COUNCIL ON HIGHER EDUCATION

Title: Higher Education Practice Standard for
Research and Innovation

1. PREAMBLE

1.1 Introduction and scope

The Quality Assurance Framework (QAF) for Higher Education in South Africa anticipates, as a key design feature, the development of standards and the associated guidelines as codes of practice for quality assurance in all types of higher education provision (CHE, 2021:37). Research and innovation (R&I) is globally recognised as a core mission of higher education provision and therefore requires national standards to be considered and adhered to, to safeguard nationally acceptable and comparable standards of performance, quality and transformation in, through and of research and innovation.

The scope refers to what is included in the HEPS for R&I. To this end, the following focus areas are considered, forming the basis of the dimensions, key aspects, and guiding questions that emerge.

Firstly, the institutional and national policy and regulatory frameworks that impact R&I, along with the alignment between them, are crucial. A second consideration is the institutional capacity and infrastructure for R&I, noting the significant differences among institutions in general and between public and private HEIs in particular. Another vital area for consideration is research quality and integrity, focusing on the conditions that safeguard methodological rigor as well as the requirements for ethical and social responsibility. Additionally, attention is given to the mechanisms that promote innovation and knowledge transfer, highlighting the linkages between research output and its societal impact. Furthermore, the quality assurance (QA) of R&I is considered to support both internal and external QA goals, especially those related to continuous improvement. Global competitiveness and benchmarking are also recognised as critical indicators of the value and relevance of R&I in South African HEIs.

The HEPS for R&I incorporates both basic and applied research and embraces the broader notion of scholarship - i.e., the intellectual engagement with a subject, including the creation, preservation, interpretation and dissemination of knowledge. Drawing from Ernest Boyer's (1990) work, the HEPS recognises the central significance of research (which Boyer terms the scholarship of discovery) alongside other forms of academic activities that together contribute to the advancement of knowledge and its application. The other three forms of scholarship, according to Boyer, include: i) the scholarship of teaching which focuses on enhancing educational practices for better student outcomes; ii) scholarship of integration - which aims to develop new insights by connecting existing knowledge in innovative ways; iii) scholarship of application and engagement - which aims to bridge the gap between theory and practice by applying scholarly expertise to societal challenges as well as using feedback from community engagement to enrich other academic activities. Widening the discourse to a broader notion of scholarships would imply that comparable levels of scholarly rigour (typically required in traditional research) can be expected in all forms of scholarly activities.

1.2 Context

The context for the HEPS for R&I is significantly shaped by several key legislative and policy instruments. Of primary importance is the Higher Education Act (1997), as amended, which, among other provisions, identifies R&I as a core mission of HEIs and designates the Council on Higher Education (CHE) as the quality assurance (QA) agency for higher education in South Africa. Next is the National Research Foundation Act (1998), as amended, which established the National Research Foundation (NRF) to support and promote research across various disciplines. However, the influence of the NRF is limited to public HEIs, adding to the significant public-private dichotomy in South African higher education. Another important instrument is the Intellectual Property Rights from Publicly Financed Research and Development Act (2008), which aims to ensure that intellectual property (IP) arising from publicly funded research is secured and utilised for the benefit of society (Simelane, 2009). Additionally, the Protection of Personal Information Act (POPIA) (2013) is crucial for safeguarding the privacy and protection of data subjects.

With regards to the policy framework, prime consideration is given to the National Development Plan (NDP) 2030, which aligns with the United Nations (UN) Sustainable Development Goals (SDGs) and the African Union's Agenda 2063. Other important instruments include the National Research and Development Strategy (2002) and the White Paper on Science, Technology and Innovation (2019).

Within the South African higher education sector, differences in R&I capabilities have been characterised mainly by differences in ownership structures, history and resource endowments. Firstly, there is the dichotomy between the public HEIs where R&I is publicly funded and the private HEIs where it is not. However, even among the public universities, differences exist where a high proportion of research and outputs are concentrated in historically advantaged institutions. Despite the intention of higher education policies designed to address past injustices and promote inclusion, a significant portion of research activities and output remains concentrated in the more established, better-resourced universities. Furthermore, there is currently no statutory requirement for private higher education institutions to account for research and innovation outcomes, except to the extent necessary for the provision of postgraduate qualifications. Hence, for the majority of institutions in this sub-sector who only offer undergraduate qualifications, more effort would be required to initiate and embed cultures of scholarship. It is a goal of this HEPS to promote cultures of scholarship that are relevant to the diverse institutional contexts found in South Africa, implemented to high standards and producing socially desirable impacts. It can thus be stated that the narrowing of the research and innovation excellence gap across the higher education sector is essential to enhance South Africa's overall performance in research and innovation. This might require a reimagining of the research and innovation practice, development of funding mechanisms as well as enabling all higher education institutions to meaningfully participate in local and global R&I endeavors. This would foster an inclusive research and innovation environment where currently marginalized individuals and institutions will also participate in R&I.

