

A Systematic Review of Sustainable Research Capacity Building in Higher Education: Definitions, Practices, and Challenges

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Abstract: The motivation for this study stemmed from the limited literature addressing sustainable research capacity building (SRCB) in higher education, which has resulted in poorly implemented practices. A literature search was conducted across four databases: Web of Science, Scopus, ERIC, and Google Scholar. In total, 62 studies were included from an initial pool of 7,793 screened articles. To enhance the specificity and relevance of the literature search, the study employed the Population, Intervention, Comparison, and Outcome (PICO) framework to formulate the search strategy and establish eligibility criteria. The reasons for excluding records are documented in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. This review sought to answer the following questions: (a) how sustainability is conceptualised within research capacity building; (b) how institutional practices influence SRCB among novice researchers; and (c) the challenges that threaten its sustainability within higher education institutions (HEIs). The findings indicated that SRCB was not consistently defined across the

reviewed articles. Although effective practices were implemented to promote SRCB, various challenges impeded their effectiveness. The implications of the findings highlight the necessity for a clear, sustainability-focused definition of SRCB that acknowledges responsibilities at both the individual and institutional levels and integrates expertise, motivation, and opportunity. SRCB is supported through structured mentorship, enhanced supervision, supportive policies, and equitable research environments. However, current practices often prove unsustainable due to excessive teaching loads, gender inequities, and deficiencies in postgraduate research training. It is the responsibility of all stakeholders within HEIs to cultivate a more sustainable research ecosystem.

Keywords: Systematic literature review, sustainable research, research capacity building, next generation of academics, research practitioners.

1. Introduction

Educational research is characterised by a systematic, critical, and empirical approach to problem-solving. It encompasses a range of activities, including the formulation of inquiries, the conduction of observations, the evaluation of information sources, the design of studies, the development of data collection tools, the analysis of outcomes, the proposal of solutions, and the dissemination of findings (Del Savio et al., 2024). In essence, research involves critical reflection and systematic inquiry aimed at addressing challenges and capitalising on opportunities (Marino-Jiménez et al., 2024). Consequently, Daniels et al. (2024) and Yoshioka-Kobayashi and Shibayama (2020) argued that research in all its forms, types, and purposes possesses the potential to catalyse environmental, social, and economic prosperity. As a result, governments and funding bodies in both developed and developing nations are increasingly positioning research productivity as a strategic national priority. However, this growing emphasis on research output has reshaped the academic landscape and intensified institutional competition. While enhanced investment and policy support are intended to bolster research productivity, they have simultaneously engendered pressures that raise significant

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questions about the long-term sustainability of research practices in higher education institutions (HEIs).

Del Savio et al. (2024) reported that research has the potential to contribute to the achievement of the United Nations' 17 Sustainable Development Goals. Regarding economic benefits, knowledge generation is particularly valuable for developing nations, as it serves as a critical driver of new product and service creation (Zheng et al., 2024). For scholars such as Jackson et al. (2022) and Kozhakhmet et al. (2022), it is therefore unsurprising that national governments have augmented their investments and policies to promote research productivity and the development of the next generation of academics. Complementing these efforts, international development donors and governmental bodies have reaffirmed their commitment to initiatives that strengthen research capacity in developing nations (Vicente-Crespo et al., 2021). In relation to the social dimension of sustainability, impactful research can stimulate socioeconomic development by implementing evidence-based policies and practices, enhancing human capital, and developing technologies and products that benefit underserved populations (Pulford et al., 2021).

It is to this end that HEIs and national governments bear the responsibility of investing in knowledge production and those tasked with its execution (Yoshioka-Kobayashi & Shibayama, 2020). In this context, Sustainable Research Capacity Building (SRCB) acts as a critical catalyst for the development of globally competent, world-class academics and research institutions. Building upon this imperative, research empowers universities to maintain relevance as they engage with the processes of globalisation and internationalisation (Del Savio et al., 2024). In this regard, Ulla and Tarrayo (2021) have highlighted that reputable assessments, such as the Academic Ranking of World Universities (ARWU), Quacquarelli Symonds (QS) World University Rankings, and Times Higher Education (THE) World University Rankings, evaluate institutions based on their academic and research output. An increase in publications enhances university rankings and funding, thereby attracting top talent. Consequently, HEIs incentivise academics to enhance both the quality and quantity of their research, engage in international networks, and publish in esteemed journals (Jackson et al., 2022).

Daniels et al. (2024) observed, however, that HEIs are under considerable pressure to attract increased investment, talented staff, and students, while simultaneously enhancing their global rankings. As a result, academics encounter numerous challenges, including time constraints and multiple responsibilities. A significant challenge is the need for active research engagement amidst the "publish or perish culture," which is regarded as a critical indicator of an academic's productivity, qualifications, and potential for career progression (Kozhakhmet et al., 2022; Ulla & Tarrayo, 2021; Wilkins et al., 2021). In fact, Wilkins et al. (2021) noted that, for the past three decades, it has been mandatory for academic professionals to produce scholarly work as part of their professional obligations. Moreover, Mydin and Surat (2021) reported that academics are expected to secure research grants through time-consuming application processes, engage in international collaborative research, and meet citation metrics (Le, 2024). Furthermore, Hernández-Peña et al. (2022) noted that the research landscape is constantly evolving due to societal and institutional changes, including mass higher education, globalisation, and the emergence of new technologies, such as Artificial Intelligence. Despite these pressures, academics frequently encounter limited institutional support, coupled with the emotional and psychological strains associated with prolonged and taxing involvement in research endeavours.

