

From Normative Ethics to Human Intelligence: A Five-Phase Model for Transforming Research Career Systems in Europe

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Abstract

Across the European Research Area (ERA), research careers are increasingly shaped by the convergence of ethics, governance, and human-centred institutional transformation. Building on findings from the Horizon Europe project SMART Researchers, this paper introduces a five-phase model for research career system development that operationalises excellence through sequential transformation layers: Normative, Structural, Human, Digital, and Societal. Normative – defining how excellence is governed through ethical and policy coherence; Structural – building where excellence happens through transparent and responsive HR systems; Human – empowering who delivers excellence by developing competencies, integrity, and leadership; Digital – enabling how excellence is evidenced, measured, and trusted via open and data-driven mechanisms; Societal – reaffirming why excellence matters through public engagement and shared value creation. Empirical insights are drawn from multi-country audits and surveys conducted under the SMART Researchers framework, integrating the European Charter for Researchers (2023), Council Recommendation on the European Framework for Research Careers (2023), and HRS4R principles. Preliminary analysis reveals significant disparities in ethical maturity and leadership capacity across institutions, but also a clear trajectory from compliance-based to reflexive, learning-driven excellence. By articulating the interdependence between normative alignment, human capability, and digital trust, the paper advances a new model of ethical intelligence in research leadership – positioning values not as static ideals, but as dynamic enablers of institutional and societal transformation.

Keywords: European Research Area, research careers, ethical intelligence, HRS4R, research governance, competency frameworks

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Introduction

The European Research Area (ERA) is undergoing a profound transformation. What began as a voluntary coordination mechanism among member states has evolved into a binding normative architecture that fundamentally reshapes how research careers are governed, supported, and evaluated across Europe. This shift from soft recommendations to enforceable standards represents not merely an administrative adjustment but a paradigmatic change in how excellence is defined, measured, and sustained within European research institutions (Council of the European Union, 2025). The ERA Policy Agenda 2025–2027 and the anticipated ERA Act 2026 signal a decisive move toward regulatory coherence, institutional accountability, and career sustainability in the research and innovation sectors (Council of the European Union, 2025).

Yet despite these policy advances, research career systems across Europe remain fragmented. Significant disparities persist in ethical maturity, governance structures, leadership capacity, and digital infrastructure, particularly between established research systems and widening countries (CESAER, 2020). Early career stages are characterized by high uncertainty, limited advancement opportunities, underdeveloped support systems, and unclear career paths, hindering long-term talent development and the ERA's ability to achieve its ambitions. The European Charter for Researchers (2023) and the Council Recommendation on the European Framework for Research Careers (2023) provide normative guidance, but their translation into institutional practice remains uneven (European Commission, 2023a). The Human Resources Strategy for Researchers (HRS4R) has emerged as a key quality mechanism, yet its implementation varies widely in depth and effectiveness (Peirats et al., 2024).

This fragmentation is compounded by the complexity of contemporary research governance. Institutions must simultaneously address research integrity, gender equality, open science, transparent recruitment (OTM-R), responsible research assessment (COARA/DORA), competency-based career development (ResearchComp, RM-Comp), digital infrastructure (EOSC), and societal engagement (European Commission, 2023b, 2023c). These dimensions are often treated as separate compliance requirements rather than as interdependent elements of a coherent transformation strategy. The result is institutional overload, policy incoherence, and a persistent gap between normative ambition and operational reality.

The Horizon Europe project SMART Researchers (Strategic Micro-Credentialing and Skills Recognition for a Dynamic Early-Stage Researcher Talent Ecosystem, Grant Agreement No. 101216967) provides the empirical foundation for this paper. Through multi-country audits, surveys, and institutional assessments conducted across diverse European contexts, the project has documented both the challenges and opportunities inherent in transforming research career systems. Preliminary findings reveal that while normative alignment is advancing, structural gaps remain pronounced, particularly in widening countries. Leadership capacity emerges as the most significant predictor of institutional transformation readiness, yet it is also the dimension most neglected in current policy frameworks. Digital infrastructure is the most uneven across institutions, and societal engagement remains the least developed phase, despite increasing funder requirements.

