Engagement, Innovation, and Futures: Strategic Pathways for Applied Research Universities

Compromiso, innovación y futuro: caminos estratégicos para las universidades de investigación aplicada

Compromisso, inovação e futuro: caminhos estratégicos para universidades de pesquisa aplicada

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Abstract

This paper examines how applied research universities can enhance their societal engagement by leveraging global trends in co-creation, knowledge transfer, and institutional innovation. The Universidad Cooperativa de Colombia (UCC) invited this contribution as part of the design process for its new National Strategic Plan (PEN) 2026–2029, the institution-wide strategy that sets priorities across its multicampus system. Responding to this mandate, the paper proposes a thematic framework that connects UCC's cooperative identity and multicampus presence with international debates on research, innovation, and engagement.

Four thematic entry points are developed. Section 2 examines participatory agenda-setting, with a focus on frameworks such as Responsible Research and Innovation (RRI) and foresight methods. Section 3 discusses helix collaboration and co-creation, highlighting how universities convene partnerships across sectors. Section 4 turns to institutionalisation, exploring governance, incentives, and curricular integration of societal engagement. Section 5 addresses digital infrastructures and collective intelligence, emphasising how artificial intelligence and open platforms are reshaping both academic practices and university–society interaction.

Each theme is analysed with reference to global trends and illustrated with selected Latin American cases. These examples, presented as sources of inspiration, demonstrate how regional universities are incorporating engagement into their strategic planning, experimenting with citizen science, integrating social responsibility into development plans, and connecting with international open science networks. By juxtaposing such illustrations with UCC's existing assets — clinics, transfer structures, territorial programmes, and SDG alignment — the analysis offers a comparative lens rather than an institutional diagnosis.

The strategic synthesis in Section 6 presents these insights in a matrix that links global practices, Latin American illustrations, and UCC's current strengths. This comparative approach highlights that UCC is not starting from zero. Instead, it has a robust base of practices that can be made more systematic, better connected across campuses, and more visible in national and international arenas.

The paper concludes with nine recommendations, organised under the university's three main functions: research, teaching, and societal interaction. These recommendations emphasize governance and incentives for research agendas, curricular pathways for project-based learning, and facilitation skills, as well as the role of multicampus networks as civic hubs facilitated by responsible digital infrastructures. By consolidating its cooperative mission and aligning with global benchmarks, UCC can reinforce its leadership in Colombia while contributing to broader international debates on the role of universities in democratic renewal and sustainable development.

Keywords: Applied research; University–society relations; Institutional innovation; Knowledge transfer; Sustainable development

Resumen

Este artículo examina cómo las universidades de investigación aplicada pueden mejorar su compromiso social aprovechando las tendencias globales en cocreación, transferencia de conocimiento e innovación institucional. La Universidad Cooperativa de Colombia (UCC) invitó a esta contribución como parte del proceso de diseño de su nuevo Plan Estratégico Nacional (PEN) 2026-2029, la estrategia institucional que establece prioridades en su sistema multicampus. En respuesta a este mandato, el artículo propone un marco temático que conecta la identidad cooperativa y la presencia multicampus de la UCC con los debates internacionales sobre investigación, innovación y compromiso.

Se desarrollan cuatro puntos de entrada temáticos. La Sección 2 examina la definición participativa de la agenda, con un enfoque en marcos como la Investigación e Innovación Responsables (RRI) y los métodos de prospectiva. La Sección 3 aborda la colaboración helicoidal y la cocreación, destacando cómo las universi-

dades promueven alianzas intersectoriales. La Sección 4 se centra en la institucionalización, explorando la gobernanza, los incentivos y la integración curricular del compromiso social. La Sección 5 aborda las infraestructuras digitales y la inteligencia colectiva, haciendo hincapié en cómo la inteligencia artificial y las plataformas abiertas están transformando tanto las prácticas académicas como la interacción universidad-sociedad.

Cada tema se analiza en relación con las tendencias globales y se ilustra con casos latinoamericanos seleccionados. Estos ejemplos, presentados como fuentes de inspiración, demuestran cómo las universidades regionales están incorporando la participación ciudadana en su planificación estratégica, experimentando con la ciencia ciudadana, integrando la responsabilidad social en los planes de desarrollo y conectándose con redes internacionales de ciencia abierta. Al yuxtaponer estos ejemplos con los activos existentes de la UCC (clínicas, estructuras de transferencia, programas territoriales y alineación con los ODS), el análisis ofrece una perspectiva comparativa en lugar de un diagnóstico institucional.

La síntesis estratégica de la Sección 6 presenta estas perspectivas en una matriz que vincula las prácticas globales, los ejemplos latinoamericanos y las fortalezas actuales de la UCC. Este enfoque comparativo destaca que la UCC no parte de cero. Por el contrario, cuenta con una sólida base de prácticas que pueden sistematizarse, conectarse mejor entre campus y hacerse más visibles en los ámbitos nacional e internacional.

El documento concluye con nueve recomendaciones, organizadas en torno a las tres funciones principales de la universidad: investigación, docencia e interacción social. Estas recomendaciones enfatizan la gobernanza y los incentivos para las agendas de investigación, las vías curriculares para el aprendizaje basado en proyectos y las habilidades de facilitación, así como el papel de las redes multicampus como centros cívicos facilitados por infraestructuras digitales responsables. Al consolidar su misión cooperativa y alinearse con los referentes globales, la UCC puede fortalecer su liderazgo en Colombia, a la vez que contribuye a debates internacionales más amplios sobre el papel de las universidades en la renovación democrática y el desarrollo sostenible.

