Doctoral Thesis
PhD in Local Development and International Cooperation

Title:
The Role of Universities in the expansion of human capabilities and just sustainability transitions

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September 2024

ABSTRACT

This doctoral dissertation explores the role of universities in enhancing human development and fostering just transitions, addressing two central research questions: How can universities' knowledge production improve human development within their academic and broader communities? And what roles can universities play in fostering just transitions to effectively address social challenges? To answer these questions, the research encompasses three case studies from two universities and a practical policy project that brought together researchers, policymakers, and practitioners from diverse backgrounds.

The dissertation comprises four publications, each contributing to the overarching themes by addressing specific sub-research questions through experimental engagements and theoretical analysis. Key findings include the expansion of epistemic capabilities through participatory decision-making in university settings, the integration of the Transformative Innovation Policy (TIP) framework with the Human Development and Capabilities approach, and the development of a new analytical framework for assessing the role of universities in just transitions, particularly in the Global South.

Empirically, the research provides insights into the practical application of theoretical frameworks in real-world scenarios, such as the creation of a capability list at Universidad de Ibagué, the experimental governance engagements at Universidad Autónoma Latinoamericana (Unaula), and the Peace and Region program. These case studies demonstrate the importance of involving diverse actors, fostering democratic deliberation, and creating experimental spaces to drive transformative innovation and regional sustainability.

The dissertation concludes with actionable policy recommendations for fostering transformative innovation to achieve the Sustainable Development Goals (SDGs), emphasising the need for time investment, trust-building, and the inclusion of diverse voices. The research journey continues to evolve, generating new avenues for exploring desirable futures, reparative perspectives, and the transformation of the higher education system to support just sustainability transitions.

RESUMEN

Esta disertación doctoral explora el papel de las universidades en la mejora del desarrollo humano y el fomento de transiciones justas, abordando dos preguntas de investigación centrales: ¿Cómo puede la producción de conocimiento en las universidades mejorar el desarrollo humano dentro de sus comunidades académicas y las comunidades más amplias con las que interactúan? Y, ¿qué roles pueden desempeñar las universidades en el fomento de transiciones justas para abordar eficazmente los desafíos sociales? Para responder a estas preguntas, la investigación abarca tres casos de estudio de dos universidades y un caso de política de innovación transformativa que reunió a investigadores, responsables políticos y profesionales de diversos orígenes.

La disertación consta de cuatro publicaciones, cada una contribuyendo a los temas generales al abordar preguntas de investigación específicas a través de casos experimentales y análisis teóricos. Los hallazgos clave incluyen la expansión de las capacidades epistémicas a través de la toma de decisiones participativa en entornos universitarios, la integración del marco de la Política de Innovación Transformativa (PIT) con el enfoque de Desarrollo Humano y Capacidades, y el desarrollo de un nuevo marco analítico para evaluar el papel de las universidades en las transiciones justas, particularmente en el Sur Global.

Empíricamente, la investigación ofrece conocimientos sobre la aplicación práctica de marcos teóricos en escenarios del mundo real, como la creación de una lista de capacidades en la Universidad de Ibagué, los acuerdos de gobernanza experimental en la Universidad Autónoma Latinoamericana (Unaula) y el programa de Paz y Región. Estos estudios de caso demuestran la importancia de involucrar a actores diversos, fomentar la deliberación democrática y crear espacios experimentales para impulsar la innovación transformativa y la sostenibilidad regional.

La disertación concluye con recomendaciones de políticas prácticas para fomentar la innovación transformativa para lograr los Objetivos de Desarrollo Sostenible (ODS), destacando la necesidad de inversión de tiempo, construcción de confianza e inclusión de voces diversas. El viaje de investigación continúa evolucionando, generando nuevas vías para explorar futuros deseables, perspectivas reparadoras y la transformación de los sistemas de educación superior para apoyar transiciones sostenibles y justas.

RESUM

Aquesta dissertació doctoral explora el paper de les universitats en la millora del desenvolupament humà i el foment de transicions justes, abordant dues preguntes d'investigació centrals: Com pot la producció de coneixement a les universitats millorar el desenvolupament humà dins de les seues comunitats acadèmiques i les comunitats més àmplies amb les quals interactuen? I, quins rols poden exercir les universitats en el foment de transicions justes per a abordar eficaçment els desafiaments socials? Per a respondre a aquestes preguntes, la investigació abasta tres estudis de cas de dues universitats i un projecte de política pràctica que va reunir investigadors, responsables polítics i professionals de diversos orígens.

La dissertació consta de quatre publicacions, cadascuna contribuint als temes generals en abordar preguntes d'investigació específiques a través de compromisos experimentals i anàlisis teòriques. Les troballes clau inclouen l'expansió de les capacitats epistèmiques a través de la presa de decisions participativa en entorns universitaris, la integració del marc de la Política d'Innovació Transformativa (PIT) amb l'enfocament de Desenvolupament Humà i Capacitats, i el desenvolupament d'un nou marc analític per a avaluar el paper de les universitats en les transicions justes, particularment en el Sud Global.

Empíricament, la investigació ofereix coneixements sobre l'aplicació pràctica de marcs teòrics en escenaris del món real, com la creació de d'una llista de capacitats a la Universitat de Ibagué, els cacords de governança experimental a la Universitat Autònoma Llatinoamericana (Unaula) i el programa de Pau i Regió. Aquests estudis de cas demostren la importància d'involucrar actors diversos, fomentar la deliberació democràtica i crear espais experimentals per a impulsar la innovació transformativa i la sostenibilitat regional.

La dissertació conclou amb recomanacions de polítiques pràctiques per a fomentar la innovació transformativa per a aconseguir els Objectius de Desenvolupament Sostenible (ODS), destacant la necessitat d'inversió de temps, construcció de confiança i inclusió de veus diverses. El viatge d'investigació continua evolucionant, generant noves vies per a explorar futurs desitjables, perspectives reparadores i la transformació dels sistemes d'educació superior per a donar suport a transicions sostenibles i justes.

ACKNOWLEDGEMENTS

In 2018, I never imagined embarking on another doctoral journey. Having already completed a rigorous PhD far from home—with all the personal challenges of devoting time, energy, dreams, and even moving countries—I was fully focused on my professional career. I was also settling into my personal life in Colombia. Yet, unresolved questions from my previous PhD continued to ignite my curiosity, particularly about transforming the higher education system. When I met Alejandra Boni in 2017 and shared my academic and professional interests with her, we immediately connected over our mutual passions. We saw potential in exploring how human capabilities could be expanded through universities. While Alejandra was delving into innovation studies, I was eager to further develop the human development aspect of my research.

This doctoral journey began because of the stimulating academic discussions with her. Together, we embarked on a fruitful and life-changing process, culminating in the accomplishment of this PhD. Sandra's support, patience, care, and contributions—both professional and personal—have been invaluable. Through her, I have learned and grown immensely. My infinite gratitude goes to Sandra, with whom I have forged a lifelong friendship and a rewarding professional partnership.

I also want to acknowledge the vibrant community at Universidad de Ibagué. During my two years there, I worked closely with faculty, administrative staff, students, and regional partners, enriching my professional life, expanding my capabilities, and forming lasting friendships.

I extend my thanks to the Transformative Innovation Policy Consortium for opening doors that have shaped my professional path, and especially to Ingenio. This research centre welcomed me back to Europe and provided the opportunity to demonstrate my potential beyond Latin America. Most of this PhD was completed while working at Ingenio, and I couldn't have finished it without the support of Jordi, Isabel, Maria Jesus, Ester, Marisa, and all my colleagues at the institute. Sandra, once again, played a crucial role in creating the spaces and opportunities for me to develop my career and complete this PhD in Ingenio.

My heartfelt recognition and gratitude also go to Johan, who has been both a mentor and a dear friend. His support and our conversations have been instrumental in bringing this doctoral journey to a successful conclusion.

Lastly, I want to express my deepest gratitude to my family, who has always stood by me. My mother has unwaveringly believed in me and offered loving support at every stage of my life. Mami, ¡gracias! No creo merecer tener una madre como tú. To my father, who instilled in me a love for study and research; my sister Maria del Pilar, who has played a crucial role in shaping the person I am today; my sister Ana María, whose wise counsel and steadfast support have guided me through every phase of life; and my brother Juan David, along with my nephew and niece, who bring boundless joy to my life—thank you all from the bottom of my heart.

CONTENTS

1. Introduction

1.1. Motivation

I completed my PhD in Science and Technology Studies at the University of Edinburgh in 2015. Afterwards, I returned to my home country to enhance the role of universities in addressing social and environmental challenges through research, teaching, social outreach, and innovation.

That PhD research focused on innovation policies at the national and sectoral levels in Colombia. I concluded that the prevailing innovation policy frameworks—linear and systems of innovation—had significant limitations. The 'systems of innovation' framework lacked a normative stance on possible rebound effects and unintended consequences of innovation. It also separated the action domains of academia, industry, and policy and treated broader society merely as users and recipients of innovation. My research demonstrated how this framework in Colombia promoted STI policy instruments that deepened disciplinary research funding, favouring universities with stronger research groups as measured by scientific publications. This approach had less emphasis on and fewer mechanisms for the appropriation of knowledge, which were primarily aimed at creating links with productive sectors (Velasco, 2015). At the time, social and environmental challenges requiring a transdisciplinary approach (Bernstein, 2015) were absent from the science, technology, and innovation (STI) policies.

After finishing my PhD, I initially worked at Universidad del Rosario in Bogotá, Colombia, designing, creating, and leading the university's research and innovation direction. This office aimed to design and implement strategies to promote and strengthen the university's research and innovation processes, providing policies and procedures to support these goals. Universidad del Rosario, founded in 1653, is the oldest continuously operating university in the country and one of Colombia's most important institutions in terms of research and academic standing.

After completing my PhD and gaining an overview of the national STI system, I became aware of the weaknesses in the research and innovation vision and performance indicators at the national level. Colombia had low investment in STI, significant capabilities differences between regions in the country, and a lack of directionality in innovation strategies, focusing mainly on catching up with better-performing countries in Latin America and the OECD. Private and public universities were the primary knowledge producers, with only a few national research centres. I saw an excellent opportunity to contribute to the country's challenges through university action. This experience deepened my understanding of creating university policies aligned with local and national needs, making our knowledge production and social appropriation processes relevant to other knowledge producers and the broader scientific community.

Wanting to be closer to social and environmental challenges, I moved to a smaller university in a region struggling with persistent unemployment, violence, corruption, and economic and research dependency on the centre. As the Academic and Research Vicerrector, I found a vibrant academic community that was deeply concerned with and integrated into regional problems. I realised the critical role of universities in deprived regions as catalysts for human development.

This led me to pursue a second doctoral program focused on higher education and its role in transformation, which is developed in this doctoral thesis. I began my research where I left my previous PhD by exploring the role of STI policies in developing countries using innovation studies literature. I continued my journey by investigating the role of higher education in transforming unjust and unsustainable practices from a human development perspective.

The chapters of my thesis reflect my journey as a practitioner who advances her research agenda through the questions and challenges encountered along the way. The evolution of the thesis shows my process of understanding the importance of enabling participatory decision-making processes in designing university policies. These processes strengthen the directionality towards social and

environmental transformations and highlight the role of universities in co-producing knowledge that addresses complex, place-based challenges.

1.2. Aim, research questions and thesis structure

Universities have played a fundamental role in the construction of modern society, serving as critical institutions in the development and dissemination of knowledge. The traditional model of universities has emphasised a hierarchical structure where scientific knowledge is often produced within rigid disciplinary boundaries (Ben-David & Zloczower, 1962). This has been both a strength, in terms of depth of expertise, and a limitation, as it has created intellectual silos, inhibiting interdisciplinary collaboration and broader societal engagement. The development of academic disciplines has been essential for advancing vital technologies and innovations that have shaped the world we live in today. However, it has also led to the creation of academic elites and the segmentation of scientific practice, a reductionism to approach complex phenomena, and elitism within academia disregarding non-academic knowledge and giving superiority to particular disciplines, having implications in isolating academic knowledge from social needs and challenges (Giddens, 1990).

The oversimplification of complex environmental and social phenomena has significantly contributed to our current state of polycrisis. The challenges that impact both present and future generations and the viability of human life on this planet have intensified scrutiny on how knowledge is produced, who produces it, and for whose benefit (Breznitz & Feldman, 2012; Sedlacek, 2013). There is a growing demand, both within and outside academia, to adopt a different approach to knowledge creation and dissemination, one that supports a just transition towards sustainability (Boni et al., 2023).

Universities can challenge hegemonic knowledge production by reconsidering their traditional vision of scientific knowledge and contributing to creating and enabling broader epistemic communities. This vision of the university aligns with a capabilities approach to human development, embracing pluralistic, contextual, and practical knowledge whose outcomes are co-developed by researchers and the actors with whom they engage (Boni & Walker, 2013). Beyond the instrumental nature of unidimensional knowledge production, universities can provoke and stimulate transformative innovations that are locally relevant and simultaneously significant for the global context.

This research aims to explore the role and agency of universities in enabling and promoting just transitions towards sustainability. The meaning of justice comes from the human development and the capabilities approach, and sustainability is seen from the transitions approach. The research questions are:

- How can universities' knowledge production enhance human development within their academic community and the broader communities and territories they engage with?
- What roles can universities play in fostering just transitions that effectively address social challenges?

The questions are answered through four publications, each one contributing to different aspects.

The second chapter of the thesis responds to the first question, which is explored through a specific case study of a regional university in the Global South that developed a participatory process to build an overarching university policy based on the values of human development, aiming to expand a capabilities list produced by a constellation of actors engaged with the university in different roles. The chapter is based on the following publication:

Velasco, D., & Boni, A. (2020). Expanding epistemic capability in participatory decision-making processes: The Universidad de Ibagué capabilities list. In M. Walker & A. Boni (Eds.), *Participatory Research, Capabilities and Epistemic Justice* (pp. 27–57). Palgrave Macmillan. https://doi.org/https://doi.org/10.1007/978-3-030-56197-0

Building on this chapter and connecting the first and second questions on how to foster just transitions from the university, the third chapter develops, through two case studies, how the university can

contribute to transformative innovation processes through a deliberative approach to directionality in line with the normative framework of the just transitions. Central to the discussion is the approach to directionality through university policy developed through experimental engagements that required proactive governance arrangements that enabled the inclusion of generally excluded voices embedding different types of knowledge. The publication contained in the chapter is:

Velasco, D., Boni, A., & Chalela, S. (2021). Developing Transformative Innovation Through Policy Experimentation in Two Colombian Universities. In L. A. Orozco, G. Ordóñez-Matamoros, J. H. Sierra-González, J. García-Estévez, & I. Bortagaray (Eds.), *Science, Technology, and Higher Education: Governance Approaches on Social Inclusion and Sustainability in Latin America* (pp. 181–204). Springer International Publishing. https://doi.org/10.1007/978-3-030-80720-7_7

The fourth chapter is dedicated to exploring the role of universities in promoting just transitions, taking as theoretical frameworks the human development values and the regional transition pathways to sustainability. It continues the analysis of Universidad de Ibague, not only from a university policy and governance angle but also from a specific program in the formal curriculum that links students with projects in rural and urban municipalities in which the university is immersed in. The chapter proposes a practical framework in which universities can contribute to incremental change in line with social justice and preserving biodiversity, support place-based and multi-actor negotiations, and trigger multi-scalar processes towards equity, participation, empowerment, and efficiency by enhancing agency in different regional actors. The chapter is developed through this publication:

Velasco, D., Boni, A., Delgado, C., & Rojas-Forero, G. D. (2021). Exploring the Role of a Colombian University to Promote Just Transitions. An Analysis from the Human Development and the Regional Transition Pathways to Sustainability. *Sustainability*, *13*(11), 6014.

The fifth chapter discusses how engagements between university researchers, policy-makers, and practitioners can foster localised transformative innovation that aligns with the sustainable development goals (SDGs). The focus of the chapter is not in the role of the university as a social organisation and main actor of the higher education socio-technical system but on how action research takes place in the frame of a specific collaboration based on enhancing the transformative potential of a water project in South Africa with an ex-post assessment of how this experimental engagement could have benefited from the human capabilities approach. In this sense, the chapter provides an example of a transdisciplinary engagement using the just transitions lenses. The chapter contains the following publication:

Boni, A., Velasco, D., & Tau, M. (2021). The Role of Transformative Innovation for SDGs Localisation. Insights from the South-African "Living Catchments Project." *Journal of Human Development and Capabilities*, *22*(4), 737–747. https://doi.org/10.1080/19452829.2021.1986688

The sixth chapter builds from the previous one to discuss how the university can enhance and promote regional just transitions from a Global South perspective.

The last chapter contains the conclusions of the research and further research implications.

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Velasco, D. (2015). *Innovation systems in developing countries: A top-down and bottom-up approach to studying the Colombian System of Innovation and the coffee, flower and sugarcane production chains* [University of Edinburgh]. https://era.ed.ac.uk/handle/1842/15813?show=full

2. Expanding Epistemic Capability in Participatory Decision-Making Processes: The Universidad de Ibagué Capabilies List

Based on this publication:

Velasco, D., & Boni, A. (2020). Expanding epistemic capability in participatory decision-making processes: The Universidad de Ibagué capabilities list. In M. Walker & A. Boni (Eds.), *Participatory Research, Capabilities and Epistemic Justice* (pp. 27–57). Palgrave Macmillan. https://doi.org/https://doi.org/10.1007/978-3-030-56197-0

2.1. Challenges of the University in Colombia

Colombia faces significant social and environmental challenges. With high economic inequality and disparities between regions, 25% of households with unsatisfied basic needs, and threats to biodiversity by the expansion of agricultural and illegal activities like coca planting and illegal mining, major transformations are urgently needed (ACCEFYN 2018). Additionally, the country is undergoing an ongoing, contentious implementation of the peace agreements signed between the national government and the Revolutionary Armed Forces of Colombia on November 24, 2016. Many opportunities come with the cessation of this civil armed conflict, such as progress in structural conditions for the improvement of the quality of life for Colombians and a deep and true reconciliation process for the whole population. Within this context, how can Colombian universities contribute? Universities should primarily contribute to more humane and sustainable development, along with the more traditional contribution to the economic development of the country. They are called upon to strengthen civic education and reform their teaching, research, and community outreach, with special emphasis on communities that have historically suffered the scourge of violence and injustice.

This chapter examines these issues in the policies of the Universidad de Ibagué (UI), a private, medium-sized university located in Tolima, one of the Colombian regions most affected by illegally armed groups. Throughout the year 2019, university leadership conducted an inclusive and participatory process involving 127 people in a first phase for constructing a capabilities list, and 62 people in a second phase aimed at validating the list. The intention is to promote a university policy based on the declared capabilities list, as a working document. The participants represented different university community groups: faculty, students, alumni, technical staff, management teams, and business and social organisations that have projects with the university. The chapter describes how this policy-making process has expanded the capabilities of the participants, especially the epistemic capability. It is a process that contributes to greater cognitive justice, one of the necessary ingredients for a more just and democratic society (Sen 2009; De Sousa Santos 2014).

The chapter is structured as follows: in the second section, we describe the role of education in the capability approach and its contribution to democracy, as well as the relevance of an epistemic capability for higher education. In the third section, we reflect on the development of capabilities lists in the field of higher education by offering examples of lists of capabilities that have been significant in our process. In the fourth section, we illustrate the context and characteristics of UI. In the fifth section, we describe the methodology for the preparation of the list. In the sixth and seventh sections, we analyse the expansion of the epistemic capability and other related capabilities with the conversion factors that made this participatory exercise possible. Finally, we conclude with some reflections on the implications of experiences such as the one in UI for the contributions that higher education can make to human and sustainable development.

2.2. Education and epistemic capability

As Sen states, capabilities are the real possibilities and opportunities of leading a life that a person has reasons to value. They refer to different combinations of achievable functions, where functions are "the different things that a person can value doing or being" (Sen 1999, p. 3). These, together, constitute what makes a person's life valuable. The distinction between achieved functionings and capabilities is that the former refers to what is effectively possible and can be put into action, and the latter are the freedoms or valuable options from which one can choose (Robeyns 2005). In this vein, the main constrictions on freedom should be reduced or eliminated so that society can thrive as a whole.

McCowan and Unterhalter (2013) suggest different ways in which capabilities have a bearing on education and on ethical development. First, is the distributional aspect of education. Thinking in terms of capabilities raises a wider range of issues than simply looking at the number of resources or commodities people have: "Because of interpersonal diversity, people need a different amount of resources in order to transform these into the functioning of being educated" (Unterhalter 2009, p. 166). In capability language, we refer to conversion factors, which are personal, social, and environmental characteristics that intersect through different dimensions. Learners could differ along (a) personal conditions (e.g. gender, age, class, etc.), (b) intersecting external environmental conditions (e.g. wealth, climate, etc.), and (c) inter-individual or social conditions (Walker 2006). Furthermore, people with the same outcome may have had very different opportunities, so they should not be judged in the same manner. Apart from this distributional aspect, in our chapter the reference to conversion factors is crucial to understand the context in which the UI capabilities list was designed (the process aspect) as well as its content. As Robeyns (2017) suggests, we do not only ask about who has more or less capability and their corresponding functioning, but we also assess processes and the conditions of possibility under which functionings are enabled or limited by different conversion factors.

Second, education can be a capability multiplier. Education can develop skills that open up a wider set of opportunities in employment, leisure, and more. Some of the opportunities enabled by education are derived from the certification provided by formal education, and some from learning itself, which can be gained from a wide variety of educational experiences (McCowan and Unterhalter 2013, p. 146). We illustrate in this chapter that the expansion of capabilities in higher education does not only happen in formal settings but also in other pedagogical encounters (Walker 2019).

Third, education is highly related and based on values. While education should not necessarily promote particular political and moral values, it is always inescapably charged with values (McCowan and Unterhalter 2013). Further, values are formed through the education process (Vaughan and Walker 2012). From a human development perspective, four fundamental values should be at the core of any development process: 1) empowerment, understood as the expansion of the capabilities of people (real opportunities to achieve valuable ends), the expansion of valuable functioning (valuable purposes achieved), and participation; 2) the equitable distribution of basic skills; 3) sustainability; and 4) the freedom of people to enjoy their opportunities and achievements (Boni and Gasper 2012). As McCowan (2015) points out, this approach to development has particular applications for education. First, educational systems should distribute their benefits in an egalitarian manner; second, educational processes should be multipliers of capabilities that empower the individual to understand, exercise, and defend their rights; third, educational practices should foster individual autonomy - the ability to choose between different life courses and to enhance agency. If we add a sustainable dimension, the distributional aspect should take into account that resources are not limitless. Moreover, rights to be defended could include future generation rights or even earth rights.

Connected with the importance of promoting autonomy and agency, the capability approach is linked with other participatory approaches to development in considering a deeply democratic way of making decisions, paying special attention to the most marginalised groups who have fewer opportunities to participate in the decision-making process (Boni and Wilson-Strydom 2018).

Related to the democratic and participatory aspects of the capabilities approach is the epistemic discussion. Sen (2009) states that democratic practice requires the inclusion of epistemic grounds

because the demand of justice can be assessed only with the help of public reasoning. In similar terms, De Sousa Santos (2014) stresses the importance of cognitive justice to arrive at a global social democracy in which there is recognition of the multiplicity of social practices and experiences of the world. But there can be no global social democracy if there is no democracy between forms of knowledge. So, the epistemic capability, understood as the real possibility of producing knowledge in an inclusive way, is paramount for this understanding of democracy.

Miranda Fricker (2015, pp. 73-90) points out the importance of epistemic contributions from all citizens as contributors to the production and sharing of information (also see Chapter 1). However, she notes that this capability has not been sufficiently addressed in the capability approach literature. Hence, Fricker stresses that one of our most basic needs is to use our reasoning to discern the everyday facts and social meanings that condition, constrain, and make sense of our shared lives (2015, p. 76). This has implications for other capabilities; most notably, practical reasoning is dependent upon it, given that deliberation implies knowledge and understanding (Boni and Velasco 2019). Fricker's (2015) epistemic contribution capability can be operationalised by distributing informational and interpretive materials. The first comprises not only information itself but also anything bearing upon the question at stake, such as evidence, critical doubt, hypothesis and argumentation. The second includes distributing interpretive materials required to make sense of a more or less shared social world (including not only interpretations themselves but also anything bearing on their justification and reasonability, such as the concepts used, alternative interpretations, or other relevant critical materials) (Fricker 2015). This is fundamentally a relational capability: it implies giving information with uptake or with a reasonable likelihood of uptake. Sen's approach would also emphasise the relational aspect of this capability in that public reasoning requires relationships of reciprocity and non-domination with others; otherwise, the deliberative process does not work well (Walker 2019, p. 224).

