

From Aspiration to Output: A Research-Capacity Conversion Architecture for Teaching-Oriented Universities

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Abstract

Background: Teaching-oriented and emerging universities are under growing pressure to increase research productivity, doctoral completion, and publication visibility, yet many still lack the institutional conditions required to convert scholarly aspiration into durable output. The central problem is therefore not adequately explained as low individual productivity alone, but as a failure of institutional conversion. **Purpose:** This article develops an evidence-informed Research Capacity Conversion Architecture (RCCA) to explain how teaching-oriented universities can build durable research capability through institutional alignment rather than isolated interventions. **Methods:** The study employs a critical integrative review with framework synthesis and theory-building intent. Evidence was drawn from peer-reviewed studies, conceptual scholarship, regional frameworks, and authoritative policy and programme documents published principally between January 2015 and April 2026, with selective inclusion of earlier seminal works where theoretically indispensable. The review was reported with selective adaptation of transparency principles from PRISMA 2020 and PRISMA-S appropriate to non-effect reviews. Analysis combined deductive coding across eight institutional domains with inductive thematic comparison and abductive model building. **Findings:** The synthesis identifies recurrent bottlenecks in research leadership, research management, supervision and mentoring, ethics and integrity, writing-to-publication support, incentive design, and institutional learning. In response, the article proposes the RCCA as an eight-domain model structured across three interacting layers: strategic foundations, developmental mechanisms, and a recursive conversion-learning loop. The analysis shows that sustainable research growth is best understood as an emergent institutional achievement produced by alignment among governance structures, scholarly practices, and evaluative feedback rather than by training intensity or metric pressure alone. **Conclusion:** The article contributes a theoretically specified, context-sensitive, and operationally useful framework for strengthening research capacity in teaching-oriented universities. It also provides a defensible basis for institutional reform, responsible research assessment, and future comparative implementation research in African and comparable higher education contexts.

Keywords: *research capacity strengthening; teaching-oriented universities; higher education in Africa; research governance; doctoral supervision; responsible research assessment; integrative review.*

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1. Introduction

1.1 Background Context

African higher education now occupies a structurally asymmetrical position within the global knowledge order. Universities across the continent are increasingly expected to generate policy-relevant knowledge, doctoral graduates, innovation, and locally grounded solutions to social and economic crises, yet the institutional conditions that make sustained knowledge production possible remain sharply uneven. UNESCO's recent Africa-focused higher-education materials underscore the scale of this imbalance: the continent invests only 0.78% of gross domestic product in research and development against a global average of 1.93%, generates less than 1% of world research output, and continues to operate within a tertiary system where enrolment remains very low, at roughly 9% compared with a global average of 42% (UNESCO, 2024). The same UNESCO background note, drawing on ARUA and World Bank-linked estimates, indicates that African universities would need to produce approximately 100,000 PhD graduates over the next decade to meet labour-market and development demand. The challenge, therefore, is not simply one of prestige, rankings, or institutional ambition. It is a question of epistemic capacity: who is able to produce authoritative knowledge, under what institutional conditions, and with what degree of continuity, legitimacy, and social relevance.

Recent African initiatives also show that stronger research environments can be built when institutional development is organized deliberately rather than rhetorically. The Africa Higher Education Centers of Excellence programme, for example, has over the last decade supported more than 80 centres across more than 50 universities in 20 countries, enrolling more than 90,000 students including 7,650 PhD candidates and generating over 10,350 internationally peer-reviewed publications (World Bank, 2025). These results matter not because they offer a simple model for replication, but because they demonstrate that research capability does not arise spontaneously

from exhortation or aspiration alone. It is built when institutions align leadership, infrastructure, postgraduate formation, research support, and evaluative routines around a coherent developmental purpose (Cooke, 2005; ESSENCE on Health Research, 2023). The central problem for teaching-oriented and emerging universities is that they are increasingly asked to emulate research-intensive outputs without yet possessing comparable supervision ecosystems, research-management capacity, or protected scholarly time.

Teaching-oriented universities deserve special analytical attention because their constraints are not incidental but systemic. These institutions frequently operate under heavy undergraduate teaching loads, expanding enrolments, limited doctoral depth, fragile grant support mechanisms, and modest traditions of organized mentoring (UNESCO, 2024; Pulford et al., 2020). In such contexts, research is often treated as an individual moral duty rather than an institutional function. Faculty members are told to publish, supervise, and attract grants, but they do so within settings where writing support, ethics administration, proposal development, and promotion criteria are weakly coordinated. The result is institutional decoupling: universities publicly adopt the language of research excellence while the everyday routines that make research possible remain thin, fragmented, or absent (Pulford et al., 2020; Bromley & Powell, 2012).

1.2 Problem Statement

The central problem addressed in this article is the absence of an integrated institutional architecture for research-capacity strengthening in teaching-oriented and emerging universities. Existing scholarship provides considerable insight into individual components of the problem, including mentorship, doctoral supervision, research management, writing groups, ethics training, and incentive systems. Yet these strands of literature often proceed in isolation. They identify useful interventions, but they do not adequately specify how those interventions should be

sequenced, governed, resourced, and evaluated as mutually reinforcing parts of an institutional system. This fragmentation is especially problematic in African higher education, where many universities are attempting to expand research expectations faster than they are building the internal structures needed to support them (Dean et al., 2017; Pulford et al., 2020; IUCEA & APHRC, 2024; Kwan et al., 2021; Senghore & Omotosho, 2025; Lim et al., 2025).

Put differently, the unresolved gap is not merely programmatic but explanatory. The literature tells us that mentoring matters, that supervision matters, that research offices matter, and that incentive systems matter. It tells us much less about the causal ordering through which these elements become mutually reinforcing, remain loosely coupled, or actively undermine one another in teaching-oriented institutions. This is precisely where many reform agendas fail. Universities often adopt the language of excellence before they build the conversion mechanisms that make excellence reproducible. The result is a policy field crowded with interventions yet relatively thin on institutional theory. The present study addresses that gap by shifting the analytical question from “Which intervention matters?” to “What institutional architecture converts dispersed interventions into cumulative capability?”

1.3 Research Aim and Objectives

The overarching aim of the study is to develop an evidence-informed institutional architecture capable of strengthening research leadership, faculty development, supervision quality, ethics and integrity, writing-to-publication pathways, and incentive alignment in teaching-oriented and emerging universities. The study pursues three objectives. First, it **identifies** the principal structural, cultural, and organizational barriers that constrain research productivity in these institutions. Second, it **synthesizes** the institutional mechanisms most strongly supported in contemporary literature for strengthening research capacity. Third, it **formulates** a conceptual and implementation-oriented architecture that can guide university leaders,

graduate schools, and research offices in building more durable research cultures.

1.4 Research Questions

The article is guided by three research questions. **RQ1.** Which structural, cultural, and capability gaps most consistently constrain research productivity in teaching-oriented and emerging universities? **RQ2.** Which institutional mechanisms most consistently strengthen research leadership, faculty development, supervision, ethics governance, writing support, publication mentoring, and incentive alignment in the literature? **RQ3.** How can these mechanisms be coherently integrated into a research-capacity architecture that is realistic for teaching-oriented institutions rather than only for elite research-intensive universities?

1.5 Significance and Contribution of the Study

The article contributes at five levels. Conceptually, it advances the idea of research-capacity conversion to explain how institutions translate dispersed scholarly aspiration into reproducible routines, outputs, and learning. Theoretically, it integrates multilevel capacity thinking, dynamic capabilities, communities of practice, and an explicitly emergent understanding of institutional causation into a single explanatory frame tailored to teaching-oriented universities. Methodologically, it demonstrates how a transparent integrative review can produce theory-building insight without reducing heterogeneous evidence to a single evidentiary hierarchy. Practically, it offers a staged architecture that leaders, graduate schools, and research offices can use to align governance, research management, mentoring, supervision, ethics, writing support, incentives, and institutional learning. Normatively, it argues that research capacity is also a question of epistemic justice: universities with weak research systems do not merely publish less; they are less able to define problems, authorize locally grounded knowledge, and participate on equal terms in the production of legitimate understanding (Fricker, 2007).

2. Literature Review and Analytical Framework

2.1 Conceptual Clarification and Scope of the Field

Research capacity in higher education is often reduced to the visible end-products of scholarship, especially publications, grant income, and doctoral completions. That narrow view is analytically misleading. A stronger definition understands research capacity as an institution's durable ability to generate relevant questions, support methodologically sound and ethically governed inquiry, develop researchers across career stages, supervise postgraduate work well, secure and manage resources, disseminate outputs, and reproduce these capabilities over time. ESSENCE's recent good-practice guidance is especially useful because it conceptualizes capacity strengthening as a multilevel process spanning individuals, institutions, and wider systems, and involving leadership, infrastructure, resources, skills, and culture (ESSENCE, 2023).

Within this article, teaching-oriented universities are defined as institutions whose primary historical mission, staffing pattern, and workload distribution remain centred on undergraduate instruction rather than research intensity, even where research expectations are rising. Emerging universities refer to institutions seeking to expand research and postgraduate output but still consolidating the systems required to do so consistently. Research-capacity strengthening is used in preference to the narrower language of productivity because the latter risks privileging counts over conditions. Productivity matters, but as an outcome of institutional ecology rather than as its synonym. The field examined here therefore sits at the intersection of higher education studies, academic development, organizational theory, research governance, and research ethics.