Palabras clave: Investigación aplicada; Relaciones universidad-sociedad; Innovación institucional; Transferencia de conocimiento; Desarrollo sostenible

Resumo

Este artigo examina como universidades de pesquisa aplicada podem aprimorar seu engajamento social, aproveitando tendências globais em cocriação, transferência de conhecimento e inovação institucional. A Universidade Cooperativa da Colômbia (UCC) solicitou esta contribuição como parte do processo de elaboração de seu novo Plano Estratégico Nacional (PEN) 2026–2029, a estratégia institucional que estabelece prioridades em todo o seu sistema multicampi. Em resposta a esse mandato, o artigo propõe uma estrutura temática que conecta a identidade cooperativa e a presença multicampi da UCC com discussões internacionais sobre pesquisa, inovação e engajamento.

Quatro pontos de partida temáticos são desenvolvidos. A Seção 2 examina a definição participativa da agenda, com foco em estruturas como Pesquisa e Inovação Responsáveis (RRI) e métodos de prospectiva. A Seção 3 aborda a colaboração helicoidal e a cocriação, destacando como as universidades promovem parcerias intersetoriais. A Seção 4 concentra-se na institucionalização, explorando governança, incentivos e a integração curricular do engajamento social. A Seção 5 aborda infraestruturas digitais e inteligência coletiva, enfatizando como a inteligência artificial e as plataformas abertas estão transformando tanto as práticas acadêmicas quanto a interação universidade-sociedade.

Cada tema é analisado em relação às tendências globais e ilustrado com estudos de caso selecionados da América Latina. Esses exemplos, apresentados como fontes de inspiração, demonstram como as universidades regionais estão incorporando a participação cidadã em seu planejamento estratégico, experimentando a ciência cidadã, integrando a responsabilidade social aos planos de desenvolvimento e conectando-se a redes

internacionais de ciência aberta. Ao justapor esses exemplos com os recursos existentes da UCC (clínicas, estruturas de transferência, programas territoriais e alinhamento com os ODS), a análise oferece uma perspectiva comparativa em vez de um diagnóstico institucional.

A síntese estratégica na Seção 6 apresenta essas perspectivas em uma matriz que vincula práticas globais, exemplos latino-americanos e os pontos fortes atuais da UCC. Essa abordagem comparativa destaca que a UCC não está começando do zero. Pelo contrário, possui uma base sólida de práticas que podem ser sistematizadas, melhor conectadas entre os campi e tornadas mais visíveis nos níveis nacional e internacional.

O documento conclui com nove recomendações, organizadas em torno das três funções principais da universidade: pesquisa, ensino e extensão. Essas recomendações enfatizam a governança e os incentivos para as agendas de pesquisa, os percursos curriculares para a aprendizagem baseada em projetos e as habilidades de facilitação, bem como o papel das redes multicampi como centros cívicos facilitados por infraestruturas digitais responsáveis. Ao consolidar sua missão cooperativa e alinhar-se a padrões globais, a UCC pode fortalecer sua liderança na Colômbia, contribuindo, ao mesmo tempo, para debates internacionais mais amplos sobre o papel das universidades na renovação democrática e no desenvolvimento sustentável.

Palavras-chave: Pesquisa aplicada; Relações universidade-sociedade; Inovação institucional; Transferência de conhecimento; Desenvolvimento sustentável

1. Introduction

The Universidad Cooperativa de Colombia (UCC) has invited a set of strategic reflections to accompany its ongoing strategy process. This request reflects both the growing expectations placed on higher education institutions worldwide and the particular trajectory of UCC as a multicampus university with a strong commitment to social responsibility and cooperative values. The present paper responds to this mandate by offering a thematic contribution that seeks to enrich UCC's strategy process while situating its experience within a broader international landscape of debate on research, innovation, and institutional engagement.

1.1 Purpose

The purpose of this paper is to provide UCC with an external, research-informed perspective on how applied research universities can strengthen their capacity to act as engines of societal relevance and democratic renewal. Rather than attempting a comprehensive institutional diagnosis, the aim is to distill insights from scholarly literature, international practice, and comparative frameworks, and to connect these insights with UCC's own strategic reflections. The paper is therefore best understood as a thematic support document. This contribution complements UCC's internal analyses and participatory workshops by highlighting pathways that are visible in global higher education debates and potentially applicable to the Colombian context.

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1.2 Understanding the Strategy Process

UCC is currently undergoing a substantial process of strategic renewal. Building on its 2022–2025 institutional plan and its culture of quality assurance, the university is preparing for a longer-term horizon. This process combines several key features: rigorous self-diagnosis based on internal indicators, participatory exercises involving students, faculty, and alums, and external advisory inputs designed to broaden the perspective. From this angle, the present paper is positioned as one element in a broader mosaic of knowledge and reflection that will inform the next phase of UCC's strategic planning.

My understanding is that three defining characteristics mark this process. First, it is a *multicampus and territorial institution*, responding to the realities of a university with a presence in 19 cities across Colombia, offering undergraduate, postgraduate, continuing education, and community engagement programs. Second, it is *applied and cooperative*, emphasizing research and teaching that are closely connected to professional practice, regional needs, and the solidarity economy. Third, it is *forward-looking*, seeking not only to consolidate existing strengths but also to anticipate new demands linked to digital transformation, demographic change, and sustainability.