However, this epistemic capability can be frustrated by hermeneutical injustices. David Coady (2017, p. 64) points out that hermeneutical injustice occurs prior to communicative activity. The concept of hermeneutic marginalisation, in turn, is explained as a matter of belonging, "to a group which does not have access to equal participation in the generation of social meanings" (Fricker 2013, p. 1319). Coady argues that Fricker's account of hermeneutical injustice in terms of hermeneutic marginalisation is (at least implicitly) a principle of distributive justice:

> The egalitarian principle according to which it is a requirement of justice that everyone should have equal access to participation in the generation of social meanings. That is, everyone should have equal hermeneutic power. To be marginalized with respect to a certain good is just to have less than an equal share of it. (Coady 2017, p. 65)

Hermeneutical injustice is also addressed by José Medina (2017, p. 42) who stresses that this kind of injustice occurs when subjects are not simply mistreated as intelligible communicators but also prevented from developing and exercising a distinctive 'voice', that is, prevented from participating in meaning-making and meaning-sharing practices. In this sense, Medina adds an active component to the epistemic capability (although he does not use this term), illustrating that is not only an issue of giving interpretive materials but also of having the possibility of participation in epistemic practices (Boni and Velasco 2019). Both the characteristics of epistemic capability and these different interpretations of hermeneutical injustice are useful in analysing our case study.

2.3. Capability lists in higher education settings

In the capability approach, there is a debate about whether to list capabilities (see Robyens 2017). A central aspect of this debate is focused on the importance of aligning the construction of the list with the central assumptions of the capability approach: the centrality of agency, choice, and freedom,

underpinned by a commitment to participation and public dialogue (Robeyns 2017). Sen argues that it is preferable to avoid predetermined lists of capabilities and allow those affected by a list to identify their own capabilities based on participatory and deliberative processes (1999, 2006, and 2009). On the other hand, Nussbaum (2000) argues that a list of capabilities is essential to avoid problems of omission. This could happen when groups overlook a capability that might be important to them (not least under conditions of hermeneutic marginalisation) and, therefore, having a list from which to start may be useful. To this end, in this section, we present two capability lists that have been influential in the capabilities list construction for UI.

Following Nussbaum's perspective, Walker (2006) developed an ideal-theoretical list of eight central capabilities for higher education contexts: 1) practical reason; 2) educational resilience; 3) knowledge and imagination; 4) learning disposition; 5) social relations and social networks; 6) respect, dignity, and recognition; 7) emotional integrity; and 8) bodily integrity. The list was produced after reviewing six existing education-related capabilities lists, as well as her empirical work and her experience working in higher education contexts. She provides three overarching reasons to justify the utility of her list. First, a targeted list is needed to focus the capability approach on the specificities of higher education. Second, this level of specificity provides the basis for arguing for educational practices that explicitly seek to foster capabilities and equality. Lastly, the formulation of a list could be useful to test the usefulness and possible applications of the capability approach in a higher education context.

Table 1: Key elements of Walker's list (2006)

Practical reason: Making well-reasoned, informed, critical, independent, intellectually acute, socially responsible, and reflective choices; constructing a personal life project in an uncertain world, good judgment
Educational resilience: Navigating study, work, and life; negotiating risk; persevering academically; responding to educational opportunities and adaptive constraints; becoming self-reliant; having aspirations and hopes for a good future
Knowledge and imagination: Disciplinary and public knowledge, critical thinking and imagination to comprehend the perspectives of multiple others and to form impartial judgments and debate complex issues. Awareness of ethical debates and moral issues
Learning disposition: Having curiosity and a desire for learning. Having confidence in one's ability to learn. Being an active inquirer
Social relations and social networks: Being able to participate in a group for learning, working with others to solve problems or tasks, collaborative and participatory learning. Being able to form good networks of friendships and belonging for learning support and leisure. Mutual trust
Respect, dignity and recognition: Respect for oneself and for others, as well as receiving respect from others; being treated with dignity; not being diminished or devalued; showing empathy, compassion, and listening to and considering others' points of view in dialogue and debate. Being able to act inclusively and respond to human need. Having competence in intercultural communication. Having a voice to participate effectively in learning; a voice to speak out, to debate, to persuade; to be able to listen
Emotional integrity: Not being subject to anxiety or fear that diminishes learning. Being able to develop emotions for imaginations, understanding empathy, awareness and discernment
Bodily integrity: Safety and freedom from all forms of physical and verbal harassment in the higher education environment

Another ideal-theoretical list of six capabilities that is especially relevant for our case because it is formulated by a Latin-American author, is the one proposed by Maria del Consuelo Chapela (2004). Her list was based on her own understanding of how a universal and utopian university might be. Chapela argues that a universal and, therefore, inclusive university has two dimensions: an objective one that is material, practical and technical; and a subjective one that is social, symbolic, and historical. The blend between these two dimensions gives the base for the list of six capabilities: 1) erotic capability, 2) sapiens capability, 3) ludens capability, 4) economic capability, 5) political capability, and 6) faber capability.

Table 2: The capabilities of Chapela (2004) list

Erotic capability, of passion, of anger, of tasting, of dreaming, of annoyance and pleasure
Ludens capability, to create, to dream, to imagine, to do the infinite, the impossible, the scripts, scenarios and rules.
Economic capability, to identify the limits and possibilities in finite material, technical and practical contexts
Political capability, to evaluate, to build alternatives, to develop projects, to choose and decide
Faber capability, to act with intention, to conduct projects to modify the objective and subjective worlds through objective practice in the material world, to inscribe subjectivity in the objective world

Walker and Chapela's lists were highly relevant to guide the first draft of the UI capabilities list, giving the researcher's group a general perspective and a university perspective of the things that make life valuable to live.

2.4. The Universidad de Ibagué

UI is a medium-sized private university, according to Colombian standards, with around 5600 students and 330 teachers, founded in 1980 by a group of businessmen and civic leaders from the Department of Tolima[1]. UI's mission defines its aim as providing comprehensive training for leaders and entrepreneurs - solid scientific and professional training, deep-rooted ethical and moral principles, and being committed to social, cultural, and economic regional development. The characteristics of the region where it is located are especially relevant to understanding the mission of the university.

Tolima department has suffered from levels of high violence produced by the armed conflict between the state, civilians, and illegally armed groups. Conflict has negatively impacted the development of the territory, putting Tolima in fourteenth place among 33 departments in competitiveness; and in eighteenth place in the tertiary education category, which includes coverage, quality and rate of employment after graduation (CPC&UR 2019). Moreover, Colombia has had different stages of civil war during the second half of the twentieth century. First, civil war occurred through the 1960s as a dispute between the two traditional political parties. After a period of truce, in the 1980s, guerrillas emerged to fight for social rights, becoming economic organisations pursuing illegal businesses. During the 1990s there was a period of organised criminal business based on drug trafficking that permeated the state structure. In 2016, a peace agreement between the Colombian government and the Colombian Revolutionary Armed Forces was signed, leading to a disarmament process in 2017. The signing of this peace agreement has given rise to a crucial moment in the country's development. In this new post-agreement scenario, words such as truth, justice, reparation, non-repetition, forgiveness, and reconciliation signal the possibility of political and moral pathways to conflict resolution.

In this particular context, UI has, since its foundation in 1980, assumed a commitment to regional development based on the enhancement of social wellbeing. UI has taken an active role to build sustainable peace processes by bringing together students with communities to enhance human development capabilities:

> The Institution was created by a group of businessmen and civic leaders of Tolima with the support of the Corporation for Human Development of Tolima and the Association for the Development of Tolima, in order to contribute to human, cultural, economic, political and social development of the region, and to offer alternatives for higher education programs different from those offered until then in the region. (Universidad de Ibagué 2018, p. i)

[1] Colombia is politically divided into departments.

The University was founded within an institutional framework aimed at bringing progress, making the region prosperous with a focus on social welfare, and creating a place for students to thrive within their personal and professional projection - a place worth staying. From its foundation, the notion and meaning of region was considered a long-term collective project of a situated community. In this sense, the region is perceived as something unfinished, as something that is continuously being built. This university ethos strengthens and gives coherence to development based on the wellbeing of people in the territory. The highest government authority is the Founders' Board, followed by the Superior Board[2]. Both boards have preserved the founders' legacy and have supported a strong path-dependency towards regional human development.

2.5. Building a capabilities list for UI

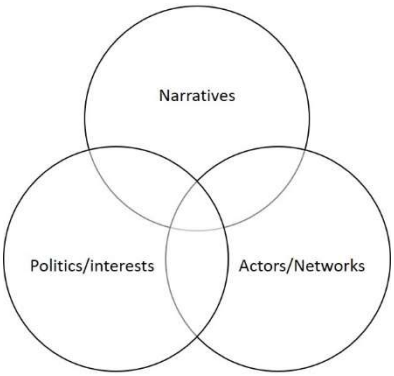
Aligned with the university ethos and the aim of giving coherence and directionality to the next decades of the UI trajectory, there is a project to build an institutional policy in a bottom-up approach based on the capabilities approach. In this approach, a contextual capabilities list can give stronger direction to university policies, practices, and projects. Moreover, a list directed towards the expansion of real opportunities valued by the university community is highly relevant for the Tolima region and is aligned with the UI vision. It was essential to assure a high degree of ownership of the list, so the list was built following a participatory process that involved representatives of faculty members, students, administrative staff, service staff, directors, alumni, enterprises, and social organisations that work with UI. The proposal for the capabilities list construction came from the University Provost, who thought about and designed the process jointly with an international professor with expertise on the capabilities approach (the authors of this chapter). The support from a university authority was crucial to carry out the whole process.

The methodology to build the capabilities list followed the principles described in Robeyns (2003). As we will present later, the explicit list has been discussed and defended. Its methodology has been clarified and debated through phases 1 and 2. Its content is very contextual since it comes from the considerations of the entire university community. The list went through different phases in its preparation, always respecting its contextual nature and its alignment with the key values of UI. Finally, the list includes all the elements that the university community has reason to value. Each element is different, although there are relationships between them.

The other key inspiration in building the list has been the Institute of Development Studies who have developed policy-building dimensions (IDS 2006). These include the consideration of: 1) the knowledge and discourse of participants and stakeholders, their narratives, and framings of reality and expectations; 2) the identification of actors and networks involved in the action context; and 3) the underlying power dynamics that configure the veiled and unveiled politics and interests of the policy process (Figure 1). This process was accompanied by an intentional vision for UI inspired by human development and a thorough process of identification of skills, incentives, resources, and action plans needed to produce real changes at UI (Knoster et al. 2000).

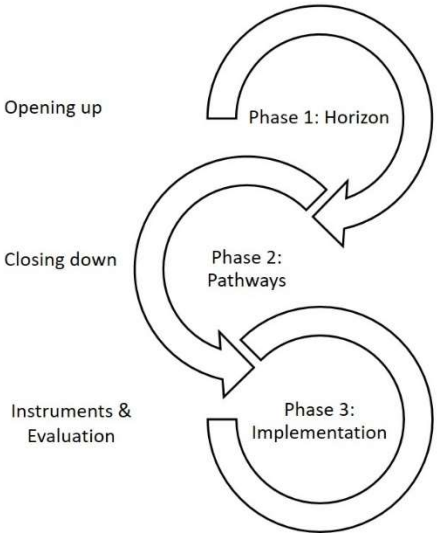
[2] The Founders' Board is the highest authority of the university. The members are elected by the current members by simple majority. The Founders' Board elects the members of the Superior Board and the University President.

Figure 1: Policy dimensions based on IDS (2006)



A three-stage process was planned, as shown in Figure 2.

Figure 2: Capabilities list-building methodology



The capabilities list process was led by the UI Provost, with the support of a group of five researchers from the University Institute Pensad, which focuses on systemic thinking and complexity. Through the whole process, the support and advice from the international professor was fundamental. The designer group has been the most instrumental group in the process, constructing the capabilities list and expanding their epistemic capability. They designed the methodology, facilitated the workshops, and were part of the data analysis. Table 2 describes the core actors to carry out the methodology.

Table 3: Lead actors of the participatory process

Pensad UI Institute–Designer group	Five researchers trained in systemic thinking, complexity, and the capability approach. Their role was focused on the workshops' design, implementation, data gathering, and data analysis.
Provost	Project leader and sponsor. Participation in the workshop design, some workshop implementation, and data analysis.
International Researcher	Professor, expert on the human development capability approach. Participation in data analysis and conducting interviews.
Sociologist	Support in data analysis and capabilities final draft.
Research assistant	Support at every research stage.

2.5.1. First phase (May–October 2019)

The horizon phase objective was to build an initial consensual capabilities list by gathering the narratives and views of what is or should be valued by UI, taking into account the university identity. Nine workshops, designed and facilitated by the Institute Pensad, were carried out with internal university members differentiated by groups (faculty, students, administrative and service staff, executive leadership, students' welfare) and external partners that work with the university (enterprise and social organisation representatives). There were 127 participants – 64 women and 63 men. Additionally, 13 interviews were conducted with regional organisations and the University Rector. The workshops were designed by the Pensad Institute to be interactive and to trigger deep reflections about what is valuable individually and collectively.

The workshops had four central stations and three main sessions to identify the participants' lived experiences with UI. The first session was focused on bringing out valuable personal experiences with UI through a practical exercise of visualisation and breathing using mindfulness techniques. Subsequently, the participants individually, anonymously, and confidentially briefly identified those memories. The second session focused on a journey through four stations aimed at exploring meaningful and valuable elements that constitute UI identity at the personal and collective levels. The stations are described in Table 3 below.

Table 4: Stations of the first stage

Station	Description	Picture
Collage	Large collage with pictures from different places in Tolima showing landscapes, cultural settings, population in context, etc. Participants were asked to look at the collage and then in groups write how the university can contribute to regional development and vice versa.	
Butterfly	Large butterfly image to reflect on what it means to be an integral trainer. Participants had to think of an example of what they consider an integral trainer by setting up a list of characteristics.	
Press Headline	Press headline saying "Higher education crisis in Colombia." The content says it is 2029 and there are only five universities still in service, one of them the UI. Through a role play, in which the group is the Superior Board, participants have to determine what aspects they would maintain and also which ones they would change in order for UI to survive.	
Silhouette	In a silhouette, participants with different colour post-its identified values, knowledge, practices, and emotions of an autonomous and humanist leader of UI.	

The third session was the workshop closure, in which participants reflected collectively on the experience. It was also the moment when the whole capabilities list process was described to the participants. It was announced that a second workshop with a mixture of participants from different areas would follow this stage, and its purpose would be to share with them a UI capabilities list produced as a result of the workshops and also a list of enabling and disabling factors to expand UI capabilities.

In addition to the workshops, interviews were conducted with thirteen representatives from social organisations that work with UI and also the University Rector. The questions focused on what is valuable in terms of the contribution of UI to the region and to their organisations as well as the obstacles in the relationship.

The data analysis was carried out by defining information categories gathered during the workshops and interviews from the participants' narratives. Results were analysed in terms of capabilities identification and enablers and disablers to expand the capabilities. By finding similarities in the results, the group defined four capabilities categories: training, territory, university community, and enterprise.

The result of the first stage was a list of eight capabilities: two in the training, two in the territory, two in university community, and one for enterprise. Enablers and disablers for these capabilities were also identified.

2.5.2. Second phase (November–December 2019)

The objective of this stage was the validation of the capabilities list; identification of enablers and disablers for specific pathways to expand the capabilities; and the possible interconnectedness between the capabilities, thinking of them as a system. The base group was maintained, so the Pensad Institute led the design and facilitation of the workshops. For this stage, six workshops with mixed participants (admin staff, students, faculty members, directors, and enterprise and social leaders) were developed. There were 62 participants, 35 women and 27 men. The workshops were developed as four sessions.

The first session recalled the participatory process of the first capabilities list stage, and the objective and meaning of the project. It also announced for the third stage an open call to fund projects aiming to expand at least one of the capabilities defined by the UI community. The second session had the format of a 'Capabilities Gallery'. By reproducing an art gallery, the eight capabilities were exposed in an enlarged size relating them to an image that illustrated the purpose of each capability. Participants observed and experienced each capability and selected two affinities with which they felt most connected. Then, they recorded answers regarding the way they live and feel about the capabilities selected and the way these capabilities can empower and can be enhanced in the university community.

Figure 3: Pictures 1 and 2 (Images of the Capabilities Gallery)

During the third moment, participants, divided by groups, proposed interrelationships between the capabilities in a systemic view, defined the system's purpose, and identified enabling and disabling factors affecting the whole system. For this section, the facilitators used cards that reproduced, in a smaller size, the art gallery images and capabilities definition as well as 'joker' cards in case the group would

like to suggest a new capability. Groups could also reject one or more capabilities for the system. Groups also had a wool hank, scissors, duct tape, and paper to represent the system (Pictures 7, 8 and 9).

Figure 4: Pictures 3, 4 and 5 (Capabilities systems representation made by three different groups)

Once the system was designed, the facilitators gave the participants cards with enabling and disabling factors and joker cards to propose further factors. Then, participants placed the factors in the system to complete the whole set

Figure5: Pictures 6, 7 and 8 (Capabilities systems with enabling and disabling factors made by three different groups)

The third session closed by providing a feedback forum so participants could raise their doubts, criticisms, and questions about the project and provide suggestions about the methodology and the objective of the capabilities list. The whole process was designed to empower and give voice to different groups from the university, so the community itself felt that the policy-making process and the future is in their own hands.

The fourth session consisted of the groups' systems presentations. They explained the system's purpose, demonstrated connections between capabilities and presented new capabilities (if applicable) as well as the effect of the enabling and disabling factors in the system (with new factors if applicable). After the presentations, facilitators addressed the group with two questions: Which of these human capabilities would your area or unit promote and enhance? How can the designed system help define the action routes that are realised through projects?

The second stage finished with a validated list of capabilities (presented in Table 5) and a list of enablers and disablers for expanding these capabilities.

Table 5: Capability list

Category	Capability	Definition
Training	Training of persons and citizens	A university community capable of training people, professionals, and citizens with critical thinking, ethical principles, and sensitivity regarding social differences and needs.
	Integral leadership	A university community capable of training people for reasoned and responsible decisions, in accordance with criteria of justice, fairness, and respect for differences (within the framework of empathic and affective communication) that leads to the realisation of joint actions oriented to the common good.
Territory	Social construction of territory	A university community that is capable, in association with the other social actors, of rebuilding and appropriating its territory collectively, through dialogue and mutual understanding, committing itself to nature, culture, and diversity of knowledge for connivance and peace.
	University that transcends	A university community capable of generating projects and actions aimed at the development of a fair and democratic society that enhances reflection, exchange, and generation and appropriation of knowledge to respond to aspirations, challenges, and problems that affect the various actors in the territory.
University community	Purposeful critical reflection	A university community capable of reflecting and building critically on their being and daily work in the light of their identity, history, ethical stakes, bonds of trust, organisational forms, growth opportunities, and personal and collective aspirations.
	Care	A community that is capable of ensuring conditions that allow the integral growth of the self and the other, through relationships that build trust and recognition among its members as well as of the environment in which they are immersed.
	Constructive interaction	A university community capable of stimulating, allowing, and promoting a dialogue that is well informed, clear, transparent, and respectful of freedom and differences of opinion. It is oriented, on the one hand, to strengthen the social interaction between the members of the community, so that they develop the personal power to choose and act in situations of social and political environment. On the other hand, it favours participation, a good working environment, and individual and collective integral human development.
Enterprise	Weave nets	A university community capable of fostering interconnections with companies, communities, and students to develop innovative projects that respond to territorial needs, build trust, and take care of the common good, to make possible a truly local development with a global perspective.

And this is the final list (Table 6) of enabling and disabling factors identified by the UI community and external partners.

Table 6: List of conversion factors

Enabling factors	Disabling factors
Effective planning General wellbeing	Academic programmes that do not respond to society's needs Lack of regional advocacy

Supporting programmes for the university community Students' retainment unit Efficiency and quality culture Autonomy and resilience Teamwork Link between the founders and boards with the university community Collaborators, facilitators, citizens beyond leaders Good communication channels National and international networks Self-evaluation processes Relationship with the context Curriculum updating processes Trust	Lack of evaluation processes Power relationships Lack of recognition of the university capabilities by the founders and Board of Directors Ambivalent notion of leadership Non-effective communication processes and channels Mediocrity Financial resources Weak linkage with the political and business sectors Lack of trust from the business sector to the academic sector

These enabling and disabling factors were identified in order to enhance the capabilities list and the systems configured by the participants. Therefore, they do not reflect a lack or presence of all of the factors at UI but rather an overall view of the suggested presence of capabilities.

2.5.3. Third phase (January 2020–ongoing process)

The aim of this phase is to enhance the capability list in each academic and administrative organisation unit. It is a long-term, challenging process. It will start with an official statement on the aim of a university policy based on the capability list that represents what is valuable for the UI community. As a first step, in order to get participatory and concrete initiatives and projects to expand these capabilities in different contexts, the whole university community will be invited to participate in an open call to support their proposals. The challenge for UI is to promote concrete actions that make the list dynamic and useful for the shared aspirational university.

2.6. Epistemic capabilities and epistemic (in)justice

The participatory process for the construction of the capabilities list allowed different pedagogical encounters (Walker 2019), expanding the epistemic capability of the participants in the different moments of the process.

For the representatives in the two phases of the list construction, the epistemic capability was expanded individually and in groups. Individually, in phase 1, when the participants evoked their experiences, moments, situations, and people that have been pleasant, valuable, and/or significant on their path at UI, they reflected on valuable achievements and the freedom to enjoy them. Collectively, in the four-station journey, they argued about how the university could contribute to the region and/or vice versa; the characteristics of a person they consider as a comprehensive trainer; the aspects of the university they would either retain or remove; and the values, knowledge, practices, and emotions that describe a humanist and autonomous leader. In the second phase, the epistemic capability was also enhanced when participants experienced the Capabilities Gallery. When each person observed, experienced, and reflected on the capabilities presented, he or she assessed the validity and representation of what is valuable for UI, both at the personal level, and as a group during the creation of a capability system, with the identification of the enabling and disabling factors for the expansion of the capabilities.

In both the first and second phases, the epistemic capability was expanded through informational and interpretive materials. It is difficult to differentiate whether a material has been more informative or more interpretative. We believe that there is a direct relationship between the two since, by discussing information about the ideal leader, integral trainer, or contribution by UI, participants, both individually and collectively, generated an interpretation of what is and should be valued by UI.

The experience of the 13 people interviewed was different. They provided their vision on central issues for the development of the list of capabilities. In this sense, we can say that they expanded their epistemic capability when they critically presented their observations, arguments, and interpretations about UI. However, there was not a group interaction to collectively elaborate on an interpretation of the purpose of UI. In this sense, we can say that both techniques proved adequate for collecting details about the list. However, for expanding epistemic capability, participatory methodologies are better not only for generating informative materials but also interpretive materials (Boni and Frediani 2020).

The designer group, as mentioned before, had a main role in the data analysis of each one of the phases. The group collectively generated informational and interpretive materials - informational by organising and generating information categories, and interpretive by analysing and presenting a capabilities list that captured what the members and external allies of UI value. This constitutes the most relevant functioning of the epistemic capability. In addition, as it was dependent on the participants in the workshops, the epistemic capability that has given rise to the interpretive materials was developed in groups, which discussed and agreed on the capabilities and their definition.

Regarding epistemic injustices, we can say that the participatory method chosen allowed groups traditionally excluded from decision-making power in the University to have a voice in this process. Students, support staff, social organisations, and entrepreneurs are rarely called to participate in processes to define an institution's aspirational vision. In this sense, in tune with Coady (2017), the participatory process allowed a greater distribution of epistemic capability by recognising the voices of the traditionally excluded (Medina 2017).