1.3 Purpose

The overarching purpose of this HEPS is to ensure that, regardless of institutional type and context, all key activities/practices (e.g. learning and teaching, internal administration, community engagement) in HEIs should be informed by rigorous research or scholarship. Such research must support innovation and development within institutions, communities, and broader society. Hence the HEPS emphasises the importance of HEIs as key role-players in building innovation ecosystems that constantly seek to translate research outputs into knowledge development and/or desirable social and economic outcomes. Thus, the HEPS envisions research and innovation as a force for the continuous improvement of research as well as the other two core missions of higher education, namely, learning and teaching, and community engagement. By providing a general framework that can be interpreted and enacted appropriately in diverse institutional contexts (i.e. related to the various identities, visions, missions and mandates of a differentiated higher education system), the HEPS for R&I aims to enable HEIs as catalysts for social transformation and continuous improvement both within the academy and in the broader society.

Whenever an External Quality Assurance (EQA) activity is to be undertaken, the CHE will convene a Community of Practice to develop specific Criteria for the EQA exercise to be undertaken based on this and other relevant HEPS. These Criteria will be made well known in advance to the sector to enable them to prepare for the EQA activity.

2. RATIONALE

In a rapidly evolving global research landscape, it is crucial that South Africa's HEIs align their research agendas with both national priorities and international standards of excellence.

Despite progress in transforming the research and innovation landscape, re-industrialising the country and achieving the Sustainable Development Goals, South Africa continues to grapple with systemic challenges such as inequality, poverty, unemployment, climate change, and health disparities. These persistent issues underscore the urgent need for intensified, evidence-based, multi-sectoral solutions with scalable impact. Therefore, this HEPS serves as a guiding framework to help South African Higher Education Institutions strengthen their research and innovation capabilities in ways that foster impactful solutions to the challenges faced by South Africa, while also striving for global recognition of its academic excellence. This, in turn, aims to enhance their ability to collaborate with key partners both nationally and internationally, attract research funding, and contribute to solving both local and global challenges.

This HEPS establishes a foundation for advancing research quality by linking the concept of research quality with the ethical conduct of research. The Standard is grounded in the principles of *Ubuntu*, which emphasise interconnectedness, communal responsibility and mutual respect - values essential for promoting inclusive and transformative research in the context of South Africa's unique social and developmental needs.

Quality research is fundamental for advancing knowledge and addressing complex societal challenges. The Australian Code for Responsible Conduct of Research (2018) defines quality research as ethically sound, methodologically rigorous, transparent, and socially relevant. This definition underscores the importance of both methodological rigor (scientific integrity) and ethical conduct throughout the research process. Similarly, the European Commission's Framework for Responsible Research and Innovation (2013) asserts that quality research must consider the long-term societal, environmental and ethical implications. Thus, quality research extends beyond its scientific impact; it must also be socially responsible, ethically grounded and transparent. This calls for a holistic view of how quality research influences various dimensions of the standard, ultimately yielding impactful outcomes for research and innovation.

The Definitions and Conceptual Dimensions of Responsible Research and Innovation (2017) identifies several core dimensions of responsible research and innovation (RRI), including anticipation, reflexivity, inclusiveness, responsiveness, sustainability and care. These dimensions help to shape a research environment that is accountable and transformative. An accountable higher education research environment is a transparent, ethical, and responsive ecosystem where research activities, policies, and practices align with institutional, societal, and global responsibilities. For example, when conducting research on sustainable energy solutions, researchers must consider not only the technical viability of the solutions but also the environmental, social, and economic impacts on communities. Aligned with the RRI inclusiveness, responsiveness, sustainability and care dimensions, a transformative research environment within South African higher education institutions is defined as a vibrant and inclusive ecosystem that promotes equity, drives innovation, and delivers societal impact. It is distinguished by practices, policies, and institutional cultures that emphasize diversity, address historical injustices, and tackle the nation's specific challenges. The establishment of an accountable and transformative research environment is a cross-cutting theme embedded across all dimensions of the R&I standard.

Although these dimensions were developed in the Global North, their principles are useful and relevant. Consequently, noting these dimensions, this Standard adopts a comprehensive definition of quality research that integrates both methodological excellence and a commitment to ethical, responsible and sustainable outcomes. As Horn (2022) notes, ethical conduct in research is foundational to research quality. Therefore, this Standard draws from and integrates principles of the six dimensions of Responsible Research and Innovation (RRI), which include anticipation, reflexivity, inclusiveness, responsiveness, sustainability, and care, adapted for this context (Figure 1). By including sustainability and care as dimensions of RRI, the HEPS seeks to encourage research practices that prioritize long-term societal and environmental well-being, which are particularly relevant for the South African context.

Figure 1. Six dimensions of the Research and Innovation Standard guided by the principles of Responsible Research and Innovation (RRI).

The Standard also draws on ISO 56001 Innovation Management System (IMS) and the African Standards and Guidelines for Quality Assurance in Higher Education, which provides a framework for promoting quality research and assurance across the Continent. The IMS standard provides a framework for organisations and HEI's to systematically manage and implement innovation processes, ensuring that innovation efforts align with long-term goals, promote financial sustainability, and enhance overall institutional innovation performance. It is also in line with the recommendations of the CHE Quality Assurance Framework for South African Higher Education, which emphasises academic freedom, integrity and transparency. These guidelines promote Research and Innovation that are rigorous and socially responsive; aligned with both South Africa and the broader Africa's developmental needs.