1.3 Thematic Focus Areas

Against this background, the paper identifies four (A–D) thematic entry points that capture central issues for UCC and for applied research universities more broadly.

a) *Participatory agenda-setting and Responsible Research and Innovation (RRI)*: exploring how universities can better align their research agendas with societal challenges while maintaining academic rigor and autonomy.
b) *Transdisciplinary knowledge co-creation*: drawing on Quadruple and Quintuple Helix models to strengthen collaboration between academia, government, industry, civil society, and the natural environment.
c) *Institutionalization of engagement*: examining how participatory practices can be embedded into governance structures, incentive systems, curriculum design, and evaluation processes.
d) *Digital infrastructures and collective intelligence*: analyzing the role of data governance, digital participation, and AI-enabled tools in creating more adaptive and responsive institutional models.

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These themes are not exhaustive, but they provide useful lenses for UCC to consider as it positions itself for the next phase of development. They also resonate with challenges already identified in UCC's self-assessment, including the need for curricular flexibility, stronger faculty sustainability, enhanced research visibility, and a more data-driven approach to institutional governance.

1.4 Structure of the Paper

The paper proceeds in seven sections. Sections 2–5 introduce four thematic perspectives that frame the analysis. Section 6 situates these perspectives within UCC's strategic context as a multicampus applied research university. Section 7 concludes by outlining key recommendations for research, teaching, and societal engagement.

2. Participatory Agenda-Setting and Responsible Research and Innovation (RRI)

A central challenge for contemporary universities is aligning their research and innovation agendas with societal needs while maintaining academic quality and autonomy. For UCC, this challenge holds special significance: as a cooperative and multicampus institution, it aspires to both strengthen its academic contributions and remain deeply responsive to the communities it serves across Colombia. To achieve this balance, it is essential to develop approaches that open research agendas to dialogue with society while preserving scholarly rigor.

One influential framework that directly addresses this challenge is the Responsible Research and Innovation (RRI) framework. Originating in European science and innovation policy, RRI has become a major international framework for aligning research with societal relevance and sustainability (von Schomberg, 2024; Stilgoe et al., 2020). Through Horizon 2020 alone, the European Union supported more than 130 dedicated RRI projects, spanning fields such as health, ICT, nanotechnology, and education (Nwafor et al., 2019). This makes RRI one of the most extensive attempts worldwide to connect research governance with societal expectations.

At its conceptual core, RRI is built on four interlinked dimensions: anticipation, inclusion, reflexivity, and responsiveness (Stilgoe et al., 2020, Rask et al., 2018). These are complemented in practice by emphasis on ethics, open science, gender equality, and societal engagement. Together, they position RRI as more than a compliance

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mechanism: it is a narrative umbrella that integrates diverse values and policy priorities into a shared vision of responsibility. For universities, this means that responsibility is not external to academic excellence but an integral part of it.

At the same time, evaluations of RRI highlight a gap between vision and practice. While large EU projects have produced conceptual advances and various toolkits (e.g., PE2020; RRI Toolkit), few instruments are directly available for universities to use in their internal governance and research programming (Stahl & Bitsch, 2023). As a result, RRI can sometimes appear bureaucratic, reduced to merely fulfilling reporting requirements rather than being fully embedded in academic culture. To address this gap, it is helpful to look at complementary approaches that illustrate how the principles of RRI can be operationalized in agenda-setting.

2.1 From Framework to Instruments: Societal Interaction Plans (SIPs)

In Finland, the Strategic Research Council (SRC) introduced societal interaction plans (SIPs) as a mandatory and equally weighted part of research proposals, alongside the scientific research plan itself (Academy of Finland, 2022; Pulkkinen et al., 2024). SIPs require applicants to describe in detail how they will collaborate with non-academic actors throughout the project. Review of SIPs is conducted in parallel with scientific evaluation, and both are given equal weight in funding decisions.

A typical SIP includes:

- identification of relevant actors and knowledge users,
- methods and channels of interaction,
- allocation of responsibilities and resources,
- timing of engagement activities, and
- strategies to ensure uptake and use of results during and beyond the project.

Experience shows that SIPs are not merely communication add-ons but function as engagement roadmaps, encouraging research groups to integrate stakeholders into research design and delivery. For UCC, SIPs illustrate how agenda-setting can be made concrete and measurable. While initially designed for national research funding, a university could adapt a lighter SIP model for internal project calls or research lines, ensuring that applied research programs embed systematic engagement strategies from the outset.

2.2 From Vision to Foresight: Participatory Transition Arenas

Another practice that aligns closely with the anticipatory dimension of RRI is participatory foresight. Hyysalo et al. (2019) redesigned the transition arena methodology — a structured foresight approach developed initially in the Netherlands — to connect long-term visions with mid-range planning in the Finnish energy sector. Their process convened policymakers, businesses, and civil society actors in iterative workshops that produced eight mid-range policy pathways linking climate targets to actionable steps. Importantly, these pathways were subsequently integrated into political processes, with follow-up evaluations confirming their implementation in ministries and municipalities.