Given the significance of high-impact research to national governments, citizens, and universities, research capacity building (RCB) has emerged as a crucial approach that nations and universities should employ to develop the individuals responsible for its production (Del Savio et al., 2024). Typically, universities incorporate RCB initiatives such as workshops on research methodologies and seminars on publication strategies (Kozhakhmet et al., 2022). However, some scholars (Cash-Gibson

et al., 2015; Cordrey et al., 2022; McGuire et al., 2020; Niemczyk & Rossouw, 2018) advocate for a transition from RCB to SRCB, which they define as the continuous process of developing and enhancing the skills, knowledge, and resources of research practitioners and universities in order to conduct high-quality, impactful research. Therefore, SRCB represents an extension of the RCB concept, focusing on the long-term development of research capacity.

Despite the expanding body of literature on RCB, existing studies reveal several limitations. First, RCB is often conceptualised as a collection of short-term interventions, such as training workshops or publication support, rather than as a sustained, systemic process embedded within institutional structures. Second, systematic reviews (Pan et al., 2021) on RCB remain predominantly concentrated in the medical and health sciences, providing limited insight into how sustainable research capacity is cultivated across disciplines within HEIs (Lim et al., 2022). Most critically, sustainability is rarely theorised as a core dimension of RCB, resulting in fragmented approaches that prioritise immediate productivity over long-term academic development. Consequently, there is a lack of integrative practices that elucidate how HEIs can effectively and sustainably develop research capacity. Given the vital role of research in society and the necessity for high-quality, sustainable practices in RCB, it is imperative to systematically explore the current state of research on this topic in order to establish a solid foundation for future research and practices in SRCB. A systematic literature review (SLR) is consequently necessary to synthesise conceptualisations, practices, and empirical findings, identify gaps in the literature, and provide a coherent evidence base to guide HEIs in achieving SRCB. The research questions that the study aimed to answer follow.

- **RQ1:** To what extent is sustainability included in the definition of research capacity building?
- **RQ2:** How do institutional practices shape the development of sustainable research capacity building amongst novice researchers?
- **RQ3:** What are the barriers that threaten the sustainability of research capacity building in higher education institutions?

2. Methodology

The qualitative SLR was conducted using a structured protocol that included formulating relevant research questions, reviewing research protocols, and conducting a literature search across several databases. The researchers then applied the inclusion and exclusion criteria, extracted the data, and analysed it. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was utilised to execute the SLR. The key aspects of the adopted protocol are discussed next.

2.1 Eligibility criteria

As a starting point, Harris et al. (2013) recommended that once the study establishes answerable questions, the reviewer must determine the inclusion and exclusion criteria. This SLR included studies published in the past five years, from 2020 to 2024 (see Table 2). The studies examined the development of researchers across all faculties of HEIs. Consequently, the research topics considered included RCB, research training, professional development of researchers, and postgraduate student development across all faculties. The included studies were restricted to those published in English. Table 1 outlines the inclusion and exclusion criteria for the study.

Table 1: Inclusion and exclusion criteria

Criterion	Inclusion criteria	Exclusion criteria
Academic Setting	Studies focusing on RCB or SRCB in higher education.	Studies in corporate, governmental and clinical environments.

Sustainability	Literature that focuses on sustainable practices and long-term strategies related to RCB or SRCB.	Studies that lack a focus on sustainability and long-term planning.
Publication Source	Research published in peer-reviewed journals, conference proceedings or scholarly books.	Research published on non-scholarly websites, media, grey literature, unpublished dissertations/theses and non-peer-reviewed research.
Time Frame	Publications between 2020 and 2024.	Publications prior to 2020.
Types of Studies	Empirical studies, theoretical and conceptual papers.	Recurring studies or research that are already included.

2.2 Literature search strategy

The search strategy was informed by the eligibility criteria presented in Table 1 and was specifically designed to identify pertinent literature related to the theme of SRCB. To enhance the specificity and relevance of the literature search, the study employed the Population, Intervention, Comparison, and Outcome (PICO) framework to formulate the search strategy and establish the eligibility criteria (Methley et al., 2014). The researchers conducted literature searches between October 2024 and September 2025 across four distinct reliable databases: Web of Science, Scopus, ERIC, and Google Scholar. To avoid selection bias, a predefined search string along with explicit inclusion and exclusion criteria was consistently applied to all retrieved records. Screening was carried out systematically using titles, abstracts, and full texts as necessary, and the same criteria were applied uniformly, regardless of publication venue, methodology, or findings. To ensure that only high-quality, relevant sources were included, Boolean operators and keywords were utilised to filter the data (see Table 2). Furthermore, the search parameters applied, including publication date (last 5 years), source type (journal articles and conference proceedings), and language (English), are also provided in Table 2.

