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Article

Towards a Transdisciplinary Epistemology of the Mode 4: Decolonizing Knowledge Production in African Missiology

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Abstract: This pioneering article offers a sweeping, paradigm-shifting exploration of the revolutionary emergence of “Mode 4” knowledge production—a fundamental reconceptualization of the epistemological, organizational, and methodological foundations of research and innovation. Drawing on cutting-edge theoretical frameworks and a vast corpus of rigorous empirical evidence, this work argues that Mode 4 represents a transformative leap towards a more collaborative, transdisciplinary, and adaptive approach to knowledge creation—one that holds the potential to catalyze a profound and lasting transformation in the way we conceive of, organize, and mobilize research to address the complex, interconnected challenges facing our world. At the heart of this paradigm shift lies the groundbreaking “decuple helix” framework, which expands the scope of stakeholder engagement and knowledge co-creation to incorporate a comprehensive range of actors, from academia and industry to marginalized communities, the natural environment, and international organizations. By situating this revolutionary approach within the context of African missiology, the article delves deeply into the multifaceted roles and invaluable contributions of this diverse array of stakeholders, demonstrating how their active integration can unlock the transformative power of collaborative, values-oriented research and innovation for decolonizing and reimagining missionary praxis. The work examines the profound implications of Mode 4 for the epistemology, ontology, methodology, ethics, and praxis of African missiology, charting a course towards a more inclusive, emancipatory, and holistically integrated future for the missionary enterprise.

Keywords: mode 4 knowledge production; transdisciplinary paradigm; decuple helix; African missiology; mission; decolonial epistemology; collaborative co-creation; knowledge integration; systemic transformation

1. Introduction

In an era defined by the growing complexity and interconnectedness of global challenges, the limitations of traditional, linear and siloed models of knowledge production have become starkly apparent (Moleka, 2024a). Disciplines have become increasingly fragmented, with researchers operating in disciplinary silos that fail to adequately reflect the multifaceted nature of contemporary world problems (Maringe & Chiramba, 2023 ; Funtowicz & Ravetz, 1993; Pohl & Hirsch Hadorn, 2007). Moreover, the technocratic, value-neutral approach that has often characterized academic research has been widely criticized for its inability to account for the social, political, and ethical dimensions of knowledge production (Kates et al., 2001; Wittmayer & Schöpke, 2014). Recognizing these profound limitations, a growing body of pioneering scholarship has begun to explore the possibility of a transformative paradigm shift in the way knowledge is produced and applied (Gibbons, 1999; Nowotny et al., 2001; Carayannis & Campbell, 2012; Trencher et al., 2014).

This article represents a sweeping, groundbreaking analysis of the emergence of “Mode 4” knowledge production—a revolutionary reconceptualization of the epistemological, organizational, and methodological foundations of the research enterprise introduced by the Congolese scholar

Pitshou Moleka (2024b ; 2024 ; 2024d ; 2024e ; 2024f). Drawing on cutting-edge theoretical frameworks and a vast corpus of rigorous empirical evidence, this work argues that Mode 4 knowledge production represents a transformative leap towards a more collaborative, transdisciplinary, and adaptive approach to knowledge creation, with the potential to catalyze a profound transformation in the way African missionaries address the complex, interconnected challenges facing their communities. At the heart of this paradigm shift lies the groundbreaking “decuple helix” framework, which expands the scope of stakeholder engagement and knowledge co-creation to incorporate a comprehensive range of actors, from academia and industry to marginalized communities, the natural environment, and international organizations. By delving deeply into the theoretical underpinnings of this revolutionary vision, exploring the practical implications and empirical insights, and candidly addressing the significant challenges that remain, this article positions itself as a landmark contribution to the ongoing transformation of the knowledge production landscape within African missiology.

2. Theoretical Foundations: Laying the Groundwork for a Paradigm Shift

The conceptual underpinnings of the Mode 4 knowledge production paradigm can be traced to several influential strands of scholarship that have evolved over the past few decades, drawing from both Western and non-Western intellectual traditions. These foundational concepts include post-normal science, sustainability science, the science of integration, and the pioneering decuple helix framework.