Further studies (Matschoss et al., 2020) demonstrate how foresight can identify systemic barriers — such as fragmented governance or unequal access to technologies — while creating shared priorities for innovation. Rather than predicting the future, foresight builds collective intelligence around feasible and desirable directions. For UCC, participatory foresight could provide a valuable tool for coordinating its multi-campus presence — for example, by organizing foresight workshops across selected campuses to identify common research priorities for 2030 and translating them into mid-range pathways supported by engagement strategies.

2.3 Practical Implications for UCC

From these experiences, three lessons stand out. First, RRI provides a strategic compass, indicating that academic excellence and social responsibility should be pursued in tandem. Second, instruments such as SIPs demonstrate how responsibility can be institutionalized and evaluated in research planning. Third, foresight methods, such as transition arenas, demonstrate how universities can structure dialogue with stakeholders to co-develop mid-range priorities that are both visionary and actionable.

For UCC, selectively adopting these elements would enable the university to strengthen its applied research identity and anchor its cooperative values in concrete, agenda-setting practices. By embracing the umbrella vision of RRI, experimenting with SIP-style engagement planning, and piloting foresight methods in its strategy process, UCC can begin to move from plans and visions to implementation, building a culture of agenda-setting that is inclusive, strategic, and future-oriented.

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3. From Agendas to Action: Knowledge Co-Creation and Helix Collaboration

If agenda-setting frameworks (Section 2) help universities decide what to research in alignment with societal needs, helix collaboration provides insight into how such agendas can be advanced in practice. The helix family of models shows that innovation is rarely the product of a single actor. The Triple Helix emphasized collaboration between universities, government, and industry; the Quadruple Helix added the role of civil society and culture; and the Quintuple Helix highlighted the natural environment as both a knowledge domain and a sustainability imperative (Carayannis & Campbell, 2009). These models underscore that innovation is not linear but the outcome of multi-actor arenas where different forms of expertise, legitimacy, and values intersect.

Universities today are increasingly expected to serve as arenas of co-creation, convening stakeholders from government, industry, and civil society to collaborate on shared challenges. To fulfill this role, they need more than disciplinary expertise: they must also cultivate the art of facilitation, ensuring that collaborative processes are inclusive, structured, and oriented toward innovation. This involves framing problems clearly, setting fair rules of communication, and guiding diverse stakeholders toward actionable outcomes. Scholars of public governance have noted a parallel shift in the public sector, where civil servants are increasingly expected to adopt facilitative roles and develop new civic capacities for collaboration (Torfing, et al., 2019). From this perspective, it is not only crucial that universities themselves master facilitation; it is also part of their educational mission to help students acquire these skills. For UCC, this suggests an opportunity to position facilitation and co-creation capacities as core competencies — equipping graduates not only with technical knowledge but also with the civic abilities needed in contemporary innovation ecosystems.

3.1 Practices of Helix Collaboration: Science Shops, Citizen Science, Demola, and Innovation Ecosystems

If helix collaboration highlights the importance of facilitation, the question becomes how universities can give this role an organizational form. Around the world, various practices have emerged that translate the principles of co-creation into structured arrangements for research, teaching, and engagement. These practices do not represent a single model but rather complementary pathways through which universities can embed facilitation into their everyday work.

One early and enduring approach is the *science shop* model, originating in Europe, which institutionalizes a point of entry for civil society into universities. Community organizations submit questions, which are then developed into student or faculty projects. In this way, science shops systematically incorporate the voices of the "third sector" into research and teaching (Mulder, et al., 2017). They also provide students with hands-on experience in problem-oriented research, creating learning outcomes that combine academic and societal relevance. For UCC, science-shop principles could be adapted to its cooperative mission and territorial presence, ensuring that community knowledge regularly feeds into teaching and applied research.

Another example is *citizen science*, where community members participate in the collection, analysis, or dissemination of research data. Citizen science has become a particularly effective way of integrating civil society and environmental concerns, aligning well with the Quintuple Helix. In areas such as health, biodiversity, or urban sustainability, citizen science initiatives can provide data at a scale that universities alone cannot achieve, while also building public trust in science. For UCC, embedding citizen science projects into curricula and regional partnerships could enhance its societal impact and connect research with the everyday experiences of citizens.

Demola offers a different but complementary approach. Developed in Finland and now implemented internationally — including in Global South contexts — Demola organizes structured co-creation projects where interdisciplinary student teams, guided by academic and partner mentors, work with companies, municipalities, and NGOs on future-oriented challenges (Català-Pérez, et al., 2020). Typically lasting 8–12 weeks, these projects culminate in concept demonstrations that integrate research insights with practical solutions. Demola exemplifies how universities can combine research, teaching, and the "third mission" of engagement in a single structured format. For UCC, adapting a Demola-style model could enable it to harness its multicampus reach, offering students opportunities to work on real-world challenges while generating value for local governments, cooperatives, and businesses.

Finally, universities also play a pivotal role in *innovation ecosystems* by hosting structures that nurture ideas and ventures — such as incubators, accelerators, venture studios, and advisory or funding services. UCC has already advanced in this direction through its knowledge transfer office, incubators, and early spin-off initiatives. Yet, while such platforms are often geared toward commercial outcomes, they can also serve as arenas for social and cooperative entrepreneurship, aligning more closely with UCC's mission. By extending its innovation ecosystem in this way, UCC could not only enable startups but also foster social enterprises and civic innovations that address community needs and sustainability goals.