Table 2: Search strategy, boolean strings and limiters

Data base	Keyword search	Limiters
Web of Science	"Research training" OR "Research capacity" OR "Research capacity building" OR "Research professional development" OR "developing postgraduate students"	Language: English Source type: Journal articles Publication date: 2020-2024
ERIC	"Research training" OR "Research capacity" OR "Research capacity building" OR "Research professional development" OR "developing postgraduate students"	Language: English Source type: Journal articles Publication date: 2020-2024
Scopus	"Research training" OR "Research capacity" OR "Research capacity building" OR "Research professional development" OR "developing postgraduate students"	Language: English Source type: Journal articles Publication date: 2020-2024
Google scholar	"Research training" OR "Research capacity" OR "Research capacity building" OR "Research professional development" OR "developing postgraduate students"	Language: English Source type: Journal articles Publication date: 2020-2024

During the screening and selection process, the authors initially focused on the titles and abstracts of the identified studies. Irrelevant studies were excluded, and the remaining studies were evaluated against the established inclusion and exclusion criteria. Data extraction and analysis were performed

manually through a thorough review of each article. A structured data extraction form (see Table 3) was employed to enhance the reliability of the study and mitigate potential bias. This structured form facilitated efficiency and improved reproducibility and consistency across reviews. Given the relatively small dataset, it was manageable, which encouraged the authors to adopt a fully manual approach for data extraction. A total of 7,793 studies were retrieved from the four databases. Subsequently, 153 duplicates were eliminated, resulting in a total of 7,640 records (refer to Table 4). An independent analysis of titles and abstracts was undertaken, leading to the exclusion of 7,460 records that did not align with the study's objectives.

2.3 The Data extraction process

Data extraction was performed using a structured data extraction form developed by the authors to ensure consistency and mitigate bias. Extracted data encompassed publication details, study context, disciplinary focus, methodological approach, geographical setting, and key findings related to SRCB and sustainability. The qualitative synthesis employed a thematic analysis approach, guided by the principles of thematic synthesis. Initially, all included studies underwent open coding, during which relevant concepts and patterns pertaining to SRCB were identified. These initial codes were iteratively reviewed and organised into higher-order themes through constant comparison across studies. This process facilitated the identification of recurring strategies, challenges, and conceptual dimensions underpinning SRCB in higher education. To enhance reliability, data extraction and coding were independently carried out by two reviewers. Any discrepancies in coding or study interpretation were resolved through discussion and consensus.

A total of 180 records were deemed to contain content that would contribute to the findings of this SLR. Further analysis of these 180 records was conducted through full-text review. Each document was meticulously reviewed to assess its eligibility based on whether it reported on definitions of SRCB, nurturing novice research practitioners, and the challenges they encountered. A total of 118 records did not meet the criteria and were thus excluded. The remaining 62 were included in the review. As recommended by Harris et al. (2013), the reasons for excluding records are presented in the PRISMA diagram in Figure 1.

Although this review was guided by a predefined protocol aligned with PRISMA guidelines, the protocol was not formally registered on platforms such as PROSPERO or the Open Science Framework. This decision was based on the exploratory, qualitative nature of the review, which emphasised conceptual and thematic synthesis rather than outcome-based evaluation. To ensure transparency, all methodological decisions are thoroughly documented in this manuscript.

Table 3 below illustrates the contribution of each database to the final set of articles utilised in the study and elucidates the screening and selection process. A total of 7,640 articles were initially identified across four databases: Web of Science, ERIC, Scopus, and Google Scholar. From these, 180 articles were downloaded for detailed review based on their relevance to the study topic and inclusion criteria. After full-text screening, 62 articles were ultimately retained for analysis. Web of Science yielded the highest number of initial records (3,372), but only 73 articles were downloaded, of which 14 met the final inclusion criteria. ERIC provided 1,836 initial articles, of which 44 were downloaded. Notably, 30 articles were included in the final review, making ERIC the largest contributor to the final sample. Scopus produced 2,232 records, from which 13 were downloaded, and 4 were included in the SLR. Google Scholar returned 200 records; 50 articles were downloaded, and 14 were included.

Table 3: Articles sourced from each database

Data base	Total number of articles	Total number of articles downloaded	Total number of articles used
Web of Science	3,372	73	14
ERIC	1,836	44	30
Scopus	2,232	13	4
Google scholar	200	50	14
Total	7,640	180	62