2.1. Post-Normal Science: Embracing Complexity and Pluralistic Participation

The notion of “post-normal science,” pioneered by Funtowicz and Ravetz (1993), challenges the assumption of value-free, detached scientific inquiry. In an era of high stakes and deep uncertainties, they argue, traditional models of science predicated on linear, reductionist approaches are woefully inadequate. Post-normal science calls for the incorporation of a broader range of stakeholders and the embrace of pluralistic, participatory methods that can grapple with the inherent complexity of real-world problems (Funtowicz & Ravetz, 1993; Hadorn et al., 2008 ; Moleka, 2024g ; Moleka, 2024h ; Moleka, 2024i ; Moleka, 2024j). At the heart of post-normal science lies the recognition that many of the challenges facing society, including those within the realm of African missiology, do not lend themselves to simple, universal solutions. These “wicked problems” are characterized by complexity, uncertainty, and the need to navigate competing values and interests (Rittel & Webber, 1973, Moleka, 2024k ; 2024l ; 2024m ; 2024n). Addressing such challenges requires a departure from the technocratic, value-neutral approach that has often defined traditional missionary research. Instead, post-normal science advocates for the inclusion of a wider range of stakeholders, the acknowledgment of multiple forms of knowledge, and the embracing of pluralistic, participatory research methods (Funtowicz & Ravetz, 1993; Hadorn et al., 2008). By rejecting the notion of the researcher as a detached, “objective” observer and embracing a more collaborative, socially-engaged approach, post-normal science has laid crucial groundwork for the emergence of the Mode 4 knowledge production paradigm within African missiology. The emphasis on complexity, uncertainty, and the need for inclusive, participatory research methods directly informs the epistemological, organizational, and methodological foundations of Mode 4 in this context.

2.2. Sustainability Science: Transdisciplinarity and Socio-Ecological Integration

The emergence of “sustainability science” has also been instrumental in shaping the conceptual foundations of Mode 4 knowledge production. Sustainability science is characterized by a focus on complex, socio-ecological systems and a commitment to generating knowledge that can support the transition to more sustainable futures (Kates et al., 2001; Popa, Guillermin & Dedeurwaerdere, 2015). At the heart of sustainability science lies a transdisciplinary ethos, which aligns closely with the collaborative, integrative approach of Mode 4 (Lang et al., 2012; Caniglia et al., 2021). Sustainability science emerged in response to the growing recognition that many of the pressing challenges facing

African societies, from climate change to biodiversity loss, cannot be adequately addressed within the confines of traditional academic disciplines. These challenges are inherently complex, interconnected, and require the integration of diverse forms of knowledge and the active engagement of multiple stakeholders (Kates et al., 2001; Popa, Guillermin & Dedeurwaerdere, 2015 ; Moleka, 2024a ; 2024p). The transdisciplinary approach championed by sustainability science emphasizes the co-creation of knowledge between academic researchers and societal actors, such as policymakers, community groups, and industry representatives. This collaborative, problem-oriented approach transcends disciplinary boundaries, forging new pathways for the integration of different epistemologies, research methods, and ways of knowing (Lang et al., 2012; Caniglia et al., 2021). By positioning sustainability as a complex, socio-ecological challenge that requires the active engagement of a diverse array of stakeholders, sustainability science has laid the groundwork for the emergence of the Mode 4 paradigm. The transdisciplinary ethos and the emphasis on the co-evolution of problem definitions and research questions directly inform the epistemological and organizational foundations of Mode 4 knowledge production in this context.

2.3. The Science of Integration: Navigating Complexity through Adaptive Research

The nascent field of the “science of integration” has made vital contributions to the theoretical underpinnings of Mode 4 knowledge production. Scholars in this domain have sought to develop a comprehensive understanding of the processes and mechanisms by which diverse forms of knowledge can be effectively integrated to address complex problems (Hirsch Hadorn et al., 2006; Norström et al., 2020). The science of integration underscores the importance of adaptive, iterative, and reflexive research approaches that can navigate the inherent uncertainties and tensions involved in cross-disciplinary collaboration (Pohl, 2011; Luederitz et al., 2016). The science of integration emerged in response to the growing recognition that many of the challenges facing African societies, including those within the missionary enterprise, defy simplistic, linear solutions. These complex, “wicked” problems are characterized by a high degree of uncertainty, multiple competing values and interests, and the need to navigate inherent trade-offs and tensions (Rittel & Webber, 1973; Pohl & Hirsch Hadorn, 2007). Addressing such challenges requires a departure from traditional, disciplinary-siloed approaches and the development of robust, yet flexible, frameworks for knowledge integration. At the heart of the science of integration lies the understanding that effective problem-solving requires the integration of diverse forms of knowledge, including academic disciplines, practitioner expertise, and community-based perspectives. This process of knowledge integration is not a linear, one-way transfer, but rather an iterative, adaptive, and reflexive endeavor that involves the co-evolution of problem definitions, research questions, and solution pathways (Hirsch Hadorn et al., 2006; Pohl, 2011 ; Moleka, 2024). By emphasizing the importance of adaptive, iterative, and reflexive research approaches, the science of integration has directly informed the methodological foundations of Mode 4 knowledge production. The recognition that complex, “wicked” missionary problems require flexible, design-oriented research processes (Tinson, 2017) aligns closely with the core tenets of the Mode 4 paradigm shift.