The HEPS provides guidance on strengthening institutional research structures and fit for purpose research and innovation support and management systems, ensuring that institutions of all sizes and resource levels can enhance their research and innovation capabilities. This includes enhancing research and innovation management systems, infrastructure, and quality assurance mechanisms, as well as offering training and resources to researchers and students. By focusing on capacity building, the HEPS ensures that even institutions with limited resources can enhance their research quality and make incremental progress toward achieving internationally recognised standards.

In summary, the development of the HEPS for Research and Innovation serves as a crucial step towards enhancing the quality, relevance and impact of research and innovation within South African HEIs. This Standard not only aims to strengthen the South African HE system but also ensures that institutions remain globally competitive and socially responsive.

This HEPS offers a flexible and adaptive framework that guides institutions towards enhancing their research and innovation quality. It supports institutions in leveraging their unique strengths while aligning their efforts with their institutional identity and mission. By fostering a culture of excellence, ethical conduct and collaboration, the HEPS aims to ensure that South African HEIs can produce internationally recognised, high-quality research while contributing to societal development.

The HEPS for Research and Innovation aims to foster institutional capacity for advancing knowledge creation and its application, aligned with the institution's unique identity and mission. The standard provides a comprehensive framework that emphasises the interconnected pillars of leadership and governance, research excellence and integrity, collaboration and partnership, innovation ecosystem and commercialization, capacity building and inclusivity, and open science. It encourages institutions to critically assess how these pillars align with their mission and strategic objectives, fostering a sustainable environment that supports transformative research and impactful innovation. This is envisaged to enhance institutional competitive advantage and contributes to a cohesive, high-quality national higher education system.

Through this Standard, South African HEIs are envisaged to strengthen their research and innovation capabilities, contribute to a cohesive, high-quality national HE system, and towards addressing both local and global societal challenges. Research and innovation must drive transformation by privileging African contexts, addressing societal inequities, and democratizing knowledge production.

This HEPS should be read in conjunction with the HEPS on Institutional Identity and Agency; the Supervision and Assessment of Research; Learning, Teaching and Assessment; Continuous Professional Learning; Engaged Institutions, and the Data Value Chain, as together these standards promote a coherent, inclusive, and transformative research and innovation ecosystem.

3. STANDARD STATEMENT

Staff and students engage in research and other forms of scholarship in an environment that promotes excellence and leads to intellectual progress and desirable outcomes. Research and Innovation at the institution drives innovation both internally and externally, contributing to the development of innovation ecosystems that create meaningful knowledge, environmental and societal impact. The institution promotes responsible research and innovation, characterised by inclusiveness, responsiveness, anticipation, reflexivity, sustainability and care. The institution promotes a research environment that is accountable, promoting both the scientific rigor and ethical integrity necessary to cater for the needs and aspirations of all key stakeholders while achieving defined institutional strategic goals. The conceptualisation of research, the forms of research outputs valued and the institutional policies and strategies for research and innovation are aligned with the institution's mission and core mandates.

The Standard outlines the expectations for conducting ethical, inclusive and impactful research and innovation. It advocates for adherence to the rigorous standards of quality, integrity and collaboration, ensuring that research and innovation outcomes benefit students, staff, the institution and society. Moreover, it promotes the adoption of sustainable and innovative practices within higher education to support long-term progress and societal well-being.

4. GUIDELINES FOR THE HEPS: RESEARCH AND INNOVATION

The HEPS for Research and Innovation offers a structured yet adaptable framework designed to support institutions in enhancing their research and innovation practices. These guidelines are organised around six interconnected dimensions, each encompassing a range of key aspects that are essential for fostering a conducive environment to advance innovation and research excellence. The guiding questions within each dimension are presented in an open-ended format, prompting institutions to engage in a reflexive manner that encourages critical assessment of existing practices and stimulates the exploration of new and innovative approaches where necessary.

It is important to note that these dimensions are not isolated from one another; they are interdependent, and their effective implementation requires a comprehensive approach. Institutions are cautioned not to view each dimension as a discrete element but rather recognize the interconnectedness of the aspects within and across the dimensions. This integrated perspective is essential for ensuring that institutional strategies, processes and activities align in ways that contribute to an effective research and innovation ecosystem.

The guiding questions provided for each dimension are intended to inspire deeper institutional reflection and internal evaluation; and are by no means an exhaustive list of considerations. Institutions are encouraged to adapt these questions to their unique context; taking into consideration their size, mission and available resources, ensuring that they remain relevant to enable effective evaluation of their research and innovation. These guidelines are designed for application at multiple levels within the institution, from research groupings to the broader institutional level, thereby facilitating an inclusive process of quality assurance both internally and externally.

Ultimately, the guidelines are intended to foster continuous improvement in research and innovation practices, positioning institutions to effectively respond to evolving challenges, capitalize on emerging opportunities and contribute meaningfully to societal development while remaining aligned with their mission and purpose.