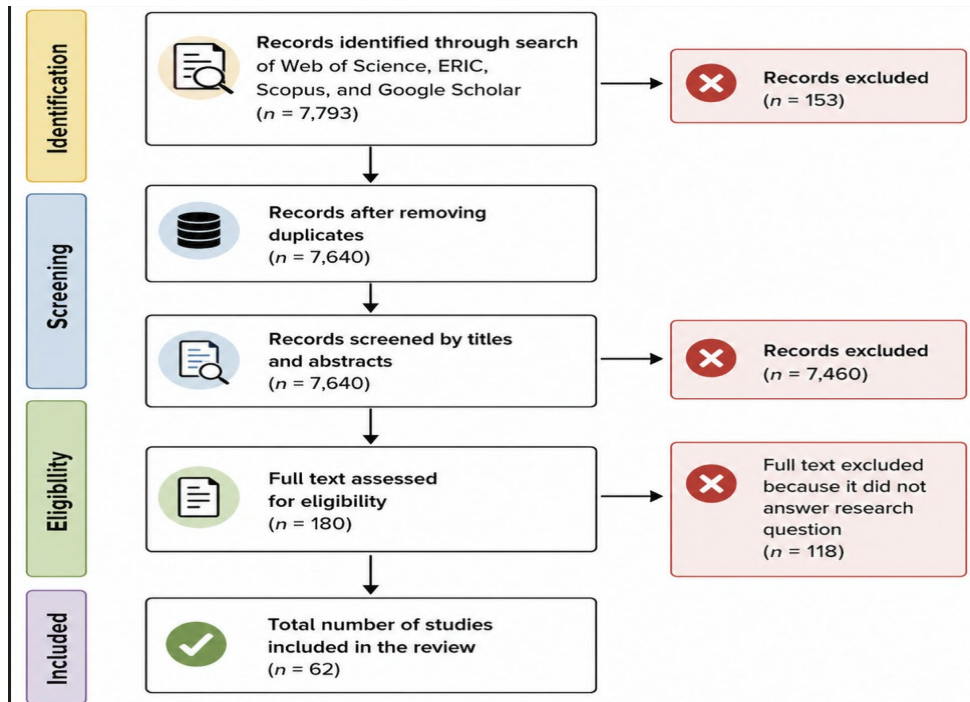


Figure 1: Systematic review process (adapted from Moher et al. 2009)

Figure 1 presents a PRISMA-style flow diagram that delineates the systematic process employed to identify, screen, assess, and include studies in the review. The PRISMA diagram illustrates the methodical narrowing process, commencing from the initial identification of records to the final inclusion stage. A total of 7,793 records were initially identified through searches conducted on Web of Science, ERIC, Scopus, and Google Scholar. Following the removal of duplicates, 7,640 unique records remained. These records underwent screening based on titles and abstracts, leading to the exclusion of 7,460 articles that did not fulfil the inclusion criteria. Subsequently, 180 full-text articles were evaluated for eligibility, resulting in the exclusion of 118 articles that did not adequately address the research questions. Ultimately, 62 studies met all the inclusion criteria and were incorporated into the final review.

3. Results

Through an in-depth review of the selected documents, three key themes emerged, each addressing the three research questions guiding this study. The first theme concerns the extent to which

sustainability is incorporated into definitions of RCB. The second theme focuses on institutional practices that shape the development of SRCB among novice researchers. The third theme highlights the barriers that threaten the sustainability of RCB in HEIs. These themes provide the structure for presenting the results and will guide the subsequent discussion.

3.1 Sustainability reflection in definitions of sustainable research capacity (RQ 1)

The table below presents key insights from the review on how SRCB is conceptualised and understood across disciplines. It highlights the limited inclusion of sustainability in traditional RCB definitions and illustrates how related concepts, such as RCS, are utilised. The table also provides the corresponding sources for each insight.

Table 4: Key insights on the conceptualisation of sustainable research capacity building

Finding	Key insights	Sources
Limited inclusion of sustainability in RCB definitions	<ul style="list-style-type: none"> RCB is poorly conceptualised, with limited attention to sustainability. Most scholars use the term RCB rather than SRCB. One study identified expertise, motivation, and opportunities as dimensions of RCB, which is related to sustainability. Another study directly defined SRCB as a process that develops sustainable abilities and skills, allowing individuals and organisations to conduct high-quality research 	(Hammad & Al-Ani, 2021; Niemczyk, 2024; Oancea et al., 2021; Pan et al., 2021; Zuzovsky & Guberman, 2024)
RCS as a related concept	<ul style="list-style-type: none"> Scholars in the health disciplines use the term 'RCS,' which closely aligns with SRCB. This concept emphasises long-term development through skills enhancement, institutional support, mentorship, leadership, and support for both current and future researchers. 	(Bilardi et al., 2021; Bonaconsa et al., 2024; Fussy, 2024; Pulford et al., 2020; Vicente-Crespo et al., 2021)

The findings interpreted from this table reveal conceptual ambiguity concerning RCB. Moreover, the dimensions of sustainability also appear to be poorly understood across the literature. The limited and explicit inclusion of the sustainability concept within the RCB suggests that the field still lacks a unified conceptual foundation. The data also indicates conflicting views among researchers on the core considerations of RCB. Most researchers use the term without integrating sustainability-oriented considerations. The review found that only one study explicitly addresses sustainability. This study focuses on the core dimensions of RCB: expertise (methodological knowledge and skills) and motivation (institutional attributes of research and opportunities). Additionally, it includes opportunities (resources such as time, funding, and institutional support). These factors align implicitly with sustained capacity over time. The other study, as indicated in the table, defined SRCB as a developmental process aimed at fostering research skills and abilities.

The second point, as alluded to in the table, is the emergence of the issue of RCS. This is particularly evident in the health sciences, where it is presented as a related concept. RCS focuses on long-term development, with a strong emphasis on mentorship, institutional support structures, and

leadership development. Additionally, it aims to enhance the skill set of both current and future researchers. This reflects a holistic approach that inherently embeds sustainability.

In summary, these findings indicate a work in progress. RCB frameworks appear to remain dominant, but they also show that sustainable research capacity demands an integrated system that focuses on expertise, motivation, opportunities, and institutional leadership. Interesting also is its focus on developmental pathways oriented toward the future.

3.2 Institutional factors shaping novice researcher development (RQ 2)

The practices outlined in Table 5 include strategies implemented at both the undergraduate and postgraduate levels. It summarises the key institutional strategies used to develop SRCB among novice researchers and highlights specific practices at these levels, including the roles of supervision and mentorship, the integration of teaching and research, the allocation of dedicated time, and leadership by experienced researchers. Additionally, the table outlines the benefits of these practices, the challenges encountered in their implementation, and the supporting sources for each insight.