2.4. The Decuple Helix: Towards a More Inclusive and Holistic Knowledge Co-Creation

The quadruple helix model, which emerged as an evolution of the earlier triple helix framework, recognized the need to expand the scope of knowledge production beyond the traditional triad of academia, industry, and government (Carayannis & Campbell, 2012; Romero-Lankao et al., 2018). The inclusion of civil society as a fourth key stakeholder represented an important step towards a more inclusive and holistic approach to knowledge co-creation within African missiology. Building on this foundation, the decuple helix framework further broadens the range of actors involved in the research and innovation ecosystem. By incorporating media and cultural institutions, the natural environment, social and values-based movements, marginalized or underrepresented communities, philanthropy and funding organizations, and religious and spiritual organizations, the decuple helix model aligns closely with the collaborative, transdisciplinary ethos of Mode 4 knowledge production (Moleka, 2024a ; 2024b ; Levin-Keitel et al., 2018; Romero-Lankao et al., 2018). The decuple helix

framework recognizes that addressing the complex, interconnected challenges facing African societies requires the active engagement and integration of diverse forms of knowledge, perspectives, and lived experiences. This inclusive, holistic approach to knowledge co-creation is a critical cornerstone of the Mode 4 paradigm within African missiology, as it enables the bridging of disciplinary divides, the empowerment of marginalized voices, and the co-evolution of problem definitions and solution pathways. By placing the decuple helix model at the center of the Mode 4 knowledge production paradigm, this article highlights the transformative potential of this comprehensive framework for stakeholder engagement and collaborative knowledge co-creation within the field of African missiology.

3. The Foundations of Mode 4 Knowledge Production: A Radical Reconceptualization

The foundations of Mode 4 knowledge production represent a revolutionary reconceptualization of the epistemological, organizational, and methodological underpinnings of the research enterprise, with profound implications for the field of African missiology.

3.1. Epistemological Shift: From Detached Observation to Collaborative Co-Creation

At the heart of Mode 4 knowledge production lies a fundamental epistemological shift—a profound reconceptualization of the role of the researcher and the nature of knowledge itself. Whereas traditional models of knowledge production have been rooted in the notion of the researcher as a detached, “objective” observer, Mode 4 embraces a more collaborative, participatory, and socially-engaged approach to knowledge creation (Gibbons, 1999; Nowotny et al., 2001; Popa, Guillermin & Dedeurwaerdere, 2015). Mode 4 recognizes the value of diverse forms of expertise and the imperative to engage a wide range of stakeholders, including marginalized communities, Indigenous knowledge holders, and decolonial thinkers, in the co-creation of knowledge. This inclusive, dialogical approach challenges the rigid hierarchies and power dynamics that have historically characterized knowledge production within the field of African missiology (Nderitu, 2023). Moreover, Mode 4 rejects the notion of a singular, objective “truth” in favor of a recognition of the plurality of valid perspectives and the contextual, situated nature of knowledge. This epistemological stance aligns with the principles of transdisciplinarity, which emphasizes the integration of different ways of knowing and the co-evolution of problem definitions and research questions (Hirsch Hadorn et al., 2006; Popa, Guillermin & Dedeurwaerdere, 2015; Norström et al., 2020). The epistemological shift at the heart of Mode 4 knowledge production can be seen as a direct response to the limitations of traditional, linear and siloed models of missionary research. By embracing a more collaborative, participatory, and pluralistic approach to knowledge creation, Mode 4 aims to better reflect the inherent complexity and interconnectedness of the challenges facing African societies. This epistemological foundation enables the bridging of disciplinary divides, the incorporation of diverse forms of expertise, and the empowerment of marginalized voices—all of which are critical to addressing wicked problems through meaningful, context-specific missionary solutions.