The article adopts an explanatory-realist stance toward research capacity. It treats capacity not as a visible stock of outputs alone but as an emergent

institutional property generated by the interaction of relatively enduring structures, recurrent practices, and evaluative regimes. On this view, publications, grants, and doctoral completions are important empirical indicators, but they are not the capacity itself. Capacity lies in the generative mechanisms that make such outcomes more or less likely: governance arrangements, workload distributions, mentoring relations, supervisory practices, administrative routines, and integrity systems. This distinction matters because universities may display short-term output growth without having built durable research capability, just as they may possess latent capability that remains constrained by misaligned incentives, fragile support systems, or fiscal shocks (Sayer, 2000).

2.2 State of Scholarship and Major Empirical Debates

Three broad debates structure contemporary literature. The first concerns whether research weakness is best understood as an individual skills problem or a systems problem. Earlier capacity-building efforts often emphasized training workshops, scholarships, and short-term projects. More recent scholarship increasingly argues that such measures, while useful, do not yield durable gains when detached from organizational systems. A scoping review of research-capacity strengthening in low- and middle-income countries concluded that the field had advanced but remained conceptually uneven, with relatively limited attention to how capacity gains are sustained institutionally (Dean et al., 2017). This shift from training to systems thinking is one of the most important developments in the literature. At the same time, much of the most institutionally detailed empirical evidence continues to come from health and health-adjacent capacity-building settings. This is analytically useful because such studies often describe mentoring, governance, ethics, and support systems with unusual granularity, but it also means that transfer into broader university contexts must be made cautiously (Dean et al., 2017; Ng'oda et al., 2024).

The second debate concerns the relative weight of governance and culture. Research management studies show that grants administration, compliance, budgeting, proposal development, and information systems are not peripheral bureaucratic issues but decisive elements of institutional performance. Pulford et al. (2020) synthesized twenty-eight assessments from twenty-five institutions in fifteen sub-Saharan African countries and found recurring deficits across research management and support services, especially under fiscal constraint. Yet mentorship studies reveal that formal structures alone do not guarantee capability. Ng'oda et al. (2024) and Mutale et al. (2023) show that weak mentoring cultures, limited institutional recognition, and insufficient time undermine faculty development even where some programmes exist. Research capacity is therefore neither purely structural nor purely cultural. It depends on how structures enable, reward, and normalize scholarly relationships and routines.

The third debate concerns the meaning of performance and excellence. Promotion systems continue to rely heavily on narrow quantitative metrics, often privileging publication counts while neglecting mentorship, supervision quality, collaborative labour, open science, or societal relevance. A large cross-national analysis of academic promotion policies found substantial variation but also a persistent reliance on output metrics, especially in the Global South (Lim et al., 2025). This debate is not merely technical. It is philosophical, because it concerns what universities regard as evidence of academic value. A system that rewards only visible outputs may increase counts while simultaneously weakening research integrity, collegiality, or local relevance. The literature therefore increasingly calls for capacity models that link productivity to ethical, developmental, and institutional considerations rather than to metrics alone.

This debate has sharpened considerably in recent years through the international movement for

responsible research assessment. The Coalition for Advancing Research Assessment (2022) argues that research evaluation should recognize the diversity of research contributions and careers, rely primarily on qualitative judgement supported by responsible use of quantitative indicators, and abandon inappropriate uses of journal-based metrics such as the Journal Impact Factor and h-index. DORA's 2024 guidance similarly emphasizes that quantitative indicators should be used transparently, contextually, specifically, and fairly, rather than as decontextualized proxies for quality. For the present study, these developments are highly consequential. They suggest that incentive design in teaching-oriented universities should not be framed as a choice between metrics and no metrics, but as a question of how evaluation systems can reward publication, supervision, mentoring, integrity, openness, and institutional contribution without collapsing academic value into output counts alone.

2.3 Comparative Review of the Most Relevant Theoretical Traditions

2.3.1 Multilevel Research-Capacity Strengthening

The first theoretical tradition is the multilevel conception of research-capacity strengthening associated with Cooke's framework and later elaborated by ESSENCE and related scholarship. Cooke (2005) argued that effective capacity building should develop skills and confidence, support linkages and partnerships, keep research close to practice, strengthen dissemination, invest in infrastructure, and build sustainability across individual, team, organizational, and network levels. This tradition is highly relevant because it resists methodological individualism. Research failure cannot be explained simply by the motivation or talent of individual academics; it emerges from the interaction of training, infrastructure, leadership, culture, and resources. Its analytical strength lies in treating capacity as relational and systemic rather than atomized.

Its limitation, however, is that it tends to be programmatic rather than organizationally diagnostic. It specifies what good capacity-building should broadly involve but is less precise about the internal sequencing of university systems under conditions of institutional scarcity. For teaching-oriented universities, the challenge is not merely to recognize multiple levels, but to determine which organizational functions are foundational, which are developmental, and which generate recursive learning. That limitation creates space for a more institution-specific architecture.

2.3.2 Dynamic Capabilities

The second tradition is dynamic capabilities theory, which emphasizes an organization's ability to sense opportunities and threats, seize them through strategic action, and transform internal routines over time (Teece, 2007). In higher education, this lens has been used to explain how universities adapt to changing expectations around knowledge transfer, innovation, and the so-called third mission (Guerrero & Menter, 2024). Its value for the present study is considerable. Teaching-oriented universities are trying to reposition themselves in environments where research, graduate training, and societal engagement matter more than before. Dynamic capabilities theory helps explain why some institutions can reconfigure workload, governance, and support systems while others remain trapped in symbolic compliance.

The strength of this tradition lies in its attention to organizational adaptation and routinized change. Its limitation is that it can overstate managerial agency and understate the social and moral character of academic work. Universities are not firms, and research cultures cannot be reconfigured by managerial decree alone. The theory needs supplementation by a relational account of how capability is socially reproduced through practice.

2.3.3 Communities of Practice

The third tradition centres on communities of practice. This approach illuminates how learning,

innovation, and identity are reproduced through recurrent participation in a shared practice (Lave & Wenger, 1991). It is particularly relevant to writing groups, supervisor forums, peer review circles, and mentoring networks. Recent scholarship is instructive here. Bicchi (2024) argues that institutions cannot simply declare communities of practice into being; such communities require alignment with a real shared practice. Jenkins et al. (2024) similarly show that communities of practice can facilitate institutional change when participants have a genuine desire to engage and when context enables reflection, experiential learning, and a shared agenda.

The power of this tradition is that it captures the tacit dimension of research capacity: how to frame a paper, revise a manuscript, navigate reviewer critique, or supervise a doctoral student well. These practices are difficult to codify fully in policy. The limitation is that communities of practice can remain exclusionary, informal, or inaccessible if not connected to equitable institutional design. Informal communities alone do not solve workload burdens, ethics administration, or promotion policy. Their strength emerges when they are nested within enabling organizational structures.

2.4 Synthesis of the Literature and Derivation of the Analytical Framework

The synthesis of these traditions suggests that the central explanatory mistake in much of the literature is to confuse capacity inputs with capacity itself. Training workshops, scholarships, writing groups, grants, and performance incentives are not research capacity in any strong sense. They are potential inputs into a wider institutional process whose outcomes depend on how governance, time, relationships, norms, and feedback interact. The present study therefore treats research capacity as an emergent institutional property rather than as a simple inventory of activities or a visible count of outputs. That move is analytically important because it separates causal mechanisms from their observable effects and helps explain why similar interventions

generate different outcomes across apparently similar universities.

Seen in this light, three rival explanations require qualification rather than dismissal. A pure human-capital account overstates individual skill deficits and understates institutional conditions. A pure resource-scarcity account correctly identifies material constraint but cannot adequately explain why institutions operating under comparable scarcity still perform differently. A pure managerial account recognizes the importance of leadership and adaptation but risks assuming that culture can be redesigned by decree. The literature reviewed here supports a more synthetic conclusion: durable research capability arises when strategic structures, developmental practices, and evaluative feedback become aligned strongly enough to convert scholarly effort into repeatable institutional performance.

On that basis, the framework retains eight institutional domains: research leadership and governance; research management and support systems; faculty development and career pathways; supervision and mentoring networks; ethics and integrity; writing and publication pipelines; incentives and workload alignment; and monitoring, evaluation, and institutional learning. External funding, digital infrastructure, and internationalization remain important, but the literature suggests that they function primarily as modifiers or accelerants rather than as the institutional core itself. The framework also rejects models that treat publication counts as the sole dependent variable because such models understate supervision quality, ethics, organizational learning, and the distributional politics of research opportunity.

What is novel in the present article is therefore not the claim that leadership, mentoring, supervision, ethics, writing support, and incentives each matter in isolation. That proposition is already well established. The article's originality lies in specifying their institutional ordering and relational logic for *Table 1. How the RCCA extends adjacent frameworks*

teaching-oriented universities. In particular, it argues that research capacity in such institutions should be understood neither as a simple aggregate of interventions nor as a generic systems metaphor, but as a conversion architecture in which strategic foundations reduce friction, developmental mechanisms reproduce tacit scholarly capability, and recursive learning enables adaptation over time.