Table 5: *Institutional practices, benefits and challenges shaping novice research capacity*

Finding	Institutional practice	Benefits	Challenges	Sources
Undergraduate research development	Undergraduate students are likely to become competent future researchers through research experience.	<ul style="list-style-type: none"> •Engagement in undergraduate research fosters ethical research conduct. •Increases the likelihood of students pursuing careers in research. 	Research opportunities are often limited to students in the developed world, those at well-funded institutions, high-achieving students, and those enrolled in STEM fields.	(Barwick et al., 2023; Beheshtian et al., 2023; Bernstein & Lindsay, 2022; Brazendale et al., 2024; Del Savio et al., 2024; Hite et al., 2022; Knight, 2023; Liu et al., 2024; Marino-Jiménez et al., 2024; Moxley, 2022; Perines, 2021; Ruth et al., 2023; Schmidt et al., 2023; Tan et al., 2022)
Postgraduate research development	High-quality postgraduate programmes should support the transition from novice to independent researchers.	<ul style="list-style-type: none"> •Postgraduate programmes provide essential development for future researchers. 	Thorough orientation of the research environment is essential for effective postgraduate development.	(Brockmann, 2023; Corr et al., 2023; Daniels et al., 2024; Horey et al., 2022; Liardet, 2024; Stojanović et al., 2023; Vital & Yao, 2023)
Effective supervision and mentorship	Effective supervision, mentorship, and research assistantships foster student independence	<ul style="list-style-type: none"> •Improves student independence, research competence, and exposure to ethical research experiences. 	Sustaining mentorship beyond the supervision period can be challenging.	(Bonaconsa et al., 2024; Borders et al., 2020; Branchaw et al., 2020; Bueno, 2023; Hoven et al., 2023; Kingiri et al., 2022; Lee et al., 2022; Mydin & Surat, 2021;

	and research competence.			Vela et al., 2024; Wang et al., 2023; Wilson & Mitchell, 2024)
Integration of teaching and research	The mutual enhancement of research and teaching leads to improvements in curricular design, pedagogical methods, and students' learning experiences.	<ul style="list-style-type: none"> • Improves curriculum design, pedagogical methods, and learning experiences. 	Implementation requires institutional support and time allocation.	(Ulla & Tarrayo, 2021)
Dedicated time and space for research activities	Novice and experienced researchers should be provided with dedicated time and space to engage in SRCB activities, such as writing retreats, to improve research outputs.	<ul style="list-style-type: none"> • Providing time and space enhances research outputs • Creates opportunities for skill development. 	Limited resources and scheduling conflicts can impede participation.	(Fussy, 2024)
Overarching finding	Empowering novice researchers is an essential institutional practice for SRCB.	<ul style="list-style-type: none"> • Structured institutional practices lead to the development of competent future researchers. 	Institutional inequities and limited resources continue to be barriers to universal implementation.	(Hernández-Peña et al., 2022; Wilkins et al., 2021)

The findings demonstrate that undergraduate research serves as a critical foundation for SRCB. Institutions that introduce research at an early stage lay the groundwork for robust future research cultures. There is consistent evidence in the literature that undergraduate research experience enhances ethical awareness, confidence, and the inclination to pursue postgraduate research. Such exposure is, therefore, essential for establishing a sustainable pipeline of researchers. However, it is concerning that access to undergraduate research programmes remains uneven, with students in well-resourced institutions deriving the most benefit. The review indicates that students in the Global South predominantly encounter limited opportunities and underfunded programmes. These

disparities suggest that undergraduate research is not merely an academic practice but also an issue of institutional equity and resource allocation.

The review confirmed that postgraduate programmes represent the subsequent stage of SRCB and provide structured development that supports students in their pursuit of independent research. Consequently, it is critical for students to receive comprehensive orientation and guidance. In contexts where such support is absent, inexperienced researchers may struggle with complex methodologies and other academic conventions, as well as with institutional expectations. This underscores the necessity for postgraduate development to encompass more than coursework; it must involve deliberate socialisation into the research environment. For this reason, close supervision, mentorship, and research assistance are vital components of the process. The literature review also highlighted the significance of effective institutional supervision and mentorship networks. These relationships and collaborations are regarded as powerful mechanisms for promoting research competence and fostering independence. Effective research leadership is another critical institutional factor, essential for securing funding, building networks, and navigating academic systems. Strong research leaders also contribute to shaping institutional policies and practices that support SRCB. However, the review revealed that many African institutions lack formal mentorship programmes or access to experienced scholars, thereby constraining professional development. Moreover, mentorship is often challenging to maintain beyond formal programme timelines. Failure to address these needs may result in professional isolation.