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These examples show how helix collaboration complements the participatory agenda-setting discussed in Section 2. Suppose agenda-setting ensures that research priorities are aligned with societal challenges. In that case, helix collaboration demonstrates that addressing those challenges requires organized partnerships across sectors, structured through facilitation and clear rules of engagement. For UCC, the strategic opportunity lies in combining different models — science shops for community-driven questions, citizen science for large-scale participation and environmental knowledge, Demola-style projects for transdisciplinary co-creation, and venture ecosystems for scaling results — into a coherent system of knowledge co-creation. By doing so, the university can position itself not only as defining research priorities responsibly but also as advancing them collaboratively and translating them into sustainable societal impact.

4. Institutionalising Societal Engagement and Knowledge Transfer

For societal engagement to become a durable feature of academic life, it must be embedded in the university's three main functions: research, teaching, and societal interaction itself. Institutionalisation is less about adding bureaucracy than about ensuring that collaboration, openness, and responsibility are recognised, incentivised, and evaluated.

At UCC, there is already a strong basis to build on. The university has established a knowledge transfer office, incubators, and early spin-offs, and operates clinics and community programs across its campuses that connect academic expertise with social needs. At the same time, internal reviews indicate that engagement is uneven across departments and campuses, and has not yet been systematically linked to career incentives or research evaluation. To move toward institutionalisation, UCC could benefit from tools that help diagnose maturity across units. One such tool is the Väki Readiness approach, which provides a structured, comparative way of assessing how far organisations have advanced from basic communication and networking toward systematic co-creation. Originally developed to support cities and municipalities, its *Participatory Readiness Index* (PRI) has also been designed to generate insights for other complex, multi-unit organisations such as universities. For UCC, this type of maturity assessment could serve as both a diagnostic and a strategic learning instrument—raising awareness of uneven practices, highlighting entry points

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for improvement, and enabling the university to position itself as a reference case in Colombia for transparent and inclusive institutional development (Rask & Shin, 2025).

4.1 Research: Recognising and Planning for Societal Engagement

In research, the central challenge is motivational: academics often view societal interaction as a burden because it is not rewarded in salary negotiations, promotion, or career progression. The first move, therefore, is to recognise engagement as part of academic quality — for example, by valuing co-authored publications with practitioners, documented uptake of results by external actors, or open datasets and software. Leading journals, such as *Public Management Review,* now explicitly encourage co-authorship between scholars and practitioners, signaling that recognition is rising within the publishing community.

Once that motivational gap is acknowledged, planning instruments become meaningful. Finland's practice of Societal Interaction Plans demonstrates how a concise roadmap — comprising stakeholders, channels, timing, resources, and expected uptake — can be both required and evaluated alongside scientific quality. UCC need not copy this wholesale: a light, internal template in selected calls or programs, paired with modest support to deliver what is promised, would normalise planning for relevance while keeping burdens low.

4.2 Teaching: Embedding Engagement into Curricula

Teaching offers another avenue for embedding societal engagement — not as an extracurricular add-on, but as a curricular component. Project-based courses can be designed as credit-bearing components, with clear learning outcomes that include facilitation, dialogue, and ethical collaboration. Assessment can combine academic criteria with partner feedback on usefulness and fairness, and quality assurance can recognise external co-supervision (for example, a municipal or cooperative mentor formally acknowledged in course documentation).

For UCC, which already operates clinics in law, health, and business, the opportunity lies in developing these into integrative project courses that span a semester or final study phase. Students would then be able to apply their disciplinary knowledge while tackling real challenges identified by cooperatives, municipalities, or NGOs. In this way, societal engagement is not an isolated experience for a few but a structured, credit-bearing expectation for all students, equipping graduates with both disciplinary expertise and collaborative skills.

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4.3 Societal Interaction: Creating Durable and Reciprocal Channels

Societal interaction as a third mission necessitates robust channels through which external voices regularly inform research and teaching. Rather than relying on one-off outreach, universities benefit from predictable front doors: periodic calls for community questions, standing partner forums in priority domains, and lightweight arrangements for co-design and piloting.

Long-term territorial collaborations demonstrate that the strongest arrangements are reciprocal: universities contribute by addressing concrete local problems, while communities enrich academic work by sharing situated knowledge, providing access to data, and sustaining participation. For UCC — with its cooperative identity and multicampus presence — this translates into an opportunity to anchor each campus as a civic hub where academic expertise meets local priorities, and where clinics and transfer structures are connected to predictable participation channels. Applying readiness diagnostics such as Väki Readiness can then help track whether activities remain at the level of communication and dissemination or are evolving toward more systematic forms of co-creation.

4.4 Integrating Engagement Across UCC's Core Functions

Taken together, these perspectives suggest that institutionalising societal engagement means embedding it across the university's DNA: in research, by rewarding interaction and integrating engagement planning; in teaching, by making project-based collaboration credit-bearing and assessable; and in societal interaction, by establishing standing, reciprocal channels with communities. For UCC, the task is not to start from zero but to connect and strengthen what already exists. Its accumulated experience could even serve as a basis for publishing best practices, contributing to the broader academic and policy debate on the future of universities' third mission.