Some might object to the power of the designer group to manage the process and create the list. While the group was powerful, there were three nuances. First, there was a concerted effort to not leave any important idea out (the principle of exhaustion and non-reduction). Likewise, the list was presented and discussed among all the participants in the second phase workshops. In that way, the information was discussed and triangulated exhaustively. The second consideration is the heterogeneity of the designer group. Its members, with the exception of the provost and one of the most senior professors at the university, were not representative of the most powerful university groups. In particular, the presence of two external advisors to the university allowed the incorporation of a wide variety of visions from diverse participants. The third consideration refers to the fact that the epistemic capability is not only reflected in the content of the list but also in the production of informational and interpretive materials. In this sense, all the participants could exercise epistemic capability even if their influence on the content of the list was lower. Nevertheless, no matter how a project is designed, all participatory processes are always permeated by power relationships that influence the degree of participation (Frediani et al. 2019).

The following table summarises the involvement of participants according to the type of epistemic functioning (kind of materials produced) and the hermeneutical power that the different groups involved have had throughout the process. We have characterised the type of power by the degree of expansion of epistemic capability and influence on the content of the final list. In this sense, we have differentiated between the people who participated in the two workshops, those who were only in the first workshop, the people interviewed, and the designer group. These characterisations are our subjective interpretations as participants in the designer group.

Table 6: Epistemic capability and hermeneutical power of the UI process

Participants	Informational materials	Interpretive materials	Individual	Collective	Degree of hermeneutical power
Workshop 1-2	X	X	X	X	XX
Workshop 1	X	X	X	X	XX
Interviewees	X		X		X
Designer group	X	X	X	X	XXXX

2.7. Other expanded capabilities and conversion factors

At the beginning of this chapter, we suggested that education can be a capability multiplier. In this case, we have verified that pedagogical encounters produced by the list creation process can expand epistemic capability. Moreover, as epistemic capability was expanded, so were other qualities. Following Walker's (2006) proposal presented in the third section, we can say that the groups involved in the process also expanded: (1) practical reason, knowledge, and imagination; (2) social relationships and social networks; and (3) respect, dignity, and recognition capabilities. However, not all capabilities expanded in the same way for each group. Those interviewed expanded their practical reason, knowledge, and imagination since they provided their knowledge, which was informed by a reflective choice. For them, the capabilities of a relational nature (social relationships and respect) were not expanded. Participants that were only in the first workshop expanded the other capabilities but to a lesser extent than the participants of the two workshops. The heterogeneous composition of the second workshop allowed a greater expansion of the capabilities of respect, dignity, and recognition. Finally, the designer group had the greatest capability expansion, due to their interactions and participation in all the different portions of the process. Again, as we proposed in the previous section, the greater the participation in the different pedagogical encounters, the greater the expansion of capabilities.

Finally, we analysed the conversion factors that allowed the expansion of the epistemic and other capabilities. Regarding personal conversion factors such as gender and age, we did not observe any barriers. That was not the case for the different university groups. The participation of active students and representatives of social organisations that have a relationship with UI was lower. In both cases, there was not any intentional exclusion; for the students, it is related to academic obligations and a lack of motivation to participate in institutional projects, as we confirmed afterwards. To encourage wider participation from students, the designer group conducted interviews and extra workshops to guarantee their voices were represented. In the case of representatives of social organisations, the fact that many of the social organisations are not located in the city of Ibagué but throughout the region was a limitation for their participation in the workshops. For this reason, we decided to conduct in-person interviews with them.

The social conversion factors were very important in this process. As described in the fourth section, the ethos of this University, characterised by a commitment to the region and an understanding of higher education from a humanistic viewpoint, made it possible to propose and execute such a process. Another key issue was the strong support of the university executive leadership that led the process from the outset and gave it legitimacy.

One potentially hindering social conversion factor, not only for the list of capabilities but of the influence that this list may have on future university policy, is the conception of the higher authorities on how to manage the university. There is no doubt that this participatory process is novel in a university context for both the South and the global North. Innovation has its risks, especially in conservative regional contexts such as the Tolima department (Velasco and Boni 2019). Although this does not invalidate the process itself, since it has already expanded different capabilities, it could certainly be a limitation for a greater impact of the list's dimensions.

2.8. Conclusion

Higher education should expand capabilities and promote values related to sustainable development (Boni and Gasper 2012; Boni and Walker 2016). The UI capability list shows the potential of higher education institutions to facilitate social justice and community outreach. It is an example of an expansion of epistemic capabilities among different participants, most of whom rarely have the opportunity to be part of epistemic practices like these in higher education. This is an example of how to challenge hermeneutical injustice and give the opportunity to practice real cognitive justice. It is also a good

example of the multiplier effect of an educational environment; the participatory process expanded other capabilities such as practical reason, knowledge, social networks, and respect and recognition. Perhaps most significantly, it is an example of a way to produce contextual and situational knowledge that takes into account the huge challenges that a particular Colombian region is facing. The content of the list itself shows a human-centred institution based on human development values that positively transforms society with the training of highly qualified and ethical citizens and that co-produces solutions to social problems. This is part of the obligation of every university, by virtue of its very existence, to the social contract.

2.9. Acknowledgements

This chapter was inspired by the vibrant community of Universidad de Ibagué. The Rector, executive leadership, faculty members, students, administrative staff, general services staff, social organisations based all over Tolima, and business men and women, were part of the capabilities list construction and saw an opportunity to raise their voice in a participatory policy-building process. To all of the participants, our greatest and special recognition. The Institute Pensad and the group of researchers that designed the whole methodology and data analysis with us were fundamental. The list construction would not have been possible without the vibrant and thoughtful contribution of Hernán López, Julio Mazorco, Carol Peña, Sergio Monroy, and Jonh Viasus. Also a special recognition to Jamith Hernández, who supported the entire process as a research assistant. Finally, Nidia Chaparro, former Provost of the University and sociologist helped the group in different stages of the data analysis and to have the final version of the capabilities list. Alejandra Boni would like to thank the BEST/ 2019 Programme of the Generalitat Valenciana for the economic support to be in Colombia during the field work and the Network Mulibien (granted by CYTED programme) for its financial support to discuss the results of this research.

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3 Developing transformative innovation through policy experimentation in two Colombian Universities

Based on this publication:

Velasco, D., Boni, A., & Chalela, S. (2021). Developing Transformative Innovation Through Policy Experimentation in Two Colombian Universities. In L. A. Orozco, G. Ordóñez-Matamoros, J. H. Sierra-González, J. García-Estévez, & I. Bortagaray (Eds.), Science, Technology, and Higher Education: Governance Approaches on Social Inclusion and Sustainability in Latin America (pp. 181–204). Springer International Publishing. https://doi.org/10.1007/978-3-030-80720-7_7

Keywords: Experimentation, University, transformative innovation, Colombia, Unaula, University of Ibagué

Abstract:

This chapter presents two experiences of university policy design following experimental processes in the vein of transformative innovation principles. They have been developed at the Universidad Autónoma Latinoamericana in Antioquia and the Universidad de Ibagué in Tolima, both in Colombia. The two experiments have a specific directionality aligned with social and environmental purposes. They have been developed following inclusive and participatory processes that consider voices usually excluded in formulating university policies. These processes were inspired by human development, learning approaches, and reflexivity among the participants, whose aim was to mobilise different types of knowledge: experiential, expert and non-expert, theoretical and practical. The history of both institutions and the participants' aspirations and needs are contextual and highly relevant. The two vice-chancellors' political support was fundamental to providing legitimacy to the process and to creating the necessary protected space to carry out the two experiments. The systemic scope of both initiatives remains to be seen. However, the cases demonstrate different university policy design and governance approaches that can be replicated in other contexts and institutions. The experimentation these two policies propose and carry out enables openings in the socio-technical regime that defines the most hegemonic University.

3.1. Introduction. Re-thinking innovation.

Innovation, in a general sense, can be understood as the ability of people and organisations to develop a new or significantly improved product (good or service), process or method to achieve a desired effect (material or social) that responds to an opportunity creatively and that is used and appropriated by a massive group of users (Freeman, 1995; Tidd, Bessant and Pavitt, 2005). This innovative activity's consequences (intentional or not) can trigger incremental or radical changes or transformations in social life (Smith, 2017). However, the dominant view and practice of innovation have been based on the private sector activity that governments and universities support. The goal is to make economies more productive by creating knowledge, subsequent business applications, and societal dissemination (Temple, 2010).

Innovation has predominantly been studied from an economic perspective. Schumpeter (1934) defines it as a new production function that covers new commodities decisive in nations' success. Innovation has also been understood as the result of conducting basic and applied research to produce solutions that can be introduced to large-scale markets (Bush, 1945). This vision of innovation is based on a linear perspective that the innovation systems approach problematises. According to the innovation systems framework, the emphasis must be mainly placed on the optimal interactions of policy, business,

academic actors and supporting infrastructures to produce economic effects that are always perceived as positive for thriving countries' development (Edquist, 1997; Freeman, 2002). Finally, and in response to the limitations of the two previous approaches, an understanding of innovation from a transformative perspective is introduced. The objective is no longer economic growth but to face the current social and environmental challenges both Global North and South face (Schot and Steinmueller, 2018). Likewise, interactions between policy, business and academic actors are not enough; citizens, communities, and civil society organisations must be centrally incorporated. The innovations arise from the response to profound social problems and under a comprehensive sustainability scheme (Pearce, Barbier and Markandya, 2000), interacting with non-hegemonic groups, which, together with traditional actors, allow changes in prevailing socio-technical systems[3]. Like in the innovation systems approach, acknowledging and understanding the norms, values, and rules of the game are paramount. However, in the transformative innovation framework, the role of active social groups, as opposed to the view of users as recipients of innovation, that seek for alternatives to solve their needs, is a central element for the innovation policy design, as is highlighted by (Boni, Belda-Miquel and Pellicer- Sifres, 2018; Pellicer-Sifres et al., 2016). The Sustainable Development Goals (SDGs), approved by the United Nations in 2015, illustrate the magnitude of challenges such as mitigating climate change, overcoming poverty and inequalities, access to quality education, among others. Failing to reach these goals has a significant affectation on the most vulnerable populations, which now more than ever need innovative solutions pathways (Schot and Kanger, 2018).

This view of innovation is aligned with human development, where people instead of economics are at the centre. The measure of success is providing means for people to have feasible access to those things they value to have a better life (Alkire y Denehulin, 2009). The human development framework has been developed and expanded through the *Human Development Reports*[4] produced by the United Nations Development Program (UNDP). Although the conceptual framework of human development has evolved over the years, it has at least five central elements (Boni and Gasper, 2012): 1) a plurality of values such as empowerment and participation, equality, and sustainability; 2) capabilities understood as the substantive freedoms or real opportunities to have the kind of life that people value, and functionings understood as the activities people do to expand their capabilities (Sen, 1999); 3) agency, as the ability of people to achieve the objectives they value, it implies power and control not only at the individual but also at the collective level; 4) the multi-dimensionality of well-being beyond economic income, including the sources, means and environmental conditions needed for people to expand their capabilities; and 5) democracy and public debate, to have political freedom and democratic political systems.

Looking at innovation from this point of view also implies re-thinking the role of the University. Suppose innovation policies and practices are oriented towards objectives where the predominant logic is not increasing economic growth. In that case, we must ask ourselves questions such as: What professionals do we need? What kind of research should we carry out? What types of actors should be included in the University dialogue? What social impact can we produce in the face of local and global challenges?

In this chapter, we respond to these questions, paying particular attention to two regional university initiatives: the definition of a university policy at the Universidad de Ibagué in Tolima Colombia and the re-significance of the research policy of the Universidad Autónoma Latinoamericana in Medellín, Colombia. The second section details the characteristics of transformative innovation following Schot and Steinmueller (2018) and Schot, Boni, Ramírez and Steward (2018). In the third and fourth sections, we present and analyse the two case studies, considering what transformative innovation suggests. The fifth section approaches the discussion, and the sixth section concludes.

[3] The socio-technical systems are understood as those links and functions in the relations of production, diffusion and use of technology, which are configured to respond to social needs and challenges, such as energy, water, food production, etc. (Geels, 2004).

[4] The reports can be found in http://www.hdr.undp.org/

3.2. Transformative innovation

As we pointed out at the beginning of this chapter, the development of STI policy is essential to address social and environmental challenges. For this reason, a relevant question arises: Is the current STI policy fit for purpose? In recent decades, the interest of policymakers and the business sector has focused mainly on the use of knowledge as an engine for economic growth and innovation to increase competitiveness and job creation. Adverse effects of innovation are not considered, as far as there is a positive economic effect.

The Transformative Innovation Policy framework (TIP) implies a direction towards solving social and environmental challenges, expanding the STI policy scope and purpose towards alternatives such as green growth, eco-innovation, social innovation and inclusive innovation (Schot et al., 2018). The causal relationship is altered, giving prevalence to development based on social well-being, participation and empowerment of social groups, and equity for social justice (Boni & Gasper, 2012). Therefore, different approaches to measuring "success" other than GDP growth (such as the UN Human Development Index or the OECD Well-being Index) are highly needed. This vision of innovation has unique characteristics that differentiate it from previous frameworks, briefly discussed below.

3.2.1. Socio-technical system change

The United Nations Agenda to 'transform our world' can be interpreted as a call for a new type of innovation. The OECD (2015) also calls for a systemic view of world challenges. Innovation goes beyond the use of technologies and science; it requires changes in the different dimensions of the socio-technical systems that include changes in users' preferences, knowledge creation expressed in science and technology, skills and capacities absorption, infrastructure, policy, industrial structure, and cultural significance.

The economy has many socio-technical systems that fulfil essential social functions in areas such as energy, food, health, mobility and communication. Policy for transformative innovation aims to produce transitions in socio-technical systems towards a more sustainable direction.

3.2.2. Directionality is the starting point

The transformative change framework proposes including different perspectives and broad participation of diverse actors to envisage the consequences of innovation *ex-ante*, opening up pathways towards collective priorities. Such a process implies creating visions of sustainable and desirable scenarios for the different socio-technical systems that connect with concrete trajectories and technical options. Being open and fostering radical new alternatives, often not perceived as feasible or desirable, is a critical aspect of the TIP. The change pathways provide contextual technological solutions in tune with social choices and environmental benefits. As a policy principle, directionality opens the space to assess multiple scenarios aligned with human development values and environmental preservation. For this reason, the directionality of transformative innovation is aligned with the SDGs insofar as they represent a global agenda with local commitments.

3.2.3. Experimentation and development of alternative practices as a way of innovation

Finding new directions requires experimentation. Change implies processes based on experience and second-order learning (also called double-loop learning or deep learning). Socio-technical systems are driven by rule-sets composed of behavioural instructions, cognitive beliefs, norms and values (Geels 2002, Geels and Schot 2007, Schot and Steinmueller 2018). Thus, second-order learning goes beyond understanding and realising one's assumptions; it implies changes in people's mental and cognitive frameworks, producing changes in behaviour.

Given that the direction towards alternative and sustainable practices implies dealing with uncertainty and complexity, experimentation offers the possibility of exploring various sustainability pathways

that ultimately lead to systemic change. Within the framework of transformative innovation, this experimentation is proposed through participatory processes with diverse actors, offering the possibility of agency for non-hegemonic players. As expressed by (Ramírez, 2020: 2): "The experiments in transformative innovation are not intended to confirm an alternative already defined in advance, but rather to try different alternatives, produce prototypes and demonstrative solutions that can inform new paths and, above all, generate deep learning (or second-order learning), through a formative evaluation". These alternative practices start at the local and regional level and usually come from the local communities. At the same time, public policy plays an essential role in scaling up and accelerating local initiatives for transformative change. Intermediation between local alternatives, regulatory and institutional frameworks, and industrial practices is often required.

3.2.4. Inclusion as a prerequisite for transformative change

The inclusion of diverse voices and the agency of non-dominant actors, such as organised civil society movements, is critical to the emergence of alternative practices. The experimentation process must be inclusive regarding participation and results and have a direction that leads to human and sustainable development. Inclusive does not only mean reporting on results. It implies that those involved have the power to exert influence on alternative solutions. Inclusive processes can lead to the incorporation of conflicting points of view that, instead of being avoided, are discussed and managed. The policy should create appropriate framework conditions for inclusive participation and supporting actors to navigate conflicts and build trust throughout the process.

Table 1 summarises the main characteristics of this innovation framework:

Change of socio-technical system	Change in consumer practices and needs, skills and capabilities of all the actors involved, infrastructure, government, regulation, industrial structure and cultural significance.
Directionality	Creation of visions on sustainable futures connected to development trajectories and technical options. Consideration of multiple directions, embedded in a broader range of options that allow for a second-order learning and formative evaluation process.
Experimentation	Change that is based on experience and deep learning. Learning that transforms assumptions and action patterns ingrained in the dominant practices of the different socio-technical systems, such as energy generation, the use and disposal of water, the growth of cities, and consumption patterns, among others. Experiments can be embedded as alternative practices in niches that compete with an unsustainable dominant practice. Governance is critical to the extent that new intermediations must be designed between local initiatives, new regulatory and institutional frameworks, and the alignment of different but complementary policies for the change of socio-technical systems.
Inclusion	Incorporate non-dominant actors and actors from diverse sectors, including producers, civil society, users, and policymakers. The experimentation process must be inclusive in terms of participation and results. Inclusion and experimentation imply the support of actors to navigate conflicts and build trust throughout the process.

Table 1. Characteristics of transformative innovation. Note. Own elaboration based on Schot et al. (2018).

The Transformative Innovation Policy Consortium (TIPC) (Schot, Kivimaa & Torrens, 2019) has identified five modes of experimentation (or experimental engagements as defined in the text) by which public policy can drive transformative innovation. As its authors state, it is an open proposal that aims to be inspiring. It seeks to open the discussion on possibilities within public policy. Table 2 shows the five modes of experimental engagements we will return to later in the discussion.

Modes of Experimental Policy Engagement	Mode 1: Policy Design Experiments	Mode 2: Policy Instrument and Policy Process Experiments	Mode 3: Creating Experimental Spaces	Mode 4: Supporting, Connecting and Evaluating Societal Experiments	Mode 5: Experimental Governance Culture
Role of experimentation in policy	Assists in the formulation, calibration and justification of policy instruments	Setting up of specific experimental policy interventions in the form of new policy instruments or policy processes tried out temporally or in a small scale.	Creates dedicated environments and a constituency for experimentation, where the normal conditions (e.g. regarding permits, taxation) are relaxed.	Articulates existing experiments carried out by multiple actors, facilitates learning from and between experiments, and supports the development of networks.	Creates flexible and proactive governance arrangements, including open-ended goals, allowing decentralised and experimental interventions by multiple actors.
Actors involved	Policymakers, and recipients of the policy treatment.	Policymakers and policy analysts, stakeholders involved in the experiments.	Lead users, entrepreneurs, technology advocates, designers, civil society actors, policymakers.	Networks implicated in experiments, intermediaries and policymakers.	As others, but with the aim of broadening participation to actors normally excluded from policy process.
Approaches	Randomised Control Trial, Behavioural Experiments.	Experimenting with new formats in established policy instruments/ processes (programmes, subsidies, regulation).	Urban Living Labs, policy labs, walkshops, transition arenas.	Intermediary organisations and platforms, workshops, online resources.	Strategies and initiatives to promote experimental culture; rewarding reflexivity and learning.

Table 2. Modes of experimental engagements (Schot et al., 2019: 2)

3.3. The institutional account for science, technology, and innovation of the Universidad Autónoma Latinoamericana

3.3.1. Context and characteristics of the Universidad Autónoma Latinoamericana

The Universidad Autónoma Latinoamericana (Unaula) was established in 1966 by the university dissidence inspired by the Cordoba Manifesto of 1918[5]. In its fifty-three years of existence, Unaula has been recognised in the local context for its social commitment.

[5] According to (Arcila, 2011), the Córdoba Manifesto is rooted in the structural changes generated by the collapse of hegemonic eurocentric values (as a result of phenomena such as the First World War, the Russian Revolution, and the strengthening of the bourgeoisie on the continent). This antecedent promoted an educational reform that gave rise to university management models that focused on the training of professionals, in conditions of equality, with a stance and critical thinking regarding the socio-political reality. It sought the vindication of quality in education and allowed to set missionary objectives focused on the training of the working class and the students representation in the institutional governance.

People recognised locally for their direct work within the community, such us Héctor Abad Gómez, Jaime Gil Sánchez, and Gilberto Martínez Rave[6], have given a particular ethos to Unaula. They committed their heritage to an academic cause devoted to popular assistance, allowing the entry to higher education of nearly 10,000 students from the lowest socioeconomic strata (working-class and low-income people). At the time, this fact made Unaula recognised as the "University of the Poor" (Durango, 2008).

Unaula maintains its foundational spirit by including institutional policies to support vulnerable local communities, defend human rights, keep an open professorship, and decentralise work in different popular neighbourhoods of the city. These actions have allowed the University to fully immerse in the territory and be recognised as a popular end university (Jaramillo, 2016) with nearly 6,000 students and an academic offering of 27 undergraduate and graduate educational programs.

Unaula has also invested significant efforts in generating scientific knowledge that aims at the social transformation of communities in the local and regional order. In this sense, its different academic departments have created research groups and social projection units dedicated to the generation and transferring of new knowledge through divulgation strategies for public understanding, aside from the most traditional forms such as scientific publications, patents, consultancy, participation in national and international events, amongst other activities.

An innovation unit for the Univesity was created in 2015 to consolidate the knowledge transfer processes derived from research results from a linear incremental innovation framework. The assumption was that applying knowledge derived from research or technological development results in introducing a new product or service that creates economic revenue. However, this conceptual approach to innovation is distant from the foundational principles that underpin Unaula's organisational structure. Unaula is committed to contributing to the better coexistence of the human species and is aware that adequate education contributes to greater spiritual, material, cultural, and social well-being. In this sense, pluralism, co-government, autonomy and values such as eco-sensitivity, solidarity, equality and respect for difference have characterised the historical evolution of the institution.

3.3.2. The construction of an institutional narrative

In 2016, the University reformed its organisational structure, creating a Vice-Rectory for Research (Agreement 57 of 2016 - Superior Council). This change opened the possibility of reviewing the meaning, orientation, and purpose of research at the University. The Vice-Chancellor started a process to identify organisational capabilities for research, with the support of external advisers on inter-institutional relations and cooperation for development, in coherence with the institutional principles and values (examined in institutional documents such as the foundation act, university statutes, the strategic planning documents, physical master plan, among others) and semi-structured interviews with different institutional and non-institutional actors.

Additionally, 15 semi-structured interviews were conducted with the university leadership (3), deans (3), faculty members (4), employers' associations (2) and social organisations (3) (see figure 1).

[6] It is worth mentioning that most of them were persecuted or killed for their fierce defense and opposition to the constant and systematic violation of the human rights of people with limited resources who lived in Medellín, during the 1980s and 1990s.

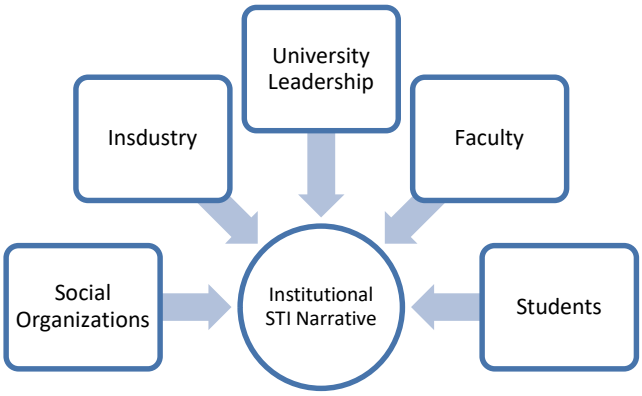

Figure 1. Participative identification of organisational capabilities.

Five organisational capabilities for the development of an institutional research policy were identified and recognised based on the information collected and on the institutional trajectory: a) critical thinking as the axis of the institutional education project; b) commitment to good living (Buen Vivir), from a Latin American perspective; c) the defence of human rights; d) the existence of a diverse and inclusive academic community; and e) infrastructure for development in the city centre.

Based on these capabilities, an Institutional Narrative for Science, Technology and Innovation (STI) was built related to the Sustainable Development Goals (SDGs) with five confluences: a) UniverCity, b) Human Rights, justice and gender, c) Economic development, formalisation, creation of wealth and new networks, d) Social inclusion: culture, disability and education, and e) Eco sensitivity: territory, environment and rurality (see table 3).