3.2. Organizational Transformation: From Hierarchies to Flexible, Networked Structures

The epistemological underpinnings of Mode 4 knowledge production have profound implications for the organizational structures and institutional arrangements that enable and support missionary research within the African context. Whereas traditional models of knowledge production have typically been characterized by rigid, hierarchical structures that reinforce disciplinary boundaries and limit cross-pollination, Mode 4 calls for the dismantling of these siloed, bureaucratic structures in favor of more flexible, networked organizational models (Carayannis & Campbell, 2012; Trencher et al., 2014; Levin-Keitel et al., 2018). These networked structures may take the form of transdisciplinary research centers, collaborative platforms, or “living labs” that bring together diverse stakeholders to co-create knowledge and co-design solutions within the realm of African missiology. Beyond the organizational level, the implementation of Mode 4 also requires a

fundamental shift in the institutional arrangements and governance structures that shape the missionary research ecosystem, including the development of new funding mechanisms and the redesign of academic reward systems (Wittmayer & Schöpke, 2014; Caniglia et al., 2021). The organizational transformation at the heart of Mode 4 knowledge production is a direct response to the limitations of traditional, siloed structures within African missiology. Rigid, hierarchical models that reinforce disciplinary boundaries and concentrate power within academic and missionary institutions have proven inadequate in addressing the complex, interconnected challenges facing African societies. In contrast, the flexible, networked structures championed by Mode 4 enable cross-pollination, foster synergies between diverse stakeholders, and empower marginalized voices to participate actively in the knowledge production process. By dismantling the traditional silos and empowering more inclusive, collaborative organizational models, Mode 4 knowledge production aims to catalyze a fundamental shift in the way missionary research is conducted, funded, and disseminated within the African context. This organizational transformation is a critical enabler of the epistemological shift towards more participatory, transdisciplinary approaches to knowledge creation in African missiology.

3.3. Methodological Transformation: Iterative, Adaptive, and Design-Oriented Approaches

In parallel with the epistemological and organizational shifts, Mode 4 knowledge production also demands a radical reconceptualization of research methodologies within the field of African missiology. Whereas traditional models have often relied on linear, reductionist approaches, Mode 4 emphasizes the need for iterative, adaptive, and design-oriented research processes that can navigate complexity and generate actionable, context-specific solutions. The complexity and interconnectedness of the challenges facing African societies today defy simplistic, linear problem-solving approaches. Addressing wicked problems within the missionary enterprise requires flexible, design-oriented research methodologies that can accommodate evolving problem definitions, integrate diverse forms of knowledge, and co-create solutions through an iterative, collaborative process (Rittel & Webber, 1973; Pohl, 2011; Luederitz et al., 2016). At the heart of the methodological transformation within Mode 4 knowledge production lies the emphasis on iterative, adaptive research approaches. This involves the deployment of flexible, design-oriented methodologies that enable the co-evolution of problem definitions, research questions, and solution pathways in response to emerging insights and changing contexts (Norström et al., 2020). Rather than a linear, predetermined sequence of steps, Mode 4 research processes are characterized by iterative cycles of problem framing, data collection, analysis, and solution prototyping—all within a collaborative, transdisciplinary framework. This adaptive, design-oriented approach to research methodologies directly aligns with the epistemological and organizational foundations of Mode 4 knowledge production. By embracing flexibility, iteration, and collaborative problem-solving, these methodologies enable the active engagement of diverse stakeholders, the integration of multiple forms of knowledge, and the co-creation of context-specific, actionable solutions within the realm of African missiology (Popa, Guillermin & Dedeurwaerdere, 2015; Wittmayer & Schöpke, 2014; Caniglia et al., 2021). Moreover, the methodological transformation within Mode 4 knowledge production extends beyond individual research projects to encompass the broader institutional and systemic arrangements that shape the missionary research enterprise. This includes the development of new funding mechanisms, evaluation criteria, and academic reward systems that incentivize and support the implementation of iterative, adaptive, and design-oriented approaches to research and innovation (Caniglia et al., 2021). By radically rethinking the methodological foundations of knowledge production, Mode 4 represents a profound departure from the linear, reductionist models that have historically defined academic research in African missiology. This methodological transformation is a critical enabler of the epistemological and organizational shifts that lie at the heart of the Mode 4 paradigm, empowering researchers to navigate complexity, integrate diverse forms of knowledge, and co-create transformative solutions in partnership with a wide range of societal actors.

4. Mode 4 Knowledge Production and African Missiology

The introduction of the Mode 4 knowledge production paradigm must be situated within the broader context of African missiology, which has long grappled with the legacies of colonial epistemologies and the imperative for decolonial interventions. This section delves deeply into the profound implications of Mode 4 for the epistemology, ontology, methodology, ethics, and praxis of the missionary enterprise within the African context.