2.5 Conceptual Model and Propositions

The resulting model is termed the Research Capacity Conversion Architecture. Its central proposition is that research productivity in teaching-oriented universities is neither a direct function of staff motivation nor a simple function of training intensity. It is the cumulative outcome of institutional alignment across strategic foundations, developmental mechanisms, and recursive learning processes. Strategic foundations include research leadership, research management, and ethics systems. Developmental mechanisms include faculty development, supervision and mentoring, and writing-to-publication support. The conversion and learning layer consists of incentive alignment and monitoring systems that translate activity into durable institutional memory.

Four propositions follow. Proposition 1 holds that leadership, research management, and ethics systems are necessary but insufficient foundations of institutional research capacity. Proposition 2 holds that developmental mechanisms, especially supervision, mentoring, and writing support, mediate the relationship between institutional foundations and scholarly outputs. Proposition 3 holds that incentives and workload design moderate whether capacity-building efforts are converted into sustained output or remain symbolic. Proposition 4 holds that monitoring, evaluation, and institutional learning generate recursive gains by enabling adaptation, accountability, and strategic reallocation of support. Figure 1 summarizes the conceptual model.

Framework or tradition	Primary contribution	Limitation for teaching-oriented universities	What RCCA adds
Cooke (2005) and later multilevel capacity frameworks	Establish that research capacity is systemic and multilevel rather than merely individual	Under-specify the internal sequencing of university functions under conditions of scarcity	Orders institutional domains into strategic foundations, developmental mechanisms, and recursive learning
Dynamic capabilities theory	Explains adaptation, reconfiguration, and institutional response to changing environments	Risks overstating managerial agency and understating scholarly socialization and normative labour	Embeds adaptation within supervision, mentoring, writing support, ethics, and workload realities
Communities of practice	Explains tacit learning, identity formation, and peer socialization in scholarly work	Weak on formal governance, incentives, ethics administration, and service infrastructure	Connects informal scholarly learning to formal institutional design
Responsible research assessment reform (CoARA, DORA)	Clarifies how evaluation should recognize diverse contributions and use indicators responsibly	Normatively strong but not an institutional architecture for building research capacity	Situates responsible assessment within a broader conversion system linking evaluation to capability building

Note. The table is intended to clarify analytical differentiation rather than to suggest that these frameworks are competing or mutually exclusive.

Figure 1. Research Capacity Conversion Architecture (RCCA)

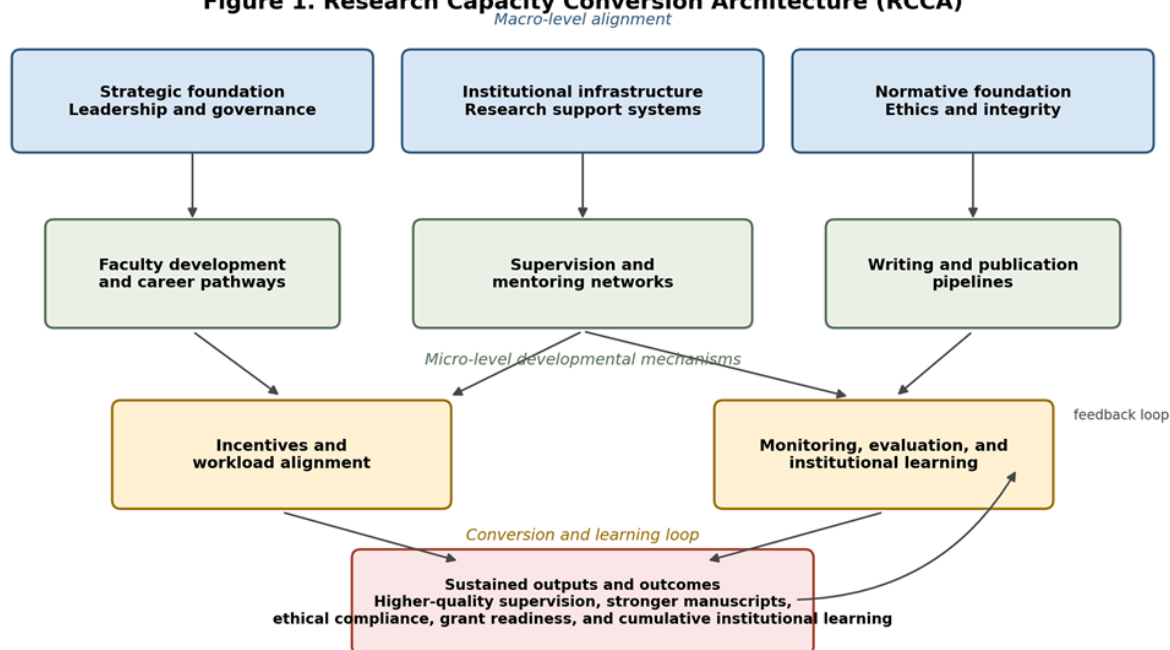


Figure 1. Evidence-derived Research Capacity Conversion Architecture (RCCA).

Evidence-derived Research Capacity Conversion Architecture (RCCA) showing how strategic foundations enable developmental mechanisms, while incentives and monitoring create a recursive feedback loop that feeds institutional learning back into the research system. Source: Author's synthesis based on Cooke (2005), *ESSENCE on Health Research* (2023), Pulford et al. (2020), IUCEA and APHRC (2024), Ng'oda et al. (2024), and Senghore and Omotosho (2025).

3. Methodology

3.1 Research Design

This study used a critical integrative review with framework synthesis and theory-building intent. The design was selected because the problem under investigation is institutional and explanatory rather than intervention-specific: the aim was not to estimate the isolated effect size of a single programme, but to synthesize a heterogeneous evidence base into an analytically coherent model of how research capacity is built, constrained, and reproduced in teaching-oriented universities. Integrative review methodology is appropriate in such cases because it permits the disciplined combination of empirical studies, conceptual scholarship, review articles, and policy-relevant documents, provided that inclusion logic, source handling, and analytic decisions are made transparent (Whittemore & Knafl, 2005; Torraco, 2016). To strengthen traceability, the reporting of search, source selection, and retrieval procedures was informed selectively by PRISMA 2020 and PRISMA-S principles relevant to non-effect reviews, without misclassifying the study as a conventional systematic review of intervention effectiveness (Page et al., 2021; Rethlefsen et al., 2021).

3.2 Study Scope and Review Boundaries

The review focused on institutional mechanisms rather than discipline-specific research techniques. Substantively, it examined eight domains recurrent in the literature on research-capacity strengthening: research leadership and governance, research management and support systems, faculty development, supervision and mentoring, ethics and integrity, writing and publication support, incentives and workload alignment, and monitoring, evaluation, and institutional learning. The principal review window covered January 2015 to April 2026 in order to capture the most recent decade of scholarship and policy development while incorporating current guidance on research assessment and African higher-education reform. Earlier seminal works were

retained only where they remained theoretically indispensable. Geographically, the centre of gravity was African higher education, but studies from other regions were included where they offered strong conceptual or institutional relevance to teaching-oriented universities. Disciplinarily, the review drew on higher education studies, academic development, organizational theory, research governance, research ethics, and health-adjacent capacity-strengthening literature.

3.3 Data Sources

The evidence base comprised three categories of secondary material: peer-reviewed journal articles, review and conceptual papers, and authoritative policy or programme documents. Peer-reviewed literature was prioritized because it provides the strongest analytic depth and argumentative discipline. However, the review also included selected materials from UNESCO, the World Bank, WHO/TDR-ESSENCE, IUCEA, APHRC, CoARA, DORA, and the Science for Africa Foundation because some of the most current African evidence on institutional reform, research management, supervision frameworks, and responsible assessment is reported first through authoritative organizational channels rather than journal publication alone. Such documents were not treated as equivalent to peer-reviewed evaluative evidence. Instead, they were used to triangulate institutional priorities, design logics, and implementation considerations emerging from the scholarly literature.

3.4 Search Strategy and Source Identification

Source identification followed a structured integrative-review logic designed to maximize conceptual coverage while preserving transparency. Searches were undertaken iteratively during manuscript development in Scopus, Web of Science Core Collection, ERIC, and Google Scholar, with coverage focused on literature published principally between January 2015 and April 2026. Because significant African higher-education and research-governance evidence lies outside indexed

journals, supplementary targeted searches were also undertaken in the official repositories of UNESCO, the World Bank, WHO/TDR-ESSENCE, IUCEA, APHRC, CoARA, DORA, and the Science for Africa Foundation. Search strings combined three concept blocks: research capacity and research support; institutional type and higher-education context; and domain-specific mechanisms such as mentoring, supervision, ethics, writing support, and incentives. Representative search strings included: (“research capacity” OR “research capacity strengthening” OR “research productivity” OR “research culture”) AND (“teaching-oriented universit*” OR “teaching-focused universit*” OR “emerging universit*” OR “African universit*” OR “higher education institution*”); (“research management” OR “research support services” OR “grant management”) AND (“universit*” OR “higher education”); (“doctoral supervision” OR mentoring OR “faculty development” OR “writing groups” OR “publication support” OR “research ethics” OR “research integrity” OR incentives) AND (“higher education” OR universit*). Citation chaining was then used to identify influential sources not captured by database indexing. Appendix B reports the verified search architecture, repository pathways, core query logic, screening criteria, and final retained corpus in a form appropriate to a theory-building integrative review.