The review uncovered another significant finding: the importance of integrating teaching and research to enhance both curriculum quality and learning experiences. Lecturers who align their teaching with their own research ensure that students benefit from exposure to relevant and recent scholarship. Moreover, such a strategy normalises research as an integral part of the academic journey and, by doing so, demystifies the research dynamics for novice researchers. It also supports the concept of a comprehensive SRCB. Nonetheless, successful integration requires institutional commitment, support, and appropriate workload allocation. Without structural backing, academics struggle to balance research engagement with heavy teaching responsibilities—a challenge particularly acute in teaching-focused institutions. The study underscored the necessity of dedicated time and space to create conditions conducive to productivity. In this regard, researchers should be provided with protected time and physical space to conduct research. These provisions should include writing retreats and research workshops, which are crucial for collaboration, skill development, and improved research output. However, research constraints and scheduling conflicts may limit frequent participation, especially amid high teaching loads and constrained budgets.

Overall, the message is clear: inexperienced researchers should be empowered through structured institutional practices. Therefore, institutions should invest in several targeted initiatives, including early exposure to research, supportive supervision, dedicated spaces, integrated teaching and research environments, and leadership.

3.3 Barriers to long-term research capacity building in universities (RQ 3)

The reviewed literature elucidates several challenges that impede the efficacy of SRCB in HEIs across both developed and developing contexts. The table below summarises these key challenges that hinder SRCB for novice researchers.

Table 6: Table 6: Barriers associated with sustainable research capacity building

No.	Theme	Description of Barrier	Context	Sources
i	Infrastructural and research	<ul style="list-style-type: none"> Persistent infrastructural challenges in developing nations, such as poor 	Developing countries	(Daniels et al., 2024; Hammad & Al-Ani, 2021;

	capacity limitations	internet connectivity, low research productivity, and limited research capacity, <ul style="list-style-type: none"> • Neglect of the diverse needs of researchers. 		Mapako et al., 2021; Oancea et al., 2021)
ii	Excessive academic workload	<ul style="list-style-type: none"> • Academics face competing demands, including heavy teaching loads, supervision overload, and extensive administrative responsibilities • Negatively impacts the ability to engage in SRCB initiatives. 	Developed and developing countries	(Griffioen, 2020; Oancea et al., 2021; Ulla & Tarrayo, 2021; Zuzovsky & Guberman, 2024)
iii	Lack of mentorship and institutional support	<ul style="list-style-type: none"> • Inexperienced academics, particularly in culturally and linguistically diverse contexts, experience limited mentorship • insufficient institutional support despite early-career pressures. 	Developing countries	(Chukwudi, 2022; Wang et al., 2023; Wekullo et al., 2024)
iv	Gendered challenges in research-intensive roles	<ul style="list-style-type: none"> • Research-intensive academic positions are demanding and stressful for women 	Developing countries	(Busse et al., 2022; Zheng et al., 2024)
v	Navigating academic career pathways	<ul style="list-style-type: none"> • Early-career academics and postgraduate students struggle to navigate their way through the academic arena. • Novice scholars were reported to have limited awareness of academic integrity, ethical standards, and research methodology 	Developed and developing countries	(Addae & Kwapong, 2023; Garay-Argandona et al., 2021; Owens et al., 2020; Saeed & Qunayeer, 2021; Wainscott, 2023)
vi	Limited supervisory capacity	<ul style="list-style-type: none"> • Increasing postgraduate enrolments strains the already limited supervisory capacity within HEIs. 	Developing countries	(Moxley, 2022; Nwosu et al., 2024; Wilkins et al., 2021)
vii	Insufficient funding opportunities	<ul style="list-style-type: none"> • Limited government and institutional funding for research activities, skills development, and conferences, especially in developing countries, often compels researchers to self-fund their research and RCB initiatives. 	Developing countries	(Daniels et al., 2024; Fussy, 2024; Mapako et al., 2021)

viii	Insufficient academic writing and critical thinking	• Novice academics display a poor understanding of student academic capacity.	Developed and developing countries	(Addae & Kwapong, 2023; Kozhakhmet et al., 2022)
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The study identified several limitations in infrastructure and research capacity, particularly in developing nations. Infrastructural challenges encompass poor and unreliable internet connectivity, low research productivity, limited institutional research capacity, and the neglect of diverse researcher needs. These constraints are noted to undermine national and institutional efforts to build and sustain research capacities. The data also revealed limitations on scholarly development. Academics worldwide are experiencing excessive academic workloads, which include heavy teaching loads, extensive supervision responsibilities, and administrative duties. This situation significantly restricts the time available for research, participation in RCB, and the ability to develop meaningful scholarship programmes. Notably, this specific challenge affects both developing and developed contexts.

The review highlighted a deficiency in mentorship and institutional support, particularly for students in culturally and linguistically diverse environments. It was discovered that institutions frequently fail to provide structured mentorship programmes, adequate research guidance, and supportive professional development opportunities. This inadequacy exacerbates early-career pressures and diminishes research output. Another area of concern is the issue of gendered challenges in research-intensive roles. The data indicated that women, in particular, frequently encounter heightened pressures. These barriers include the necessity to balance research productivity with childcare and family responsibilities, as well as the demanding nature of research. Furthermore, early-career academics and postgraduate students often struggle to navigate academic norms. Reported challenges encompass limited understanding of academic integrity and ethical standards, inadequate grounding in research methodology, and uncertainties regarding academic progression.

