africa's challenge lies in scaling and sustaining its progress, ensuring that transformation is inclusive, equitable, and system-wide.

There are also some TCs operating at the regional level, promoting collaborations and partnerships among actors. Through their engagement platforms, they bring together stakeholders, providing opportunities for regional transformation. Examples of such regional networks include the Association of African Universities (AAU), Regional Universities Forum for Capacity Building in Agricultural (RUFORUM), African Women in Agricultural Research and Development (AWARD), African Malagasy Council for Education (CAMES).

3.1.5. Strategic Implications/Recommendations for a Transformative Research System

Based on the findings of the study, the following strategic implications/recommendations are proffered:

1. ***Strong partnership between research and government****:* Researchers and government should work hand-in-hand towards national development. While government provides regulations, funding and other platforms for research to thrive, research outputs should be made key to national development decision making. Research should provide evidence to the government on critical development issues to inform policy and practice. This is of a top priority in ensuring a transformed research ecosystem.
2. ***Leveraging Existing Institutional Assets:*** Both regions exhibit a mix of legacy institutions, emergent platforms, and embedded expertise that can be mobilized to scale transformation. In Central Africa, opportunities lie in reinforcing emerging institutions that already demonstrate transformative potential. For example, the DRC's CERDAS, LACDEV, and the Peace Observatory offer platforms for inclusive,

locally driven research and policy dialogue. Similarly, the Professor TOUMI Foundation and Louis Pasteur City in Congo provide foundational infrastructure for health-related innovation and training. However, these institutions remain project-dependent and require strategic investment to scale nationally. In West Africa, the presence of mature institutions and nationally integrated research actors presents stronger opportunities for system-wide transformation. Ghana's KNUST and University of Ghana, Nigeria's TETFund, and Côte d'Ivoire's FONSTI and PASRES are operationally aligned with national STI priorities. Senegal's MESRI and UCAD also act as hubs for policy-embedded research and innovation. Central Africa must consolidate and scale isolated excellence into system-wide anchors; West Africa can deepen and replicate existing institutional successes to enhance national research capacity.

3. ***Institutionalizing Inclusive and Participatory Research Models:*** Equitable transformation demands systems that include youth, women, civil society, and marginalized communities. In Central Africa, the DRC's Annual Scientific Engineering Conclave, STEM equity programs, and public policy observatories demonstrate early efforts to engage non-traditional actors. However, these remain isolated and externally driven. There is an opportunity to institutionalize these practices into national curricula, research mandates, and regulatory frameworks. In West Africa, several countries are already mainstreaming participatory models. Senegal's co-production of knowledge with farmers, Ghana's CSO-government policy dialogues, and Côte d'Ivoire's youth research networks represent a systemic embrace of inclusion. These efforts could be expanded to support decentralized innovation systems, especially in underserved regions and sectors. Central Africa has incipient participatory models with limited institutional embedding; West Africa exhibits broader and more systemic incorporation of inclusive research practices.
4. ***Scaling Open Science and Digital Knowledge Platforms:*** Digital transformation and open science infrastructure offer both regions a critical pathway to global visibility, data democratization, and research impact. In Central Africa, open science innovations such as the Politoscope, CRIIC's digital libraries, and the Peace Observatory show significant promise. These tools provide real-time, citizen-facing platforms for policy monitoring, participatory research, and information dissemination. There is a strategic opportunity to expand access, enhance interoperability, and build institutional mandates around digital openness. In West Africa, open science is already being mainstreamed through institutional repositories, digital grant platforms, and open publishing mandates. Ghana and Nigeria have established university-led open-access infrastructure, while Côte d'Ivoire and Senegal engage in cross-national data-sharing initiatives, linked to Horizon Europe and PASET. Further opportunities lie in harmonizing standards and expanding access beyond urban research centers. Central Africa has innovative but fragmented digital platforms with limited scale; West Africa demonstrates system-wide adoption with potential for regional harmonization.
5. ***Enhancing Regulatory Coherence and Institutional Autonomy:*** Regulatory reform is a strategic fulcrum for both regions but demands different interventions based on systemic readiness. In Central Africa, key regulatory frameworks (e.g., STI policies in the DRC, Cameroon, and Congo) exist but are under-implemented, poorly monitored, and politically influenced. Strategic opportunities include merit-based leadership appointments, creation of national researcher databases, and establishing performance-based funding mechanisms. In West Africa, there is more policy continuity and iterative reform. Ghana is currently reviewing its STI policy, while Côte d'Ivoire operationalizes regulation through FONSTI and PASRES. Nigeria's proposed National Research and Innovation Council (NRIC) could serve as a central coordination platform if fully enacted. Opportunities lie in deepening regulatory accountability, scaling policy innovation across states, and linking STI law to the disbursement of funding. Central Africa needs to activate dormant regulatory tools and enforce accountability; West Africa should focus on policy deepening, decentralization, and legislative integration.