3.5 Eligibility, Quality Appraisal, and Evidence Selection

Sources were eligible when they addressed institutional mechanisms plausibly linked to research-capacity strengthening in higher education and offered substantive empirical, conceptual, or implementation-relevant insight. Sources were excluded if they were purely promotional, lacked analytic content, focused narrowly on student learning without relevance to research capacity, or treated productivity only as a decontextualized output metric without attention to institutional conditions. Selection proceeded through staged screening for topical relevance, source credibility, analytical substance, and institutional fit with teaching-oriented

universities. Quality appraisal was fit-for-purpose rather than formulaic. Peer-reviewed empirical studies were assessed for methodological clarity, adequacy of analysis, and relevance to the institutional problem. Review and conceptual papers were assessed for synthesis quality and explanatory value. Policy and programme documents were assessed for institutional authority, recency, and implementation relevance. Conflicting evidence was retained where analytically useful in order to identify boundary conditions, sectoral variation, and tensions between normative policy prescriptions and organizational realities.

3.6 Data Extraction and Organization

Data extraction proceeded through an evidence matrix that recorded source type, year, geographical context, institutional setting, methodological form, focal problem, institutional mechanism described, implementation conditions, and reported implications. Each source was also tagged against the eight RCCA domains in order to support cross-source comparison without flattening methodological differences. This procedure made it possible to compare empirical studies, conceptual works, and policy documents within a common analytic frame while preserving distinctions in evidentiary status. A corpus summary table is provided in Appendix C to make the composition of the evidence base visible.

3.7 Analytical Techniques

Analysis combined deductive framework coding with inductive thematic comparison and abductive model building. Deductively, the review began with provisional domains derived from the research questions and the theoretical traditions discussed in Section 2. Inductively, recurrent themes were added where the literature repeatedly pointed to mechanisms not sufficiently captured by the initial frame, especially around workload alignment, ethics administration, responsible assessment, and institutional learning. Comparative analysis then examined how barriers, enabling conditions, and outcomes interacted across domains. The final architecture emerged abductively through iterative

movement between evidence, theory, and the practical problem faced by teaching-oriented universities: how to convert fragmented research effort into cumulative institutional capability.

3.8 Validity, Reliability, and Reproducibility

Rigor was strengthened through source triangulation, explicit boundary-setting, and transparent analytic documentation. Triangulation reduced dependence on any single disciplinary tradition or evidence type. Transparency was improved by documenting databases, repository searches, search concepts, inclusion principles, and the logic of source weighting. Reproducibility in the strict systematic-review sense is neither fully claimed nor appropriate for an interpretive integrative review whose purpose is theory building rather than exhaustive intervention aggregation. What is claimed instead is procedural traceability: a reader should be able to see what kinds of materials were sought, why particular materials were retained, how they were compared, and how the conceptual model was derived. To support that standard, an adapted selection-flow summary is provided in Appendix B and a corpus profile is provided in Appendix C

3.9 Ethical Considerations

Although the study relies exclusively on secondary sources and therefore does not require primary-data ethical approval, ethical responsibility remains central. Responsible secondary research requires accurate representation of sources, fair treatment of conflicting evidence, and resistance to overclaiming. Particular caution was exercised to avoid romanticizing externally funded programmes whose success may be difficult to replicate under routine institutional conditions. Ethical reflection was also built into the analysis itself by treating research capacity not only as an output problem but as a question of integrity, equity, and institutional justice.

3.10 Methodological Limitations and Mitigation

The design has limitations. The strongest empirical literature on research-capacity strengthening remains concentrated in health and health-adjacent fields, which can overshadow realities in the humanities, education, and theology. Transfer across institutional types must therefore be made carefully. In addition, integrative reviews cannot provide the same statistical conclusiveness as meta-analysis where outcomes are sufficiently standardized. These limitations were mitigated by foregrounding institutional mechanisms rather than discipline-specific techniques, by privileging convergent findings across different kinds of evidence, and by being explicit about the conceptual rather than causal ambition of the study. For that reason, the RCCA should be read as a transferable explanatory heuristic and institutional design framework rather than as a universally validated causal model.

4. Findings and Discussion

4.1 Overview of Findings

What the synthesis supports most strongly is not a claim about one universally superior intervention, but a claim about patterned institutional causation. The literature repeatedly indicates that the same intervention can perform differently depending on its organizational embedding. Mentoring without workload recognition becomes voluntary exhaustion. Supervisor training without monitoring becomes symbolic compliance. Publication pressure without writing infrastructure becomes productivist distortion. Research management reform without a leadership mandate becomes administrative patchwork. The value of the architecture proposed here therefore lies not in recommending more interventions, but in clarifying the conditions under which interventions cease to be episodic and become cumulative.

4.2 Structural and Cultural Barriers to Research Productivity in Teaching-Oriented Universities

The first major finding is that research weakness in teaching-oriented universities is best understood as institutional conversion failure. Faculty interest in research often exists, but the institution does not reliably convert that interest into manuscripts, grants, postgraduate completions, or cumulative capability. This failure begins with governance. In many settings, research remains rhetorically prioritized but weakly budgeted, thinly administered, and marginal to workload design. Without stable strategic signals from senior leadership, research is treated as discretionary labour undertaken after teaching and administrative obligations have been met. The consequences are predictable: research time becomes residual, mentoring becomes informal and unequal, and publication emerges as a high-risk activity reserved for those with exceptional personal networks or resilience (UNESCO, 2024; Pulford et al., 2020; Ng'oda et al., 2024; Kwan et al., 2021).

Mentorship and supervision constitute the second barrier cluster. African mentorship literature consistently reports that mentoring relationships improve skills, confidence, collaboration, publication, and grant success, yet weak mentorship culture remains one of the most persistent institutional gaps (Ng'oda et al., 2024; Mutale et al., 2023). The issue is not simply the number of available mentors but the absence of institutionalized routines that prepare, recognize, and support mentoring labour. The same applies to doctoral supervision. Contemporary supervision scholarship makes clear that good supervision is neither instinctive nor reducible to subject expertise. It requires training, standards, communities of practice, monitoring, and administrative support (Guarimata-Salinas et al., 2024; IUCEA & APHRC, 2024). Where such systems are absent, supervision quality becomes highly uneven, jeopardizing throughput, student well-being, and the next generation of academic staff.

A third barrier concerns the administrative and normative infrastructure of research. Pulford et al. (2020) show that weak research management systems remain a widespread institutional problem across sub-Saharan Africa. Proposal development, compliance, procurement, budgeting, and reporting are often under-professionalized, creating friction that discourages researchers and slows institutional learning. Ethics systems present a related problem. Ethics review is frequently treated as a bureaucratic checkpoint rather than as part of the institutional fabric of good research. Yet evidence from West Africa and EDCTP-supported programmes indicates that training, committee administration, standard operating procedures, and integrity education are all necessary for credible and efficient review systems (Senghore & Omotosho, 2025). Fragile ethics systems not only slow projects but also weaken trust, quality, and the moral legitimacy of the research enterprise.

A fourth barrier cluster lies in the writing-to-publication pathway. Teaching-oriented faculty often face fragmented time, limited editorial support, and weak peer-review cultures. The literature on faculty writing groups is striking because it repeatedly shows that protected time and structured collegial support increase productivity and strengthen the research community (Kwan et al., 2021). The implication is important: publication bottlenecks are not only about journal rejection rates or language proficiency. They are also about whether institutions create recurring spaces in which manuscripts can be drafted, reviewed, revised, and resubmitted as ordinary academic work. Without such spaces, writing becomes episodic and vulnerable to overload.

Finally, the synthesis highlights incentive misalignment as a recurrent source of distortion. Promotion systems commonly reward visible outputs while leaving mentoring, supervision quality, open scholarship, and institution-building weakly recognized. This creates a contradiction: institutions demand research culture while rewarding narrow

productivism. Large-scale evidence on promotion policy confirms that quantitative assessment remains common, especially in lower-resource systems, even though such metrics inadequately capture the diversity of academic contribution (Lim et al., 2025). The result is not only inefficiency but epistemic narrowing. Scholars are nudged toward what is countable rather than what is developmental, collaborative, or socially needed.

4.3 Evidence-Supported Institutional Mechanisms for Strengthening Research Capacity

The second major finding is that the literature supports a cluster of institutional mechanisms whose effectiveness is mutually dependent. The first mechanism is visible and durable research leadership. Research cultures strengthen when senior leaders move beyond strategic slogans and instead align policy, budgeting, workload, and accountability around clear developmental priorities. This includes naming research as a core institutional function, assigning operational responsibility, protecting budget lines, and creating continuity across leadership transitions. Without these signals, even well-designed programmes remain peripheral (Cooke, 2005; ESSENCE on Health Research, 2023; Science for Africa Foundation, 2023).