The systematic review identified a constrained supervisory capacity. The increasing postgraduate enrolments place significant strain on the current academic staff, resulting in longer completion times, reduced supervision quality, and overburdened academic departments, especially in developing countries. Additionally, funding opportunities represent another significant issue. The review suggests that government and institutional funding for research remains insufficient, hindering opportunities for conference travel and skills development. This inadequacy adversely influences research participation and contributes to low research productivity, particularly in resource-constrained contexts. Consequently, academics sometimes grapple with insufficient academic writing and critical thinking skills. This, in turn, impairs their ability to supervise students, produce quality research outputs, and engage meaningfully in scholarly discourse.

4. Discussion

This review aimed to address three research questions: (a) how sustainability is conceptualised within RCB; (b) how institutional practices influence SRCB among novice researchers; and (c) the barriers threatening its sustainability in higher education institutions. This study advances research on SRCB by adopting a global, cross-disciplinary perspective. Previous studies have concentrated on specific contexts, such as evidence synthesis capacity in Africa through co-authorship analysis in the medical field (Pan et al., 2021) or RCB interventions in low- and middle-income universities (Vicente-Crespo et al., 2021). In contrast, this review systematically examines how SRCB is conceptualised, implemented, and challenged across HEIs.

In addressing the first research question, the following findings emerge from the 62 reviewed articles and their comparison with other scholarly literature. Firstly, there is a persistent lack of conceptual clarity surrounding SRCB. Most studies fail to provide a consistent definition. Instead, scholars and their institutions employ alternative terms such as training and development or RCS. This supports Ngozi's (2019) observation that, despite SRCB's potential to enhance research competencies and societal impact, no shared definition exists. This finding underscores the urgent need for a coherent, shared definition of SRCB, as the absence of such a definition leads to inconsistencies across initiatives that undermine long-term research systems. Moreover, existing definitions often marginalise sustainability, even though key dimensions of SRCB—namely, expertise, motivation, and opportunity—are inherently aligned with the concept (Bilardi et al., 2021). Secondly, recent scholarship highlights the necessity of defining SRCB practices that consider researchers' diverse developmental stages and institutional contexts (Zuzovsky & Guberman, 2024). This view is reinforced by Oancea et al. (2021), who advocated for differentiated professional development for both novice and seasoned scholars. These findings imply that SRCB initiatives must adopt differentiated, context-responsive strategies to address the varying developmental stages in capacity building. Thirdly, it was found that mentorship is an essential component of SRCB, as it facilitates the deliberate transfer of research knowledge and expertise (Van Rensburg et al., 2017; Fussy, 2024; Griffioen, 2020). This discovery suggests that SRCB initiatives must prioritise a structured mentorship approach, ensuring engagement and knowledge exchange between experienced scholars and their junior peers. Lastly, a finding not reported in the SLR is that several scholars advocate for a two-tiered definition of SRCB, encompassing the development of individual researchers' capacity and the research capacity of the institution (Di Pierro, 2023; Fredua-Kwarteng, 2021; Léautier & Mutahakana, 2012; Malyan & Jindal, 2014). At the individual level, emphasis is placed on developing research skills and ethical practices (Fredua-Kwarteng, 2021). Meanwhile, institutional efforts focus on performance, adaptability, and policy alignment to sustain research cultures (Di Pierro, 2023; UNDP, 2023; see also Matus et al., 2018; Ngozi, 2019; Niemczyk & Rossouw, 2018).

Findings related to the second research question indicate that institutional practices play a decisive role in shaping SRCB among novice researchers. SRCB appears to be more firmly institutionalised in developed contexts, while significant gaps persist in developing regions, particularly in the provision of structured mentorship for undergraduate and postgraduate students. These disparities highlight the need to embed research activities within university curricula and to support them through formalised mentorship structures. A growing body of scholarship identifies mentorship as a cornerstone of SRCB, given its role in nurturing research skills, professional identity, and scholarly confidence (Brizuela et al., 2023; Huenneke et al., 2017; Mafenya, 2019; McGuire et al., 2020; Singh, 2015). Niemczyk and Rossouw (2018) further emphasise the importance of connecting novice researchers with experienced academics through policy-aligned mentorship frameworks supported by adequate infrastructure to cultivate future scholars. Daniels et al. (2024) and Liardet (2024) also argue that collaborative publishing and participation in knowledge production are critical for the development of independent researchers. In this regard, research-intensive postgraduate programmes and structured research assistantships provide valuable opportunities for doctoral candidates and early-career researchers to develop research competence under guided supervision (Niemczyk, 2019). This view is supported by Matus et al. (2018), who note that research assistantships and collaborative research environments also support ethical research practice by enabling novice researchers to apply theoretical knowledge within supportive, real-world contexts. Responsibility, therefore, lies with institutions to develop enabling policies that foster supportive research cultures and provide scaffolded pathways from novice to independent researcher (Mafenya, 2019; Stojanović et al., 2023; Corr et al., 2023). Importantly, institutional research policies should promote local and international collaboration, providing access to funding and diverse methodological training (Hammad & Al-Ani, 2021; Mafenya, 2019; Matus et al., 2018). Such practices, however, require

mentors, supervisors, and academic leaders to be adequately trained to offer academic and psychosocial support.