This paper introduces a five-phase model for research career system transformation that addresses these challenges. The model operationalises excellence through five sequential but interdependent layers: Normative (governing excellence through ethical and policy coherence), Structural (building the architecture where excellence happens), Human (empowering those

who deliver excellence), Digital (evidencing and trusting excellence through transparent mechanisms), and Societal (reaffirming why excellence matters through public engagement). By articulating the interdependence between these phases, the paper advances a new concept of ethical intelligence in research leadership, positioning values not as static ideals but as dynamic enablers of institutional and societal transformation.

The paper proceeds as follows. The next section reviews the literature on ERA governance, research ethics and integrity, and human capability and digital trust in research leadership. The third section presents the five-phase model, detailing each phase's conceptual foundations, key mechanisms, and empirical findings from the SMART Researchers project. The fourth section discusses the interdependence of phases and introduces the concept of ethical intelligence. The final section concludes with implications for policy and practice, limitations, and directions for future research.

Literature Review

The European Research Area and Research Career Governance

The European Research Area (ERA) was introduced at the Lisbon European Council in 2000, while its strategic consolidation began with the European Commission's Green Paper in 2007 (Iacoboaiei, 2008). Its original objective was to establish a unified research space enabling the free circulation of researchers, scientific knowledge, and technology across Europe. For much of its early development, however, the ERA functioned primarily as a soft coordination mechanism based on voluntary cooperation rather than binding obligations (Pohoryles, 2002).

A major shift occurred with the ERA Policy Agenda 2022–2024, which introduced stronger coordination mechanisms, performance monitoring, and evaluation frameworks (European Commission, 2022). This direction is reinforced by the ERA Policy Agenda 2025–2027, which places explicit institutional responsibilities on research career development, open science, ethical standards, and digital capacities (Council of the European Union, 2025). Furthermore, the anticipated ERA Act 2026 is expected to transform existing principles into legally binding requirements by establishing minimum standards for employment, competence development, mobility, and investment in research and innovation. Consequently, European research governance is evolving from a recommendation-based approach toward a legally grounded system that promotes quality, transparency, and sustainability.

This transformation is driven by three key policy instruments. First, the European Charter for Researchers (2023) defines principles concerning the roles, responsibilities, and rights of researchers and their employers while emphasizing institutional responsibility for creating ethical, transparent, and supportive research environments (European Commission, 2023a). Second, the Council Recommendation on the European Framework for Research Careers (2023) establishes a common framework for career stages, competencies, and progression pathways, aiming to reduce fragmentation and improve mobility across European research systems (European Commission, 2023a). Third, the Human Resources Strategy for Researchers (HRS4R) provides an institutional quality mechanism through self-assessment, action planning, and external evaluation to demonstrate alignment with the Charter and the Code of Conduct for the Recruitment of Researchers (Peirats et al., 2024).

These reforms are complemented by changes in research assessment. The San Francisco Declaration on Research Assessment (DORA, 2012) and the Coalition for Advancing Research

Assessment (COARA, 2022) advocate moving beyond purely bibliometric indicators toward more qualitative and context-sensitive evaluation approaches. Similarly, the Leiden Manifesto promotes the responsible use of quantitative metrics (Hicks et al., 2015). Collectively, these initiatives recognize that evaluation systems shape researcher behavior, career trajectories, and institutional culture, while poorly designed metrics may incentivize quantity over quality, conformity over creativity, and individual competition over collaboration.

Finally, competence frameworks have become central instruments for operationalizing research career development. ResearchComp, the European Competence Framework for Researchers, defines the knowledge, skills, and attitudes required across different career stages and provides a common reference for researcher development within the ERA.

Ethics, Integrity, and Normative Frameworks in Research

Research integrity has evolved from a narrow focus on scientific misconduct (fabrication, falsification, plagiarism) to a broader understanding of responsible research conduct encompassing ethical conduct, transparency, accountability, and reflexivity (Finikov, 2017). This shift reflects growing recognition that integrity is not merely an individual responsibility but a systemic property of research environments shaped by institutional cultures, governance structures, incentive systems, and leadership practices.

The European Charter for Researchers (2023) identifies research integrity as a core principle, requiring institutions to establish ethical oversight mechanisms, conflict-of-interest procedures, and policies that promote responsible research conduct. Consequently, implementing integrity standards increasingly relies on comprehensive institutional frameworks, including dedicated offices, ombudspersons, ethics committees, grievance mechanisms, training programmes, and transparency policies (Cesaer, 2021). These measures recognize that misconduct often arises from organizational conditions rather than isolated individual failures.