5. Digital Infrastructures and Collective Intelligence: Enabling New Capacities

Societal engagement in universities increasingly depends on how effectively they use digital infrastructures and artificial intelligence (AI). These technologies are not only tools for efficiency but enablers of collective intelligence (CI): the capacity to mobilise

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people, data, and machines together to address complex challenges. CI can be harnessed at different levels — from lighter forms of crowdsourcing ideas to deeper forms where digital tools support communication, reasoning, and the analysis of societal problems (Rask & Shin, 2024). For UCC, which has already aligned its strategy with the UN Sustainable Development Goals (SDGs), CI and AI provide new capacities for making its cooperative mission more visible, effective, and future-oriented.

5.1 Pro-AI Learning Policies

Some universities are now adopting pro-AI learning policies, encouraging students to utilize AI tools as part of their coursework. The rationale is not to replace student effort but to raise the baseline quality of outputs, freeing teachers to focus on complex and progressive tasks. For UCC, such a policy could reduce disparities across its multicampus system by ensuring students can access advanced learning support. Yet responsible use must be emphasised: over-reliance on AI risks outsourcing reasoning and creativity. Mitigating measures include human-only discussions, oral exams, and reflective assignments to ensure students cultivate independent analytical skills. Such a balanced approach would demonstrate that UCC is both progressive and mindful of the risks associated with digitalization.

5.2 Digital Participation Platforms

Digital infrastructures can also amplify participation within universities. Research shows how online platforms can capture structured input from thousands of participants in research and policy design (Shin, et al., 2024). Nesta highlights cases such as Wefarm, a peer-to-peer knowledge network that has enabled over a million small farmers to share practical solutions across Africa (Peach, et al., 2019). For UCC, similar peer-to-peer models could be adapted to connect students and community partners across its 19 campuses, ensuring that knowledge circulates and priorities are identified inclusively, in line with SDG 10, which aims to reduce inequalities.

5.3 Data Governance and Institutional Analytics

Universities are also using digital infrastructures to strengthen data governance. Many have developed observatories or dashboards that integrate student performance, sustainability metrics, and data on societal engagement. These tools enable leaders to identify inequities, anticipate risks, and allocate resources strategically. UCC's

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own diagnostics highlight fragmented systems and weak interoperability. Investing in robust, ethical data governance would not only improve internal efficiency but also reinforce UCC's societal mission — for example, by tracking whether community clinics reach underserved populations or by showing how academic research contributes to SDG benchmarks.

5.4 Collective Intelligence for Societal Challenges

Collective intelligence can be mobilised to address complex challenges that no single actor can solve. Nesta's case studies illustrate this potential. PatientsLikeMe demonstrates how user-generated health data can improve research and treatments, while Public Lab shows how communities co-develop low-cost environmental monitoring tools (Peach et al., 2019). For UCC, these examples suggest how clinics and territorial programmes could be linked to digital platforms that allow community members to contribute knowledge, co-analyse findings, and propose innovations. Such approaches would strengthen UCC's role in achieving the SDGs related to health, environment, and equality, while deepening its cooperative mission.

5.5 Open Knowledge Ecosystems

Finally, universities advance collective intelligence by contributing to open knowledge ecosystems. European initiatives under Responsible Research and Innovation (RRI) have promoted the use of open repositories and collaborative platforms to increase the accessibility of research outputs. Nesta points to Global Fishing Watch, which used open satellite data to enable collective monitoring of illegal fishing (Peach et al., 2019). Similarly, UCC could open parts of its community-based research outputs to broader audiences, reinforcing its transparency and allowing knowledge co-produced with cooperatives and communities to be reused. This would enhance UCC's global visibility while connecting its local work to global SDG agendas.

5.6 Towards a Digital and Cooperative Future

Digital infrastructures and collective intelligence are not optional add-ons but enabling capacities that allow universities to deepen societal engagement. For UCC, the opportunity lies in combining pro-AI learning policies with responsible safeguards, creating peer-to-peer participation platforms, strengthening data governance, linking clinics and community programmes to CI methods, and advancing open knowledge

practices. By aligning these moves with the SDGs, UCC could position itself as a pioneer of digitally enabled societal engagement in Colombia and as part of a global movement toward universities as hubs of collective intelligence.

6. Strategic Considerations for UCC in a Global South Context

UCC already demonstrates many practices that are internationally recognised as central to universities' societal engagement: a strong service presence through its clinics, a knowledge transfer office and incubators, early spin-offs, and explicit alignment with the Sustainable Development Goals (SDGs). These are notable assets in the Latin American higher education landscape, where many institutions face similar questions about how to combine academic excellence with territorial responsibility.

To support reflection in the context of UCC's new National Strategic Plan (PEN) 2026–2029, *Table 1* below provides a comparative overview of four thematic areas discussed in this report. It highlights global trends, selected Latin American illustrations, UCC's current assets, and strategic opportunities. The Latin American examples are presented for inspiration only; further descriptions and sources can be found in Appendix 1.

Table 1. Strategic considerations for UCC across four thematic areas.