The second mechanism is the professionalization of research management and support services. The literature increasingly rejects the assumption that principal investigators alone can carry the full administrative burden of research. Effective institutions develop proposal support, grants administration, ethics coordination, data management, and reporting functions as professional services rather than incidental tasks. This is one of the clearest findings in African research-management scholarship, and it has immediate practical implications for emerging universities where administrative friction can consume scarce faculty time (Pulford et al., 2020). Recent African institutional reform initiatives reinforce this

conclusion. The Science for Africa Foundation's Africa Research Management Capacity Strengthening Programme explicitly argues that the long-standing model in which principal investigators simultaneously conduct research and manage compliance, budgeting, reporting, and operational coordination is no longer tenable. Its framework instead treats institutional leadership, sustainability, standards, and individual research-management capacities as mutually reinforcing components of a professional research ecosystem. This is particularly relevant to teaching-oriented universities, where scarce faculty time is already fragmented by intensive teaching and administrative obligations. In such settings, professional research management is not merely an administrative convenience; it is a condition for protecting academic time and stabilizing research routines.

The third mechanism concerns multimodal faculty development. The strongest mentorship literature does not recommend a single mentor model as universally sufficient. Instead, it points toward dyadic mentoring, multiple-mentor arrangements, peer and near-peer support, and topic- or affinity-based groups as complementary modalities (Schwartz, 2023). Tanzanian evidence further shows that inter-professional mentoring communities can produce publications, scientific presentations, grant participation, and doctoral progression when properly supported (Balandya et al., 2021). This suggests that capacity grows most effectively where institutions build mentoring networks rather than relying on one-to-one idiosyncratic mentor-dependent arrangements.

The fourth mechanism is the professionalization of supervision. Supervisor development is not a luxury add-on for doctoral schools; it is a core institutional investment. The literature indicates that universities should formalize supervisor induction, offer continuing development, monitor supervisory loads, and provide communities in which supervisors can reflect on practice. The IUCEA-APHRC framework is instructive precisely because it translates

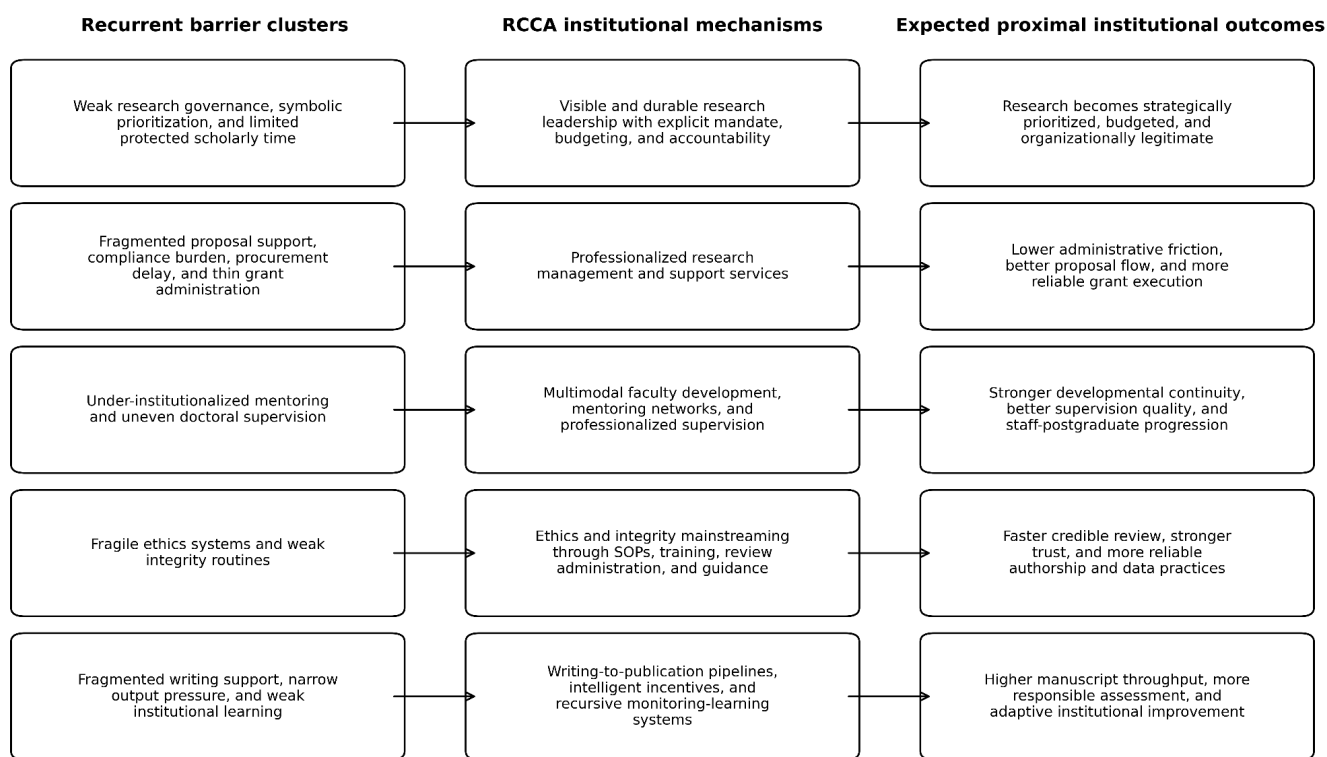
supervision from private craft into institutional systems, linking quality assurance, execution, capacity strengthening, and stakeholder engagement (IUCEA & APHRC, 2024).

The fifth mechanism is ethics and integrity mainstreaming. Efficient and credible ethics systems require more than a committee name. They require trained reviewers, administrative coordination, predictable turnaround, clear authorship and misconduct guidance, and integrity education for staff and students. This matters not only for compliance but also for the quality of the research culture. Institutions that normalize responsible research practices reduce downstream problems in supervision, authorship disputes, data quality, and reputational risk (Senghore & Omotosho, 2025; ESSENCE on Health Research, 2023).

The sixth mechanism is process-oriented publication support. Writing groups, editorial clinics, peer-review circles, journal-targeting support, and manuscript tracking systems constitute the operational bridge between research activity and publication. Evidence from teaching institutions shows that protected time and structured peer support can improve writing

productivity and rebuild scholarly morale (Kwan et al., 2021). Such mechanisms are especially important in settings where faculty have the knowledge to publish but insufficient routinized support to complete manuscripts. A related Rwanda-focused line of work similarly suggests that capstone-to-publication pipelines can help institutions convert supervised research activity into visible scholarly output when mentoring, internal review, and manuscript development are deliberately structured (Sangwa & Ntohsi, 2025).

The seventh mechanism is intelligent incentive design. The literature strongly implies that institutions should reward not only publication counts and grant income but also supervision quality, mentorship, collaborative labour, open science, and research integrity. Reward systems that recognize only outputs risk depleting the very institutional labour that produces sustainable output. Recent guidance on research rewards similarly emphasizes the importance of recognizing sharing, stewardship, and other contributions often ignored by conventional evaluation systems (Mabile et al., 2025; CoARA, 2022; DORA, 2024).



The figure synthesizes the manuscript's core claim that recurring barriers become tractable only when matched to institutional mechanisms that convert fragmented activity into cumulative capability.

Figure 2. Barrier–mechanism–proximal outcome alignment within the Research Capacity Conversion Architecture (RCCA). The figure shows how recurrent institutional barriers identified in the review map onto the mechanisms of the RCCA and the proximal institutional outcomes those mechanisms are designed to improve in teaching-oriented universities. Source: Author's synthesis from Sections 4.2–4.4.

4.4 Integrating the Mechanisms: The Research Capacity Conversion Architecture

The third and most important finding is that the above mechanisms can be integrated into a coherent architecture designed specifically for teaching-oriented universities. The proposed Research Capacity Conversion Architecture organizes the evidence into three layers. The first layer consists of strategic foundations: research leadership and governance, research management and support systems, and ethics and integrity. These functions stabilize institutional direction, reduce administrative friction, and define the normative conditions of legitimate research. Without them, developmental programmes remain fragile and output gains remain contingent.

The second layer is the developmental engine: faculty development and career pathways, supervision and mentoring networks, and writing and publication pipelines. These domains operate at the micro level of scholarly practice while remaining institutionally scaffolded. They reproduce tacit research capability across career stages through routinized rather than episodic intervention. A university does not become research-capable because it hosts occasional workshops; it becomes research-capable when it normalizes cycles of guided inquiry, supervised writing, collegial critique, manuscript development, and timely resubmission.

The third layer is the conversion and learning loop: incentives and workload alignment, together with monitoring, evaluation, and institutional learning. Incentives matter because even the best

developmental systems fail where research time is structurally crowded out or where mentoring and supervision remain institutionally invisible. Monitoring matters because universities need usable feedback on which supports are functioning, where bottlenecks persist, and how resources should be reallocated. As outlined in Section 2.3.2, this recursive layer enables the institution to sense emerging constraints, seize opportunities for adjustment, and transform support routines over time.

The architecture also clarifies sequencing. Teaching-oriented universities should not begin with ambitious publication targets alone. They should first consolidate a minimal strategic core: leadership mandate, research office capability, ethics procedures, and baseline data systems. They should then build developmental routines through supervision training, mentoring structures, and writing support. Only after these are in place should performance pressures

intensify, and even then they should be tied to developmental indicators rather than only to output counts. This sequencing is crucial because premature metric pressure can produce gaming, burnout, and superficial compliance rather than durable capacity.