Under the European Framework for Research Careers, ethics and governance are integrated through the ResearchComp competence model, which defines integrity as a multidimensional capability encompassing ethical reasoning, leadership, responsible decision-making, and transparency (European Commission, 2023b). Accordingly, institutions are expected to embed integrity principles across recruitment, retention, promotion, management, and research assessment, creating organizational cultures that support ethical behaviour while reducing questionable research practices and fostering academic excellence.

Open science further extends the normative framework by linking research integrity with transparency, accessibility, and reproducibility. European policies promote open access to publications and data, implementation of Open Science Clouds (EOSC), provision of FAIR-compliant research data, and institutional policies on Data Management Plans (DMPs) and open research services (European Commission, 2022). These initiatives position openness as an ethical principle that strengthens reliability, reproducibility, and democratic access to scientific knowledge.

At the same time, transparency and accountability are reinforced through the Open, Transparent and Merit-based Recruitment (OTM-R) framework, designed to address persistent challenges such as implicit bias, limited international competitiveness, and opaque recruitment procedures (Gica, 2012). Within the broader HRS4R process, OTM-R serves as a key

implementation mechanism for aligning institutional recruitment systems with European standards of fairness and excellence.

Together, these developments illustrate the transition from compliance-oriented ethics toward a more reflexive and systemic understanding of research integrity, where ethical behaviour emerges not only from individual responsibility but also from institutional environments that encourage transparency, openness, accountability, and continuous learning.

Human Capability and Digital Trust in Research Leadership

Competency-based approaches to researcher development have increasingly replaced traditional credential-focused career models. ResearchComp and RM-Comp provide structured frameworks for identifying, developing, and recognizing the competencies required for successful research careers (European Commission, 2023b, 2023c). Beyond technical expertise, these frameworks emphasize transferable skills such as communication, collaboration, project management, leadership, and entrepreneurship. By making competencies explicit and assessable, they promote transparent career progression, facilitate mobility across sectors, and recognize diverse career pathways.

Within this context, micro-credentials have emerged as flexible mechanisms for certifying competencies acquired through formal, informal, or experiential learning. Unlike traditional degrees, which aggregate multiple competencies into a single qualification, micro-credentials enable granular recognition of specific skills, support lifelong learning, and allow researchers to build personalized competency portfolios across different contexts.

Leadership development is likewise recognized as a critical determinant of institutional transformation. Research leaders—including principal investigators, research group leaders, department heads, and research administrators—shape organizational culture, allocate resources, define priorities, and model ethical conduct. However, academic systems have traditionally assumed that research excellence naturally translates into leadership capability, despite growing evidence that effective leadership requires distinct competencies such as strategic thinking, people management, conflict resolution, and change management (Armbruster, 2008).

Mentoring and supervision are equally essential for researcher development. High-quality mentoring provides technical guidance, career support, professional socialization, and psychosocial assistance, whereas poor supervision contributes to researcher dissatisfaction, attrition, and early-career distress. Consequently, structured mentoring programmes, supervisor training, and institutional accountability mechanisms are necessary to ensure equitable developmental support for researchers.

Digital infrastructure further strengthens research career transparency through tools that make research activities, outputs, and competencies visible and verifiable. Persistent researcher identifiers such as ORCID, Research Information Management Systems (RIMS), open repositories, and Data Management Plans (DMPs) facilitate the documentation, monitoring, and dissemination of research outputs while supporting open science practices.

Finally, the concept of digital trust refers to stakeholders' confidence in the accuracy and reliability of digital representations of research activities and outputs. Such trust depends on

the quality, integrity, and transparency of research information systems, making digital infrastructure an increasingly important component of effective research governance.

Proposed Framework

The Five-Phase Model: Conceptual Foundations

The five-phase model introduced in this paper provides a sequential but interdependent architecture for transforming research career systems. Each phase builds on the previous, creating a cumulative logic of institutional development. The model is grounded in empirical work conducted under the SMART Researchers project, which has documented patterns of institutional maturity, identified common challenges, and tested interventions across diverse European contexts.