Confluences	**Visions of the future**	**SDGs**
UniverCity	The compact city; redefinition of the city centre; public space and heritage; and urban regeneration as conditions for community well-being.	Sustainable cities and communities
Human Rights, justice, and gender	Contribution to training processes in political culture, the defence of human rights, gender diversity and redistributive justice.	Gender equality, Peace, justice, and strong institutions
Economic development, formalisation, wealth creation and new networks	Deepen interventions in formalisation, innovation, productivity, decent employment, and collaborative networks that address the precariousness and potential of these critical sources of employment and entrepreneurship.	Decent work and economic growth Industry, innovation, and infrastructure Responsible consumption and production
Social inclusion: culture, disability, and education	Commitment to comprehensive education in the city and the region, considering diversity and acting in accordance.	Quality education Reduced inequalities
Ecosensitivity: territory, environment, and rurality	Human and institutional attitudes aligned with caring for the environment; sincere concern for the current eco planetary problem, our ecosystem, and internal and external relations.	Climate action Life on land

Table 3. Unaula narrative for STI

Experimentation from these confluences has generated new institutional research processes that involve articulations between academic actors and social organisations, whose scope is not limited to academic publications, consultancies or participation in academic events.

An example of alternative practices is the Alliance with Women[7] (at the confluence of Human Rights, justice and gender), which has articulated four universities and two social organisations in order to reveal the humanitarian crisis experienced by women victims of gender violence in order to mobilise social, political and legal actions that contribute to the eradication of this scourge.

The Alliance with Women defines the objective of this articulation process as follows:

> The union of efforts between civil society and the academy contributes to the construction of spaces for academic, social and political debate that favours the materialisation of women's human rights and the generation of knowledge that explains this social phenomenon [gender violence] and promotes alternatives through research, advocacy processes and strategic litigation, to strengthen access to justice and administrative measures related to their care. For all these reasons, this project seeks to strengthen the Alliance as a space in which, in addition to the production of knowledge, the dialogue of multiple perspectives is launched, generating the reinforcement of the installed capacity of the partners. It does it through the consolidation of work teams compounded by researchers, students, and activists in an interdisciplinary body of knowledge that, from an initial legal emphasis, also addresses violence against women as a social and public health problem. It seeks local and national projection and impact, thanks, among other things, to the participation of organisations such as the Human Corporation of the city of Bogotá, as well as that of the Collective Corporation for Justice for Women, a focal point of the National Network of Women, and a social platform with presence in more than 16 cities in Colombia (Alliance with women, 2018).

The Alliance participated in the elaboration of the gender public policy of Medellín and the creation of the Feminist Legal Clinic to complement the processes of training lawyers from a feminist perspective; likewise, it has generated legal innovations about violence against women in intimate relationships, ex-partners and other relational forms, among other activities.

Another notable example is the Live Experiences program[8] "School of Systematisation of Local Experiences" (confluence of social inclusion: culture, disability, and education). Live Experiences is conceived as "a space for reflection, appropriation of theories and methodologies that make possible the construction of city and country agendas that are prone to the construction of scenarios of peace and coexistence, as necessary conditions for a good life." (Live Experiences, 2017).

This program emerged in 2017 as an initiative to systematise the local experiences of fourteen social organisations in Medellín. From 2019, it has managed to articulate with more than sixty-two social organisations from other cities, such as Bogota, Tunja, and Duitama, through activities of knowledge dialogue, which implies local knowledge co-production and systematisation projects through methodological tools for the defence of the territory.

3.4. The participatory process of defining the central capabilities of the University of Ibagué

3.4.1. Context and characteristics of the Universidad de Ibagué

The Universidad de Ibagué (UI) is a medium-sized regional private university (by Colombian standards, with around 5,600 students and 330 teachers in 2019) founded in 1980 by business people and civic leaders from the Department[9] of Tolima. The UI has contributed to regional development based on human-centred values and offers higher education alternatives from its foundation (Institutional Self-Assessment Report, p. I). Its academic offer, research agendas and programs are embedded in the territory by impacting the regional well-being with tangible results. The UI has a path-dependence towards

[7] Working alliance for strategic litigation in defense of the human rights of women in the city of Medellín, Colombia. Website: https://alianzaconlasmujeres.com/

[8] Website: https://www.experiencesvivas.com/

[9] Colombia is politically and geographically divided into departments.

citizenship training, high standards of academic quality and social projection, making its campus the entire Tolima department, as seen in figure 2.

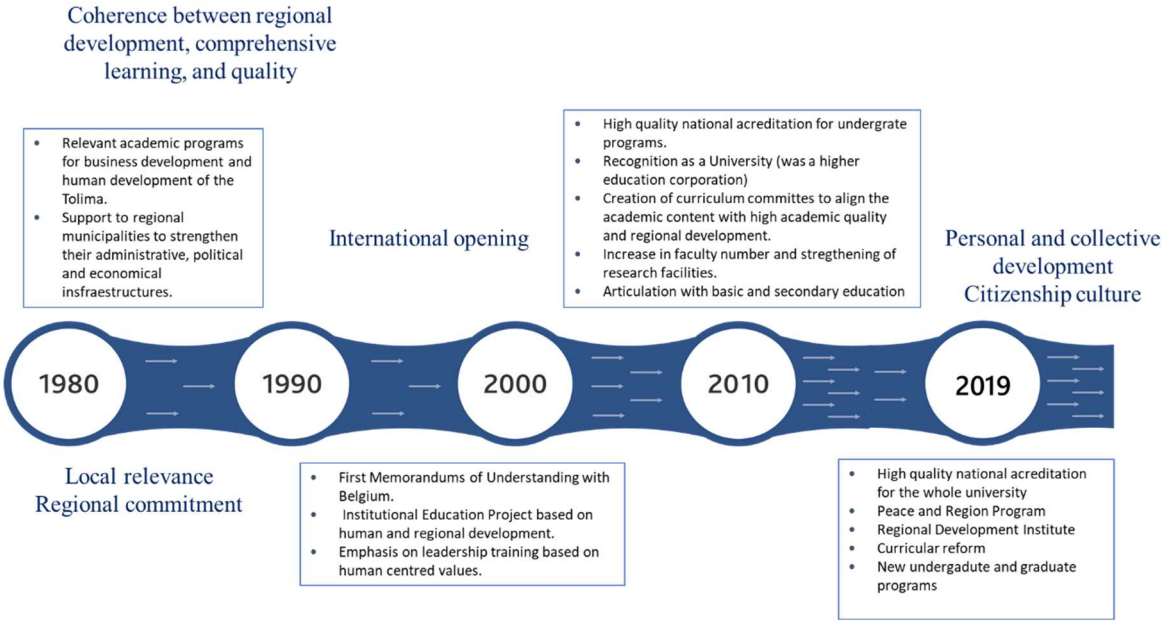

Figure 2. Universidad de Ibagué Path-Dependancy

Tolima has historically suffered high levels of violence due to the armed conflict between the State, the guerrillas and the illegal armed groups. According to the Departmental Competitiveness Index of Colombia, the conflict has negatively impacted the human development of the territory, placing Tolima in 12th place among 32 departments with the highest poverty levels in Colombia. In 2016, a peace agreement was signed between the Colombian government and the Revolutionary Armed Forces of Colombia (FARC), which started a disarmament process in 2017. The signing of this peace agreement has led to a crucial moment in the country's development. In this new post-agreement scenario, words such as truth, justice, reparation, non-repetition, forgiveness, and reconciliation, among others, point to the possibility of political and moral routes for conflict resolution. For the regions, particularly for the Tolima region, the peace agreement has opened up an opportunity for centring efforts on much-needed social well-being. More now than ever, the UI is central in mobilising knowledge for the region's thriving.

Within this context, the UI has played an active role in transformation and building sustainable peace processes by bringing together students, faculty, technical personnel, companies, social organisations, communities and local governments to foster human capabilities[10].

3.4.2. The participatory process to define capabilities for human development

In 2019, the UI started a journey to define what is valuable for the university community and partners in terms of capabilities. The process was widely collaborative and participatory, involving faculty, administrative staff, managers, students, alums, the business sector, municipalities, and social organisations with which the institution collaborates.

A collective vision was expressed in a list of capabilities that characterise the aspirational spirit of the UI. All participants co-constructed a specific directionality towards a human-centred transformation inside and outside the University. The process was designed as a mode of experimental governance by

[10] Specific programs such as Peace and Region (https://pazyregion.unibague.edu.co/), projects developed jointly between local governments, social groups and the UI (https://extension.unibague.edu.co/proyectos) are some of the evidences of this affirmation.

creating a flexible and proactive space that allowed multiple actors' decentralised interventions, resulting in the list.

The process started in May 2019, and by December 2019, the final list of capabilities for the UI was finished. During the process, it had the drive and support of the rectory team, which gave it legitimacy. The UI Provost led the design of the experiment with an international expert on human development and transformative innovation, both authors of this chapter, and designed and developed jointly with five researchers of the Special Projects Unit[11], part of the UI. We called this group the designer group. The methodology was designed in three phases, described in figure 3. In this chapter, we report the results up to the second phase.

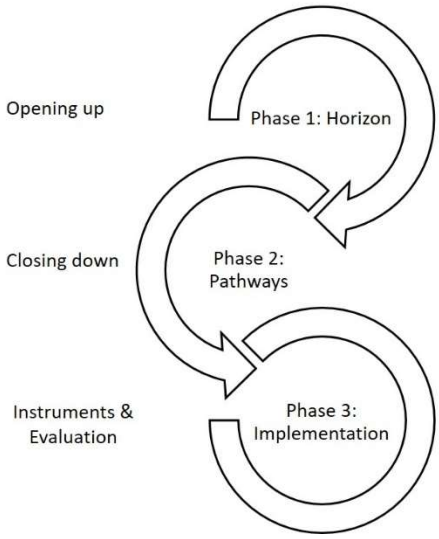

Figure 3. Experiment methodology phases

The horizon phase focused on gathering different university members (students, faculty, administrative staff, leadership, alums, entrepreneurs and social organisations) for a co-produced vision of the UI based on social and sustainable practices. There were 127 participants in 9 workshops and 13 interviews (64 women and 63 men). The result was a list of eight university capabilities: two related to training, two related to territory, three to the university community, and one to enterprise.

During the pathways phase, the seven capabilities list was validated with mixed groups of phase one participants. The purpose was also to find connections between the capabilities and define pathways to expand the UI capabilities list. There were 62 participants (35 women and 27 men). The final list collectively built by the UI community is presented in Table 4.

Category	Capability	Definition
Training	Training of persons and citizens	A university community capable of training people, professionals, and citizens with critical thinking, ethical principles, and sensitivity regarding social differences and needs.
	Integral leadership	A university community capable of training people for reasoned and responsible decisions, in accordance with criteria of justice, fairness, and respect for differences (within the framework of empathic and affective communication) that leads to the realisation of joint actions oriented to the common good.
Territory	Social construction of territory	A university community that is capable, in association with the other social actors, of rebuilding and

[11] Institute devoted to the study of complexity and systemic thinking. It acts as a think tank for the University and for the region.

		appropriating its territory collectively, through dialogue and mutual understanding, committing itself to nature, culture, and diversity of knowledge for connivance and peace.
	University that transcends	A university community capable of generating projects and actions aimed at the development of a fair and democratic society that enhances reflection, exchange, and generation and appropriation of knowledge to respond to aspirations, challenges, and problems that affect the various actors in the territory.
University community	Purposeful Critical reflection	A university community capable of reflecting and building critically on their being and daily work in the light of their identity, history, ethical stakes, bonds of trust, organisational forms, growth opportunities, and personal and collective aspirations.
	Care	A community that is capable of ensuring conditions that allow the integral growth of the self and the other, through relationships that build trust and recognition among its members as well as of the environment in which they are immersed.
	Constructive interaction	A university community capable of stimulating, allowing, and promoting a dialogue that is well informed, clear, transparent, and respectful of freedom and differences of opinion. It is oriented, on the one hand, to strengthen the social interaction between the members of the community so that they develop the personal power to choose and act in situations of social and political environment. On the other hand, it favours participation, a good working environment, and individual and collective integral human development.
Enterprise	Weave nets	A university community capable of fostering interconnections with companies, communities, and students to develop innovative projects that respond to territorial needs, build trust and take care of the common good, to make possible a truly local development with a global perspective.

Table 4. UI Capabilities List

The third stage is on hold due to a change in the university leadership. The Special Projects Unit is expected to move forward with instruments and resources to expand the university community capabilities at all levels for every university member and stakeholder.

3.5. Discussion

The Unaula and UI experiences can be understood as a mode five of experimental governance culture. The decision processes and policy documents were based on flexible and proactive governance arrangements. The inclusion of open objectives allowed decentralised and experimental interventions by multiple actors with the active involvement of actors usually excluded from the policy processes. For Unaula, co-creating an institutional narrative opened up the possibility of expanding the participation of institutional and non-institutional actors in policy construction. In the UI case, designing the list of capabilities gave voice to students, alumni, social organisations, businesses, and administrative officials in a strategic university exercise, envisioning a just and sustainable set of real options valued by the university community. Likewise, the methodology based on experiential workshops to create reflexivity spaces provided the means for second-order learning, or learning that enables changes in frames and assumptions and that provides a broader view of the UI beyond the particular role the participants have

in university life (Schot, Kivimaa and Torrens, 2019). It is noteworthy that in the second pathways phase for the list of capabilities construction, the mixed groups (admin staff, faculty, students, entrepreneurs) allowed the participants to share their views about the University and its role in the regional transformation, increasing the possibilities of learning as suggested by the transformative innovation approach.

It is worth highlighting the directionality that the five confluences and the list of the eight capabilities for human development can give to university policies. The two directions are closely connected to the social and environmental issues central to transformative innovation. Unaula's case exemplifies the connection of the narrative with various SDGs. The connection is apparent in the capabilities list in the UI case, particularly in the training, territory, and enterprise categories. A leadership based on justice, equality, and respect for the differences for the common good; a university community that re-signifies continuously and collectively the territory committed to the preservation of nature, culture, and diversity of knowledge; and a university that is capable of weaving nets to foster innovative projects to respond to territorial needs; give direction to an educational model inspired by comprehensive and humanistic training. Both experiments aim to transform the system (in this case, the University) in a specific direction.

The two university policies can be understood as protected spaces for experimentation, with clear leadership from the Vice Rectories, giving it a strategic policy dimension and providing the means to have a collective vision to build and open up different pathways towards just transitions (Stephens and Graham, 2010). Two determining factors made both experiments possible: the first is their *ethos*. Both have a social vocation from their foundation, are more political in the case of Unaula, and are more ethical and oriented towards regional development in the UI case. In both cases, the institutional missions (probably not shared by the entire university community but protected by its founding documents) have protected and legitimised the two innovations. The second issue is the two Vice Rectories' explicit support and direct participation. These experiments require institutional involvement and political will that need top-down support. In both cases, the vice-rectors distributed their power for a bottom-up policy construction process. In Unaula, the recent creation of a Vice-Rectory for Research as an autonomous dependency on other substantive functions allowed the Vice-Rectory to design the experiment to create the university research policy. For UI, the Academic Vice-Rectory saw an opportunity to align the capabilities framework with critical foundational documents and the University's policies to expand human capabilities.

Experimenting, empowering different actors, and creating alternative governance arrangements bring tension and sometimes conflict. In Unaula's case, there has been intense questioning from the Academic Council, which advocates for traditional processes of measurement and evaluation of science. Council members do not believe that having a comprehensive university narrative is compatible with scientific production. There were tensions with the Superior Board for UI, which has final approval on all institutional policies, caused mainly by governance arrangements triggered by the Vice-Rectory.

Finally, it is worth raising questions about the systemic scope of the two initiatives. In terms of transformative innovation, to what extent do both initiatives aim for socio-technical change? This would lead us to a more in-depth discussion (which goes beyond the objective of this chapter) about the characteristics of the knowledge creation socio-technical regime in Colombia. What is certain is that both universities are inserted in a broader quality accreditation system that rewards publication in high-impact journals, generation of economic resources from enrollment, traditional knowledge transfer, and the internationalisation of students and teachers, among others, which are necessary but not sufficient conditions. The two policies must fit into this context and coexist with it simultaneously, proposing alternative metrics to evaluate the research performance in the case of Unaula and providing a university vision based on human development in the UI's case. These different institutional arrangements open new possibilities for experimentation and recognise alternative practices in teaching, research, extension and even university governance.

We present a systemic understanding of the possibilities for transformative innovation from the University. Although our case studies can be considered isolated experiments at this point, they are two

examples that can be replicated and adapted to other universities in Colombia and abroad. Replication possibilities are also increased thanks to the networks that both institutions have.

3.6. Conclusions

This chapter presents two experiences defining university policies that can be understood as experimental processes according to the proposed transformative innovation policy framework. Both experiences have a specific directionality aligned with social and environmental challenges. They have been developed following inclusive and participatory processes that have considered voices generally excluded in formulating university policy. They have aimed to generate learning and reflexivity among the participants, mobilising and recognising different types of knowledge: experiential, expert, non-expert, theoretical and practical. The contextual aspect of both experiments is highlighted and linked to both institutions' evolution and the participants' aspirations and needs.

The role of experimentation in university governance was taken forward in the Unaula and UI cases. Proactive governance arrangements broaden the spectrum of voices heard and give agency to the university community and allies to co-create institutional policies congruent with the principles of transformative innovation policy. Rewarding reflexivity and learning in university policy construction opens the discussion in university management to challenge the current institutional dominant practices.

Considering the above, applying the transformative innovation policy framework to examine the organisational processes in higher education institutions provides possibilities to break with the institutional isomorphism that makes universities behave homogeneously.

3.7. Acknowledgements

Alejandra Boni acknowledges the support of the BEST-2019 Program of the Ministry of Education and Culture of the Generalitat Valenciana to write this chapter in the framework of research leave (BEST / 2019/011).

Diana Velasco thanks the Special Projects Unit, particularly the designer group, that thought and implemented the experiential workshops for phases 1 and 2 of the methodology for the capabilities list construction. Also, to Jamith Hernández, a young researcher from the University of Ibagué, and Nidia Chaparro, a professor and former Vice-Rector of the UI, for their participation in the capabilities list construction presented in this chapter.

Salim Chalela thanks the Cooperation, Development and Management unit, mainly to Sofía Botero and Hernán Aristizábal, for their dedication to constructing the institutional narrative for the STI. Also to Hernán Jaramillo and Ana María Aldana for their contributions in the framework of the institutional strengthening project of the Alliance for Formal and Inclusive Economy.

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4 Exploring the Role of a Colombian University to Promote Just Transitions. An Analysis from the Human Development and the Regional Transition Pathways to Sustainability

Based on this publication:

Velasco, D., Boni, A., Delgado, C., & Rojas-Forero, G. D. (2021). Exploring the Role of a Colombian University to Promote Just Transitions. An Analysis from the Human Development and the Regional Transition Pathways to Sustainability. *Sustainability*, *13*(11), 6014.

Abstract

Universities are central organisations that can act as promoters and amplifiers of regional just transitions. In this paper, we analyse how a Colombian regional university, the University of Ibagué (UI), is playing this role through two initiatives: (1) a governance experiment piloted between 2018 and 2019 that constructed an aspirational vision for this university through the definition of eight human capabilities; (2) a formal curriculum regional programme named Peace and Region (P&R) established in 2010 as a service-learning strategy for undergraduates in their final year. To analyse the contribution of these two initiatives towards a just transition, we built a specific analytical framework based on the human development and capability approach and Regional Transition Pathways to Sustainability (RTPS). Exploring both the content and the process of building the list and perceptions of the different actors involved in the P&R programme, we found that both initiatives have a strong directionality that resonates with the normative ambition of a just transition. Moreover, in both processes, people involved have expanded human capabilities, and co-produced holistic and transdisciplinary knowledge through the interaction of academic and non-academic actors. From an RTPS perspective, the programme captures regional complexity and moulds micro-dynamics to socially fair and sustainable paths.

Keywords: university; higher education; just transition; regional transitions; sustainable devel-opment; human development; capability; knowledge; co-production; Colombia; Tolima; global south

4.1. Introduction

International organisations have widely recognised universities' roles in promoting sustainable development in both the Global North and the Global South. With other international organisations, UNESCO stresses the vital role of education as the main driver for peace, tolerance, and human fulfilment and in achieving the proposed Sustainable Development Goals [1]. However, what is the meaning of sustainable development in specific regional locations? Following Storper and Pike et al. [2,3], we argue that the notion of development is contextual and related to specific economic, institutional, cultural and social trajectories. Development cannot be measured simplistically through GDP growth in an empty container delimited by political and geographical borders. Development occurs in particular spaces where actors interact and shape the flow of capital, knowledge, rules, politics and energy. Hence, we understand the space as a relational social construction [4–6].

In this paper, we explore how a university can contribute to development in a regional context. Our case study is the Universidad de Ibagué (UI), a Colombian medium-size private university located in a Colombian region (Tolima) with a low human development index. Tolima has suffered from a prolonged armed conflict between the State, civilians, guerrillas, and illegal armed groups. In this context, discussing sustainability implies posing ourselves the question: what kind of local and regional development is happening, and for whom? [3] The answer suggests a choice about what development means, for whom and where. It also implies a choice on how development priorities should be decided.

Human development pays special attention to those questions. It is based on the core values of empowerment, participation, equity, efficiency and sustainability [7]. A human development understanding stresses the relevance of equitable opportunities for all, and it implies a world where many worlds fit (un mundo donde quepan muchos mundos; It is a phrase attributed to the Subcommander Marcos of the Zapatista Army of Mexican Na-tional Liberation, a political–military movement for the reinvindication of indigenous rights) without jeopardising future generations' resources. The inclusion of typically unheard voices giving them agency in decision-making processes related to their own becoming is a crucial element of a people-centred notion of development. We stress the United Nations principle of "Leave No One Behind" (Universal Values UN 2030 Agenda, https://unsdg.un.org/2030-agenda/universal-values/leave-no-one-behind), not only for the inclusion of the poorest, combating discrimination and preventing inequalities, but also to enable and enhance cognitive justice by recognising the multiplicity of social practices and experiences of the world [8]. Human development has been theorised through the capability approach, and the two concepts are closely interwoven. Human development seeks to expand a persons capabilities, and expanding capabilities advances human development [9]. Therefore, the effective opportunities people have, and what they have reason to value, is at the centre. It highlights substantive freedoms ("capabili-ties") and outcomes or what is achieved ("functionings") [10,11].

However, human development does not discuss the role of HEIs as multi-scalar intermediaries that integrate regional, national and global scales and have the agency to drive towards specific directionalities [12,13]. This is our second analytical framework's contribution: the regional transition paths to sustainability (RTPS). In this understanding, HEIs can enact change at the regional level by understanding and acting on the co-evolution, co-production and co-learning [14] required to trigger sustainability with a transdisciplinary approach [14,15]. This understanding goes beyond the idea of an "engaged university" that provides tailor-made solutions to region-specific challenges and problems [16]. The university becomes a "change agent" that pinpoints the potential of HEIs to modulate and trigger institutional and organisational changes that are part of the micro-level plasticity of regional paths ("Path plasticity provides a certain scope for variation within a well-established institutional setting of a path. This characteristic of paths is rooted in the interpretative flexibility of institutions and incoherence of paths themselves due to the interconnectedness of institutional settings at different [spatial] levels." [17], p. 69.

The combination of the two analytical frameworks provides meaning to the idea of just transition in the sense understood by Swilling [18] (p. 19): "the outcome is a state of well-being (Firiamonti, 2015) founded on greater environmental sustainability and social justice". Figure 1 depicts our approach to just transitions. This understanding of transitions is particularly relevant in a Global South Context where states have a mixture of diverse institutions, in a context of an imperfect market, with clientelistic and exclusive communities, homes where patriarchal culture prevails and patrimonial and market-dominated states [19,20]. Ramos-Mejía et al. [21] highlight that research on transitions has rarely explored the characteristics of Global South contexts implicitly focusing on the environmental sustainability of production and consumption systems, without paying due attention to social and institutional sustainability. This social and institutional dimension of sustainability refers to the ability of societies to reverse processes of reproduction of poverty and deprivation of human capabilities, as understood by human development [21]. A similar critique comes from the field of socio-ecological transitions where it is noted that structural biases in knowledge production systems mean that the unique and necessary capacities of the Global South to innovate, experiment towards sustainability and nurture transformative

trajectories are under-researched and some-times not even known, despite their potential to inform transformative processes across the world [22–24]. For this reason, authors such as Swilling [18] propose just transitions, which are those in which processes of radical incremental changes accumulate over time and advance towards the SDGs and sustainability. The result is a welfare state based on greater environmental sustainability and social justice. These changes arise from a great multiplicity of struggles, each with its own context-specific spatial and temporal dimensions.