4.1 Leadership and Governance

This dimension invites the institution to reflect on its identity, vision, mission and the related governance mechanisms that influence research and innovation as a core higher education mission. It hinges on the HEPS for Institutional Identity and Agency, placing specific focus on research and innovation. It explores the alignment between institutional and national policy and the regulatory environment, institutional strategy, leadership orientation and governance approach for promoting responsible research and innovation. Additionally, it explores the internal quality assurance mechanisms for research and innovation.

Sub-dimensions	Guiding questions
Institutional identity refers to the defining characteristics of the institution and how that shapes its mandate and key policy positions in relation to R&I.	1. To what extent does the institution value and leverage R&I as a catalyst for the fulfilment of its mission and to what extent do these efforts align with its long-term strategic goals? 2. To what extent does the institution prioritise specific forms of scholarship and how well do these priorities reflect and advance the institution's mission and purpose? 3. Are institutional policies on R&I comprehensive, clear and responsive to current ethical standards and requirements and how effectively do they guide and foster a culture of responsible research conduct? 4. What mechanisms are in place to promote the consistent interpretation and implementation of R&I policies? How robust and effective are the mechanisms?
Strategic orientation explores the institutional vision, mission and strategic priorities for R&I and has implications for resource allocation and the value attached to R&I outcomes.	1. Does the institution have a strategy for R&I; what are the key drivers of the strategy? And are key stakeholders involved in shaping and refining the institution's R&I strategy? 2. In what ways does the institution communicate and operationalise its strategic priorities for R&I, and how are these priorities aligned with its overall mission and goals? 3. How important are R&I outcomes in the institution's performance management system? To what extent are R&I Key Performance Indicators integrated into the institution's overall performance management system and how do they influence decision-making at different levels (e.g., institutional leadership, academic departments, research teams, staff members)? 4. To what extent is the global perspective and partnerships considered for R&I advancement, ensuring that institutional strategies are not only responsive to local needs but also competitive and aligned with international research trends and standards? 5. How are R&I activities aligned with the institution's learning and teaching goals, and how do they enhance the student experience and prepare graduates for the current and future world of work?

Leadership structure and support explores the importance of R&I in the leadership and decision-making structures of the institution.	1. How does the leadership/senior management structure prioritise research and innovation within the institution's broader strategic goals? To what extent is R&I considered a central driver of institutional growth? 2. How effective are the structures for promoting R&I goal alignment across different levels and units of the institution? 3. In what ways does institutional leadership demonstrate a commitment to recognising, rewarding and incentivising excellence in research and innovation at both the individual and institutional levels? Are there opportunities to improve the support and openly communicate these efforts across the institution? 4. In what ways does the leadership ensure that effective resource management mechanisms are in place in terms of funding, infrastructure and human capital to adequately support R&I activities? 5. How does the leadership address challenges related to institutional culture and organisational structure that may impede the growth or sustainability of R&I activities?
Governance relates to the approach and mechanisms for promoting responsible decision-making and accountability to key stakeholders in matters related to R&I. Anticipatory governance opens up R&I strategies to broader scrutiny so that more desirable outcomes can be designed.	1. What principles underpin the governance of R&I at the institution? And how are they reflected in policies, practices and decision-making? 2. What structures exist or are required to promote and align responsible decision-making processes (e.g. with deep reflection on both technical as well as societal outcomes and impacts) in R&I across disciplines, organisational units and projects at the institution? 3. Who are the key stakeholders in respect of R&I at the institution; and how well are their interests represented/protected in the planning and implementation of R&I programmes and projects? 4. How does the institution ensure accountability and continuous improvement in its R&I governance?
Internal quality assurance interrogates institutional mechanisms for quality planning, monitoring, evaluation and continuous development of R&I initiatives.	1. What assumptions underpin the conceptualisation of R&I, and are the assumptions still valid? 2. What dimensions/indicators of research quality does the institution value and how does that compare nationally and internationally? 3. How often are the indicators of research and innovation quality measured; and how are they used to improve the R&I system?

4.2 Research Excellence and Integrity

Guided by the principles of Responsible Research and Innovation (RRI), this dimension encourages higher education institutions to embed systems and practices that collectively promote the production of high-quality and impactful research. Key features of such research are originality and innovation, methodological soundness and rigour, significance, and ethical integrity. It advocates for the development of a sustainable and long-term vision for research and innovation as well as institutional mechanisms for the monitoring and evaluation of research quality, integrity and impact. Within this dimension, the notion of impact is restricted to knowledge impact, as other forms of impact (i.e. societal, environmental, etc.) are discussed under a separate dimension, namely, the Innovation Ecosystem and Commercialisation. By continuously evolving these principles, higher education institutions can cultivate a shared understanding of acceptable practices, essential for sustaining high quality and integrity across diverse research and innovation programmes.