The model's logic is as follows. Normative alignment establishes the ethical and policy foundations, defining what excellence means and how it should be governed. Structural transformation builds the institutional architecture, creating transparent systems for recruitment, career progression, and resource allocation. Human capability development empowers individuals and teams, ensuring they have the competencies, support, and leadership needed to deliver excellence. Digital enablement provides the infrastructure for evidencing, measuring, and trusting excellence, making research activities and outputs visible and verifiable. Societal engagement reaffirms the purpose of excellence, connecting institutional achievements to broader public value and democratic accountability.

While the phases are presented sequentially, they are not strictly linear. Institutions may advance at different rates across phases, and progress in one phase can catalyze or constrain progress in others. The model is intended as a diagnostic and planning tool, helping institutions assess their current state, identify priorities, and design coherent transformation strategies.

Phase 1 – Normative: Governing Excellence Through Ethical and Policy Coherence

The normative phase defines how excellence is governed through ethical and policy coherence. It encompasses alignment with ERA principles, research integrity standards, gender equality plans, OTM-R, and COARA/DORA reforms. Institutions in this phase must formalize policies, codes of conduct, and ethical oversight mechanisms that translate abstract principles into operational requirements.

Key mechanisms include comprehensive institutional regulations that specify roles, responsibilities, and procedures; codes of conduct that articulate expected behaviors and ethical standards; ethical oversight bodies such as research ethics committees and integrity officers; gender equality plans that set targets and accountability measures; OTM-R procedures that ensure transparent and merit-based recruitment; and adoption of responsible research assessment principles aligned with COARA/DORA.

Empirical findings from the SMART Researchers project reveal significant variation in normative maturity across surveyed institutions. Established research systems in Northern and Western Europe tend to have comprehensive policy frameworks, while widening countries often have formal policies on paper but lack effective implementation mechanisms. Common challenges include policy fragmentation (multiple, uncoordinated policies addressing different dimensions), lack of institutional ownership (policies imposed by external requirements rather

than internally driven), and weak enforcement (policies exist but are not consistently applied or monitored).

Successful normative alignment requires not only formal policy adoption but also cultural change, leadership commitment, and capacity building. Institutions must move beyond compliance checklists to embed ethical principles in everyday practices, decision-making processes, and institutional identities.

Phase 2 – Structural: Building the Architecture of Excellence

The structural phase builds the institutional architecture where excellence happens. It encompasses transparent HR systems, institutional governance structures, and recruitment and advancement policies. Structural transformation ensures that career pathways are clear, predictable, and equitable, and that institutional resources are allocated in ways that support researcher development and retention.

Key mechanisms include OTM-R implementation in practice (not just policy), with transparent job advertisements, diverse selection panels, and candidate feedback; clear career pathways that specify progression criteria, timelines, and support mechanisms; structured postdoctoral programs that provide mentoring, training, and career development opportunities; tenure-track or tenure-track-like models that offer stability and predictability for early-career researchers; and institutional governance structures that ensure researcher representation in decision-making.

Empirical findings from the SMART Researchers project indicate that structural gaps are most pronounced in widening countries. Common challenges include lack of structured career pathways (researchers advance through informal networks rather than transparent criteria), limited postdoctoral support (postdocs treated as temporary labor rather than developing professionals), and weak institutional governance (decisions made by small leadership groups without broader consultation).

Structural transformation requires not only policy change but also resource investment, administrative capacity building, and cultural shifts in how institutions value and support researchers. It also requires addressing power asymmetries, ensuring that early-career researchers have voice and agency in shaping institutional policies and practices.

Phase 3 – Human: Empowering Those Who Deliver Excellence

The human phase empowers those who deliver excellence by developing competencies, integrity, and leadership. It encompasses competency development based on ResearchComp and RM-Comp, mentoring and supervision, leadership programs, and training in research integrity, open science, and professional skills.

Key mechanisms include competency mapping and development planning aligned with ResearchComp and RM-Comp frameworks; micro-credentials that recognize specific competencies acquired through diverse learning pathways; mentoring programs that provide structured developmental support; doctoral training that goes beyond disciplinary knowledge to include transferable skills; research integrity courses that foster ethical awareness and reflexive practice; open science training that builds capacity for data management, open access

publishing, and public engagement; and leadership programs for research group leaders, principal investigators, and institutional administrators.