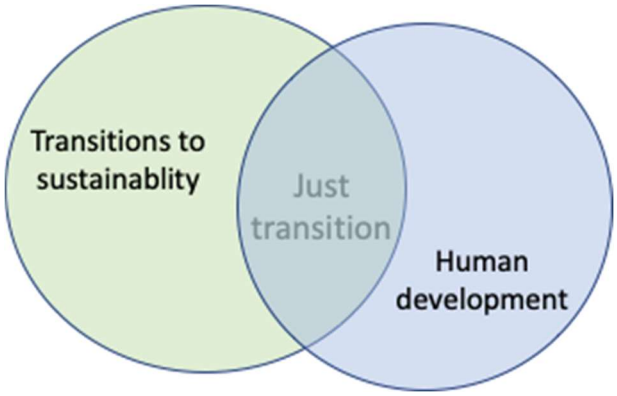


Figure 1. Analytical frameworks to understand just transitions.

To explore further our framework, we use two case studies. The first one is a governance experiment piloted between 2018 and 2019 that constructed, following a participatory process, an aspirational vision for this university through the definition of eight human capabilities. The second is a formal curriculum regional programme, Peace and Region (P&R). It was established in 2010 as a service-learning strategy for undergraduates in their final year. During one semester, the students get involved in transdisciplinary projects working and living with the communities to contribute to peace and local development.

The paper is structured as follows: in Section 2, we present the analytical approach to explore the case studies focusing mainly on the implications of human development, regional transition paths to sustainability, and the role of universities in unfolding such regional just transitions; in Section 3, we introduce the context of the UI and the main characteristics of the two initiatives; in Section 4, we refer to the research methods; in Section 5, we discuss the outcomes of the two experiments providing theoretical insights to just transitions in spatio-temporal institutional settings in Global South contexts. Finally, we conclude with the main findings of our study.

4.2. Analytical Approach

4.2.1. The Human Development: A Multi-Dimensional and Normative Approach to Development

Although the appearance of the Human Development Report (HDR) of the United Nations Development Program (UNDP) in 1990 marks a fundamental milestone for the dissemination of the concept of human development, the origins of this theory go back to the 1970s with the conceptualisation of the basic needs approach applied to development processes [25] and the adjustment with human face promoted by UNICEF. The first one represented a shift in economic development thinking by introducing concerns about the social aspects of development, participation, and the depletion of natural resources. The second one represented a significant challenge in facing dominant mainstream development paradigms, putting people first in development planning [26]. Another relevant milestone for the introduction of human development was the entrance of Mahbub Ul Haq as a special advisor to the general manager of the UNDP in 1989. Haq [27] explained that social arrangements must rather be judged by the extent to which they advance the human good, citing Aristotle, who argued that "wealth is evidently not the good we are seeking for, it is merely useful and for the sake of something else". As

Haq [27] p. 17 elucidated, "the basic purpose of development is to enlarge people's choices"; such choices are dynamic and encompass economic, social, cultural, and political lives.

Alkire [28] explains that human development sets priorities among goals, integrating several principles simultaneously. Commonly used principles include poverty reduction, equity, efficiency, voice and participation, sustainability, respect for human rights, and the promotion of the common good. Human development is thus multi-dimensional, and its components are crucially interconnected. Alkire outlines the definition of human development as follows:

> Human development aims to enlarge people's freedoms to do and be what they value and have reason to value. In practice, human development also empowers people to engage actively in development on our shared planet. It is people-centred. At all levels of development, human development focuses on essential freedoms: enabling people to lead long and healthy lives, acquire knowledge, to be able to enjoy a decent standard of living and shape their own lives. Many people value these freedoms in and of themselves; they are also powerful means to other opportunities.[28] p. 43

What is clear from Alkire's definition above is that human development conceives a multi-dimensional notion of the plurality of what a good life encompasses. These plural dimensions and underpinning values constitute a crucial anchor and guard against easy domestication when applying the ideas to universities. Alkire and Deneulin [7] (pp. 36, 37) identify four interlocking principles of equity, efficiency, participation and empowerment, and sustainability and elaborate on each as follows:

(1) Equity draws on the concepts of justice, impartiality, and fairness. It incorporates consideration for distributive justice between groups. In human development, we seek equity in the space of people's freedom to live valuable lives. It is related to, but different from, the concept of equality, which implies equality of all people in some space. In human development, equity draws attention to those who have unequal opportunities due to various disadvantages and may require preferential treatment or affirmative action.

(2) Efficiency refers to the optimal use of existing resources. It is necessary to demonstrate that the chosen intervention offers the highest impact on people's opportunities. When applying this principle, one must conceive efficiency in a dynamic context since what is efficient at one point in time may not necessarily be efficient in the long run.

(3) Participation and empowerment are about processes in which people act as agents—individually and as groups. It is about the freedom to make decisions in matters that affect their lives, hold others accountable for their promises, and the freedom to influence development in their communities.

(4) Sustainability is often used to introduce the durability of development in the face of environmental limitations. However, it is not confined to this dimension alone. It refers to advancing human development in all spheres—social, political, and financial—over time. Environmental sustainability implies achieving developmental results without jeopardising the natural resource base and biodiversity of the region and affecting future generations' resource base. Financial sustainability refers to how development is financed without penalising future generations or economic stability. Social sustainability refers to how social groups and other institutions are involved, support development initiatives over time, and avoid disruptive and destructive elements. Cultural liberty and respect for diversity are also important values that can contribute to socially sustainable development. In education, sustainability requires quality in processes and to secure educational achievements.

As Alkire and Deneulin point out, these four principles are not exhaustive; other values, such as responsibility or justice, could also be considered. However, we agree with Ibrahim and Tiwari [29] that an intervention inspired by the human development approach should incorporate the four dimensions; even if its focus is on one dimension, the others must also be considered concerning the primary value chosen.

4.2.2. The Capability Approach: Freedoms, Opportunities and Agency

Human development is theorised through the capability approach, and the two concepts are closely interwoven; human development seeks to expand people's capabilities and expanding capabilities, in turn, advances human development. The capability approach [11,30] is a broad normative framework rooted in a philosophical tradition that values individual freedoms and is used to evaluate and assess individual well-being, social arrangements, and the design of policies and proposals for social change. The approach conceptualises "good" development as broad freedoms constituted by human capabilities rather than only as national income or people's subjective preferences. Income does not tell us who has money or what it is used for, while preferences may be subject to adaptations in the light of poor living conditions. Instead, the core focus of the approach is on the effective opportunities people have, and what they have reason to value. It highlights substantive freedoms ("capabilities") and outcomes or what is achieved ("functionings"). If the capability is freedom of opportunity, the agency is freedom of process. Agency refers to the ability of the individual to pursue and achieve the objectives they value. An agent is someone who acts and makes change happen [10]. As Deneulin [31] (p. 27) explains, "well-being depends not only on what a person does or is but on how [author's emphasis] she achieved that functioning, whether she was actively involved in the process of achieving that functioning or not". The process is therefore significant. Sen [32] (p. 150) explains: "The crucial question here, in the context of well-being, is whether the freedom to choose is valued only instrumentally, or is also important in itself". In other words, being able to make one's own choices matters intrinsically. Because people as agents will choose the life they have reason to value, this makes "capabilities an agency-based and opportunity-oriented theory" [33] (p. 2).

4.2.3. Human Development, Capability Approach and University

Despite international declarations recognising the role of HEIs in promoting sustainable development [1,34], mainstreaming higher education policy is driven by an economic and knowledge-based development paradigm [35]. Coherent with this direction, scientific activities are aligned with a global environment highly competitive in knowledge resources [36] and the training of a qualified labour force. This configuration reinforces the predominance of higher education from the North, excluding most universities in developing countries [37]. Such a scenario is more likely to perpetuate uneven development.

The human development and capability approach can provide a different narrative to understand the purpose of HEIs [9]. A narrative that challenges the rationale where: university fees become the price, students are customers, knowledge is converted into money units (cost of a book, price for an article), the education is a commodity to be bought and sold. Human development and capability thinking offer visionary norms by adopting a multi-dimensional and policy-responsive view of what a good university could look like, embracing the public good, social justice and sustainability in any definition of a policy narrative [38].

The approach also provides an evaluative space to analyse the extent to which capabilities such as practical reason, educational resilience, knowledge and imagination, learning disposition, social relations and social networks, respect, dignity and recognition, emotional integrity, emotions and bodily integrity [39] can be enhanced through teaching [40], research [41], and social outreach [42]. Finally, the human development and capability approach can be helpful in scrutinising the strategic level of universities in terms of their policy-making processes.

4.2.4. Regional Transition Paths to Sustainability (RTPS) and Universities

Sustainability transitions have been mainly studied from four theoretical frameworks: the Multi-Level Perspective (MLP), The Technological Innovation Systems (TIS), Strategic Niche Management (SNM) and Transition Management (TM) [43–45]. The MLP has been very influential within the transition studies (TS) since it provides a heuristic to understand and analyse transitions in the long term and through the interactions of three analytical levels: (1) niches, which are protected spaces for experimenting with

developing sustainable alternatives to the dominant practices. It is in the niches where radical innovations are assumed to emerge [46,47]; (2) socio-technical regimes that constitute the stable set of rules and routines and account for path-dependence and stability in industrial, technological, behavioural, cultural and political practices; (3) the broad, long-term, exogenous environment trends that are called landscape [48]. The MLP provides a valuable and powerful analytical framework to govern transitions by offering tools to understand incremental and radical innovation dynamics and complexity. However, scholars have highlighted some limitations when applied to empirical cases [44,49–52]. The landscape is less studied and therefore can act as a "black box" where everything that does not fit in the regime and niche levels go; natural, physical and geographical studies are only tangentially incorporated; agency of different actors beyond their role as consumers or users is less explored given the strong emphasis on the technical side of innovation; the fluidity and dynamic configurations of the niches, regimes and landscape are oversimplified, and therefore the MLP fails to capture microdynamics in boundary categories [53,54].

Regional institutional settings with their territorial actors' configurations and networks influence sustainability transitions' pace and scope [51,54–56]. A spatially sensitive perspective is needed to study innovative interactions, which have contingencies of the territory's transitions. The growing interest in urban and regional transitions and their multi-scalar character has urged for a framework that captures the short-time changes on the micro-level and long-term transformations at socio-technical system levels [54]. Regional transition paths to sustainability (RTPS) provide a robust alternative to studying organisational and institutional dynamics that happen simultaneously in multiple so-cio-technical regimes [57]. In this sense, the RTPS framework goes beyond single re-gime-niche interactions, as analysed in the MLP. Four key features are relevant to understanding transitions from the RTPS perspective. Firstly, transition processes in interdependent regimes are a primary unit of analysis. Secondly, adjustment and recombination of institutional settings and change occur in the niches and regime levels. The overlapping nature of change is particularly important in the Global South context [44], where forming regimes compete with mature niches. Thirdly, change starts from and within micro-level transformations at a progressive pace in protected spaces. These transformations are place-specific, which mould possibilities for adjustment depending on the recombination of the existing contextual institutions. Fourthly, RTPS emphasises the temporary dimension of transitions by analysing if and how microdynamics changes are finally stabilised [54].

The four distinctive aspects of the RTPS have in common the attention to the processual analysis of the institutional dynamics on the emergence and evolution of multiple paths. Path-dependency is studied beyond the rigid categories of regimes and niches and includes analysing context-dependent organisational forms in spatio-temporal arrangements [54]. By including an evolutionary economic geography understanding, the RTPS explores path-dependent developments at the micro-level characterised by local actors' incremental changes [53,58]. Within these actors, universities play a critical role.

4.2.5. Role of Universities in RTPS

Universities are key regional actors in promoting and triggering sustainability transitions, especially in regions with low human development indexes. Beyond their role of educating, universities serve societal needs by being intermediaries between local and global knowledge (since they are embedded in regional and international networks) [59]. Through their institutional framework, campus operations, teaching, knowledge generation, outreach and collaboration [60] towards a localised development agenda, universities have the potential of becoming experimental frontrunners for temporary organisational forms for de- and re-alignment of normative cultural and behavioural practices [61].

Knowledge, scholarship and research are not neutral [62], and therefore HEIs can promote a normative kind of development rooted in regional needs [63]. The agency that universities have in their relational space allows them to be key actors in promoting a sustainability vision with social inclusion and empowerment.

An engaged university acts on a regional base to provide alternative solutions to oppressing challenges that affect people's well-being in diverse needs such as sanitation, health, food, transport, energy,

and education. Due to their close connection and influence with local actors, HEIs have a great potential to influence the micro-dynamics that shape the culture, knowledge, industrial settings, markets, and policies of intertwined so-cio-technical systems. From this perspective, universities can serve as facilitators between regional and other institutional actors [13].

Higher education can contribute to territorial sustainability change in developing a societal vision with short, mid and long term specific goals (strategic level); drawing and fostering coalitions and co-operation in regional actors networks to create inclusive sustainability paths (tactical level); and aligning and embracing change towards sustainability with social justice in their curriculum, research, campus operations and social out-reach (operational level) [14,63]. The extent to which HEIs can contribute RTPS is mul-ti-scalar in time and space and related to their missional functions and campus operations

Teaching activities can advance a long-term vision of desirable development via the graduates and their professional activities, acting as multipliers of sustainable development processes in social learning systems. "While a theoretical consideration of sustainability issues helps to raise awareness, practical student projects in collaboration with regional stakeholders can have a direct impact on the regional transition path" [17], (p. 165. In this sense, pedagogical innovation in strategies such as service-learning to move forward from knowing what to knowing how with social responsibility are positive directions to unlock the role of HEIs as mere knowledge transfer institutions to a trans-disciplinary way of co-production and use of knowledge in context.

Research is one of the most visible functions of HEIs to contribute to society. The mainstream knowledge production system has been challenged to break the disciplinary silos and integrate findings from different knowledge areas (interdisciplinarity). More-over, HEIs are called to integrate other knowledge producers such as citizens, practi-tioners, and policymakers (transdisciplinarity). As O'Riordan et al. highlight, "We need to expand the boundaries of each discipline, make them porous and flexible, and identify inter- and transdisciplinary processes that integrate knowledge and diverse ways of knowing" [15], (p. 7). Research that contributes to RTPS requires a transdisciplinary ap-proach with strong problem-solving. The transition of knowledge production towards more integrative science requires a multi-stakeholders research agendas definition to envision timely and contextual sustainability paths [13].

Social outreach, or more commonly known in Global South contexts as the third mission of universities, plays a substantial role in transformation. Materialising sus-tainable development in a specific territory requires cross-sector partnerships based on co-creation [64]. A socially embedded knowledge to trigger environmental transfor-mations acts as a chief driver, which challenges the traditional technology transfer model developed by HEIs [66]. Engaging in co-creation processes requires trust-building and long-term commitment between actors, highlighting how power modulates relationships and connections within networks across various scales [56]. To influence localised paths in multi-actor environmental and social governance, universities, as influential organisa-tions in their territories, can take a proactive role in advancing sustainability agendas in regional advisory boards, political engagements, and civic movements. Moreover, they can enhance their brokering and bridging function to expand and deepen regional net-works to mobilise human, financial and material resources [61].

4.3. The Universidad de Ibagué and its Two Processes: A Capabilities List as a Collective Actionable University Vision and the Peace and Region Program

The Human Development Index (HDI) is a summary measure for assessing long-term progress in three human development dimensions: a long and healthy life, access to knowledge and a decent standard of living. Colombia's HDI value for 2019 ranks it 83rd out of 189 countries (UNDP, 2020). Although the country has improved from 1990 in its three dimensions by almost 30%, inequality is still profound. The 2010 Human Development Report introduced the Inequality-adjusted HDI (IHDI), "which considers inequality in all three dimensions of the HDI by "discounting" each dimension's average value according to its level of inequality" (UNDP:4, 2020). When the inequality is dis-counted from Colombia's HDI, the

country losses 22.4% in the distribution of the HDI dimension indices. It directly hinders people's right to enjoy a decent standard of living and, therefore, shape their own lives. Moreover, there are prominent differences at the regional level, surprisingly having those regions with richer natural resources with lower HDI and higher inequality. From 32 departments (departments are the geographical po-litical division of territories in Colombia), the Tolima region ranks in 18th place.

The Universidad de Ibagué (UI) is located in Ibagué, the capital and biggest city in terms of population, administrative and financial size of the Tolima Department. The region has great natural wealth (in Tolima's territory, 27.7% are paramos (Ecosystem of the regions above the continuous forest line, yet below the permanent snowline); it has 40% of the country's bird's species; 11% of dry tropical forest; contains three protected natural parts; and fourteen strong agricultural products for national and exports con-sumption, being rice the main crop) and cultural diversity (Tolima has 11 indigenous communities from the Pijao Etnia. It also has mestizos originally coming from the Tolima territory, and migrations from Antioquia, Cundinamarca and Boyaca (other Colombian departments)), but only two regional universities (there are other university branches but they only offer a limited number of programs), including the UI. Therefore, a large part of the local population has limited access to higher education, which has influenced the relatively low development and the high unemployment rate (In 2019, according to the National Department of Statistics (DANE), Tolima was the department with the highest unemployment rate (15.3%)). Additionally, Tolima has been a region hit hard by political violence, first during the 1950s with a bi-partisan civil war. From the 1960s onwards, the conflict between illegal armed groups and the State has been sustained.

The UI has a good reputation in the Tolima region, which was amplified nationally with its high-quality institutional accreditation, obtained in 2019. The UI defines itself as a regional university committed to regional development. From its beginning, the UI has adopted a human development conception based on the construction of local identities and the balance of human well-being with environmental sustainability. Formal curriculum reforms to situate learning in the territory from the first semester onwards; regional teaching case studies based on real regional challenges gathered through the territory-based programs; sustainable business practices; citizen's engagement through business and law clinics; the institutional research agenda co-produced with regional stakeholders aimed at solving local problems; and the programs of social projection and extension are some of the concrete initiatives the university has promoted from its foundation [67].

However, the UI approach to sustainability is less clear since most of the transversal and specific guidelines, programs, projects, policies have not been thought from that perspective. Nevertheless, there is a formal recognition that there cannot be social well-being without preserving territorial natural resources. In the last years, the UI introduced courses related to the conception of sustainability and technical understanding on how to produce sustainable solutions; had an increase in research projects related to sustainability both funded internally and externally; changed practices related to water, electricity, waste disposal, recycling, green spaces in the campus operations; and introduced a normative direction towards environmentally friendly practices in the social outreach projects. These changes motivated voluntary participation of the UI in the Green Metric World University Ranking (http://greenmetric.ui.ac.id/what-is-greenmetric/. Access on February 14th 2021. In 2019, the UI ranked 278th out of 780 universities, and in 2020, 381st out of 912 universities in the world. In Colombia, the university is ranked 27th out of 47 universities).

The UI academic offer has concentrated on undergraduate programs. The professional programs are offered, in the majority, for students in the most vulnerable levels of economic income, who, in Colombia, are qualified in socio-economic strata. The strata levels go from 1 (the lowest) to 6 (the highest). In 2019, 48% of the students were in Strata 1 and 2 and 35% in Strata 3. The university offers the opportunity to local students (up to 85% of the students come from Tolima) to get a high-quality education (The UI was accredited by the National Ministry of Education of Colombia as a High-Quality University in 2019 (Resolution 010440 03). This is a voluntary process where universities present themselves to the Accreditation National Council. It is a highly demanding process. At the time, the UI was

the only university in Tolima with High Quality Accreditation). The UI presents 32 subjects that include sustainability topics in the teaching function, representing 5.2% of the total subjects offered.

The research agenda of the UI is updated according to the regional needs through participatory forums where different sectors (industry, government, producers, civil society) express their needs and interests. The UI responds with its faculty expertise. The agenda is defined around five research topics: food security, environment, social well-being, civic coexistence, regional development. These topics collate six interdisciplinary programs: Innovative technology-based agroindustry; conservation and eco-efficient use of natural resources and the environment; High value-added service industry; Education and well-being for integral human development; Laws and justice for citizen coexistence; Inclusive and sustainable regional development. During 2018–2020, the university had 75 active research projects related to sustainability from humanities, engineering, social sciences, natural sciences, mathematics, business and finances, law and political science. During the same period, 69 were finalised, according to data provided by the UI Research Direction.

However, despite these efforts, there is a limited assumption about the relationship between regional needs and disciplines among faculties and students. As the rector stated: "There is a misunderstanding of the purpose of academia. For instance, the misunderstanding that focusing on the region distracts the disciplines from their formal instruments and cutting-edge research. It is important to deactivate these conceptions through a dialogic and pedagogical process." Furthermore, this is, precisely, one of the goals of the capabilities list initiative.

4.3.1. The Aspirational Capabilities List for the UI

In 2018, the UI leadership enabled a participatory process to envision the university as a space where the community, both from the university and from the region, can expand human capabilities. The definition of what is valuable for the UI includes representatives of faculty members, students, administrative staff, service staff, leadership, alumni, enterprises, and social organisations that work with the university. The initial aim was to build an umbrella institutional policy based on the capability approach designed from a bottom-up approach [65].

The final capabilities list, developed and approved by the UI community, can be seen in Table 1:

Table 1. The UI capabilities list†.

Category	Capability	Definition
Training	Training of persons and citizens	A university community capable of training people, professionals, and citizens with critical thinking, ethical principles, and sensitivity regarding social differences and needs.
	Integral leadership	A university community capable of training people for reasoned and responsible decisions, in accordance with criteria of justice, fairness, and respect for differences (within the framework of empathic and affective communication) that leads to the realisation of joint actions oriented to the common good.
Territory	Social construction of territory	A university community that is capable, in association with the other social actors, of rebuilding and appropriating its territory collectively, through dialogue and mutual understanding, committing itself to nature, culture, and diversity of knowledge for connivance and peace.
	University that transcends	A university community capable of generating projects and actions aimed at the development of a fair and democratic society that enhances reflection, exchange, and generation and appropriation of knowledge to respond to aspirations, challenges, and problems that affect the various actors in the territory.
University community	Purposeful critical reflection	A university community capable of reflecting and building critically on their being and daily work in the light of their identity, history, ethical stakes, bonds of trust, organisational forms, growth opportunities, and personal and collective aspirations.

	Care	A community that is capable of ensuring conditions that allow the integral growth of the self and the other, through relationships that build trust and recognition among its members as well as of the environment in which they are immersed.
	Constructive interaction	A university community capable of stimulating, allowing, and promoting a dialogue that is well informed, clear, transparent, and respectful of freedom and differences of opinion. It is oriented, on the one hand, to strengthen the social interaction between the members of the community, so that they develop the personal power to choose and act in situations of social and political environment. On the other hand, it favours participation, a good working environment, and individual and collective integral human development.
Enterprise	Weave nets	A university community capable of fostering interconnections with companies, communities, and students to develop innovative projects that respond to territorial needs, build trust and take care of the common good, to make possible a truly local development with a global perspective.

†[65] p. 47 In (Velasco and Boni: 47, 2020).

The UI capabilities list shows what the university community values and wants to expand through its organisational operation and its different academic and social out-reach programs. It is a collective manifestation of a human-centred vision integrated with the territory. The effects of the list in the university operation are still to be seen. How-ever, this participatory process shows the possibilities that an HEI has to enable and co-create a collective vision.

4.3.2. The Peace and Region Programme of the UI

The Peace and Region Programme (P&R) is an undergraduate curricular strategy that links students with projects in rural and urban municipalities of the Tolima region. It started as a graduation option, but in 2015, after a curricular reform for all the under-graduate programs, it became a graduation requirement. Students spend a semester liv-ing in the territory, with the support from regional advisors, who are full-time tutors specialised in regional development. The programme revolves around three key themes: peace, citizenship, and regional development. It is developed in three stages:

1. Contextualisation: It encompasses a seminar (16 h to approach the three themes), the development of the semester's action plan, and an induction week, before the displacement of the students to the different municipalities in rural or urban contexts.

2. Regional experience: Each student settles in different locations (provided by the public or civic organisation that the student will engage with); incorporates in a project previously agreed; engages in two learning encounters organised by the regional tutors in which students located in geographical proximity gather to have a critical reflection on their process and the regional needs.

3. Closure: It includes two activities, a collective review between the university tutor, the regional organisation's project leader, and the student to evaluate the experience and to define the continuity of the project to be taken from a coming student; and a collective formative evaluation in the UI campus where all the students and tutors reflect on the learning experiences both in terms of their personal growth and professional training and in terms of the knowledge co-production between local communities and the University for regional thriving.