To translate the Research Capacity Conversion Architecture from a conceptual model into an evaluable institutional design, Table 2 specifies the principal mechanism associated with each domain, the relative resource intensity required for implementation, and a small set of measurable indicators through which institutional progress can be tracked. The table is not proposed as a universal scorecard. Rather, it provides an evidence-informed operational heuristic that can help teaching-oriented and emerging universities stage reform, monitor bottlenecks, and distinguish between foundational process gains and later output gains.

Table 2. Operationalizing the Research Capacity Conversion Architecture: Core Mechanisms, Relative Resource Tiers, and Illustrative Institutional Indicators

RCCA domain	Core institutional mechanism	Representative evidence anchor	Relative resource tier	Illustrative measurable indicators
Research leadership and governance	Approved research strategy, delegated decision rights, annual research planning cycle, and anti-bottleneck governance for approvals	UNESCO (2024); ESSENCE on Health Research (2023)	Low-Medium	Research strategy approved; proportion of research approvals completed within target timeline; annual research budget execution rate
Research management and support systems	Pre-award and post-award support, standard operating procedures, internal service standards, and contract/compliance tracking	Pulford et al. (2020); Science for Africa Foundation (2023)	Medium	Number of proposals internally supported; median time from award notice to contract execution; proportion of grants meeting reporting deadlines
Faculty development and career pathways	Structured research induction, methods and proposal-development support, targeted development pathways by career stage	Dean et al. (2017); ESSENCE on Health Research (2023)	Low-Medium	Proportion of eligible faculty completing research induction; participation in methods or proposal clinics; proportion of early-career staff progressing to lead-author or PI roles
Supervision and mentoring networks	Supervisor development, multimodal mentoring platforms, supervisory load monitoring, and mentor recognition	IUCEA & APHRC (2024); Ng'oda et al. (2024); Schwartz (2023)	Medium	Postgraduate completion rate; supervision satisfaction score; proportion of active supervisors trained; mentoring participation rate
Ethics and integrity	Ethics SOPs, REC training, throughput tracking, authorship guidance, and research-integrity orientation	Senghore and Omotosho (2025); ESSENCE on Health Research (2023)	Low-Medium	Median ethics-review turnaround time; number and proportion of investigators trained; proportion of protocols receiving decisions within service standard
Writing and publication pipelines	Writing groups, internal peer review, submission clinics, journal-targeting support, and manuscript tracking	Kwan et al. (2021)	Low-Medium	Number of manuscripts in development; manuscripts submitted per year; acceptance rate after peer review; proportion of manuscripts receiving internal review before submission
Incentives and workload alignment	Protected research time, promotion criteria recognizing mentoring and supervision, and responsible-use assessment criteria	Lim et al. (2025); CoARA (2022); DORA (2024)	Medium	Protected-time compliance rate; proportion of promotion criteria revised; proportion of evaluated staff receiving recognition for mentoring or supervision contributions
Monitoring, evaluation, and institutional learning	Integrated KPI dashboard, annual learning review, and corrective-action tracking across research-support domains	Kilmarx et al. (2023); ESSENCE on Health Research (2023)	Low	Dashboard produced on schedule; number of corrective actions logged; proportion of corrective actions completed within review cycle

Note. Resource tiers are relative to the conditions of teaching-oriented and emerging universities and indicate approximate institutional effort rather than fixed financial cost. The indicators are illustrative rather than exhaustive and should be calibrated to local baselines, mission, disciplinary mix, and reporting capacity.

The analytical value of Table 2 lies in making the architecture empirically tractable. It demonstrates that each domain can be specified not only normatively but operationally, allowing institutions to monitor whether capacity is actually being built rather than inferred from publication counts alone. It also clarifies that the most defensible indicators in the early phases of reform are process and systems indicators, such as turnaround times, participation rates, and service reliability, because these are the conditions from which later output indicators become meaningful.

4.5 Integrative Cross-Disciplinary Discussion

Viewed across disciplines, the findings converge on a common institutional lesson. Higher education studies emphasize institutional differentiation and the need to align mission with organizational form (UNESCO, 2024; Uaciquete & Valcke, 2022). This concern with mission alignment is also reflected in recent Africa-focused work arguing that policy alignment and innovation pathways are central to how mission-driven universities scale without losing institutional coherence (Sangwa & Murungu, 2025). Organizational theory highlights the importance of adaptive capability and the risk of symbolic policy adoption (Guerrero & Menter, 2024; Bromley & Powell, 2012). Research ethics scholarship shows that research capacity is institutionally fragile when integrity systems are weak (Senghore & Omotosho, 2025; ESSENCE on Health Research, 2023). Academic development literature demonstrates that scholarly growth is social, relational, and highly dependent on protected time and structured peer support (Kwan et al., 2021; Jenkins et al., 2024). These perspectives are not competing explanations. Together they indicate that research capacity is best understood as an ethical and organizational ecology rather than as an output metric or training inventory.

At the same time, the architecture should not be misread as a discipline-neutral law (Dean et al., 2017; Ng'oda et al., 2024). Much of the strongest evidence base still derives from health and health-adjacent capacity programmes, where grant systems, mentoring infrastructures, and compliance

architectures are often more developed than in many humanities, education, or theology contexts. The value of the present model therefore lies in its institutional logic rather than in any assumption of frictionless transfer. Its domains are likely to travel across fields; their operational design, intensity, and sequencing may not.

A further implication concerns epistemic dependence. When universities lack robust internal research systems, they become disproportionately dependent on externally set agendas, donor timeframes, imported evaluation metrics, and publication incentives that may not map neatly onto local developmental priorities. In that sense, weak research capacity is not merely a productivity problem. It is also a problem of constrained agenda-setting power. Institutions that cannot sustain their own research routines struggle to define what counts as a significant question, which forms of evidence are institutionally supportable, and how locally urgent problems can be rendered publishable without being conceptually displaced. The architecture proposed here should therefore be read not only as a productivity framework but also as a partial response to epistemic marginalization.

This perspective also clarifies several counterarguments. One possible objection is that resource scarcity, rather than institutional architecture, is the decisive variable. Scarcity undoubtedly matters. Yet the literature repeatedly shows that similar resource environments can produce different outcomes depending on leadership, mentoring systems, administrative support, and incentive design (Pulford et al., 2020; Mutale et al., 2023; Science for Africa Foundation, 2023). Another objection is that research expectations may distract teaching-oriented universities from their teaching mission. The evidence suggests a more nuanced conclusion. Poorly designed research policy can indeed become extractive, but well-designed research capacity can enrich teaching, strengthen postgraduate education, and improve institutional relevance by linking scholarship to curriculum, supervision, and

social problem-solving (Uaciquete & Valcke, 2022; Paine et al., 2025).

4.6 Theoretical, Ethical, and Policy Implications

Theoretically, the article argues for moving beyond human-capital accounts of research productivity toward an institutional conversion perspective. The RCCA model refines multilevel capacity theory by specifying how foundational, developmental, and recursive functions interact inside universities and by distinguishing capacity-generating mechanisms from the outputs through which capacity is usually inferred. It also tempers dynamic-capabilities accounts by showing that organizational adaptation in universities is mediated by scholarly relationships, ethical norms, and workload realities rather than by managerial agency alone.

Ethically, the findings challenge models of excellence that celebrate output while neglecting supervision, integrity, collegiality, or equitable access to mentoring and time. A university that produces more papers by overloading staff, compressing supervision, instrumentalizing junior scholars, or treating ethics as a procedural obstacle may increase counts while diminishing scholarly legitimacy. For teaching-oriented institutions in particular, the central evaluative question should not be whether more outputs can be extracted from already constrained environments, but whether the institution is building a fair and durable ecology of inquiry.

Policy-wise, the analysis implies that ministries, councils, funders, and institutional leaders should invest less in isolated training events and more in the ordinary infrastructures that make research an organized institutional practice. Those infrastructures include professional research management, supervisor development, ethics administration, protected writing time, developmental promotion criteria, and institution-level learning systems. A consolidated domain-deficit-function matrix is provided in Appendix A, while Appendices B and C

make the review process and corpus composition more transparent.

5. Conclusion, Implications, and Limitations

5.1 Conclusion

The article has argued that the central challenge facing teaching-oriented and emerging universities is not a simple absence of scholarly motivation, but an absence of institutional conversion architecture. Research capacity is not built by exhortation, isolated workshops, or metric pressure in the abstract. It is built when universities align leadership, research management, supervision, mentoring, ethics, writing support, incentives, and learning systems into a coherent developmental ecology. The three research questions can therefore be answered in a disciplined way. First, the most persistent barriers are structural, cultural, and organizational rather than merely individual. Second, the most strongly supported mechanisms are mutually reinforcing rather than singular. Third, these mechanisms can be integrated into a layered architecture that is realistic for institutions that cannot assume the resource base, doctoral density, or administrative sophistication of elite research-intensive universities.

5.2 Theoretical and Scholarly Contribution

The article advances scholarship in three principal ways. First, it introduces the concept of research-capacity conversion, which clarifies how institutions translate academic aspiration into durable outputs and learning. Second, it synthesizes fragmented literatures on research management, mentorship, supervision, ethics, writing support, incentives, and responsible assessment into a single explanatory framework. Third, it offers a model sensitive to institutional differentiation, showing why the architecture appropriate to teaching-oriented universities must be judged not by imitation of elite research universities, but by the quality with which it aligns mission, support systems, developmental practice, and evaluative learning.