4.1. Epistemological Foundations of Mode 4 in African Missiology

The epistemological shift at the heart of Mode 4 knowledge production represents a radical reconceptualization of the role of the missionary researcher and the nature of missiological knowledge itself. By rejecting the notion of the researcher as a detached, “objective” observer and embracing a more collaborative, participatory, and pluralistic approach, Mode 4 challenges the rigid hierarchies and power dynamics that have historically characterized knowledge production within African missiology. Mode 4 recognizes the value of diverse forms of expertise, including marginalized communities, Indigenous knowledge holders, and decolonial thinkers, and actively engages these stakeholders in the co-creation of missiological knowledge. This inclusive, dialogical approach enables the bridging of disciplinary divides, the empowerment of previously excluded voices, and the co-evolution of problem definitions and solution pathways (Hadorn et al., 2008; Polk, 2015; Caniglia et al., 2021). Moreover, Mode 4 rejects the notion of a singular, objective “truth” in favor of a recognition of the plurality of valid perspectives and the contextual, situated nature of knowledge. This epistemological stance aligns with the principles of transdisciplinarity, which emphasizes the integration of different ways of knowing and the co-evolution of research questions and methodologies (Hirsch Hadorn et al., 2006; Popa, Guillermin & Dedeurwaerdere, 2015; Norström et al., 2020). By embracing a more collaborative, participatory, and pluralistic approach to knowledge creation, Mode 4 aims to better reflect the inherent complexity and interconnectedness of the challenges facing African societies, enabling missionaries to address wicked problems through meaningful, context-specific solutions.

4.2. Ontological Shift and the Decolonial Imperative

The paradigm shift embodied by Mode 4 knowledge production also demands a profound ontological reconceptualization within the field of African missiology. By centering the pluriversality of knowledge systems and the epistemic justice imperative, Mode 4 calls for missionaries to relinquish their claims to detached expertise and universal truths, instead embracing a posture of humility, reciprocity, and deep engagement with local, Indigenous, and decolonial ways of being and knowing. This ontological shift involves the reframing of the missionary’s role from that of a detached observer or authoritative expert to that of a collaborative facilitator, co-learner, and decolonial interlocutor. Mode 4 invites a reconsideration of the ethical and normative foundations of the missionary calling, emphasizing the alignment of missionary praxis with broader societal values of equity, inclusion, and environmental regeneration (Hernández--Medina, 2010; Choquez-Millan et al., 2024). By centering the pluriversality of knowledge systems and challenging the Eurocentric and often universalist assumptions that have historically defined the missionary vocation, the Mode 4 paradigm shift within African missiology represents a profound decolonial imperative. This ontological transformation is essential for dismantling the colonial legacies that have long shaped the field and paving the way for a more inclusive, emancipatory, and holistically integrated future for the missionary enterprise.

4.3. Methodological Transformation in Mode 4

Alongside the epistemological and ontological shifts, Mode 4 knowledge production also demands a radical reconceptualization of research methodologies within the field of African missiology. Whereas traditional approaches have often relied on linear, reductionist, and extractive methods, the Mode 4 paradigm calls for the embrace of iterative, adaptive, and design-oriented

research processes that can navigate complexity and generate actionable, context-specific solutions. The complexity and interconnectedness of the challenges facing African societies today defy simplistic, linear problem-solving approaches. Addressing wicked problems within the missionary enterprise requires flexible, design-oriented research methodologies that can accommodate evolving problem definitions, integrate diverse forms of knowledge, and co-create solutions through an iterative, collaborative process (Rittel & Webber, 1973; Pohl, 2011; Luederitz et al., 2016). At the heart of the methodological transformation within Mode 4 is the emphasis on iterative, adaptive research approaches. This involves the deployment of flexible, design-oriented methodologies that enable the co-evolution of problem definitions, research questions, and solution pathways in response to emerging insights and changing contexts (Norström et al., 2020). Rather than a linear, predetermined sequence of steps, Mode 4 research processes are characterized by iterative cycles of problem framing, data collection, analysis, and solution prototyping—all within a collaborative, transdisciplinary framework. This adaptive, design-oriented approach to research methodologies directly aligns with the epistemological and organizational foundations of Mode 4 knowledge production.

By embracing flexibility, iteration, and collaborative problem-solving, these methodologies enable the active engagement of diverse stakeholders, the integration of multiple forms of knowledge, and the co-creation of context-specific, actionable solutions within the realm of African missiology (Popa, Guillermin & Dedeurwaerdere, 2015; Wittmayer & Schäpke, 2014; Caniglia et al., 2021). Moreover, the methodological transformation within Mode 4 extends beyond individual research projects to encompass the broader institutional and systemic arrangements that shape the missionary research enterprise. This includes the development of new funding mechanisms, evaluation criteria, and academic reward systems that incentivize and support the implementation of iterative, adaptive, and design-oriented approaches to research and innovation (Caniglia et al., 2021). By radically rethinking the methodological foundations of knowledge production, Mode 4 represents a profound departure from the linear, reductionist models that have historically defined academic research in African missiology. This methodological transformation is a critical enabler of the epistemological and organizational shifts that lie at the heart of the Mode 4 paradigm, empowering missionary researchers to navigate complexity, integrate diverse forms of knowledge, and co-create transformative solutions in partnership with a wide range of societal actors.