From 2010 until 2019, P&R has co-designed and implemented more than 400 regional development projects in the 47 municipalities of the Tolima department. It has signed over 70 cooperation agreements to develop projects with municipal governments, hospitals, public services providers, community and civic organisations, agricultural producers associations, and enterprise foundations. Over 1000 students from the schools of engineering, business and economics, humanities and social sciences, and law, have fully immersed themselves in the territory and worked with the local communities [68].

From an organisational perspective, the P&R programme has an internal administrative and academic unit with a director, and three coordinators: research, academic, projects, and the regional tutors' group. The UI-local organisation agreement guarantees that the UI supports the co-identification of local needs, co-formulates relevant projects to respond to those needs, and supports the continuation of the projects until their closure. From the organisations' side, they commit to providing housing and food for the students and support their learning process.

4.4. Methodology

To explore how and to what extent universities can develop and promote just transitions, we chose a middle-size regional university in a region with a low human development index in the Global South. It was a deliberate decision, not only because of the novelty of the two cases that we studied within the university but also to have a deeper exploration of just regional transition paths to sustainability in adverse contexts. Although our research was based on two experiments within a single university, we aim to contribute to the understanding of the role of HEIs towards regional just transitions.

We developed qualitative research based on semi-structured interviews, focus groups, participant observation, documentary analysis, and a set of participatory methods designed following the human development values and the human capabilities approach. The two case studies were the construction process of a university policy deeply rooted in the territory and the contribution of a curricular programme to human development and RTPS.

The capabilities list construction process started in March 2018 with two phases that finished in December 2019. The analysis of the Peace and Region programme had two stages. The first was carried out between September and November 2019, and the second between November and December 2020. Each case study had a different methodology design; that is why we describe them separately. Although the methodologies for both cases were tackled from the human capabilities approach, we analysed the data gathered with RTPS lens.

4.4.1. The Capabilities List Methodology

The list was built in two stages. The first phase was explorative and based on an opening up process to integrate: (1) the various narratives, knowledge, and discourses of the different groups; (2) actors and networks involved in the UI action; (3) the underlying vested interests of the participants. The second phase was devoted to validating the list with the community, reflecting on the enablers and disablers to expand the capabilities list, and building connections between them. A third phase that was truncated due to changes in the university leadership was devoted to building action pathways to expand those capabilities expressed in concrete plans, programs, calls, policies [65]. A description of the methods and phases can be seen in Figure 2.

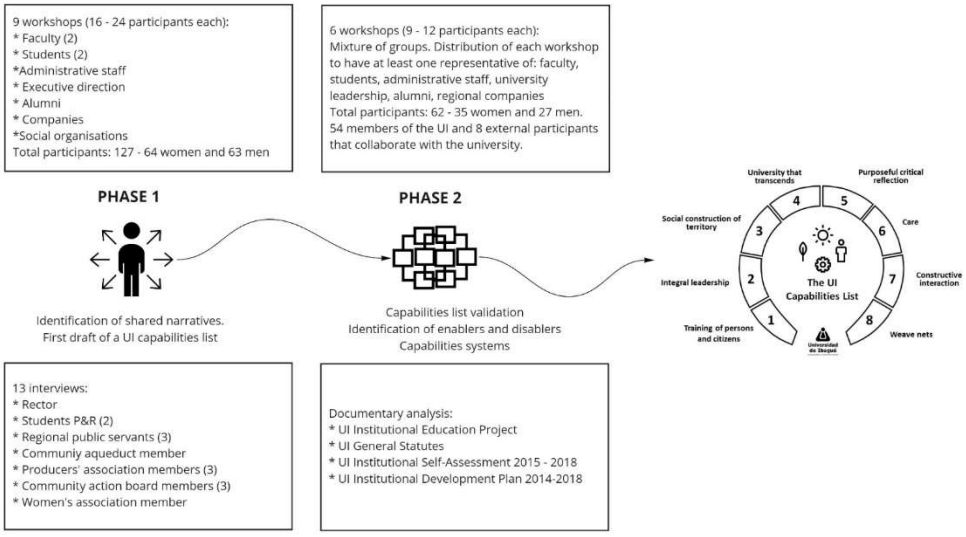


Figure 2. The UI capabilities list methodological process.

The methodology was designed and applied by a group of seven researchers trained in human development, innovation studies, and systemic thinking from the UI, and by the joint research centre of the Spanish National Research Council (CSIC) and the Universitat Politècnica de València (UPV), Ingenio. The first stage had nine workshops grouping together the same type of actors (students, faculty, administrative staff, external partners, etc.) so that participants could express themselves freely in a peers' environment. The workshops used transpersonal, narrative, and visual methods to situate participants in their context and explore what they considered valuable as university community members [68–72]. The researchers' group gathered the data through participant observation and the collection of written reflections developed by the participants. Additionally, 13 interviews were performed with the UI Rector and territory social organisations that could not be part of the workshops developed in Ibague.

Former stage participants were summoned to validate the list and formulate concrete ways to expand capabilities inside and outside the UI in a second stage with six workshops between November and December 2019. The participants were mixed this time, so discussions on what is valuable for the UI would have different perspectives. The workshops had "three moments". The first was dedicated to recalling the first stage of the process and the objective and meaning of the project. The second moment had a format of a "Capabilities Gallery" where participants could interact with each one of the capabilities in a sensory way, touching the frames, reading the texts, and connecting with the content. An image accompanied each capability. During the second moment, participants included new capabilities or exclude any of the ones presented. They also related capabilities systems and identified enabling and disabling factors to expand the capabilities system. The third moment entailed participatory feedback from the participants related to the process and the output (the list). Simultaneously, a documentary analysis of formal UI documents such as the general statutes, the university educational project, and the different organisational development plans was developed. The initial list was adjusted with the second stage results, and a list of disablers and enablers to expand the list was recorded.

4.4.2. The Peace and Region Programme Methodology

The main methods used to analyse the P&R programme were the following: official documents analysis, semi-structured interviews, focus groups, and a seminar about initial findings with the P&R team, faculty, students, and university leadership.

Eighteen interviews were performed and distributed over eight students, four regional organisations, three P&R board members, one faculty member, the president, and the university provost. The focus group was done with six of the regional tutors. The interviews with regional organisations and students were focused on the municipality of Chaparral since 1) Projects have been executed every year from the start of the programme in 2011; 2) Every year has a mixture of projects with local authorities,

social organisations, and social foundations; and 3) There have been students doing the experience from four of the five schools. The remaining interviews and the focus group performed with the regional tutors included questions about the experience in the whole territory. Table 2 presents a description of the methods and participants involved in the data gathering.

Table 2. Peace and Region research methods description.

Participants	Methods
Students	Eight interviews to students from the programs of: Civil Engineering, Political Sciences, and Industrial Engineering. Seven women and one man.
Regional organisations	Four interviews to: Chaparral Major's office, Chaparral Aqueduct manager, Chaparral Women's network for peace, Chaparral Hospital manager
Peace and Region Team	One focus group with six regional tutors Three interviews to: Program's director, Academic Coordinator, and Projects Coordinator
Faculty	One interview to a full-time lecturer involved with the program
Institutional Leadership	Two interviews: Rector and Provost
Researchers	Documentary analysis: Thesis related to Chaparral UI Social responsibility policy UI Institutional Education Project UI Curricular reform assessment 2018 Institutional Development Plan 2014–2018 UI Curricular Guidelines 2011 Peace and Region Semester Regulation 2017 Peace and Region Internal recompilation of learning materials

The instruments for data collection were guided by the human capabilities approach and centred the attention on the expansion of capabilities related to learning processes enhanced by the P&R program. Special consideration of the well-being and agency of all the stakeholders involved in the process was also central in the analysis.

4.4.3. Data Analysis for the Current Study

The authors were part of the research design and data collection processes for the two case studies and worked together with researchers from the UI. To advance in the study of the cases, we analysed the raw data with two criteria: the values of human development and the central elements that constitute the RTPS. We triangulated the data gathered in the interviews, focus groups and workshops with institutional documents and analysed it following the categorisation in Table 3. The categorisation was done separately for each one of the categories.

Table 3. Data analysis categories.

Human Development Values	Regional Transition Paths to Sustainability
Equity	Interdependent socio-technical systems
Sustainability	Organisations and institutions involved
Participation and empowerment	Multi-scalarity
Efficiency	Plasticity
	Relational space

Human development and RTPS place a strong emphasis on the equal importance of the process and the results. Our analysis is crossed by focusing on how just transitions are configured based on

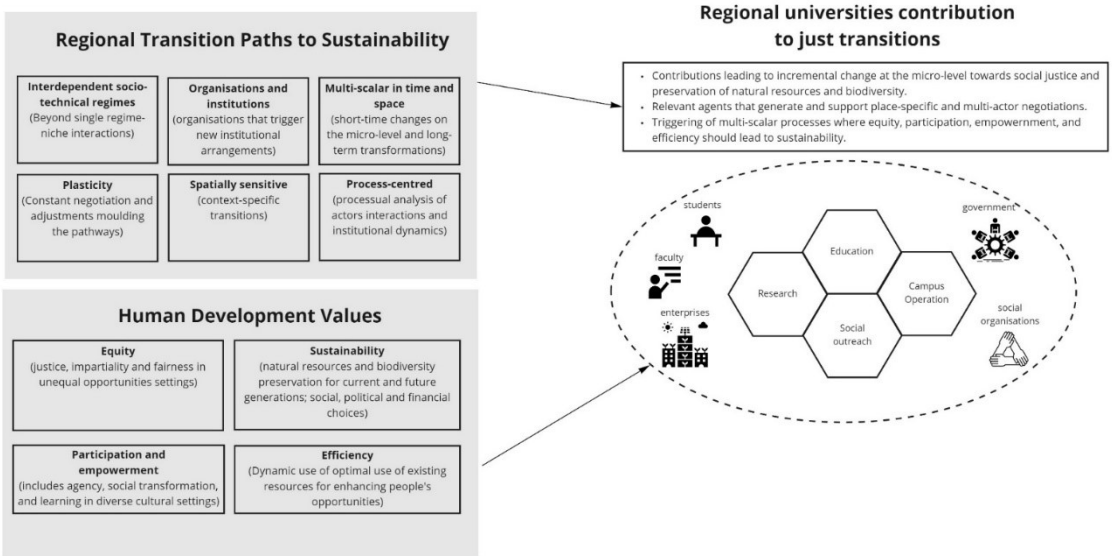
these theoretical frameworks, taking our case studies as references. Therefore, in our discussion section, we present the findings for each case study differentiating the process and the results dimensions using the two analytical frameworks.

4.5. Discussion

In Section 2, we argued that merging the two analytical approaches, RTPS and human development, can provide us with an adequate approach to discuss to what extent the UI is contributing to a just transition through two specific initiatives. As we stated in the introduction, this is especially relevant in Global South contexts, where social justice must be a goal of any sustainable transition [18]. Following Loorbach's complexity-based governance framework, which distinguishes four types of governance activities [73], we argue that the capabilities list is a strategic university policy activity, and the P&R programme can be framed as an operational programme that roots the university regional commitment into its teaching, research and social outreach missional functions. Both cases have an experimental nature that aims to enhance a normative regional view. The regional dimension of the transition pathways shaped by specific organisations and institutions is directly addressed in both case studies. Recognising that place-specificity and scale influence the transition processes [51] is crucial to analyse how a regional university acts as an intermediary to challenge path-dependency.

From one side, the human development approach provides the following analytical elements: (1) its core values (equity, participation, sustainability, and efficiency) that will allow assessing the content of the list and the main features of the P&R programme; (2) the capabilities expansion as a result of both initiatives. From another side, the RTPS framework provides central elements to observe the two initiatives: the relevance and dependence of the spatial context; the multi-scalar nature of transitions; changes at the micro-level that can influence pathways and trigger new institutional arrangements and a process-centred perspective. Supporting our analysis in our case studies, we explore how a regional university, from its core activities of teaching, research, and social outreach operated from its campus, can contribute, or not to just transitions. Figure 3 depicts our understanding of how universities as critical actors to engage regional governments, enterprises, social organisations, and their inner community can trigger multi-scalar processes towards social justice and sustainability. Following this reasoning, in Section 5.1, we analyse the capabilities list; in Section 5.2, we approach the P&R program; in Section 5.3, we discuss to what extent the two initiatives are contributing or not to a just transition in this regional context.

Figure 3. Human Development and RTPS to analyse the role of universities in the promotion of just transitions.



4.5.1. The UI's Capabilities List

4.5.1.1. On the Content of the List

Examining the content of the list reveals a strong connection with three of the four core values of human development. Equity is central in the definition of the training capabilities: A university community capable of training people, professionals, and citizens with critical thinking, ethical principles, and sensitivity regarding social differences and needs (cap. #1) or in accordance with criteria of justice, fairness, and respect for differences (cap. #2). References to equity also appear in the cap. #4 related to how the generation and appropriation of knowledge should respond to aspirations, challenges, and problems that affect the various actors in the territory.

Participation and empowerment are the preferred values for the UI's community. We can find references to them in all the eight capabilities, those related to the training characteristics *(*critical thinking, ethical principles, and sensitivity (cap. #1), with reasoned and responsible decisions (cap. #2). Additionally, as part of interactions with other actors: fostering interconnections with companies, communities, and students to develop innovative projects (cap. # 8); in its internal operation: a university community capable of reflecting and building critically on their being and daily work (cap. #5); creating relationships that build trust and recognition among its members (cap. #6) or promoting a dialogue that is well informed, clear, transparent, and respectful of freedom and differences of opinion (cap. #7). References to the capability to enact changes and expand agency appear clearly in cap. #7: develop the personal power to choose and act in the social and political environment, in cap. #3: rebuilding and appropriating its territory collectively and in cap. #8: to make possible a truly local development with a global perspective.

On the contrary, efficiency, understood as the optimal use of existing resources, is absent in the list. Even when the list mentions a university community capable of fostering interconnections between different actors to develop innovative projects, the aspiration is to respect territorial needs, build trust and take care of the common good.

Finally, references to sustainability appear clearly in cap. #3: appropriating its territory collectively, through dialogue and mutual understanding, committing itself to nature, culture, and diversity of knowledge for connivance and peace and in cap. #6: build trust and recognition among its members and the environment in which they are immersed.

When the list is analysed from the RTPS we find coherence between the UI mission and what its community considers valuable individually and collectively. It is clear in each of the eight capabilities that the UI has a normative regional vision that puts the environment, social well-being, and civic coexistence at its centre. That is also included in its thematic research areas and, to a lesser extent, in the academic programs offer. The UI community expresses the characteristics of a university engaged with the region, when it states the sensitivity regarding social differences and needs (cap. #1); rebuilding and appropriating its territory collectively (cap. #3), generation and appropriation of knowledge to respond to aspirations, challenges, and problems that the various actors in the territory (cap. #4); care for the environment (cap. #6); and fostering interconnections with companies, communities, and students to develop innovative projects that respond to territorial needs (cap. #8).

The expression of what is valuable for the university community and its multiple local partners in the list shows the explicit intention to influence short- and long-term regional paths at a strategic level. As the rector stated, the most valuable contribution of the UI is "a regional consciousness, a regional commitment [which is visible] in the environment, in curricula, in the regions' outlook".

The list also draws tactical regional paths based on coalitions and cooperation among regional actors when states that the territory is socially constructed (cap. #3), that a constructive interaction among different stakeholders is central to act in a joint regional vision (cap. #7), and that weave nets is the way to make possible a truly local development with a global perspective (cap. #8). The operational level of the list was started to define, in the second stage of the process, when the capabilities were displayed in a systemic, interconnected way and enablers and disablers were identified. A third stage to develop

operational instruments was truncated by the change of university government and a more conservative vision of the policy-making process from the university board.

The ambition to be a decisive regional actor with a positive reputation and insertion of the UI in the regional context lays the ground for the UI to be an experimental frontrunner to trigger new institutional settings [61]. Moreover, the directionality expressed in the list suggests that new institutional arrangements should be multi-actor, inclusive, and respectful of the people and the environment. However, the extent to which the UI has influenced RTPS and could trigger transformation through its joint vision requires further research grounded in approaches developed in the RTPS field (i.e., a transition topology as the one developed by Pflitsch and Radinger-Peer (2018) [74]).

4.5.1.2. On the Process of Building the List

From a human development perspective, as presented with more details elsewhere [65], the participatory process for constructing the capabilities list expanded the epistemic capability of the participants. Following Fricker [75], the epistemic contribution capability is the real opportunity to produce and share information. This capability was expanded individually and in groups. Individually, in phase 1, when the participants evoked their experiences, moments, situations, and people that have been pleasant, valuable, and/or significant on their path at UI. Collectively, in the four-station journey, when they argued about how the university could contribute to the region and/or vice versa; the characteristics of a person they consider as a comprehensive trainer; the aspects of the university they would either retain or remove; and the values, knowledge, practices, and emotions that describe a humanist and autonomous leader. In the second phase, the epistemic capability was also enhanced when participants experienced the Capability Gallery when each person observed, experienced, and reflected on the capabilities presented.

Apart from the central epistemic capability, other capabilities have been expanded. We can mention the practical reason capability understood as making well-reasoned, informed, critical, independent, intellectually acute, socially responsible, and reflective choices [39] and, enacted during collective moments, the social relationships capability, understood as being able to participate in a group to learn, work with others to solve problems or tasks, and collaborative and participatory learning [39].

The list's construction methodology was designed to be highly inclusive with regional partners and alumni included so that the aspirational guiding vision for the UI had the recognition of wide regional underlying institutional dynamics. The multi-scalar nature of regional paths was also included in the construction process. When participants were asked to state the fundamental characteristics that the UI should have to fulfil its mission and endure in time; the current enablers and disablers to expand the collective capabilities; the required short and long-term changes for the UI and the region were constantly in negotiation. The UI defines itself as a regional university. Therefore, space is a central element. In the first phase, a specific stage in the workshop was dedicated to the definition of the region and how the university can contribute to it and vice versa. In this sense, participants discussed how context-specific activities could draw specific action pathways.

The list's ambition was twofold. Firstly, to empower the university community through the process (internal and regional partners) to express what they value and want to expand through the UI. Secondly to set a high-level strategy to guide the university policies in the long-term so the coherence with its normative regional vision would be preserved. The first ambition was fulfilled, but the second is still uncertain. All processes are contextual and dependent on constant negotiations and adjustments that mould the pathways. From a RTPS perspective, the list could be seen as an attempt to trigger new institutional arrangements to foster a regional directionality towards just transitions. However, as has been showed in many analysis of socio-technical transitions [76], power issues can strongly influence directionality and are constantly moulding pathways to sustainability.

4.5.2. Peace and Region Program

4.5.2.1. Learning and Capabilities Expansion

Previously explained in Section 3, P&R is an undergraduate curricular strategy that links students with projects in rural and urban municipalities of the Tolima region. It is based on different pedagogical strategies devoted to promoting an active, dialogical, contextual, and collaborative learning environment, as shown in Table 4 [76–78]. It is also informed by a project-based learning approach [80] designed around specific questions or problems that require autonomous learning and decision-making processes. Those questions and problems are based on community needs following a service-learning approach [81].

Table 4. Pedagogical strategies and learning types in the Peace and Region Program.

Pedagogical Strategy or Learning Mode	Peace and Region
Active: The student learns by acting and reflecting on her actions [77]	Learning by action, with constant reflections on attitudes and values.
Contextual: Critical application of knowledge in real situations	Territory as a learning space. Re-valorisation of the meaning of space and citizenship.
Cooperative or collaborative: Relational learning based on joint purposes beyond their own interests [78]	Interdependence and interaction with actors in the territory. Responsibility and communication skills.
Project-based: Learning process designed around specific questions or problems that requires autonomous learning and decision-making processes [80]	Based on projects with autonomous work with the support of disciplinary UI lectures. Co-production of solutions with the community.
Dialogic: Learning based on communication, interaction, dialogue, and consensus/dissent among participants [79]	Egalitarian dialogue and creation of meaning. Reflexive transformation of the environment.
Service-learning: based on community needs [81]	Learning through sense-making of contextual needs and participatory approaches to solving them

From a human development perspective, we can argue that P&R is based on a participatory approach where the different actors involved (local organisations, students, lecturers, regional advisors) work together to develop a learning environment. At the same time, the projects developed by the students should address problems identified by regional tutors and local organisations. Detailed scrutiny of those problems' content reveals differences between the priorities detected by local municipalities and companies that those highlighted by social organisations. Local municipalities and companies are most inclined to identify sustainability needs (understood in terms of preventing or mitigating environmental hazards) and efficiency (how students can help local municipalities be more efficient in their performance). Some interviewees consider the UI students as bearers of technological novelties that can optimise local services: "they bring technological novelties, industrial and technological revolutionaries' ideas"; "they helped us to optimise the sanitation service".

Social organisations also value the technical contributions of UI students: "the interns helped us to manage social networks, to prepare a news stories, photographs, and with writing styles". However, they also consider that the students are closer to the social contexts in Tolima's region. As one of the former students of P&R said: "P&R gave me the opportunity to get to know the region, how it works, and how it is being prepared as a real actor of the post-conflict". However, even if we can appreciate these differences de-voted to the profile of the hosting organisations, in terms of students' capability expansion, results are homogenous. Firstly, P&R contributes to expanding capabilities related to knowledge acquisition. Although this capability already exists in students, P&R contributes to acquiring multidisciplinary and contextual knowledge. One example of multidisciplinary knowledge is this quote from an interview with an engineering student: "Well, I am not doing what an [engineer] does, but what a social communications person does. However, the idea is to grow professionally or have another type of

experience and not just business experience. [P&R] did open my mind, it opened my vision to other branches of a professional environment".

Another example of contextual knowledge is this quote from a student involved with a social organisation: "When you come to the network you realise the sacrifice that women undertake. In the sense that they are mothers, they have their other jobs, but nevertheless, they are there, they are there to keep the office hours of the network...Being in the women's network was like: "Listen, you have to sweat it, you have to fight it, you have to intervene, you have to send letters, you have to make presentations, you have to influence the politics and policies for the people"...At that point, it served as an example for me. Showing me how a simple organisation and a group of women can contribute to society or create an outcome."

The learning acquired helps expand the capability to achieve critical thinking, which the students' value as key to their personal and professional future. As one of the students interviewed stated: "When there is a problem, there is something in the background, something that is causing it. It does help you to look for, and investigate, the why and what is happening in the community and in the people causing that situation. Not to look at the problem as a problem but as a situation, an alteration in the community".

Moreover, students expand their capability to learn. Many students were reluctant and suspicious about a new learning opportunity at the beginning of the process. However, during the P&R semester, the daily presence in the context and interactions with other students and local actors enhanced the learning capability. "It's very different when they tell you: "A flowchart is done like this, a process flow is done like this". Yes, they give you the basic case, they tell you the story, but from this experience of P&R I had to do everything. You start to identify and think: "Hey, how do I do it? How can I put that down on paper so that the person who comes and sees it understands what we can do?"".

Finally, one capability that is definitively expanded is practical reasoning. It is understood as making well-reasoned, informed, critical, independent, intellectually acute, socially responsible, and reflective choices [39]. Throughout the P&R process, students should reason, reflect, co-produce, and communicate. All of that allows students to make more informed and critical decisions about their future. This quote reveals the essence of this capability: "I believe that P&R trains you in values more than anything else. You are committed and ready for whatever they need because that's what you went there to do, to help. It teaches you values, and that is very important for your personal and professional life".

4.5.3. A Spatial Analysis

When it comes to the space dimension, through the P&R program, diverse actors such as local authorities, formal and informal producers' associations, civic foundations, and public services providers define their notion of territory in terms of the culture, values, needs, challenges dynamically. The UI also states and acts on a relational base of the territory by expanding its campus to the region and encouraging experimentation with a transdisciplinary base attached to the students' formative process. Therefore, the UI's role in this Colombian regional context is also a good example of the interdependence of socio-technical systems. As Kanger (2020) [52], (p. 352) points out: "an education system that would integrate sustainability issues to every subject on all levels could play a foundational role in supporting transitions in other systems by socialising a whole generation of people in a considerably different manner (…) This, in turn, can contribute to the alleviation of resource pressures on energy, mobility and food systems". We argue that P&R, as part of the educational socio-technical system in the Tolima's regions, is playing this role not only in training students but also in fostering co-creation processes with local stakeholders to enrich projects. Such an approach facilitates lasting solutions and capacity-building in communities for managing their own transition pathways, and challenges current institutional arrangements. Another relevant contribution of P&R to a more nuanced spatial understanding of the challenges that the Tolima faces is identifying and addressing those challenges. Students are asked to approach a specific local context from the beginning of the semester and identify its needs and challenges. As one of the companies interviewed stated, talking about the relationship between the UI and local companies:

"We have recovered a broken bond. We build with, and for, local companies. The P&R programme offers a real immersion, real participation. It is not only the intern's support…we value the process continuity; the students become part of our organisation. We also value the dynamic and flexible planning".