5.3 Practical Implications

The practical implication of the analysis is that institutions should resist the temptation to begin with output targets alone. For teaching-oriented universities, the more defensible sequence is to build a minimum strategic core first: a clear leadership mandate for research, professionalized research-office capability, functional ethics procedures, and baseline monitoring systems. Only on that basis can developmental mechanisms such as supervisor training, mentoring networks, and writing pipelines operate with continuity rather than episodic enthusiasm. For regulators and quality-assurance bodies, the implication is similar. Assessment frameworks should move beyond narrow compliance logic and evaluate whether institutions are building durable capability in supervision, mentoring, integrity, and research support. For funders, the evidence points away from short-cycle workshop models and toward longer-horizon investment in institutional routines, especially research management, ethics administration, supervisor development, and publication support. At the curricular level, this also implies building stronger methodology-to-output pathways inside teaching programmes so that research training is not detached

from publication-oriented scholarly development (Sangwa & Mutabazi, 2025). In all three domains, the central lesson is the same: research performance is more sustainably improved by strengthening the ordinary infrastructures of scholarly work than by intensifying metric pressure in structurally weak environments.

5.4 Impact Assessment Framework

Operationalizing the RCCA requires staged monitoring rather than annual output counting alone (Kilmarx et al., 2023; ESSENCE on Health Research, 2023; CoARA, 2022; DORA, 2024). Early indicators should test whether governance, ethics, mentoring, and writing systems are functioning reliably. Intermediate indicators should track supervisory quality, proposal development, manuscript movement, and participation in developmental routines. Longer-horizon indicators should assess postgraduate completion, publication quality, grant performance, integrity outcomes, and the stability of research-support systems across leadership cycles. Figure 3 presents a phased implementation roadmap derived from the model.

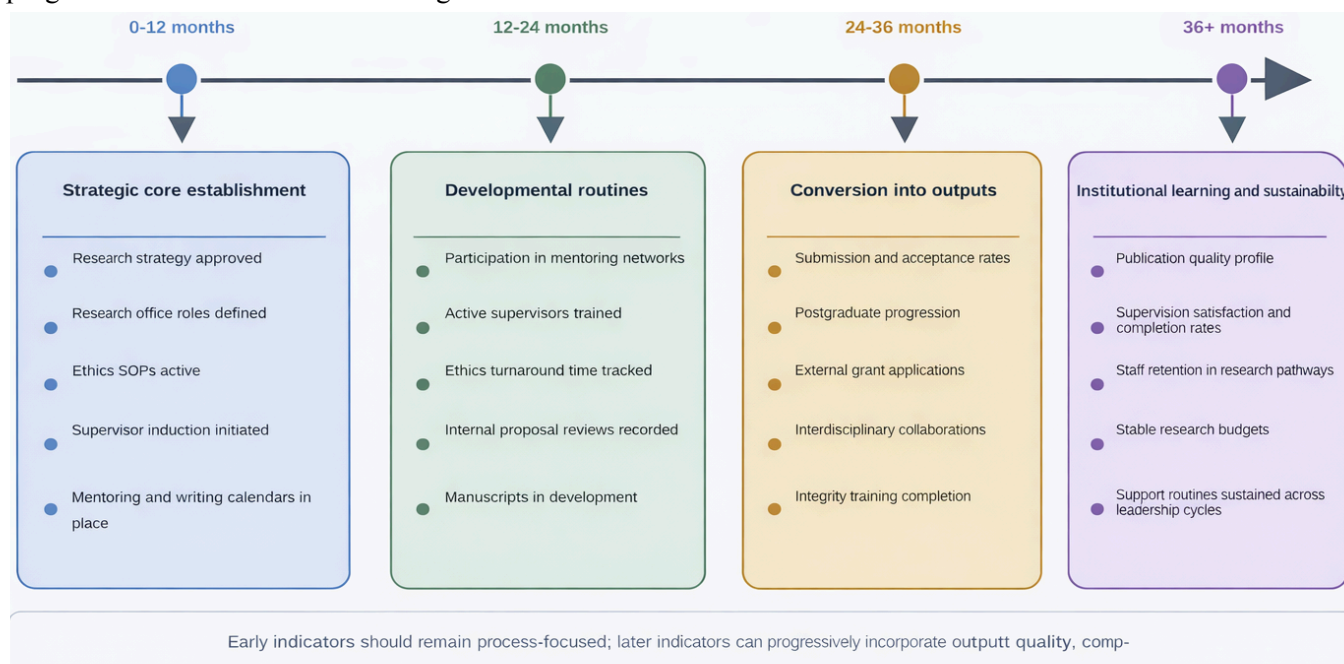


Figure 3. Phased implementation roadmap for operationalizing the Research Capacity Conversion Architecture (RCCA). The figure shows how teaching-oriented universities can sequence implementation from strategic core establishment to

institutional learning and sustainability, with early emphasis on process indicators and later emphasis on output, quality, and durability indicators. Source: Author's synthesis informed by Kilmarx et al. (2023), ESSENCE on Health Research (2023), CoARA (2022), and DORA (2024).

5.5 Study Limitations

This study should be read as a theory-building synthesis rather than as a universally validated causal model or a statistically exhaustive review. The evidence base is uneven across disciplines and remains stronger in health and health-adjacent capacity literature than in the humanities, business, education, or theology. The review also privileges institutional mechanisms over macro-political economy variables such as national funding regimes, academic labour markets, and global publishing inequalities, all of which condition how the

architecture travels across settings. In addition, although the review procedure was made more transparent through explicit search, selection, and corpus-reporting logic, interpretive judgement remained unavoidable in source weighting and model construction. These limitations do not nullify the article's contribution. They instead define its proper use: the RCCA is best treated as a transferable explanatory heuristic, a framework for institutional diagnosis, and a platform for future comparative and longitudinal testing.

Appendices

Appendix A. Evidence-derived domain-deficit-function matrix for the Research Capacity Conversion Architecture

Domain	Typical deficit in teaching-oriented universities	Primary institutional function
Research leadership and governance	Research stated as priority but weakly budgeted, poorly coordinated, or disconnected from workload design	Sets strategic direction, allocates responsibility, protects continuity, and legitimizes research as a core mission
Research management and support systems	Thin grant support, fragmented compliance, procurement delays, weak data systems	Reduces administrative friction and professionalizes the operating environment of research
Faculty development and career pathways	Generic workshops without progression routes or targeted support	Builds capability across career stages and clarifies advancement pathways
Supervision and mentoring networks	Informal, unequal, or unrecognized mentoring and uneven supervisor preparation	Transfers tacit knowledge, improves postgraduate quality, and reproduces scholarly capability
Ethics and integrity	Slow review systems, limited committee support, weak integrity culture	Protects legitimacy, data quality, authorship standards, and public trust
Writing and publication pipelines	Fragmented writing time, weak peer review culture, limited editorial support	Converts research activity into manuscripts, submissions, revisions, and publications
Incentives and workload alignment	Publication pressure without time protection or recognition of mentoring and supervision labour	Aligns staff effort with institutional goals while reducing distortion
Monitoring, evaluation, and institutional learning	Little feedback on what support works, no dashboard for mentoring, supervision, proposals, or outputs	Creates recursive learning, accountability, and adaptive reallocation of support

Source: Author's synthesis from the reviewed literature, Cooke (2005), ESSENCE on Health Research (2023), Pulford et al. (2020), IUCEA and APHRC (2024), Ng'oda et al. (2024), and Senghore and Omotosho (2025)

Appendix B. Review transparency record and adapted source-selection summary

This appendix reports the verified search architecture, organisational repositories, core query logic, screening criteria, and final retained corpus for the integrative review. Because the review was conducted iteratively for theory building rather than as a prospectively registered systematic review, exact per-database retrieval dates and identification-stage hit counts were not preserved in a form that permits defensible retrospective reconstruction. To avoid retrospective fabrication, the appendix reports only those elements that can be verified from the manuscript, the retained corpus, and the archived reference base.