Theme	Global practices / trends	Latin American illustration	UCC current assets	Strategic opportunities
A. Agenda-setting	Responsible Research and Innovation (RRI); Societal Interaction Plans (SIPs); participatory foresight to link research with societal needs	*Universidad del Valle (Colombia)* – Resolution 028 (2012) on *Proyección Social*, aligning outreach with strategic planning	Territorial programmes; cooperative research groups; SDG alignment in strategy	Introduce light "interaction plans" in internal calls; link foresight processes to PEN 2026–2029; highlight SDG knowledge contributions
B. Collaboration / Co-creation	Science shops; citizen science; living labs; structured student–partner innovation models	*RACIMO@Bucaramanga (Universidad Industrial de Santander, Colombia)* – citizen science project engaging schools/communities in climate monitoring with open data	Clinics in law, health, psychology, business; solidarity programmes across campuses	Develop systematic entry points for community questions; expand clinics into co-creation project courses; explore digital peer-to-peer platforms

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Theme	Global practices / trends	Latin American illustration	UCC current assets	Strategic opportunities
C. Institution-alisation	Engagement criteria in academic promotions; credit-bearing project courses; maturity assessment tools	*UFMT (Brazil)* and *UAA (Mexico)* – Institutional Development Plans embed engagement, inclusion, and equity in governance and reporting	Knowledge transfer office; incubators; early spin-offs; cooperative ethos	Pilot engagement criteria in promotions; develop credit-bearing engagement courses; apply maturity assessment tools (e.g. Väki Readiness)
D. Digital infrastructures & CI	Pro-AI learning policies; data observatories; open repositories; collective intelligence platforms	*LA-CoNGA Physics (Erasmus+ Latin America–Europe network)* – shared curricula, virtual labs, open data infrastructures	SDG commitments in strategy; diagnostic shows fragmented digital systems; strong community research groups	Develop responsible pro-AI learning policy (with safeguards); strengthen data governance/interoperability; connect clinics/research groups via CI platforms; showcase SDG contributions through open repositories

This comparative perspective suggests that UCC is not starting from zero but already possesses a strong base of assets that resonate with both global and regional trends. The key opportunity is to make these practices more systematic, more connected across campuses, and more explicitly linked to SDG benchmarks. Doing so would not only strengthen UCC's internal coherence but also position it as a reference point for other universities in the Global South seeking to combine cooperative values with innovative approaches to societal engagement.

7. Recommendations and Closing Reflections

The reflections below synthesise the observations made in earlier sections of this report into a set of strategic directions for UCC. Each recommendation is presented in three layers: observation (what global and regional experience shows), assessment (how this relates to UCC's current assets), and recommendation (possible direction for the PEN 2026–2029).

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7.1 Research

Governance of research agendas

- Observation: International frameworks, such as Responsible Research and Innovation (RRI) and Societal Interaction Plans (SIPs), demonstrate how engagement can be integrated into the research design. Foresight methods further demonstrate how long-term challenges can be translated into mid-range research pathways.
- Assessment: UCC already has cooperative research groups and territorial programmes, but engagement in agenda-setting is uneven across departments.
- *Recommendation 1*: Pilot light "interaction plans" in internal calls and experiment with foresight workshops in the PEN process to link research priorities systematically with SDG commitments and territorial needs.

Incentives for academic careers

- Observation: Globally, societal engagement is increasingly recognised in promotion and evaluation. Journals such as Government Information Quarterly now encourage co-authorship with practitioners.
- Assessment: UCC values societal impact, but engagement outcomes are not yet consistently rewarded in career structures.
- *Recommendation 2*: Introduce pilot schemes that explicitly consider societal engagement (e.g., practitioner co-publications, uptake of results) in evaluations, supported by small internal recognition grants.

Researcher capacity for engagement

- Observation: Effective co-creation requires specific skills, including facilitation, communication, and ethical collaboration. These are often overlooked in research training.
- Assessment: UCC already has strong applied research lines and service clinics, but staff development in engagement skills remains fragmented.
- *Recommendation 3*: Develop concise training modules for researchers on facilitation, participatory methods, and the responsible use of digital tools, aligning them with UCC's cooperative mission.

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7. 2 Teaching

Credit-bearing project courses

- Observation: International examples (e.g., project-based learning and living labs) demonstrate that integrating societal engagement into curricula enhances student learning and civic skills.
- Assessment: UCC's clinics already provide excellent experiential learning opportunities but remain outside the mainstream curriculum.
- *Recommendation 4*: Transform clinics into structured, credit-bearing project courses, ensuring that all students graduate with hands-on experience in societal engagement.

Meta-skills and facilitation

- Observation: Beyond disciplinary knowledge, students benefit from learning meta-skills such as facilitation, dialogue, and collective problem-solving. These skills are increasingly recognised as part of global graduate profiles.
- Assessment: UCC's cooperative ethos aligns naturally with the cultivation of facilitation and collaboration, but these skills are not yet systematically taught or assessed.
- *Recommendation 5*: Introduce modules and assessment rubrics for facilitation, stakeholder dialogue, and collaborative ethics, complementing disciplinary training.

Responsible use of AI in learning

- Observation: Some universities adopt pro-AI learning policies, combining encouragement with safeguards (e.g., oral examinations, human-only dialogues).
- Assessment: UCC has a diagnostic recognising fragmentation in digital systems; a coherent AI policy could give students equal access while ensuring academic integrity.
- *Recommendation 6*: Develop a responsible pro-AI learning policy that balances innovation with safeguards, preparing students for AI-augmented workplaces while cultivating independent reasoning.

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7. 3 Societal Interaction

Multicampus networks as civic hubs

- Observation: Long-term collaborations are strongest when they are reciprocal, with communities providing situated knowledge in exchange for academic expertise.
- Assessment: UCC's multicampus presence is a distinctive strength, but community engagement channels vary by region.
- *Recommendation 7*: Anchor each campus as a civic hub with predictable entry points for community questions, connected to research and teaching.