6. ***Strengthening Regional and Global Connectivity:*** Connectivity across sectors, countries, and global networks enhances resilience, innovation, and knowledge translation. In Central Africa, regional collaboration remains underdeveloped. While countries participate in CAMES and benefit from bilateral partnerships, there is no formal regional research integration platform. Strategic options include creating Central African research consortia, improving South-South collaborations, and formalizing diaspora partnerships. In West Africa, inter-country collaboration is more advanced. ECOWAS frameworks, cross-border funding programs, and institutional partnerships (e.g., PASET RSIF, African Research Universities Alliance) provide robust platforms for regional engagement. Expansion of regional data platforms, joint research calls, and cross-border PhD programs can further consolidate this strength. Central Africa must build connectivity infrastructure from the ground up, as West Africa has the opportunity to scale and institutionalize existing regional networks.
7. ***Transforming the Role of Civil Society and Private Sector*** Civil society and private actors offer strategic potential to scale demand-responsive research, ethical accountability, and innovation linkages. In Central Africa, civil society actors such as RODHECIC and the Peace Without Borders Consortium have demonstrated transformative interest, especially in peace and governance research. However, they face institutional exclusion from policymaking. The private sector, while emerging (e.g., Congo Agriculture Partners), lacks formal engagement pathways. Opportunities include policy co-creation platforms, multi-stakeholder observatories, and private sector incentives for R&D. In West Africa, CSOs are often policy actors in their own right. Ghana's IMANI and ACET, Nigeria's civil society grant programs, and Côte d'Ivoire's engagement of youth collectives provide strong models. The private sector, through hubs like CcHub, Orange Fab CI, and Andela, is directly involved in innovation systems. These models can be replicated across new thematic sectors (e.g., climate, health) and scaled in rural zones. Central Africa must institutionalize inclusive governance and expand multi-actor partnerships; West Africa can consolidate CSO-private sector integration and broaden sectoral impact.
8. ***Mobilizing Strategic Funding Mechanisms:*** Targeted and transparent financing is critical to catalyze transformation. Central Africa, for instance, relies primarily on donor-driven, project-based financing with little national coordination. There is an urgent opportunity to establish national research funds, clarify eligibility, and link disbursement to national priorities. The DRC's lack of publicized funding, despite available mechanisms, reveals a severe communication and coordination gap. In West Africa, countries like Nigeria (TETFund) and Côte d'Ivoire (FONSTI, PASRES) operate national research funds with strategic alignment. Ghana is also coordinating donor support to reduce fragmentation. Further potential lies in incentivizing interdisciplinary research, encouraging public-private co-financing, and ensuring equitable fund distribution. Central Africa must establish and institutionalize transparent research funding, while West Africa can optimize fund governance and scale sectoral investments.
9. ***Community participation:*** ensuring that research addresses community needs is essential in addressing the critical developmental challenges in both regions. Researchers, government and other stakeholders should prioritize community involvement from the conceptualization of research, through implementation and uptake of research results.

The strategic opportunities in both Central and West Africa are grounded in shared aspirations toward a transformative, inclusive, and sustainable research ecosystem. However, the readiness and leverage points differ: Central Africa faces an opportunity to transition from pilot innovations to system-wide institutionalization. The region must focus on activating regulatory frameworks, scaling digital tools, formalizing stakeholder networks, and building national and regional funding infrastructure. Strategic investments in institutions like CERDAS, Politoscope, and civil society alliances can anchor this transformation if mainstreamed into national research agendas. West Africa, by contrast, has entered a

phase of institutional deepening and network consolidation. The key opportunities lie in expanding inclusion, scaling open science and participatory models, harmonizing regulatory ecosystems, and broadening regional research consortia. Countries like Ghana, Côte d'Ivoire, Senegal, and Nigeria can serve as transformation nodes for the sub-region, exporting models of structured STI governance, multi-stakeholder engagement, and coordinated research financing.