Table B1. Verified search architecture for the integrative review

Search location	Coverage focus	Query logic or repository path	Role in the final corpus
Scopus	Literature published principally between January 2015 and April 2026	("research capacity" OR "research capacity strengthening" OR "research productivity" OR "research culture") AND ("teaching-oriented universit*" OR "teaching-focused universit*" OR "emerging universit*" OR "African universit*" OR "higher education institution*")	Core peer-reviewed literature on research-capacity strengthening, higher education, and institutional mechanisms
Web of Science Core Collection	Literature published principally between January 2015 and April 2026	Same core string structure as Scopus, supplemented by domain-focused combinations on research management, supervision, mentoring, ethics, writing support, and incentives	Complementary peer-reviewed retrieval, especially for higher-education and organizational-theory literature
ERIC	Literature published principally between January 2015 and April 2026	("doctoral supervision" OR mentoring OR "faculty development" OR "writing groups" OR "publication support" OR "research ethics" OR "research integrity" OR incentives) AND ("higher education" OR universit*)	Higher-education, academic-development, supervision, and writing-support literature
Google Scholar	Literature published principally between January 2015 and April 2026	Broad combinations of the three concept blocks used in the main search strategy, plus author-title and citation-following searches	Supplementary retrieval of hard-to-index higher-education literature and follow-up verification of cited sources
UNESCO repository	Africa-focused higher-education and research-system materials	Targeted repository searching using combinations such as "higher education Africa," "research and development Africa," "doctoral graduates Africa," and "gross enrolment ratio sub-Saharan Africa"	Continental system context, especially on enrolment, R&D intensity, and higher-education development
World Bank repository and official news pages	Africa-focused higher-education and institutional reform materials	Targeted searching for "Africa Higher Education Centers of Excellence," "research output Africa universities," and related programme documents	Programme-scale evidence on research-capacity outcomes and institutional reform
WHO/TDR-ESSENCE repository	Research-capacity strengthening guidance	Targeted search for "ESSENCE research capacity strengthening," "capacity strengthening funders," and related guidance documents	Cross-cutting capacity-strengthening guidance and monitoring logic
IUCEA and APHRC repositories	Postgraduate supervision and mentorship in East Africa	Targeted retrieval of supervision and mentorship frameworks for postgraduate training and careers in East Africa	Regionally grounded supervision and mentoring framework evidence

CoARA and DORA websites	Responsible research assessment	Targeted retrieval of guidance on research assessment reform and responsible use of indicators	Normative and policy guidance on incentives, assessment, and recognition systems
Science for Africa Foundation website	Research management capacity strengthening in Africa	Targeted retrieval of the Africa Research Management Capacity Strengthening Programme and related institutional materials	Institutional reform logic for research-management professionalization
Citation chaining	Cross-cutting	Backward and forward citation chasing from anchor texts including Cooke (2005), Dean et al. (2017), Pulford et al. (2020), ESSENCE (2023), and Ng'oda et al. (2024)	Identification of seminal, adjacent, and complementary sources not captured through keyword searching alone

Note. This appendix is designed to improve procedural traceability for an integrative review. It should not be read as a claim that the study was conducted as a conventional systematic review with prospectively archived identification-stage counts.

Appendix C. Corpus profile of included sources

This appendix summarizes the composition of the evidentiary corpus by source type, region, methodological form, and principal RCCA domain. Its purpose is to make the architecture's evidentiary base visible and to distinguish clearly between peer-reviewed empirical evidence, review and conceptual scholarship, and policy or programme documents.

Table C1. Corpus by source type

Source type	Number of sources	Percentage of corpus	Illustrative examples
Peer-reviewed journal articles	22	64.7%	Pulford et al. (2020); Ng'oda et al. (2024); Lim et al. (2025)
Books and monographs	3	8.8%	Fricker (2007); Lave and Wenger (1991); Sayer (2000)
Policy, framework, guidance, or programme documents	7	20.6%	UNESCO (2024); IUCEA and APHRC (2024); World Bank (2025)
Reporting-guideline articles	2	5.9%	Page et al. (2021); Rethlefsen et al. (2021)
Total	34	100.0%	

Table C2. Corpus by main geographical focus

Main geographical focus	Number of sources	Percentage of corpus	Illustrative examples
Africa-focused, including continental, regional, or country-specific African settings	9	26.5%	Balandya et al. (2021); IUCEA and APHRC (2024); Pulford et al. (2020); UNESCO (2024); World Bank (2025)
Global, international, or cross-regional/comparative focus	25	73.5%	Kwan et al. (2021); Teece (2007); CoARA (2022); Lim et al. (2025)
Total	34	100.0%	

Note. Geographical focus refers to the principal empirical, policy, or institutional setting emphasized by the source, not to the nationality of authors or the broader portability of the argument.

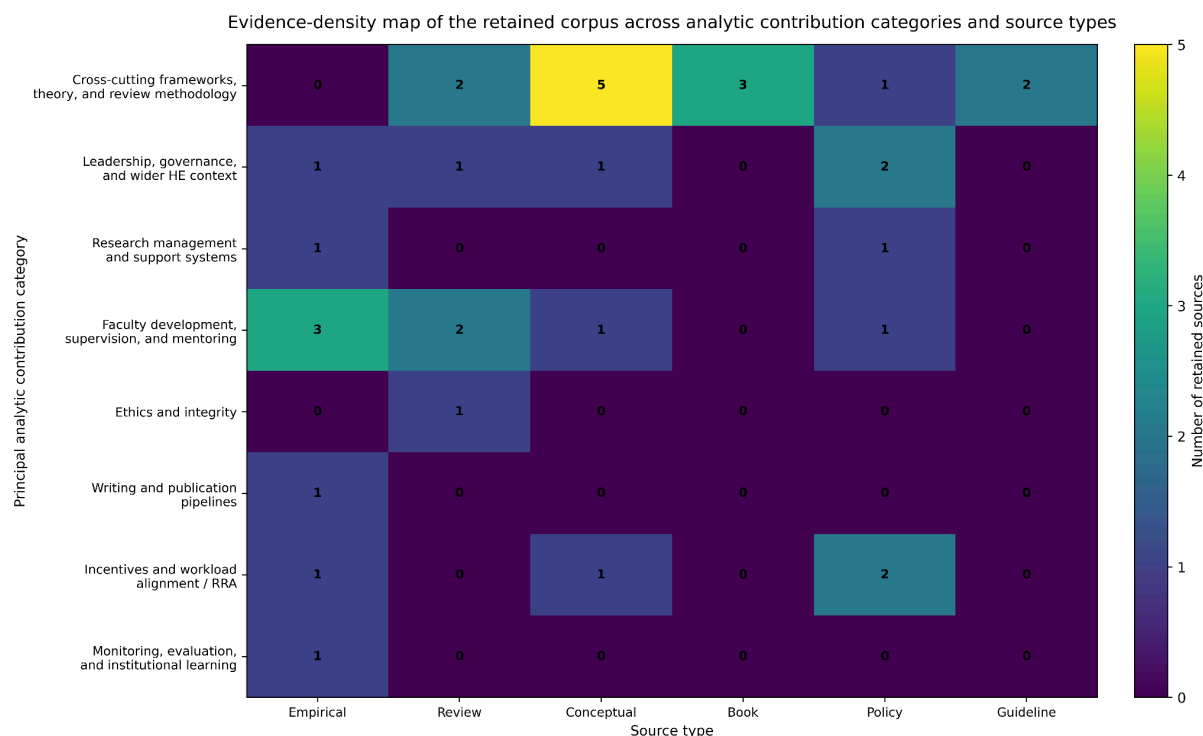
Table C3. Corpus by methodological form

Methodological form	Number of sources	Percentage of corpus	Illustrative examples
Empirical studies and institutional analyses	8	23.5%	Balandya et al. (2021); Kwan et al. (2021); Lim et al. (2025); Pulford et al. (2020)
Review and synthesis articles	6	17.6%	Dean et al. (2017); Ng'oda et al. (2024); Senghore and Omotosho (2025)
Conceptual, theoretical, or methodological journal articles	8	23.5%	Bicchi (2024); Cooke (2005); Teece (2007); Torraco (2016)
Books and monographs	3	8.8%	Fricker (2007); Lave and Wenger (1991); Sayer (2000)
Policy, framework, guidance, or programme documents	7	20.6%	ESSENCE (2023); IUCEA and APHRC (2024); UNESCO (2024)
Reporting-guideline articles	2	5.9%	Page et al. (2021); Rethlefsen et al. (2021)
Total	34	100.0%	

Table C4. Corpus by principal analytic contribution to the RCCA

Principal analytic contribution	Number of sources	Percentage of corpus	Illustrative examples
Cross-cutting capacity frameworks, theory, and review methodology	13	38.2%	Cooke (2005); ESSENCE (2023); Fricker (2007); Sayer (2000); Torraco (2016); Page et al. (2021)
Leadership, governance, and wider higher-education system context	5	14.7%	UNESCO (2024); World Bank (2025); Bromley and Powell (2012); Guerrero and Menter (2024)
Research management and support systems	2	5.9%	Pulford et al. (2020); Science for Africa Foundation (2023)
Faculty development, supervision, mentoring, and career pathways	7	20.6%	Balandya et al. (2021); IUCEA and APHRC (2024); Ng'oda et al. (2024); Schwartz (2023)
Ethics and integrity	1	2.9%	Senghore and Omotosho (2025)
Writing and publication pipelines	1	2.9%	Kwan et al. (2021)
Incentives, workload alignment, and responsible research assessment	4	11.8%	CoARA (2022); DORA (2024); Lim et al. (2025); Mabile et al. (2025)
Monitoring, evaluation, and institutional learning	1	2.9%	Kilmarx et al. (2023)
Total	34	100.0%	

Note. The coding in Table C4 reflects the principal analytic contribution of each source to the architecture. Several sources informed more than one RCCA domain, but each source was counted once only in order to avoid double counting.

**Figure C1.**

Evidence-density map of the retained corpus across analytic contribution categories and source types. The figure visualizes the distribution of the 34 retained sources across source types and their principal analytic contributions to the RCCA. Each source is counted once only, using the principal coding logic reported in Appendix C. Source: Author's coding of the retained corpus summarized in Tables C1–C4.

Declarations

Conflict of interest: The authors declare that they have no known financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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