Sub-dimensions	Guiding questions
Originality and innovation - focuses on institutional opportunities for knowledge creation and development and the innovation of research processes, outcomes and impact.	1. What are the institutional mechanisms for: ● promoting research that generates new knowledge or insights? ● supporting the challenge of existing paradigms? and ● promoting creativity in research designs or methodologies? 2. To what extent does scholarship support practice innovations in higher education itself (e.g. in learning and teaching, community engagement, student support, institutional research etc.) at the institution?
Methodological rigour advocates the requirement for the thoughtful selection and application of scientific principles and processes in all forms of scholarly activities to inspire public confidence in research processes and outputs.	1. How does the institution conceptualise methodological soundness and rigour in research and what are the mechanisms for its effective implementation? 2. What mechanisms are in place to ensure that research initiatives are grounded in clearly defined and appropriate philosophical foundations and methodological choices? 3. How does the institution conceptualise and define the ethical collection, curation, preservation, protection and sharing of data in research and innovation projects? To what extent are data management practices aligned with national regulations and international best practices? 4. How does the institution address incidents of unethical data use, and what measures are in place to prevent such occurrences in the future?
Significance and relevance interrogates how research addresses important scientific, cultural and societal	1. How does the institution define and measure research quality and how do these criteria reflect academic rigour and societal relevance? 2. What mechanisms are in place to ensure that research initiatives target important scientific, cultural or societal questions?

questions and the potential to shape or influence future directions in respect of such matters.	3. How does the institution promote diverse perspectives and the integration of multiple forms of knowledge in research practice, particularly in advancing indigenous knowledge systems? 4. To what extent does the institution require researchers to account for the influence or impact of their research on the development and evolution of policy and practice? 5. What mechanisms are in place to periodically assess the long-term impact of research and how are these assessments incorporated into future research planning and strategy?
Ethical integrity advocates system-wide adherence to high moral principles in the conduct of research to promote responsible research and public trust in research outcomes.	1. How well are current ethical guidelines aligned with national and international standards and how often are these guidelines reviewed or updated? 2. In what ways does the institution ensure all researchers, including students and early career researchers are familiar with and trained in the institution's ethical standards? 3. What are the institutional mechanisms for ensuring that: ● researchers show respect for the rights and dignity of participants, the environment and cultural sensitivities? ● researchers take responsibility for good ethical conduct such as the management of conflict of interest, etc.? ● there is public scrutiny of the assumptions and values that guide research and development and a mindfulness of own/systemic limitations? ● there is proper regard for intellectual property rights? and ● the responsible use of AI in research practice is developed, communicated and monitored?
Monitoring and evaluation research quality and ethical integrity.	1. How does the institution conceptualise the monitoring and evaluation of research and innovation quality? 2. To what extent does the M&E of research quality and ethical integrity promote continuous improvement in R&I? 3. To what extent does the M&E of research quality and ethical integrity influence R&I policy and strategy development at the institution? 4. What benchmarks or key performance indicators (KPIs) are used to measure the institution's research and innovation performance against global standards? 5. How does the institution's research and innovation strategy align with global trends and challenges to maintain its competitiveness on the international stage?

4.3 Collaborations and Partnerships

This dimension aims to foster impactful collaboration and partnerships in research and innovation among higher education institutions or with other organisations across sectors locally or internationally. Effective research collaborations embrace a plurality of perspectives and provide greater opportunities for reflexivity, a key principle of Responsible Research and Innovation (RRI). Effective research partnerships are characterised by shared goals, shared responsibility and decision-making, and shared recognition and benefits. They require an environment of mutual trust and respect, with due regard for contextual and cultural sensitivities and strong governance structures. This dimension advocates for the sustainability of research collaborations and partnerships as a catalyst for greater impact.

Sub-dimensions	Guiding questions
Collaborations and partnerships as a strategic lever emphasizes the significance of forming partnerships in research and innovation to enhance research quality, broaden access to resources, and address complex global challenges. This approach promotes diverse perspectives, unites resources and facilitates the exchange of knowledge and expertise across different disciplines, geographies and sectors.	1. How does the institution frame collaborations and partnerships as a critical aspect of research and innovation? 2. To what extent are collaborations and partnerships integrated into the institution's strategic objectives and operational plans? 3. How does the institution encourage and support collaboration internally across different faculties or departments and externally with other institutions? 4. What programs exist that promote partnerships within the institution and externally with organisations, such as industry, government, civil society organisations or other academic and research institutions? 5. What mechanisms exist for the effective governance of research collaborations and partnerships?
Mutual trust and respect refer to the promotion of transparency, fairness and accountability among collaborators and partners. Additionally, it refers to respect for the perspectives, expertise and contributions of collaborators and partners. The open exchange of information and decision-making among all participants is essential. This fosters trust	1. How does the institution ensure transparency, fair and equitable access to resources and accountability in research collaborations and partnerships? 2. What are the institutional guardrails to ensure the respect and recognition of the perspectives, expertise and contributions of research collaborators and partners? 3. What mechanisms does the institution have to address conflicts of interest or ethical concerns in collaborations?