Empirical findings from the SMART Researchers project reveal that leadership capacity is the most significant predictor of institutional transformation readiness. Institutions with strong leadership development programs, cultures of distributed leadership, and explicit attention to leadership competencies are better able to navigate change, address challenges, and sustain momentum. Conversely, institutions that neglect leadership development often struggle with implementation, face resistance to change, and fail to translate policy commitments into practice.

Common challenges include lack of systematic competency development (training offered ad hoc rather than as part of coherent career development plans), poor mentoring quality (supervisors lack training and accountability), and neglect of leadership development (assumption that research excellence automatically translates into leadership capability).

Human capability development requires not only training programs but also cultural change, institutional support, and recognition that researcher development is a shared responsibility of individuals, supervisors, and institutions.

Phase 4 – Digital: Evidencing and Trusting Excellence

The digital phase enables how excellence is evidenced, measured, and trusted through transparent mechanisms. It encompasses researcher portfolios, EOSC integration, open repositories, DMP tools, and responsible AI frameworks. Digital maturity is a precondition for transparency, accountability, and trust in research systems.

Key mechanisms include researcher portfolios (ORCID profiles, CV databases) that provide comprehensive, verifiable records of research activities and outputs; research information management systems (RIMS) that enable institutional tracking and reporting; open science institutional repositories that make research outputs accessible; data management plan (DMP) tools that support responsible data handling; EOSC integration that enables data sharing and reuse; and frameworks for ethical and responsible AI use in research, including transparency, fairness, and accountability principles.

Empirical findings from the SMART Researchers project indicate that digital infrastructure is the most uneven across institutions. Established research systems tend to have sophisticated digital infrastructures, while widening countries often lack basic systems for tracking research activities, managing data, or supporting open science. Common challenges include lack of interoperability (systems do not communicate with each other), poor data quality (incomplete or inaccurate records), and limited user adoption (researchers do not use available tools).

Digital transformation requires not only technology investment but also training, user support, and attention to user experience. It also requires governance frameworks that address data privacy, security, and ethical use, ensuring that digital tools serve researcher needs rather than imposing surveillance or administrative burden.

Phase 5 – Societal: Reaffirming Why Excellence Matters

The societal phase reaffirms why excellence matters by connecting institutional achievements to broader public value and democratic accountability. It encompasses public engagement, open science dissemination, citizen science, and shared value creation. Societal engagement is increasingly required by funders and expected by publics, yet it remains the least developed phase in most institutions.

Key mechanisms include public engagement activities that communicate research findings to non-specialist audiences; open science dissemination through accessible publications, data, and educational resources; citizen science projects that involve publics in research design, data collection, and interpretation; science communication training for researchers; institutional communication strategies that highlight societal impact; and partnerships with civil society organizations, policymakers, and community groups.

Empirical findings from the SMART Researchers project reveal that societal engagement is the least developed phase but increasingly required by funders. Common challenges include lack of institutional support (public engagement seen as individual researcher responsibility rather than institutional priority), lack of training (researchers lack skills and confidence for public engagement), and lack of recognition (public engagement not valued in career progression or evaluation).

Societal engagement requires not only individual researcher effort but also institutional commitment, resource allocation, and cultural change that values diverse forms of impact and recognizes that research excellence is ultimately accountable to societal needs and democratic values.

The Interdependence of Phases and Ethical Intelligence

The five phases are not merely sequential but mutually reinforcing. Normative alignment provides the ethical foundation for structural transformation, which in turn creates the conditions for human capability development. Digital infrastructure enables transparency and accountability, which support both structural and human dimensions. Societal engagement reaffirms the purpose of excellence, providing motivation and legitimacy for the entire transformation process.

This interdependence suggests that isolated interventions in single phases are unlikely to succeed. For example, implementing OTM-R procedures (structural phase) without normative commitment to transparency and equity, or without leadership capacity to manage change (human phase), is likely to result in superficial compliance rather than meaningful transformation. Similarly, investing in digital infrastructure (digital phase) without training and user support (human phase) or without governance frameworks (normative phase) is likely to result in underutilized systems and wasted resources.