In that sense, the local context is understood holistically, avoiding compartmentalisation of socio-technical systems. The P&R programme does not focus on specific systems but a collective understanding of challenges. From a RTPS perspective, the programme captures this complexity and moulds micro-dynamics to socially fair and sustainable paths. In that way, the UI is immersed in local internal dynamics and builds transdisciplinary bridges to propose specific action lines.

Finally, since the UI is an influential actor at a regional scale, a By working with local governments, faculty and students improve policy coordination in the different government secretaries (agriculture, infrastructure, planning, and mobility, among others). It also advocates for the engagement with a broad range of actors where communities and their well-being are at the centre, which increases social acceptance, absorption, and acceleration of sustainability practices.

However, the temporal scope to which P&R is contributing to sustainability remains to be seen through more in-depth studies. As we suggested in the capabilities list, a transition topology could provide a more comprehensive view of the UI's role in new organisational and institutional arrangements towards regional sustainability. The programme was conceptualised and operated from a people-centred regional development notion. However, the region cannot thrive without preserving its natural resources endowment; that is why the lines of action include an ecological dimension. P&R is still under an experimental pathway and learning by doing.

4.5.4. Is the UI Contributing to Just Transitions?

Swilling [18] argues that just transitions are processes where incremental and increasingly radical changes accumulate over time and head toward the SDGs. The result is a welfare state based on greater environmental sustainability and social justice. These changes arise from a great multiplicity of struggles, each with its own context-specific spatial and temporal dimensions.

We analysed how the UI can be a relevant change actor in its regional context. Change comes from the directionality that inspires its activities, from the role that the UI plays in its regional context by convening multiple actors, from the knowledge produced and the capability expansion in the UI's activities. However, our study has a limited temporal scope, and we cannot observe if those changes have a broader and long-term influence on the whole regional context. It depends, among other factors, on the influence of other regional actors and institutions both inside and outside the UI. However, we can argue that micro-level transformations are in place, and those transformations have a specific directionality grounded in environmental sustainability and social justice, as Swilling [18] proposes.

The directionality is clearly expressed in the content of the capability list: teaching, researching, outreaching, and governing the UI should be based on core values such as participation, empowerment, equity, sustainability, inclusiveness and triggered by a network of different actors. All of that resonates clearly with the normative ambition of a just transition.

Moreover, during the process of building the list and participating in P&R, we found capability expansions. Swilling [18] and Ramos-Mejía et al. [21] point out that transitions should consider capabilities' expansion and deprivation as a proxy of how just a transition is, especially in Global South contexts. We found that the epistemic, learning, social network, and practical reason capabilities are outcomes of the two processes. Going back to the idea of micro-level transformations pointed out by the RTPS; we argue that scrutinising if those transformations are contributing to a just transition is the degree of human capabilities expansion.

Another consideration when discussing the idea of a just transition is the inclusive character of both initiatives that show a genuine willingness to sustain co-creation processes. The list was made with greater involvement of the UI community, including external actors as companies, municipalities, and social organisations. P&R is based on the participation of a broad range of regional actors. The list is an

example of a co-produced document with the help of participatory methodologies. In P&R, students design solutions for local problems by interacting with local actors and regional tutors. Both initiatives are good examples of the relevance of transdisciplinary knowledge produced through the interaction between academic and non-academic actors. As pointed out by Stephens et al. [14], this is how HEIs can enact change at the regional level towards sustainability and, we add, social justice.

However, as discussed previously, the influence of the microchanges that the list and P&R can have in a broad temporal scope should be researched. Both initiatives have contributed, at the moment, to expand several capabilities and sustainability in a broad sense.

Nevertheless, the UI is part of a historically regional governance structure in which the relationship between HEIs and their regional environment is critical. Organisational and institutional normative change is also multi-scalar within the HEIs (from HEI management to individual researchers and time-dependent), which shapes its expansion to a desired regional development. Hence, triggering change within and outside the HEIs requires both bottom-up activities (coming from single organisations) and top-down approaches (with more comprehensive organisational coordination) [74]. So far, the UI has expanded its potential as a regional broker by enabling co-creation spaces to respond to local challenges and actively promote desirable regional pathways.

Explicitly discussing the kind of development in a particular regional setting through the lens of human capabilities provides a cross-fertilisation for the RTPS needed not only theoretically but also empirically. The notion of justice in the centre of the dis-cussion [82] and how it can be triggered by local actors such as universities strengthen the RTPS analytical framework and opens up possibilities in Global South contexts.

4.6. Conclusions

HEIs and particularly universities are central organisations that can act as bridges between diverse actors and, more importantly, act as promoters and amplifiers of just transitions. This paper discusses how a Colombian regional university, the UI, plays this role through two initiatives: a governance experiment piloted between 2018 and 2019 that constructed, following a participatory process, an aspirational vision for this university through the definition of eight human capabilities. The second is a formal curriculum regional programme named P&R. It was established in 2010 as a service-learning strategy for final-year undergraduates as a requisite for graduation. During one semester, university students get involved in interdisciplinary projects, working and living with the communities to contribute to peace and local development.

To analyse the contribution of these two initiatives towards a just transition, we built a specific analytical framework based on the human development capability approach and RTPS. We argue that combining the two frameworks is crucial to understanding the UI's contributions to just transitions in Global South contexts characterised by environmental, social, and institutional un-sustainability.

Exploring both the content and the process of building the list and perceptions of the different actors involved in the P&R programme, we found that both initiatives have a solid normative directionality grounded in core values such as participation, empowerment, equity, sustainability, inclusiveness triggered by a network of different actors. All of that resonates clearly with the normative ambition of a just transition. Moreover, in both processes, people involved have expanded human capabilities (such as learning and epistemic capability) that contribute to a just transition. Both initiatives are also sound examples of the relevance of holistic and transdisciplinary knowledge produced through academic and non-academic actors' interaction.

However, further research should be undertaken to analyse to what extent these initiatives are triggering long term transition pathways in contexts characterised by lower human development. How to bring about paths to sustainability in regions where institutional and organisational changes are permeated by social conflict is at stake. Challenges go beyond what has been spotted in the transitions literature, primarily based on developed and industrialised economies. Our case studies argue that

context matters even more in Global South regional settings characterised by resource endowments, socio-political struggles, corrupt political systems, which require going beyond organisational and single socio-technical systems path-dependence. A next step to further explore the UI's role in Tolima to triggering just RTPS is the construction of a transition topology to capture micro-level institutional and organisational change processes over time [74]. Such a topology would need to be strengthened with a human development perspective, so identifying boundary-spanning activities would also depict if the regional paths expand human capabilities.

Author Contributions: Conceptualization, D.V. and A.B.; methodology, C.D..; validation and data curation, D.R.-F.; writing—original draft preparation, D.V. and A.B. All authors have read and agreed to the published version of the manuscript.

Funding: The fieldwork done in Colombia by Alejandra Boni was funded by BEST/2019 Programme of the Generalitat Valenciana (Valencia, Spain) and CYTED Programme through the Red Multibien (618RT0560). We also acknowledge the contribution of the Adsideo 2020 fund granted by the Universitat Politècnica de València.The fieldwork done in Colombia by Carlos Delgado was funded by the Universidad de Ibagué and Ingenio.

Institutional Review Board Statement: Ethical review and approval were waived for this study, due to the low risk of the study. The interviews and focus group questions did not include sensitive information that could harm (physically or psychologically) in any way to the participants.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data used for this study is in the Universidad de Ibagué repository and only available to the researchers involved in both case studies.

Acknowledgments: This chapter was inspired by the vibrant community of Universidad de Ibagué. To all of the participants, our most significant and special recognition.

Conflicts of Interest: The authors declare no conflict of interest.

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5 The role of transformative innovation for SDGs localisation. Insights from the South-African "Living Catchment Project"

Based on this publication:

Boni, A., Velasco, D., & Tau, M. (2021). The Role of Transformative Innovation for SDGs Localisation. Insights from the South-African "Living Catchments Project." *Journal of Human Development and Capabilities*, *22*(4), 737–747. https://doi.org/10.1080/19452829.2021.1986688

Abstract

The 2030 Agenda positioned Science, Technology and Innovation as crucial means for achieving the Sustainable Development Goals (SDGs). This paper explores how a localised South-African policy experiment named the 'Living Catchments Project' (LC Project) contributes towards the SDGs. This project is part of a portfolio of experiments to trigger innovation for transformative change in South Africa. LCP team worked directly with the Transformative Innovation Policy Consortium (TIPC) researchers on adding a transformative layer to the project's design and implementation. The project embraces uncertainty and complexity by promoting experimentation to inform and facilitate learning processes and changes in people, organisations and institutions. Additionally, we combine the TIP perspective with core concepts of the capability approach: capabilities, agency, democratic deliberation and conversion factors. With this integrated approach, we explore what the capability approach can offer to the LCP experiment. We conclude with policy recommendations on the potentialities and constraints of the combined TIP-capability approach for achieving the SDGs and conducting transformative innovation experiments.

5.1. Introduction

Global challenges represented by the SDGs are a unique opportunity for systems transformation, bringing together social, ecological, economic and technical innovation. The 2030 Agenda provides an urgent, inclusive and value-creating direction towards equity and sustainability that calls for new research and policy approaches (Schot et al., 2019).

The 2030 Agenda, unanimously adopted at the United Nations Sustainable Development Summit in September 2015, positioned Science, Technology and Innovation (STI) as crucial means for achieving the Sustainable Development Goals (SDGs). Furthermore, in the Addis Ababa Action Agenda, Member States committed to "adopt science, technology and innovation strategies as integral elements of our national sustainable development strategies" (United Nations Inter-Agency Task Team, STAIFS and European Commission, 2021). This contribution explores how a localised South-African policy experiment named the 'Living Catchments Project' (LC Project) contributes towards the SDGs.

The LC Project intends to strengthen water governance in South Africa by building and nurturing 'communities of practice' to enable collaboration, grow capacity for transformative social learning facilitation and improve policy-advice practice contributing to the country's water roadmap. The South African National Biodiversity Institute (SANBI) leads the project with the financial support of the South

African Department for Science and Innovation (DSI) and the Water Research Commission (WRC). From July 2021, the Transformative Innovation Policy Consortium (TIPC) worked with the SANBI, WRC and DSI teams to strengthen the transformative potential of the experimental initiatives.

To assess the contribution of this project to alternative policy designs, we propose a way of achieving the SDGs from a Transformative Innovation Policy (TIP) perspective, which is simultaneously different and complementary to the ongoing process of mainstreaming SDGs into current policies. TIP offers an integrated and systems approach which targets the underlying connections and trade-offs among the SDGs. Furthermore, the approach focuses on the required transitions to reach societal and environmental transformation, enabling the empowerment of sustainable alternatives through localised and inclusive innovation policies (Schot et al., 2018). Additionally, we combine the TIP perspective with core concepts of the capability approach (CA): capabilities, agency, democratic deliberation and conversion factors.

In this contribution, we describe the main features of the LC Project and how it contributes to different SGDs. Moreover, by integrating the TIP and Capabilities approaches, we analyse what the CA can offer to this particular experiment and TIP in general. Finally, we conclude with policy recommendations on the potentialities and constraints of the combined TIP-capability approach for achieving the SDGs and conducting transformative innovation experiments.

5.2. Transformative Innovation Policy and SDGs

According to Schot et al. (2019), there are no best and optimal approaches to complex challenges such as those posed by the SDGs. To transform our world, we need a new type of innovation policy. One that embraces uncertainty and complexity by promoting experimentation to inform and facilitate learning processes and changes in people, organisations and institutions (Molas-Gallart et al., 2021). The TIP framework is based on a Multi-Level Perspective on socio-technical transitions as defined by Rip and Kemp (1998) and Geels and Schot (2007). The starting point of this framework is that transitions are a change (transition) in socio-technical systems. These systems are stable and dominant configurations of practices, relations, discourses, culture, legislation etc., providing ways of performing a particular societal function (Smith et al., 2010).

Furthermore, these system elements are put in place, maintained and destroyed by a wide range of actors whose behaviour is configured by ongoing formal and informal rules or institutions. These rules contain behavioural instructions, beliefs and values concerning all system dimensions. Together they form a socio-technical regime. In the end, a system transformation is about changing the system and constructing a new regime (rule-set) using the innovative capacities of all relevant actors.

TIP proposes six principles to design policy with transformative potential (Schot et al., 2019: 23-24).

- Directionality: STI is not neutral (i.e. enhancing productivity at a high environmental and social cost). Transformation requires experimentation to trigger sustainability pathways that enable social critical appraisal and learning.
- Societal goal: policy focused on goals such as the SDGs or grand challenges.
- Systems-level impact: addressing changes at the social and technical levels.
- Learning and reflexivity: promoting second-order or "deep learning", which implies changes in the mindset and assumptions embedded in dominant practices.
- Conflict and consensus: different views about what is at stake in systems transformation can lead to conflict. Transformation welcomes conflict and includes it as part of the process.
- Inclusiveness: providing voice and agency to actors excluded from policy processes, such as civil society, users and marginalised communities.

From a transformative STI policy point of view, three types of SDGs can be distinguished (see figure 1):

1. SDGs that cover a specific or a more comprehensive range of socio-technical systems –comprises links and functions in the relations of production, diffusion and use of technology, which are configured to respond to social needs and challenges, such as energy, water, food production- or application areas. For example, SDG 3 on health, SDG 4 on education, SDG 6 on clean water and sanitation, SDG 7 on affordable and clean energy; but also SDG 9 on Innovation, industry and infrastructure, SDG 11 on sustainable cities and communities, SDG 14 on life below water, and SDG 15 about life on land. These are directly linked to a range of systems.
2. SDGs that emphasise 'crosscutting directions' or directionality. SDG 1 No poverty, SDG 2 Zero Hunger, SDG 5 Gender Equality, SDG 8 Decent work and economic growth, SDG 10 Reduced inequalities, SDG 12 responsible production and consumption, and SDG 13 Climate Action.
3. SDGs directed to structural and necessary conditions for transformation. SDG 16 Peace, Justice and Strong Institutions, and SDG 17 Partnerships for the SDGs include governance arrangements among the state, the market, civil society and science.

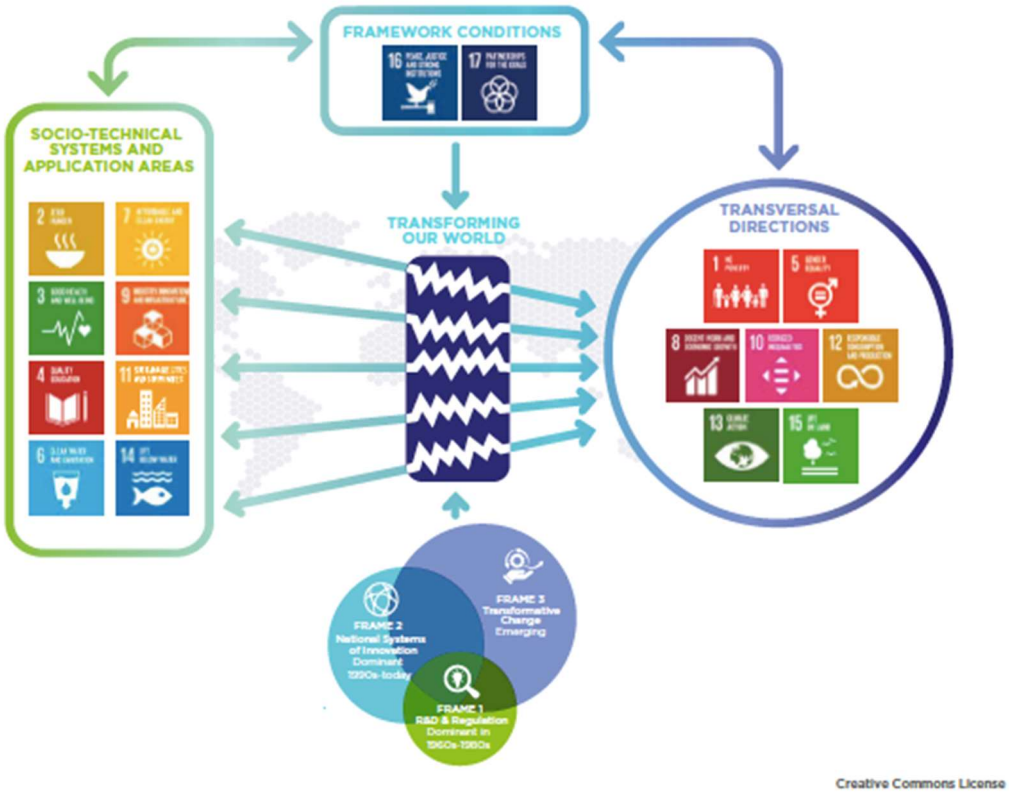

Figure 1: A transformative innovation policy on the SDGs.

Source: Schot et al., 2018.

These distinctions allow countries, regions and international organisations to focus their efforts on transforming socio-technical systems for long-term transitions guided by the SDGs.

5.3. Adding a capability layer to transformative innovation policy

TIP's core concepts can be scrutinised from the capability approach (CA) to add a transformative layer grounded on human development (Pellicer-Sifres et al., 2017). Firstly, the notion of *capabilities* or

the real opportunities people have to be or do what they have reason to value, at an individual or a collective level (Sen 1999). In that sense, experiments framed through TIP should aim to expand people's capabilities and remove the obstacles that hinder fair transitions to sustainability. CA reinforces the idea of equity in TIP, stressing that innovation processes must not enlarge inequalities.

The second contribution is the idea of *agency*, understood as freedom people have to shape their own lives and pursue their goals (Walker and Unterhalter 2007). In TIP, agency is one of the main elements, and it has a particular direction: experiments should enhance people's agency to construct a new socio-technical system. It is for this reason that learning and reflexivity have such an important role to play. Actors need to use their agency, question the rules they use in their daily practices, unmake them, and become active rule-makers (Molas-Gallart et al., 2021).

Thirdly, the processes dimension in the CA includes deliberative democracy. Public discussion and democratic decision-making (Crocker 2008) have a crucial role. The CA advocates for socially embedded agents who participate in political and social affairs shaping their social lives. What constitutes a good life and well-being is socially defined and declared. In this sense, as Capriati (2013:11) suggests, democracy provides an essential starting point for setting up innovation policies as it strengthens individual freedoms and enables actors to 'to learn from one another'. Moreover, it also plays a crucial instrumental role in enabling institutions to adequately address innovation. Innovation must be governed, in particular when it addresses societal goals. All this requires more participation and greater democratic control: citizens must be encouraged to participate fully in their community and in the discussion of innovation policies.

Finally, the CA adds the conversion factors (Robeyns 2005), which are the personal traits (e.g. physical condition, gender, ethnicity or intelligence), social arrangements (e.g., public policies, norms, values, power relations) and environmental conditions (e.g., pollution, state of the roads, communication) that determine the ability of a person to convert a specific vector of commodities into capabilities or valuable outcomes. Devote attention to personal characteristics and structural constraints in experimentation links TIP to broader historical, social, cultural, institutional, and political evolution, making them context-dependent (Capriati, 2013; Arocena and Sutz, 2012).

The following section provides a brief description of the LC project, highlighting its connections with the SDGs. Then, we go back to the fundamental concepts of the CA to strengthen the analysis and policy recommendations.

5.3.1. The 'Living Catchments Project'

Water is an essential resource underpinning the development agenda of any country. Water scarcity has emerged as one of the most significant global challenges of the 21st century. South Africa is also not spared from this reality. The country faces several water challenges, including the security of supply, degradation of ecological infrastructure, poor landscape governance and resource pollution. These are compounded by ageing built infrastructure, a growing population that requires health and well being and the impact of climate change.

The Water Research, Development and Innovation Roadmap (Water RDI Roadmap) is a ten-year (2015-2025) national planning intervention to implement research, development and innovation projects to address water scarcity in South Africa. The LC project is part of the Water RDI Roadmap to create more resilient, resourced, and relational communities at both catchment and national scales. In addition, it intends to integrate cutting edge research in governing the equitable, productive and sustainable use of water resources and ecosystem goods and services. The project takes place in four catchments in South Africa: the uMzimvubu, Tugela, Berg-Breede and Olifants catchments (Tau et al., 2020).

TIPC is a five-year programme focused on policy experimentation, evaluation, capacity building and research agenda development. An overarching ambition is to see the widespread adoption of new transformative innovation policies and practices across the globe (SDG 9). As part of TIPC, South Africa has set a portfolio of experiments to trigger innovation for transformative change. The LC project was

selected as the first project to work directly with TIPC researchers to enhance the project's design and implementation based on a formative evaluation guided by the TIP principles (Molas-Gallart et al., 2021).

The experimental policy engagement was developed through a three modules methodology with seven co-creation sessions (July-October 2020). In the first module, the team enriched a theory of change (ToC), or the explicit definition of the ideas and hypotheses (theories) about change produced through the project implementation (van Es et al., 2015). The second module connected the ToC with guiding processes and outcomes to unlock transformation. As a result, the LC project defined five outcomes. The third module set the bases for a monitoring, evaluation and learning plan to guide the project's contributions to the Water RDI Roadmap, aligned with the Clean Water and Sanitation SDG. Figure 2 represents the ToC of this experiment with the five outcomes identified and the activities and outputs conducive to these outcomes.

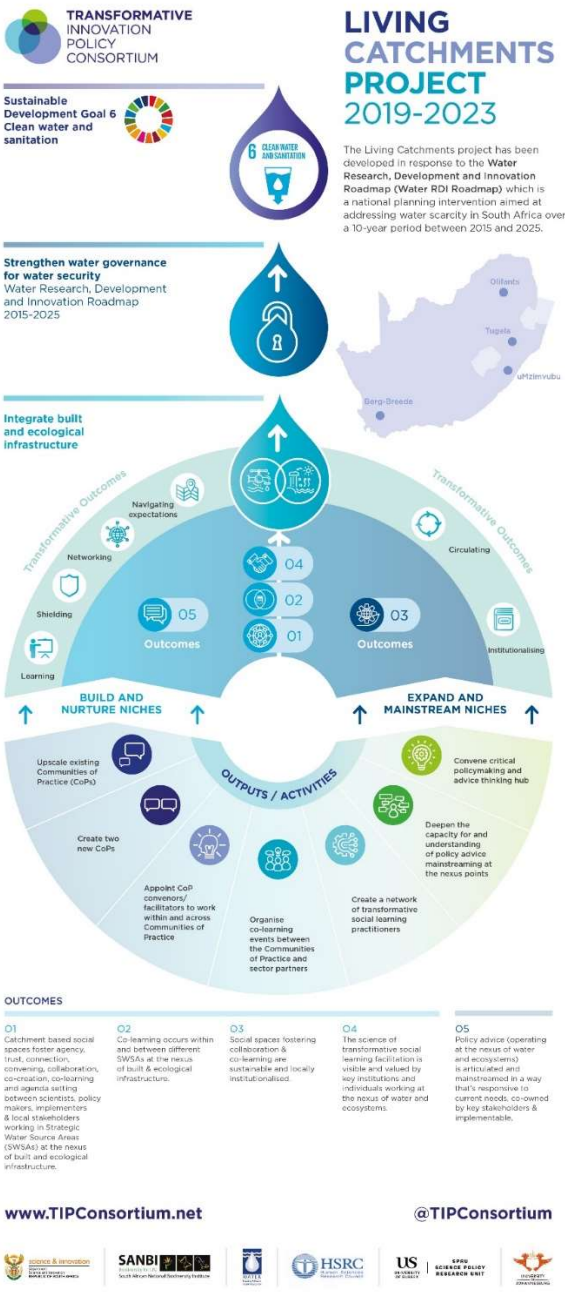

Figure 2. Living Catchment Project Outcomes

Source. TIPC (2021)

5.3.1.1. Contribution to SDGs

As figure #2 shows, the LC project relates mainly to SDG #6 devoted to improving clean water and sanitation. However, the LC project also aims to transform the innovation system (SDG #9). By having a transformative approach to social learning (outcome 4) and a different approach to policy advice grounded on current and future needs gathered with broad participation (outcome 5), the project focus goes beyond the action on the water system.