and mutual understanding by keeping all stakeholders informed about shared objectives. It entails establishing clear expectations and defining roles and responsibilities.	
Inclusivity, cultural and contextual sensitivity seeks to ensure that higher education institutions promote the creation of diverse and inclusive collaborations; and that collaborating teams recognise and respect personal, institutional, ethnic and local contexts in research practice.	1. How does the institution conceptualise inclusivity and contextual and cultural relevance in research and innovation? 2. What are the mechanisms for promoting diversity and inclusivity in research collaborations? 3. To what extent does the institution ensure that institutional, local and cultural contexts and the implications for research and innovation are recognised and respected in the implementation of research collaborations and partnerships? 4. How are voices from underrepresented or marginalized groups included, valued and protected in decision-making processes within collaborations and partnerships?
Sustainability refers to the ability of research and innovation initiatives to endure over time while continuously delivering meaningful impact.	1. How does the institution conceptualise sustainability in collaborations and partnerships for research and innovation? 2. What are the mechanisms for ensuring that collaborations and partnerships are sustained beyond the research projects, so as to safeguard accountability for long-term impact and to seize opportunities for progress? 3. What institutional strategies are in place to mobilise resources for the creation and development of long-term collaborations and partnerships?
Monitoring and evaluation of research collaborations and partnerships encompasses systematic processes used to assess the progress, effectiveness, and impact of collaborative and partnership-driven research activities.	1. What metrics and tools are used to monitor and evaluate the success and impact of research collaborations and partnerships? 2. How are RRI principles, such as inclusivity, ethics, and sustainability, incorporated into the M&E framework?

4.4 Innovation Ecosystem and Commercialisation

This dimension focuses on creating a thriving environment that fosters creativity, collaboration, and the translation of research into real-world applications. This dimension emphasizes the importance of integrating innovation into the core functions of higher education institutions, supporting the development of new technologies, products, services, and processes that can drive societal, economic and cultural advancement. This approach establishes a foundation for developing a comprehensive framework for research and innovation subsystems, enabling institutions to engage in a broader global innovation ecosystem. Such a framework would provide the necessary infrastructure and processes for researchers, peer institutions, government entities, and stakeholders to effectively commercialize their discoveries. This initiative can act as a cornerstone for the long-term financial sustainability of the institution, promoting equity and ensuring that advancements in research and innovation benefit both the institution and its stakeholders. Furthermore, it can serve as a valuable asset in shaping the landscape of science, technology, and innovation within the country.

Sub-dimensions	Guiding questions
Bridging the gap between academic research and its translation into innovative products, services or technologies seeks to promote the alignment of institutions' commercialisation of innovations and discoveries through existing intellectual property rights (IPR) processes and guidelines within the framework of the innovation ecosystem.	1. What policies and procedures are in place to guide the institution's research and commercialisation efforts? 2. How effective are the existing mechanisms in effectively translating research into commercial products, services and technologies? 3. How does the institution guarantee benefit sharing among contributors to discovery? (e.g. is there an Intellectual Property Rights policy or clause(s), which are aligned with the IPR Act)? 4. How does the institution determine the patentability of the discovery and who has the first right of refusal to protect such discovery through patents or other forms of IP protection (e.g. trade secrets)? 5. How does the institution protect discoveries to ensure their patentability, such as non-disclosure of findings or discoveries, until the patent is granted? 6. How are these policies and guidelines communicated to researchers to safeguard risks and ensure protection?
Balancing academic freedom and commercial interests refers to initiatives intended to develop an awareness of the importance and benefits of commercialising innovations, breakthroughs and discoveries made from research and	1. How does the institution safeguard academic freedom while promoting responsible commercialisation of research? 2. How does the institution ensure transparency in funding sources related to research commercialisation? 3. Are conflict-of-interest disclosures being implemented to maintain academic integrity in the commercialisation process? 4. How does the institution foster a culture that values both academic integrity and the societal benefits of research commercialisation?

innovation. This goes beyond benefits from the publications and conference presentations.	
Supportive infrastructure refers to initiatives that provide the necessary resources, expertise and mentoring to move ideas from research to the market.	1. How are Technology Transfer Offices, business incubators and entrepreneurship programs integrated into the institution’s broader innovation strategy for effective translation and commercialisation of research? 2. How does the institution's Technology Transfer Office foster partnerships and collaborations between academia, industry or private funding sources, while enabling businesses to leverage institutions’ expertise and knowledge? 3. How does the institution’s infrastructure support the transition of research and innovation from concept to commercialisation? 4. How does the institution ensure that its support systems are accessible and effective for diverse groups of innovators; including students, staff and external partners? 5. How are relevant policies and guidelines communicated to researchers to safeguard intellectual property protection?
Entrepreneurial development and advancement refers to the entrepreneurial initiatives and innovation infrastructure that play a key role in nurturing entrepreneurial talent and the exploitation of research outcomes.	1. What mechanisms are in place to foster a mindset that values risk-taking, interdisciplinary collaborations and entrepreneurial thinking among researchers and students? This includes promoting a culture where new ideas are nurtured, tested and scaled. 2. How does the institution equip staff and students with the necessary skills to navigate the business aspects of innovation? (e.g. offering courses and workshops on technology, commercialisation and entrepreneurship). 3. How does the institution promote entrepreneurship within academic settings to encourage researchers to pursue practical applications for their work, aligning academic outputs with market needs? 4. Do entrepreneurship incubators offer office space, resources, and networking opportunities to start-ups to enhance their chances of success? 5. Does the institution connect emerging entrepreneurs with experienced mentors and industry professionals to facilitate knowledge exchange and collaboration? 6. What mechanisms are in place to support the formation and success of institutions’ spin-offs?
Long-term Capital Investment refers to the allocation of financial resources for the	1. What is the institution’s strategy on long-term capital investment initiatives that support the creation of sustainable businesses and product manufacturing, thereby facilitating commercialization efforts?