4.4. Ethical and Normative Dimensions of Mode 4

The paradigm shift embodied by Mode 4 knowledge production also carries profound implications for the ethics and normative foundations of African missiology. By centering issues of equity, inclusion, and environmental regeneration, Mode 4 challenges the historically paternalistic and often extractive tendencies of missionary praxis. The emphasis on collaborative, values-oriented research and innovation within the Mode 4 framework calls for missionaries to critically examine the ethical assumptions underlying their work and to reorient their efforts towards more holistic, emancipatory, and sustainable outcomes (Hernández--Medina, 2010; Choquez-Millan et al., 2024). This involves a reconsideration of the missionary's role, moving away from a position of detached authority and universalist truths towards one of humble, reciprocal engagement with local communities and their own systems of knowledge and belief. Moreover, the Mode 4 paradigm shift demands that missionaries actively work to dismantle the colonial legacies and power imbalances that have long shaped the field of missiology. By centering the pluriversality of knowledge systems and embracing decolonial epistemologies, Mode 4 represents a profound challenge to the Eurocentric, assimilationist tendencies that have historically characterized missionary praxis (Escobar, 2008; Boaventura de Sousa Santos, 2014). Ultimately, the ethical and normative dimensions of Mode 4 knowledge production within African missiology call for a radical reorientation of the missionary vocation—one that prioritizes values of reciprocity, epistemic justice, environmental stewardship, and the holistic wellbeing of the communities they serve. This transformative shift in the ethical foundations of missionary work is essential for aligning the field with the broader societal values of equity, inclusion, and sustainable development.

4.5. *Implications for Missionary Praxis*

The implementation of the Mode 4 knowledge production paradigm within African missiology has far-reaching implications for the actual practice and deployment of missionary activities. By embracing a more collaborative, transdisciplinary, and values-oriented approach, Mode 4 fundamentally reshapes the way missionaries engage with local communities, frame problems, design interventions, and evaluate the impacts of their work. Rather than relying on top-down, expert-driven models of missionary outreach, Mode 4 calls for missionaries to adopt a posture of deep listening, reciprocal learning, and co-creative problem-solving. This involves the active integration of diverse stakeholders, including marginalized communities, Indigenous knowledge holders, and decolonial thinkers, in the co-definition of missionary priorities and the co-design of contextually relevant solutions. Moreover, the iterative, adaptive, and design-oriented methodologies championed by Mode 4 enable missionaries to respond dynamically to evolving needs and emerging insights, fostering a more nimble, flexible, and holistically integrated approach to missionary praxis. This shift away from rigid, linear models towards flexible, collaborative frameworks empowers local communities to assert greater agency and ownership over the missionary process, ultimately leading to more sustainable and impactful outcomes. The implications of Mode 4 for missionary praxis also extend to the way in which missionary activities are funded, evaluated, and disseminated. By aligning with the decuple helix model and its emphasis on inclusive, values-oriented collaboration, missionaries can leverage a broader array of funding sources, including philanthropy, international organizations, and values-based movements, to support their work. Similarly, the evaluation of missionary impact must shift away from narrow, output-focused metrics towards more holistic, participatory, and transformative frameworks that capture the multifaceted, systemic changes enabled by Mode 4 approaches. Ultimately, the implementation of Mode 4 knowledge production within African missiology represents a profound transformation in the way the missionary enterprise is conceived, organized, and deployed. By embracing collaborative co-creation, decolonial epistemologies, and flexible, adaptive methodologies, missionaries can become powerful catalysts for systemic change, addressing the complex, interconnected challenges facing African societies through meaningful, contextually grounded solutions.

5. **Decolonizing African Missiology: Centering Indigenous Epistemologies**

The Mode 4 knowledge production paradigm within African missiology must be situated within the broader context of decolonial thought and the ongoing struggle to center African and Indigenous epistemologies. Scholars such as Kwasi Wiredu (1998) and Kwame Gyekye (1995) have powerfully argued for the need to interrogate and deconstruct the Eurocentric assumptions that have long dominated missionary praxis in Africa. They emphasize the importance of drawing on African philosophical traditions, which often emphasize the interconnectedness of the spiritual, social, and natural realms, as a foundation for re-imagining and decolonizing missionary engagement (Wiredu, 1998; Gyekye, 1995). Achille Mbembe (2016) further underscores the imperative for African missiology to actively confront the colonial legacies that have shaped the field, embracing a “politics of difference” that celebrates the pluriversality of African knowledge systems. This decolonial approach aligns closely with the epistemological foundations of Mode 4, which rejects the notion of a singular, universal truth in favor of a recognition of the contextual, situated nature of knowledge (Mbembe, 2016). By integrating African philosophical traditions and decolonial perspectives, Mode 4 knowledge production within African missiology can become a powerful tool for dismantling the colonial hierarchies and power imbalances that have long defined the missionary enterprise.