Findings related to the third research question reveal a complex set of challenges that constrain SRCB, particularly in developing countries. Academic workload pressures remain a dominant barrier, with excessive teaching, supervision, and administrative demands contributing to heightened stress, burnout, and reduced research productivity (Dusdal et al., 2020; Hammad & Al-Ani, 2021; McGuire et al., 2020; Oancea et al., 2021). Such conditions limit opportunities for professional development in research. The SLR revealed a persistent lack of mentorship and institutional support, which disproportionately affects novice researchers' ability to develop research skills and establish research networks. The gendered dimensions of this challenge are evident in the declining availability of women as mentors and the limited access to supportive research networks for female academics (Snider, 2022). To address these disparities, formalised mentorship programmes, particularly same-sex mentor-mentee models, have been proposed as effective mechanisms for supporting women in research-intensive roles (Brizuela et al., 2023). These challenges are compounded by the societal expectations that women should demonstrate high research productivity during their childbearing years. Consequently, stronger gender-equitable policies within academia are necessary (Marongwe et al., 2022).

Postgraduate training also emerged as a critical concern. The literature review noted that many students demonstrate a limited understanding of academic integrity, ethical research practices, and research methodology (Ezeanolue et al., 2019; Niemczyk, 2019). Inadequate investment in postgraduate education further constrains research training, as evidenced in developing nations such as Brazil (Ferraz, 2022). Additionally, rising postgraduate enrolments, coupled with limited supervisory capacity, contribute to superficial supervision and compromised research quality (Dusdal et al., 2020). Scholars caution that these pressures, combined with funding constraints, particularly in developing contexts, restrict access to professional development and opportunities for research dissemination (Niemczyk & Rossouw, 2018; Jack et al., 2020; Mafenya, 2019; Mugimu et al., 2013). Therefore, sustained financial investment and strategic workload management are essential for strengthening institutional research capacity and supporting the development of early-career researchers (Singh, 2015).

5. Implications for Practice

The results of this SLR are anticipated to inform policymakers, educational leaders, research practitioners, and students. Furthermore, the review is structured in alignment with each research question.

For higher educational leaders and policymakers, the effective implementation of practices and policies that foster SRCB should commence with a clear definition of its components and delineation of responsibilities for its sustainable implementation, monitoring, and long-term outcomes. The definitions and implemented practices regarding SRCB should be inclusive, considering the diverse needs and developmental stages of researchers, incorporating sustainability, and acknowledging the three essential dimensions of SRCB: expertise, motivation, and opportunities. Moreover, the definition should reflect a tiered approach to SRCB encompassing individual, institutional, and systemic levels.

To promote sustainability in RCB initiatives, universities and their personnel should prioritise the development of researchers at all levels. This element of sustainability can be achieved through structured mentorship opportunities that connect emerging scholars with experienced academic mentors. Additionally, supervision and research assistantships should be enhanced. Furthermore, universities must take responsibility for crafting policies that cultivate a supportive environment for

research training and development. Concurrently, the onus is on individual researchers and students to actively engage in practices aimed at fostering SRCB.

The challenges confronting SRCB render the currently implemented practices unsustainable. Universities, researchers, and students must collaborate to address these challenges. Structural support within academic institutions is essential to alleviate the pressures on researchers, particularly those in teaching-intensive roles. Institutions should consider redistributing teaching loads or providing dedicated time for research. Targeted initiatives are required to promote gender equity in academia, such as mentorship programmes for women, which may enhance their research skills and facilitate the development of supportive networks. Current postgraduate programmes also necessitate urgent reforms to improve research training, including comprehensive education on research integrity and ethics, as well as practical research opportunities. Addressing the challenges that threaten SRCB could foster a sustainable research ecosystem within universities. In this context, all stakeholders have a role to play.

5.1 Limitations

For interpretability, this systematic review focused exclusively on studies published in English, potentially overlooking relevant research available in other languages. The literature search was conducted across four different databases, with a limit of the first 200 studies retrieved from Google Scholar that satisfied SLR requirements. However, studies in alternative databases and grey literature may have been excluded from this review, potentially introducing selection bias.

5.2 Future research

The existing literature on SRCB in universities is limited, resulting in a significant gap in the understanding of the specific practices and strategies that effectively cultivate SRCB. To address this deficiency, future research should prioritise empirical case studies of SRCB within African and other under-researched universities, thereby elucidating context-specific challenges and successes. Furthermore, comparative policy analyses across different regions and disciplines are essential for identifying effective institutional strategies. Investigations into gendered mentorship research models could also provide valuable insights into approaches that promote equity and support for female researchers.

6. Conclusion

This SLR addressed three research questions concerning SRCB in higher education. Firstly, it demonstrated that SRCB remains poorly conceptualised, characterised by a lack of a shared definition and a frequent reliance on alternative terminology that often neglects the concept of sustainability. The review clarifies SRCB as a holistic construct grounded in expertise, motivation, and opportunity, necessitating differentiated approaches that account for researchers' diverse developmental stages and institutional contexts. Secondly, the review revealed that institutional practices play a central role in shaping SRCB among novice researchers. Effective SRCB is more prominent in well-developed contexts and is significantly influenced by formalised mentorship, research-integrated curricula, collaborative research opportunities, and supportive policy frameworks. Thirdly, the SLR identified challenges that threaten the sustainability of research capacity, including excessive academic workloads, limited mentorship, gender inequities, inadequate postgraduate training, constrained supervisory capacity, and persistent funding shortages, particularly in developing contexts. With sustainability in mind, expertise, motivation, and opportunities should not be confined to a minority of researchers. It is imperative that all academic practitioners have access to and engage in the implemented practices.

7. Declarations

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