development and introduction of new products, services and sustainable technologies into the market.	2. What financial resources are available to researchers and entrepreneurs to help bring their ideas to market? How effective are the support and funding models? How well are internal funds leveraged to attract external funding?
Monitoring and Evaluation seeks to ensure that the transferred technology moves beyond discovery and translates into competitive industries, thereby sustaining the industrial development of the country.	1. How does the institution perceive the importance of commercialising its discoveries? 2. What mechanisms are in place to monitor the success and impact of commercialisation efforts, and how does the institution learn from these outcomes to improve its supportive infrastructure? 3. Does the institution have partnership agreements with owners of venture capital with which they can enter into commercialisation agreements for its discoveries? 4. Does the institution have policies, guidelines, frameworks, strategies and a research management system in place to continuously improve on research and innovation that has a potential for commercialisation?

4.5. Capacity and Infrastructure

The research and innovation capacity and infrastructure component is guided by the Responsible Research and Innovation (RRI) framework and Research Capacity Development (RCD) principles; it emphasizes the importance of robust systems that enhance sustainability, ethical responsibility and societal relevance in research. The guiding framework strengthens research systems, infrastructure and human resource development for empowering individuals, higher education institutions, and societies to improve research guidelines, align strategic objectives with practical implementation and produce impactful and high-quality research. This component sets benchmarks for essential infrastructure such as research entities, laboratories, libraries, and digital tools, along with funding mechanisms, skilled personnel, and mentorship programs. It promotes interdisciplinary collaboration, community engagement, and alignment with national and global priorities to address societal challenges and foster innovation.

Sub-dimensions	Guiding questions
Human Resources refers to skilled personnel driving research, innovation, mentorship, and academic development in a higher education institution.	1. Is the work-load model facilitating advancement of research participation coherent and realistic with regard to other responsibilities of the academic? 2. In what ways are mentorship and professional development opportunities fostering the growth of emerging researchers and future leaders? 3. How is diversity and inclusivity promoted in research leadership and decision-making roles within the institution?

	4. What measures are in place to recognize and reward exceptional research contributions, and how do these impact staff motivation and retention? 5. How does the institution promote a culture of collaboration while ensuring a balanced research and postgraduate supervision workload?
Facilities and Resources refer to physical infrastructure, research entities, laboratories, libraries, digital platforms, funding and equipment supporting research, innovation and academic excellence in a higher education institution.	1. How well do current research facilities and resources align with the institution's research and innovation goals? 2. How equitable is access to research facilities, and what practices are in place to ensure all researchers benefit from these resources? 3. In what ways are research facilities and resources optimised through collaboration within and beyond the institution? 4. How effectively does the institution support researchers in using available resources, including through training, technical support, and maintenance? 5. How does the institution ensure that research facilities meet safety, ethical, and sustainability standards while remaining adaptable to future needs?
Funding and Resource Allocation refers to the strategic distribution of financial support and assets to enhance research, innovation and institutional development within a higher education institution.	1. How sustainable and diversified are the institution's funding models, and how do they adapt to changing research priorities and needs? 2. In what ways does the institution ensure that resource allocation practices are transparent, equitable, and supportive of historically disadvantaged researchers? 3. How well does the institution balance time and workload to support meaningful research, innovation, and knowledge production? 4. How are collaborations with industry, government, and international organisations leveraged to strengthen funding streams and resource access? 5. What measures are in place to ensure that resource allocation decisions are monitored, evaluated, and aligned with the institution's strategic priorities?
Resource and Finance Management focuses on the effective allocation, utilization, and sustainability of financial and infrastructure resources to support research and innovation activities. This aspect emphasizes transparent and equitable financial practices, long-term planning, and	1. How effectively do institutional support systems, including human resources and finance, align with the evolving needs of researchers and research projects? 2. In what ways are researchers engaged in shaping the design and improvement of research support services? 3. How well are research support systems monitored through Key Performance Indicators (KPIs) and regular audits to ensure compliance, efficiency, and

compliance with institutional and national regulations.	continuous improvement? 4. How does the institution leverage technology and data-driven insights to streamline research-related administrative tasks and improve decision-making? 5. How are institutional research support systems benchmarked against national and global good practices to ensure alignment with R&D strategies and compliance with regulations?
Student Involvement and Capacity Building refer to engaging students in research activities and providing training to develop their skills, knowledge, and innovation potential in higher education institutions. Also see the Research supervision and assessment HEPS.	1. How well do institutional systems support both researchers and students in navigating research processes, from funding to project management and administration? 2. In what ways are students and researchers actively engaged in shaping research programs, mentorship opportunities, and support systems? 3. How does the institution promote equitable access to research opportunities, resources, and mentorship for students and early-career researchers, including those from historically marginalized groups? 4. What measures are in place to ensure that research training, workshops, and cross-disciplinary opportunities equip students and researchers with the necessary skills to conduct impactful and ethical research? 5. How are research outcomes, achievements, and student involvement tracked, evaluated, and celebrated to enhance the overall research culture?