4. Conclusion

This research landscape study of West and Central Africa presents a rich, comparative analysis of the regions' capacities, constraints, and trajectories toward a transformative research for development (R4D) ecosystem. Drawing on the five pillars of Equitable, Open, Capable, Connected, and Regulated research, the study reveals both shared structural constraints and divergent pathways shaped by historical, institutional, and political contexts. Central Africa, comprising the Democratic Republic of Congo, the Republic of Congo, and Cameroon, demonstrates emergent but fragmented progress. Conversely, West Africa, represented by Ghana, Nigeria, Senegal, Côte d'Ivoire, and Sierra Leone, exhibits more institutional coherence, policy maturity, and systemic integration. One of the overarching findings is that both regions are engaged in aspirational reforms that seek to align their research ecosystems with inclusive development goals. However, the maturity of institutional arrangements, the breadth of stakeholder engagement, and the operationalization of STI policies differ considerably. West Africa is further along this trajectory. Countries such as Ghana, and Côte d'Ivoire illustrate how nationally embedded institutions, including TETFund, FONSTI, PASRES, and think tanks (e.g., IMANI and ACET), can translate policy into practice, promote interdisciplinary knowledge production, and bridge the gap between civil society and government. These countries have institutionalized funding mechanisms, participatory research models, and digital platforms for open science. In contrast, Central African countries are at a foundational stage where innovation exists, but it is largely externally funded and structurally unanchored. Institutions such as CERDAS and LACDEV in the DRC, or the Professor TOUMI Foundation in Congo, act as promising transformation catalysts (TCs), but their reach remains limited by weak regulatory enforcement, fragmented governance, and donor dependency. There is limited horizontal and vertical alignment between government ministries, research institutions, and civil society. The absence of robust national funding mechanisms and institutional incentives further exacerbates this disconnect.

Despite these differences, common enablers such as international collaboration, growing youth engagement, civil society participation, and the proliferation of innovation hubs signal a continent-wide shift toward research ecosystems that are more inclusive, responsive, and globally connected. Yet, these catalysts remain unevenly distributed and underleveraged, particularly in Central Africa. The implications of these findings are far-reaching. For Central Africa, a critical next step lies in consolidating innovation into institutional frameworks and scaling up existing TCs through sustained domestic investment and cross-sectoral coordination. This includes activating dormant STI regulations, mainstreaming open science tools like Politoscope, and enabling civil society to move from advocacy to governance. For West Africa, the imperative is to sustain and deepen progress, expand regional research consortia, and ensure equitable distribution of funding and opportunities, especially in post-conflict or marginalized areas. Transformation in both regions will depend on how effectively national governments, regional bodies, and development partners can align around coherent policy frameworks, incentivize inclusive research practices, and enable institutional autonomy and accountability. The future of research in West and Central Africa will be shaped not only by investments in infrastructure and training but also by the capacity of these systems to learn, adapt, and co-produce knowledge with and for society. Only through such a comprehensive and inclusive approach can the research ecosystem serve as a true driver of transformative development across the continent.

References

Gaillard J., van Lill M., Nyasse B., and Wakata A. (2025). Science Granting Councils in Sub-Saharan Africa Country Report: Cameroon. https://horizon.documentation.ird.fr/exl-doc/pleins_textes/divers14-04/010061548.pdf

Ministry of Scientific Research and Technological Innovation (SRTI) (2024). Gilbert Kabanda Reappointed to SRTI: Who is he? Science and Technological Innovations Bulletin . Special Edition, June 2024. https://csnrdc.net/wp-content/uploads/2024/07/BULLETIN-23E-EDITION-ANG.pdf

United Nations Education, Scientific and Cultural Organization (UNESCO) (2005). UNESCO Review of Higher Education Institutions' Responses to HIV and AIDS. Access from: https://healtheducationresources.unesco.org/sites/default/files/resources/DEMOCRATIC%20REPUBLIC%20OF%20THE%20CONGO%20Case%20Study.pdf

Universite Marien Ngouabi, (2020). About UMN. Accessed from: https://www.umng.kube-tech.com/?q=en/node/78

World Bank (2020). Democratic Republic of Congo Digital Economy Assessment. Access from: https://thedocs.worldbank.org/en/doc/61714f214ed04bcd6e9623ad0e215897-0400012021/related/DRC-DE4A-EN-Final.pdf