The concept of ethical intelligence in research leadership captures this interdependence. Ethical intelligence refers to the capacity of individuals and institutions to navigate complex ethical dilemmas, integrate ethical considerations into decision-making, and foster cultures of integrity, transparency, and accountability. Ethical intelligence is not a fixed trait but a dynamic capability that develops through experience, reflection, and learning. It requires not only

knowledge of ethical principles but also practical wisdom, emotional intelligence, and courage to act on ethical commitments even when they conflict with other interests.

Ethical intelligence operates at multiple levels. At the individual level, it involves researchers' capacity for ethical reasoning, reflexivity, and responsible conduct. At the team level, it involves collective deliberation, shared norms, and mutual accountability. At the institutional level, it involves governance structures, policies, and cultures that support ethical behavior and address ethical failures. At the systemic level, it involves alignment of incentives, regulations, and norms across institutions, funders, and policymakers.

The five-phase model provides a framework for developing ethical intelligence at all these levels. Normative alignment establishes shared principles and expectations. Structural transformation creates systems that incentivize ethical behavior and sanction misconduct. Human capability development builds individual and collective capacities for ethical reasoning and action. Digital infrastructure enables transparency and accountability. Societal engagement connects ethical commitments to public values and democratic accountability.

Table 1 summarizes the five-phase model, showing for each phase the dimension, core question, key mechanisms, and key policy anchors.

Table 1

The Five-Phase Model for Transforming Research Career Systems

Phase	Dimension	Core Question	Key Mechanisms	Key Policy Anchors
Normative	Governance	How is excellence governed?	Integrity policies, Gender Equality Plans, OTM-R, COARA/DORA	European Charter for Researchers (2023), ERA Policy Agenda
Structural	Architecture	Where does excellence happen?	Transparent HR, OTM-R recruitment, career pathways	Council Recommendation on European Framework for Research Careers (2023)
Human	Capability	Who delivers excellence?	ResearchComp, RM-Comp, micro-credentials, mentoring, leadership	ResearchComp (2023), RM-Comp
Digital	Transparency	How is excellence evidenced?	Researcher portfolios, EOSC, open repositories, responsible AI	EOSC, Open Science policies
Societal	Impact	Why does excellence matter?	Public engagement, citizen science, open dissemination	ERA Societal Impact agenda

Conclusion

This paper has introduced a five-phase model for transforming research career systems in Europe, grounded in empirical evidence from the Horizon Europe SMART Researchers project. The model operationalizes excellence through five sequential yet interdependent dimensions: knowledge excellence (technical and policy coherence), structural excellence (governance and institutional architecture), human excellence (empowering those who deliver excellence), digital excellence (trustworthy digital infrastructures), and social excellence (research embedded in society). Rather than static ideals, these dimensions function as dynamic enablers of institutional and societal transformation.

The model contributes to integrating previously fragmented perspectives on research careers. Research integrity, open science, transparent recruitment, competency development, digital infrastructure, and societal engagement should not be viewed as isolated policy areas but as interconnected elements of a coherent transformation strategy. Their combined implementation strengthens institutional readiness and supports sustainable research ecosystems.

Empirical findings from the SMART Researchers project indicate a clear progression from policy compliance toward institutional leadership. Institutions implementing ERA principles primarily as external obligations may achieve compliance, whereas those embedding ERA principles into organizational culture and governance are better positioned to foster innovation, long-term resilience, and sustainable development.

Several limitations should be acknowledged. First, the study is conceptual and relies on institutional validation, while broader empirical testing remains ongoing and findings are therefore preliminary. Second, the model is derived from seven institutions across four countries within a specific European context, requiring validation in more diverse institutional and geographical settings. Longitudinal research is also needed to assess whether institutions that advance through the proposed phases ultimately achieve greater research quality, international competitiveness, and societal impact.

Future research should address several questions. Can institutions deliberately progress through these phases, or are transitions driven by external pressures? What organizational interventions best facilitate movement between stages? How do individual, team, institutional, and system-level capabilities interact during transformation? Finally, how do ethical intelligence and digital trust evolve across the proposed phases?

Overall, the proposed framework offers a foundation for understanding research career transformation as a multidimensional, dynamic process, rather than merely a matter of policy compliance or isolated institutional reforms.

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Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The authors declare that Claude (Anthropic), an AI-assisted language tool, was used solely for English language editing and proofreading.

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