4.6. Open Science

This dimension is intended to prompt the institution to reflect on its efforts towards fostering a culture of transparency, collaboration and inclusivity through the adoption of Open Science principles in all research and innovation practices. Open Science aims to democratise knowledge creation and dissemination by ensuring that research outputs, data and methodologies are accessible, reproducible and equitable for all stakeholders. Open science encompasses a range of practices, including open access to publications, open data sharing and open peer review. These practices ensure that research outputs are freely available to the global community, enabling researchers, policymakers and the public to benefit from and contribute to scientific advancements. Furthermore, open science fosters interdisciplinary and cross-sectoral collaboration and supports the reproducibility and integrity of research findings. This dimension incorporates assessment and monitoring & evaluation (M&E) processes to ensure accountability, impact and alignment with national and institutional goals, driving responsible and sustainable research practices.

Sub-dimensions	Guiding questions
Open Access refers to	1. How effectively does the institution support researchers in

the practice of making research outputs, such as journal articles, conference papers, dissertations, theses and other scholarly works, freely available to the public without financial, legal, or technical barriers.	overcoming financial barriers to publishing in open-access journals, including assistance with article processing charges (APCs)? 2. In what ways has the institution explored sustainable models, such as diamond open-access journals, to promote equitable access to publishing opportunities for all researchers? 3. How are institutional publishing agreements leveraged to secure fee waivers, discounts, or transformative agreements that promote open-access publishing and benefit the entire research community?
Institutional Repositories refers to digital platforms established by HEIs to collect, manage, preserve and disseminate the scholarly and creative outputs of their academic community.	1. How effectively does the institution manage and enhance centralised repositories to ensure long-term archiving and discoverability of research outputs? 2. In what ways does the institution ensure that its repositories comply with international standards for interoperability and data sharing? 3. How accessible are non-sensitive data and publications through the institution's repositories, and how are Digital Objective Identifiers (DOIs) or other identifiers used to improve discoverability and citation?
Open Data Practices refers to the systematic management, sharing and accessibility of research data in a way that ensures transparency, reproducibility, and equitable access to knowledge.	1. How effectively does the institution encourage researchers to use data-sharing platforms such as the South African Data Archive (SADA), Zenodo, or Dryad to enhance the visibility and impact of their research? 2. In what ways does the institution foster participation in collaborative data-sharing initiatives, such as the African Open Science Platform (AOSP), to strengthen regional and global research networks? 3. How well are researchers trained and supported to apply FAIR (Findable, Accessible, Interoperable, and Reusable) data principles and how is this reflected in their research practices?
Transparent Research Methodology refers to clear, open, and detailed reporting of the processes, approaches, and decisions made throughout the research lifecycle, from design and data collection to analysis and dissemination of results.	1. How does the institution encourage researchers to pre-register their studies on platforms such as the Open Science Framework (OSF) or the Pan African Clinical Trial Registry to promote transparency and accountability? 2. In what ways does the institution promote the publication of detailed methodologies and protocols in open-access formats to ensure the reproducibility and reliability of research findings? 3. How effectively does the institution support transparent peer-review processes to build trust in research outputs and strengthen the integrity of scholarly communication?
Adoption of Open Access Policies refers to	1. How effectively does the institution's formal policy on depositing publications and datasets into institutional

institutionalization of practices and frameworks that promote unrestricted and equitable access to scholarly research outputs.	repositories support research visibility and long-term access? 2. How well do the institution's open-access policies align with national frameworks, such as the Department of Higher Education and Training (DHET) Research Outputs Policy and global initiatives like Plan S, to promote global open-access standards? 3. In what ways does the institution support researchers in meeting funding bodies' open-access requirements, such as those from the NRF, to facilitate compliance and enhance research impact?
Ethical Standards refers to the principles, practices and guidelines that ensure integrity, responsibility and accountability in the creation, dissemination and application of knowledge.	1. How does the institution ensure that open science practices are consistently aligned with ethical guidelines and uphold the integrity of research? 2. In what ways does the institution safeguard the privacy and security of research participants and data in open science initiatives? 3. How does the institution promote equity and inclusion in its open science practices, ensuring that all researchers, especially from underrepresented groups, have equal access and opportunity?
Capacity Building refers to the process of strengthening the skills, resources, infrastructure and institutional frameworks needed to enable researchers, institutions, and communities to effectively adopt and implement Open Science practices.	1. How effectively does the institution offer training programs on open science practices and how are these programs tailored to meet the diverse needs of researchers? 2. In what ways does the institution provide ongoing support services to assist researchers in integrating open science practices into their work? 3. How has the institution fostered communities of practice to facilitate the sharing of knowledge, experiences and best practices among researchers involved in open science?

6. REVIEW OF THE HEPS

It is understood that the HEPS will undergo regular, iterative reviews and updates to reflect the evolving landscape and context in higher education. Standards may be removed, revised or consolidated as needed. However, it is important to maintain stability by allowing institutions to work with Standards in a consistent format for a period of time. The HEPS for Research and Innovation will remain in effect for the first iteration of the QAF for a duration of five years.

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