6. **The Decuple Helix and the Empowerment of Marginalized African Voices**

The decuple helix framework, which lies at the heart of the Mode 4 knowledge production paradigm, holds immense potential for the empowerment of marginalized African voices within the missionary research ecosystem. Scholars such as Sabelo J. Ndlovu-Gatsheni (2013) and Everisto Benyera (2019) have emphasized the critical importance of centering the perspectives of indigenous

communities, civic organizations, and social movements in the co-creation of knowledge and the reimagining of African development trajectories. By incorporating a comprehensive range of stakeholders, including marginalized groups, the decuple helix model directly responds to the call for epistemic justice and the dismantling of colonial power structures within African missiology (Ndlovu-Gatsheni, 2013; Benyera, 2019). This inclusive, collaborative approach enables the active integration of diverse forms of knowledge, lived experiences, and values-based perspectives, empowering previously excluded voices to shape the research agenda and catalyze transformative change. The implementation of the decuple helix framework within the Mode 4 paradigm thus represents a critical step towards decolonizing the missionary enterprise and fostering more equitable, emancipatory, and contextually grounded approaches to missionary praxis in Africa.

7. Amplifying the Voices of African Women in Missionary Praxis

A critical aspect of the Mode 4 knowledge production paradigm within African missiology is the imperative to amplify the voices and experiences of African women, who have long been marginalized within the missionary enterprise. Scholars such as Mercy Amba Oduyoye (2001) and Isabel Phiri (2009) have powerfully articulated the need to center the contributions of African women, both as active participants in church growth and revitalization, as well as lay people who have accompanied and shaped the work of white missionaries. Oduyoye's groundbreaking work on African women's theology has emphasized the centrality of African women's spirituality, community engagement, and resistance to patriarchal structures within the missionary context (Oduyoye, 2001). Similarly, Phiri's research has documented the vital role played by African women in the redynamization and revitalization of churches from colonial times to the present, often in the face of oppressive gender norms and colonial legacies (Phiri, 2009). The doctoral thesis of Congolese theologian Kilongo Fatuma, "*Les héroïnes sans couronne: Leadership des femmes dans les Églises de Pentecôte en Afrique Centrale*" (2015), further highlights how women are omnipresent in all activities of Pentecostal churches in the Eastern part of the Democratic Republic of Congo, yet are absent from decision-making structures, with only men ordained in pastoral ministry. By embracing the decuple helix framework, Mode 4 knowledge production creates space for the active integration of these African women's perspectives, epistemologies, and praxis within the missionary research ecosystem. This inclusive, collaborative approach not only challenges the patriarchal structures that have historically defined the field, but also unlocks the transformative potential of African women's leadership, spirituality, and community-based engagement in reimagining and decolonizing missionary work. The integration of African women's voices within Mode 4 research and innovation holds the promise of more holistic, contextually relevant, and emancipatory approaches to missionary praxis that are firmly rooted in the diverse realities and aspirations of African communities.

8. Pedagogical Dimensions of Mode 4 in African Missiology Curricula

The implementation of the Mode 4 knowledge production paradigm within African missiology also carries profound implications for the way the field is taught and transmitted within academic and theological training institutions. Scholars such as Lovemore Togarasei (2020) and Sarojini Nadar (2009) have emphasized the need to restructure missiology curricula to better reflect the transdisciplinary, collaborative, and decolonial ethos. Togarasei's work on the decolonization of theological education in Africa has highlighted the importance of integrating diverse epistemologies, research methodologies, and case studies that showcase the co-creative, values-oriented nature of Mode 4 knowledge production (Togarasei, 2020). Aspiring missionaries must be exposed to iterative, design-oriented approaches to problem-solving, as well as the skills and dispositions required for deep engagement with local communities, Indigenous knowledge holders, and marginalized stakeholders. Moreover, the pedagogical framework must actively challenge Eurocentric assumptions, center African philosophical traditions, and empower students to become decolonial interlocutors and facilitators of transformative change. Nadar's work on feminist, contextual, and liberationist approaches to biblical interpretation and theological education further underscores the

need to integrate the perspectives of African women and other marginalized groups within missiology curricula (Nadar, 2009). By embedding the Mode 4 paradigm within African missiology curricula, educational institutions can play a crucial role in nurturing a new generation of missionaries who are equipped to navigate complexity, integrate diverse forms of knowledge, and co-create context-specific, emancipatory solutions in partnership with the communities they serve.