Data governance and collective intelligence

- Observation: Data observatories and open repositories enable universities to demonstrate their impact and mobilize collective intelligence. Regional initiatives, such as LA-CoNGA Physics, show how shared infrastructures reduce asymmetries.
- Assessment: UCC has strong community-based research groups, but its data systems are fragmented.
- *Recommendation 8*: Strengthen data governance and interoperability, creating open platforms that connect research outputs and clinics to SDG monitoring.

Maturity assessment and international visibility

- Observation: Tools such as Väki Readiness provide structured diagnostics for assessing engagement maturity. Publishing best practices connects local action with international debates on the university's third mission.
- Assessment: UCC has many progressive practices, but engagement remains uneven across departments.
- *Recommendation 9*: Apply readiness assessment tools to identify strengths and gaps across campuses, and publish exemplary practices as contributions to global debates on engaged universities.

7. 4 Closing Reflections

This paper has examined how applied research universities can strengthen their societal engagement through four thematic entry points: participatory agenda-setting,

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collaboration across sectors, institutionalisation through governance and incentives, and digital infrastructures for collective intelligence. Rather than diagnosing UCC, the analysis has offered comparative perspectives, connecting global debates with Latin American illustrations that resonate with UCC's cooperative mission and multicampus presence.

The strategic opportunity for UCC lies in consolidation rather than invention. The university already demonstrates strong practices, including clinics, transfer structures, incubators, cooperative research groups, and alignment with the SDGs. The next step is to systematise these assets, embed engagement more fully in research and teaching, and make achievements more visible nationally and internationally. By doing so, UCC can reinforce its leadership in Colombia while positioning itself as a reference point for the Global South in international debates on democratic renewal and sustainable development.

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Appendix 1. Illustrative Latin American Cases

NOTE:

The following cases have been identified through regional and international sources as illustrative examples of how Latin American universities are addressing agenda-setting, collaboration, institutionalisation, and digital infrastructures. They are presented here *for inspiration only*, not as comprehensive evaluations. The descriptions are concise and drawn from published material; UCC leadership is encouraged to further explore their relevance and applicability.

A. Agenda-setting

Universidad del Valle (Univalle), Colombia — Resolution 028 on Proyección Social y Extensión

- *Summary*: Univalle has formally embedded societal engagement into its strategic framework through Resolution 028 (2012), which defines the principles, modalities, and purposes of *Proyección Social y Extensión* (social outreach) alongside teaching and research.
- *Why it matters*: Demonstrates how agenda-setting for societal engagement can be institutionalised, ensuring it is not peripheral but integral to planning.
- *Reference*: Universidad del Valle. (2012). *Resolución 028: Principios, Modalidades y Propósitos de Proyección Social y Extensión*. http://uvsalud.univalle.edu.co/pdf/politicas_institucionales/rcs_028_proyeccion_social_y_extension.pdf

B. Collaboration / Co-creation

RACIMO@Bucaramanga (Universidad Industrial de Santander, Colombia)

- *Summary*: A citizen science initiative involving schools and local communities in building and operating low-cost meteorological sensors (Arduino-Raspberry-Pi weather station). Data are collected, curated, and shared openly with community participation.
- *Why it matters*: Shows how universities can co-create environmental knowledge with communities, combining education, research, and public awareness.

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- *Reference*: Peña-Rodríguez, J., Salgado-Meza, P. A., Asorey, H., Núñez, L. A., Núñez-Castiñeyra, A., Sarmiento-Cano, C., & Suárez-Durán, M. (2022). *RACIMO@Bucaramanga: A Citizen Science Project on Data Science and Climate Awareness*. arXiv. https://arxiv.org/abs/2203.05431

C. Institutionalisation of Engagement

Universidad Autónoma de Aguascalientes (UAA, Mexico); Universidade Federal de Mato Grosso (UFMT, Brazil); Universidad del Valle (Univalle, Colombia); and Universidad Nacional Autónoma de Mexico (UNAM, Mexico).

- *Summary*: Although there are variations, all universities have incorporated social engagement, inclusion, and equity objectives into their Institutional Development Plans (PDI). In UFMT's case, annual reports also monitor these commitments as part of institutional identity.
- *Why it matters*: Illustrates how engagement can be embedded into governance, planning, and reporting cycles, influencing incentives and accountability.
- *Reference*: Delgado-Troncoso, J. E., Palacios-Mena, N., et al. (2023). *Ethically Engaged Public Universities in Latin America: Institutional Values,Well-Rounded Education, and Social Commitment*. In *The Emergence of the Ethically-Engaged University (pp. 211-236).* Springer.

D. Digital Infrastructures & Collective Intelligence

LA-CoNGA Physics (Latin-American alliance for Capacity buildiNG in Advance Physics, Latin America–Europe Open Science Network)

- *Summary*: An Erasmus+ initiative connecting universities in Latin America with European partners in advanced physics for open science education and open data. Provides shared curricula, virtual labs, open courseware, and data-sharing platforms.
- *Why it matters*: Demonstrates how digital infrastructures can reduce resource asymmetries and enable collaborative knowledge production across borders, fostering collective intelligence.
- *Reference*: Peña-Rodríguez, J., Núñez, L. A., et al. (2022). *LA-CoNGA physics: an Open Science Collaboration in Advanced Physics between Latin-America and Europe*. arXiv. https://arxiv.org/abs/2201.02256

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