9. Limitations and Outlook

While the Mode 4 knowledge production paradigm holds immense promise for the decolonization and revitalization of African missiology, it is important to acknowledge the significant challenges and limitations that may arise in its implementation. The dismantling of entrenched institutional structures, the bridging of diverse epistemologies, and the alignment of incentives and funding mechanisms to support collaborative, transdisciplinary research are all formidable hurdles that will require sustained commitment and systemic transformation. Moreover, the Mode 4 approach may face resistance from traditionalist or conservative factions within the missionary enterprise who are invested in maintaining the status quo. Navigating these tensions and fostering a shared vision for a more inclusive, emancipatory, and holistically integrated missionary praxis will be an ongoing struggle that requires patience, diplomacy, and a deep commitment to the principles of epistemic justice and decolonial empowerment. Despite these challenges, the potential of the Mode 4 knowledge production paradigm to catalyze a profound and lasting transformation within African missiology remains immense. By embracing collaborative co-creation, centering decolonial epistemologies, and empowering marginalized voices, this revolutionary approach holds the promise of unlocking new pathways for addressing the complex, interconnected challenges facing African societies through meaningful, contextually grounded missionary solutions. As the field of African missiology continues to evolve, the implementation of the Mode 4 paradigm represents a clarion call for a new era of missionary praxis—one that is firmly rooted in values of equity, inclusion, and holistic wellbeing, and empowers communities to chart their own paths towards a more sustainable and emancipatory future.

10. Conclusion

The revolutionary emergence of the Mode 4 knowledge production paradigm holds immense transformative potential for the field of African missiology. By radically reconceptualizing the epistemological, organizational, and methodological foundations of the missionary research enterprise, Mode 4 opens new pathways for a more collaborative, transdisciplinary, and adaptive approach to addressing the complex, interconnected challenges facing African societies. At the heart of this paradigm shift lies the decuple helix framework, which expands the scope of stakeholder engagement and knowledge co-creation to incorporate a comprehensive range of actors, from academia and industry to marginalized communities, the natural environment, and international organizations. This inclusive, holistic model enables the bridging of disciplinary divides, the empowerment of previously excluded voices, and the co-evolution of problem definitions and solution pathways—all of which are essential for navigating the wicked problems that have long plagued the missionary enterprise. The profound implications of Mode 4 for African missiology span the epistemological, ontological, methodological, ethical, and praxiological dimensions of the field. By rejecting the notion of the missionary researcher as a detached, “objective” observer and embracing a more collaborative, participatory, and pluralistic approach to knowledge creation, Mode 4 challenges the rigid hierarchies and power dynamics that have historically defined missionary research and outreach. This epistemological shift, coupled with a profound ontological reconceptualization that centers the pluriversality of knowledge systems and the decolonial imperative, paves the way for a radical reorientation of the missionary vocation. Alongside these conceptual transformations, Mode 4 also demands a methodological shift towards iterative, adaptive, and design-oriented research processes that can navigate complexity, integrate diverse forms of knowledge, and co-create context-specific, actionable solutions. This flexible, collaborative approach to missionary praxis empowers local communities to assert greater agency and ownership over the

missionary process, leading to more sustainable and impactful outcomes. Undergirding these paradigmatic shifts are the ethical and normative dimensions of Mode 4, which call for missionaries to critically examine the assumptions underlying their work and to reorient their efforts towards values of reciprocity, epistemic justice, environmental stewardship, and the holistic wellbeing of the communities they serve. This transformation in the ethical foundations of missionary work is essential for aligning the field with broader societal values of equity, inclusion, and sustainable development.

Ultimately, the revolutionary potential of Mode 4 knowledge production within African missiology lies in its ability to catalyze a fundamental shift in the way the missionary vocation is conceived, organized, and deployed. By embracing collaborative co-creation, decolonial epistemologies, and flexible, adaptive methodologies, missionaries can become powerful agents of systemic change, addressing the complex, interconnected challenges facing African societies through meaningful, contextually grounded solutions. This paradigm shift represents a clarion call for a new era of missionary praxis—one that is firmly rooted in values of equity, inclusion, and holistic wellbeing, empowering communities to chart their own paths towards a more sustainable and emancipatory future.

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