The cluster of SDGs most relevant to the LC project indicates structural and necessary conditions for transformation (SDGs #6 and #7). Not only outcome #5 indicates a suitable policy change, but also outcomes #1, #2 and #4 show the relevance of good partnerships and just institutions: Catchment based social spaces foster agency, trust, connection, convening, collaboration, co-creation, co-learning, and agenda-setting between scientists, policymakers, implementers & local stakeholders; social spaces fostering collaboration & co-learning are sustainable and locally institutionalised.

Finally, SDGs indicating directionality is not shown clearly on the ToC but underpins the project aims. We emphasise SDGs #12 and #13. The LC project aims to contribute to ongoing water challenges that pose a dilemma to South Africa's development agenda. The country faces difficult economic and societal choices between the production sector demands and ongoing rapid urbanisation (Tau et al., 2020).

5.3.1.2. Adding a capability layer to the LC project

Although the LC project was not designed using the human capabilities framework, the overall goal is to improve the well-being of the inhabitants of the living catchments providing water security. However, if the project had been inspired by human development, the LC project would have incorporated dimensions such as reducing inequalities (SDG10) or gender equality (SDG5).

In terms of capabilities, the LC project aims to expand those related to social relations, social networks, and even epistemic capabilities of differerent participants, which is coherent with the TIP approach. However, by adding the CA, the LC project could have explicitly included the relevance of epistemic justice in the formative evaluation process, incorporating less privileged participants' voices with appropriate participatory methodologies (Walker and Boni, 2020).

Agency and deliberative democracy are critical components of this project. As we have mentioned before, the TIP approach (and its formative evaluation methodology) stresses the importance of learning and reflexivity to build agency. Moreover, the LC project advocates institutionalising social spaces for collaboration and co-learning and a different approach to water governance.

Finally, we argue that LC project could have benefited from paying attention to personal and social conversion factors. It could have provided more information on participants' characteristics, relevant to inclusion and participation in the formative evaluation process. Moreover, a better account of social conversion factors would have provided a more situated understanding of the experiment. The LC Project team is compounded by very experienced practitioners in the biodiversity area, both in terms of methodologies and policymaking. It would have made a difference if the TIPC researchers team had allocated a previous stage to understand their methodologies, tensions, concerns.

5.4. Policy recommendations

The TIPC is an association of researchers, policymakers and funding agencies working together on generating new frameworks, standards and narratives with a transdisciplinary approach towards the acceleration of systems transformation in tune with the SDGs achievement. The consortium uses a

formative evaluation focused on learning and reflexivity, providing adaptive and flexible implementation of initiatives such as the LC project.

Through an intense engagement between diverse team members, the team experimented with the TIPC methodology from a critical standpoint. We can summarise the main policy recommendations as:

- Experimentation is a novel yet difficult way of approaching policy design and implementation. During the experiment cycle, policymakers and practitioners require heavy involvement and commitment to add the reflexivity and learning layer that can lead to sustainability transitions. Hence, alignment and support from the organisations involved is needed, both in financial and human resources. However, system transformation in the mid and long term is expected to make the initial investment worthwhile.
- The DSI selected the LC project to engage with a TIP approach, which allowed the team to spare 14 weeks to enhance a Theory of Change (ToC) guided by the TIP principles. Mobilising actual transformations and advancement of SDGs across national programs/departments requires integrating the TIP principles into national policies, including guidelines on project design. However, that is not yet mainstream. Integrating a TIP approach requires national support from the project design and through the implementation.
- The TIP has a normative approach based on the transitions to sustainability literature. However, a policy design based on co-creation and co-design implies sharing and discussing principles, worldviews, context and time-dependent approaches. The experimental policy engagement around the LC project unveiled struggles to build a mutual understanding, such as the feeling of imposition of a foreign methodology into an approved project designed with context-based methodologies. The LC Project Team expected the TIPC researchers to invest more time understanding the project background and finding ways to harmonise academic and practical approaches.
- The TIP approach is mainly focused on systemic transformation pathways assumed to improve human well-being. An explicit dimension to expanding human capabilities would strengthen the TIP policy design, evaluation and implementation, considering the equity dimension. Also, a detailed account of personal and social conversion factors can make the experiment more participatory and inclusive.
- On the other hand, the human capabilities approach can be strengthened by the TIP approach on providing change pathways aimed at systems transformation towards SDGs achievement.
- Grouping the SDGs in socio-technical systems and application areas results in robust designs for just transitions to sustainability where STI has a crucial role. The LC project has preserved the essence of the SDGs not as instrumental ends but as a guiding framework to move along inclusive transformation.

5.5. Acknowledgements

The authors want to thank all the LCP participants and TIPC co-researchers. The South African Department for Science has granted LCP, Technology and Innovation (Project No. K5: 2984). Alejandra Boni's involvement has benefited from the Spanish Ministry of Science and Innovation (PID2019-107251RB-I00).

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6 Discussion

Throughout the chapters, we explored the role and agency of universities in enabling and promoting transitions toward sustainability. The case studies highlight the potential of universities to drive systemic transformations, starting with their own domain—higher education—and extending to other socio-technical systems. Universities respond to place-based challenges and connect local knowledge and learning to global needs through their core mission pillars of teaching, research, and social outreach. They serve as vital bridges between diverse academic and non-academic actors, studying and facilitating the micro-dynamics of contextual change, making them ideal intermediaries in regime-niche interactions. The diversity of ontologies, epistemologies, theories, methodologies, and methods within universities equips them to tackle complexity and uncertainty from multiple angles. Particularly significant for advancing just sustainability transitions is the active role universities play in developing transdisciplinary approaches to wicked problems, enabling the exploration of creative and alternative solutions with deep involvement from directly and indirectly affected stakeholders (Bernstein, 2015).

Using the 'Living Catchments Project' as a specific example of transdisciplinary research to foster transformative innovation, we explored how experimental spaces that bring together policymakers, practitioners, students, researchers, and local communities are crucial for generating collective and collaborative knowledge. This knowledge is vital for addressing the complexity inherent in multi-system challenges. We provided evidence that adopting a human capabilities perspective—one that emphasises agency, democratic deliberation, and considers social conversion factors—is essential for fully understanding and developing the 'just' aspect of transitions. Throughout the chapters, we showed that this approach includes diverse voices and perspectives, thereby fostering inclusivity and collective responsibility.

The discussion is structured around the main findings in each of the previous chapters that contribute to answering the research questions framing this doctoral research. Hence, there will be two main subsections, each responding to the two principal research questions.

6.1. How can universities' knowledge production enhance human development within their academic community and the broader communities and territories they engage with?

Chapter 2 delves into the potential role universities play in expanding the capabilities of their communities, encompassing faculty, students, administrative and operations staff, alums, and external stakeholders such as social organisations, companies, governments, and civic society. By adopting a capability approach to education, we move beyond traditional distributional measures like access to resources—libraries, laboratories, or campus facilities—as indicators of inclusiveness and justice. Instead, we emphasise the importance of considering individual and collective conversion factors as a starting point to provide differential programmes and curricular strategies that consider differences, specific needs and individual capabilities. In this sense, university programs and policies can act as capability multipliers, offering formal and informal spaces or pedagogical encounters for learning and growth that enable diverse functionings (Walker, 2019).

The human capabilities provide a framework for enabling and enhancing core values of human development such as empowerment, equitable distribution of basic skills, sustainability, and the freedom to pursue opportunities and achievements. As discussed in Chapters 2 and 4, these values are essential to fostering human development. Chapter 3 further highlights the importance of agency, the multi-dimensionality of well-being, democracy, and public debate as critical elements (Boni & Gasper, 2012). We posed central questions about universities' roles: What professionals should we nurture? What kind

of research should be prioritised? What types of actors should be engaged in university dialogues? What social impact should be targeted in response to local and global challenges?

The case studies of Universidad de Ibagué (UI) and Universidad Autónoma Latinoamericana (Unaula) illustrate that universities can go beyond contributing to a neoliberal economic model prioritising human capital for economic success. Instead, they can focus on addressing deep-rooted injustices stemming from violence and inequality (Boni & Walker, 2013). Both universities collectively constructed capabilities lists central to their research strategies and mission pillars. This approach embraced a constellation of academic and non-academic actors who collaboratively developed, negotiated and integrated diverse visions and expectations (Velasco et al., 2024). Policies that enhance knowledge creation based on egalitarian principles, where everyone can contribute to social meaning (Coady, 2017), are not only possible but essential in addressing current global polycrises.

When looking specifically at the higher education system, which has a core aim of knowledge production, the epistemic contribution capability, or the real opportunity of producing knowledge inclusively, becomes central to a university model that is in tune with enhancing human development. The production of information, evidence, hypotheses, argumentations, and theories compounded of interpretative concepts and approaches to answer different questions and give meaning to the world we live in is part of the human condition and a right that we individually and collectively hold (Fricker, 2015). By addressing epistemic injustices related to deliberate action to block social meaning, disregard and undervalue the other as a valid knowledge producer, and exclude certain groups from the processes of knowledge production and appropriation, universities can enhance human development (Boni & Velasco, 2020). The results of both cases show how participatory processes deliberately consider in their design the actors that should be included, how research is developed, the meaning of social impact related to the territory, and the type of professionals wanted to be part of the academic community and the ones formed through the different academic programs.

Moreover, developing context-specific capabilities lists provides a clear direction for the university's role in contributing to the creation of multiple possible worlds and offering desirable visions of the future. This directionality acknowledges the inherent tensions and navigates the deep political processes involved in determining what is considered appropriate or reasonable in relation to ideas of progress and development. These political processes involve negotiations, power dynamics, and the influence of various stakeholders, all of which shape the direction of the university's role. Understanding the university's role in creating open-ended cognitive spaces—spaces that can be shaped through various pedagogical encounters and that embrace diverse and divergent values, understandings, and interests—is essential for enabling the realisation of multiple desirable worlds (Stirling, 2024).

In Chapter 3, we argue that democratic policy-building processes require protected experimental spaces where flexible governance arrangements are necessary to maintain open-ended conditions that allow for the fluid manifestation of confluences, as seen in the Unaula case, and the development of capabilities lists, as in the case of UI. Both cases aimed to transform the university from within, leveraging their ethos already rooted in a socially and regionally grounded understanding of development. Notably, both cases involved creating experimental spaces designed to achieve full organisational transformation, supported initially by leadership, to mobilise and expand epistemic capabilities beyond the groups directly involved in the processes.

It is also possible, and another way of igniting change, that such experimental governance arrangements are started and rooted in the university community and its stakeholders themselves, creating pressure on the dominant university policies and bringing about enduring organisational changes embedded in the institution's ethos. Regardless, navigating expectations and creating spaces for democratic deliberation with broad inclusiveness of diverse voices are crucial for expanding people's capabilities (Ghosh et al., 2021). Addressing the politics of policy through well-designed participatory processes can pave the way for a human capabilities-centred model of the university. However, this approach is not without challenges and potential resistance to maintaining the system's status quo and dominant practices. These aspects will be further explored in the discussion of the second question.

6.2. What roles can universities play in fostering just transitions that effectively address social challenges?

Questioning the meaning of development is crucial for advancing just transitions. In Chapter 4, we began by examining the concept of sustainable development within specific regional contexts, highlighting the importance of economic, institutional, cultural, and social trajectories unique to each territory. We explored how universities can activate foundational values of human development to create regional transition paths to sustainability (RTPS). As discussed in Chapters 2 and 3, education is deeply intertwined with values. Through the case studies of Unaula and UI, we demonstrated that educational processes can serve as powerful multipliers of individual and collective capabilities. These processes provide both the means and specific strategies—such as UI's peace and region program and Unaula's confluences initiative—to foster a people-centred approach to development. Additionally, we emphasised that human development must account for the equitable distribution of resources while remaining within the limits of natural resources and the planet's health (McCowan, 2015).

Universities can serve as vital intermediaries in multi-scalar processes that lead to RTPS. Their close connections with local actors position them as effective facilitators between regional and broader institutional stakeholders. By advancing transdisciplinary approaches to knowledge production, universities bridge local and global challenges, contribute to social justice, and support place-specific and multi-actor negotiations. This not only sparks radical change but also strengthens micro-level networks, moulding multiple pathways (Radinger-Peer & Pflitsch, 2017). In this role, universities go beyond responding to regional challenges with tailored solutions; they create environments that empower communities as change agents, opening up processes where equity, participation, empowerment, and resource efficiency are central. This approach fosters a plurality of possibilities balanced by a commitment to sustainability (Stirling, 2024).

In Chapter 3, we introduced the concept of socio-technical systems change by exploring the various dimensions of these systems. In Chapter 4, we expanded on this by explaining how change occurs through the multi-level perspective (MLP), giving particular attention to the role of different change agents in challenging unfair and unsustainable practices—especially those that do not neatly fit within fully developed and mature regimes. We highlighted that the interaction between unstable regimes and mature niches in Global South settings can offer unique opportunities to drive systems change. Consequently, we emphasised the importance of capturing the complexity of regional changes by examining the interactions between (in)mature regimes across different systems and niches, with a particular focus on the social aspects of innovation processes. Understanding how cumulative micro-changes unfold over time and across various contexts is essential for analysing the role of universities in promoting just transitions.

Universities have the potential to be experimental frontrunners by establishing both permanent and temporary organisational structures—such as the UI capabilities list, the Peace and Region Program, or the Living Catchment Project discussed in Chapter 5—designed to realign normative cultural and behavioural practices. The scale of these efforts may vary depending on the university's formal and informal institutional settings, but they can be nurtured through experimental spaces across campus operations, teaching, knowledge generation, outreach, and collaboration.

From a transitions management perspective, universities' contributions can be explored on multiple levels (Loorbach, 2010; Stephens & Graham, 2010):

- Strategic Level: They can drive long-term systemic change through their mission, vision, policies, and programs, either through the university's overall strategy or within specific schools, departments, programs, or thematic groups.
- Tactical Level: Universities can form coalitions and partnerships with various local and global actors to foster Regional Transition Pathways to Sustainability (RTPS).
- Operational Level: This involves implementing changes in academic programs, research, social outreach, and campus operations.

Universities thus play a dual role in descriptively analysing systems change and interactions while prescriptively creating conditions that integrate strategies, tactics, and operations to enable multiple pathways to sustainability. Within this framework, the human development and capability approach is key to scrutinising these strategic, tactical, and operational efforts, offering a clear understanding of what constitutes "just" in the context of transitions.

Moving beyond the individual actions of universities within their territories and their contributions to relevant global knowledge production, we explored how a constellation of academic and non-academic actors collaborated to address a national issue related to water security in four water catchments in South Africa. Chapter 5 details how an international partnership was formed among the South African Department of Science and Innovation (DSI), the South African Water Research Commission (WRC), the South African National Biodiversity Institute (SANBI), international researchers from the Transformative Innovation Policy Consortium (TIPC), and students and researchers from the University of Johannesburg. This collaboration aimed to enhance the capacity for transformative social learning, improve policy advice, and contribute to South Africa's water roadmap. As the final chapter of the thesis it highlights how TIPC, as a knowledge infrastructure platform (Velasco et al., 2024) , fostered transdisciplinary experimental policy engagements that enabled multilateral collaboration to tackle water governance on a national scale.

The Living Catchment Project had national implications that were directly connected to global water challenges and specific Sustainable Development Goals (SDGs). What set this project apart was its experimental approach to both design and execution, involving key stakeholders such as the funder (DSI), the challenge owner (WRC), the executor (SANBI), and the support of TIPC with a multidisciplinary team of researchers collaborating closely. In this chapter, we reflected on how incorporating the capabilities approach could have further enhanced the project's design and execution. By explicitly focusing on strategies to expand epistemic capabilities, the project could have better fostered agency and deliberative democracy within the communities of practice. Additionally, recognising and addressing conversion factors both within the core project team and the communities of practice in each water catchment would have further strengthened the impact of this experimental policy engagement.

The Transformative Innovation Policy Consortium (TIPC) exemplifies how universities can expand their role by creating transdisciplinary platforms to address global challenges, specifically by accelerating systems change aligned with the Sustainable Development Goals (SDGs). Throughout each chapter, we explored how experimental approaches to knowledge production, appropriation, and validation offer significant rewards but also come with challenges. These approaches are not yet dominant within the higher education system, leading to tensions such as power struggles, rigid organisational structures, resistance to alternative practices, and the persistence of colonial legacies. Despite these challenges, transforming the knowledge production system is essential to fostering human development within planetary boundaries.

Our analysis demonstrates that universities can play diverse and crucial roles in accelerating just sustainability transitions. However, these are still emerging practices that require more demonstrative projects and continued experimentation. There is a pressing need for universities to centre their actions on justice through feminist, anti-colonial, and antiracist approaches, which challenge and offer alternatives to existing wealth and power structures. As our case studies have shown, this is not only possible but necessary for driving meaningful change.

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7 Conclusions

This doctoral dissertation comprises four publications that collectively address two central research questions:

- How can universities' knowledge production enhance human development within their academic community and the broader communities and territories they engage with?
- What roles can universities play in fostering just transitions that effectively address social challenges?

To explore these questions, we presented three case studies in two universities and engaged in a practical policy project where researchers from diverse geographies and backgrounds collaborated with policymakers and practitioners. Each chapter of the dissertation is centred around a fully developed publication with its own structure and conclusions, addressing specific sub-research questions related to the overarching themes.

This section presents the main academic and empirical contributions of this research, providing a comprehensive view of the conclusions developed from this doctoral research. It's important to note that this research is ongoing. We are continually developing further research based on the results and reflections of this doctoral process. Our aim is to keep evolving the content and meaning of the 'just' part of the transitions, both to transform the higher education system itself and to contribute to desirable and reparative futures through transformative learning (Walker et al., 2023).

The second chapter, "Expanding Epistemic Capability in Participatory Decision-Making Processes: The Universidad de Ibagué Capabilies List", delves into the unique challenges faced by the Universidad de Ibagué. It poses the question of how universities can contribute to a sustainable human development in settings where economic inequality, violence caused by conflict among illegal armed groups, illegal mining and drugs traffic, among other challenging conditions are in place.

The third chapter, "Developing transformative innovation through policy experimentation in two Colombian Universities" explored how universities can develop policy experimentation to foster transformative innovation, bringing together the TIP framework and the Human Development and Capabilities approach. The questions that framed the discussion were, from a university perspective: What professionals do we need? What kind of research should we carry out? What types of actors should be included in the University dialogue? What social impact can we produce in the face of local and global challenges?

The fourth chapter, "Exploring the Role of a Colombian University to Promote Just Transitions. An Analysis from the Human Development and the Regional Transition Pathways to Sustainability" uses two analytical frameworks, the human development and the regional transition paths to sustainability, to provide meaning to just transitions and the role of universities, particularly in the Global South, to foster systems change at regional levels.

All three chapters examine Universidad de Ibagué as a case study, exploring and reflecting on the capabilities list developed there, and analyzing its implications from various perspectives using different theoretical frameworks. The third chapter also introduces the Peace and Region program at UI, demonstrating how a formal curriculum strategy—integrating teaching, research, and social outreach—can serve as a model for advancing regional just transitions. Additionally, the second chapter presents the case of Universidad Autónoma Latinoamericana, highlighting how its institutional narrative, articulated through the concept of confluences, grounds its research agenda in territorial challenges, leading to transformative innovations.

The fifth chapter, titled "The Role of Transformative Innovation for SDG Localisation: Insights from the South African 'Living Catchment Project'," focuses on the contribution of an experimental policy engagement using the TIP framework to advance the SDGs. It also highlights opportunities to strengthen these experimental spaces by incorporating a human capabilities approach. In the discussion chapter, this analysis is further developed, examining how such transdisciplinary engagements

contribute to knowledge production and its application to both local and global challenges and exploring the pivotal role that researchers within the higher education system can play in fostering just transitions.

7.1. Academic contributions

We began this thesis by critiquing the hierarchical models of universities, where knowledge is primarily produced within rigid disciplinary boundaries by academic elites with minimal societal engagement. The pressure to generate research outputs—measured largely through academic publications and patents—has been reinforced by the rise of the knowledge economy, which prioritises the rapid development of products and services based on specialised knowledge, leading to technological and scientific advances with equally rapid obsolescence (Powell & Snellman, 2004). This model manifests in the standardisation of knowledge production, heavily focused on academic capitalism, organisational efficiency, and scientific productivity.

Academic capitalism refers to the adaptation of universities to neoliberal dynamics, where scientific knowledge production is driven by economic policies that prioritise efficiency and market-driven goals, positioning universities in a competitive global race for knowledge resources (Münch, 2014). In terms of organisational efficiency, universities tend to emulate leading institutions by standardising practices and adopting metrics and indicators used by top performers, resulting in a homogenisation of practices driven by decontextualised benchmarking (DiMaggio & Powell, 2000). Scientific productivity is increasingly measured by the speed and volume of output, with recognition and leadership at both individual and institutional levels being tied to these metrics. This emphasis on rapid production is rewarded through funding, tenure, and workload distribution (Daraio, 2019).

Consequently, the focus of scientific knowledge production has shifted away from the pursuit of understanding and discovery toward the generation of research outputs as ends in themselves rather than as a means to contribute to the collective construction of knowledge. This shift has also led to greater isolation among scientists within their specialised communities, as current assessment systems do not favour the longer, more complex transdisciplinary processes that are essential for fostering broad collaboration and the integration of diverse knowledge fields.

As an alternative to traditional models, this thesis offers concrete theoretical contributions and empirical evidence on how universities can enhance human development and foster just transitions. Specifically, this doctoral research has made several novel contributions to the fields of higher education, human capabilities, and transitions studies by:

1. Demonstrating how epistemic capabilities can be expanded through participatory decision-making processes within universities, with practical implications for policy design and implementation.
2. Showcasing how experimental governance processes in universities, guided by principles of transformative innovation, can challenge decontextualised models, promote learning and reflexivity, and mobilise diverse forms of knowledge.
3. Presenting an analytical framework based on the human development capability approach and regional transition paths to sustainability, providing a robust normative direction grounded in core values such as participation, empowerment, equity, sustainability, and inclusiveness, supported by a network of diverse actors.
4. Highlighting the gaps in transitions literature, which predominantly focuses on industrialised Global North countries, and calling for more research on how transitions occur in the Global South. This includes addressing justice issues in contexts characterised by resource constraints, socio-political struggles, and corruption, which necessitate moving beyond organisational and socio-technical path dependence.
5. Exploring the significance of transdisciplinary experimentation through various types of engagements, emphasising the need to address power dynamics, decolonial practices, participant

conversion factors, and the inclusion of diverse voices throughout the experiment cycle. This approach aims to expand capabilities and increase the agency of all participants.

These contributions lay a solid foundation for redefining justice in transition studies and provide practical strategies and knowledge for advancing multi-system change within the human capabilities community.

7.2. Empirical contributions

Each chapter of this thesis offers practical insights into how theory can be applied to real-world scenarios and how practical experiences can, in turn, enrich theoretical understanding. Each publication presents experimental engagements utilising theoretical frameworks for design and analysis, yielding results that contribute to theoretical advancements. As detailed in the introduction's motivation section, this research originated from a practical aim: addressing challenges encountered in university management and exploring a pathway identified in our previous PhD work. This prior research emphasised the need for further investigation beyond the technological and competitive dimensions of innovation. Below, we will outline the empirical contributions from each chapter.

The second chapter addresses the complexities of designing university policies through participatory methods. It explores a diverse array of techniques used to collaboratively create capability lists that shape the vision for an entire university. Methods such as visualisations, drawings, storytelling, future-oriented imagination, and mindfulness were employed to engage individuals and communities, allowing them to articulate aspirational capabilities that could drive the university's efforts in human development and regional just transitions. The chapter highlights how the process, led by the promoter group, expanded their epistemic capabilities and how the capability list serves as a model for other institutions. The success of this approach is demonstrated by its recognition with the University College London Grand Challenges Prize at the Human Development and Capabilities Association Conference 2019. The jury noted that the UI case presented an exemplary case of connecting capabilities (the conference's main theme) and was "extremely relevant to several strands of our Grand Challenges programme, including Human well-being and Justice and equality". The case has also been used as a base to start a similar process at the University of Padova, Italy, as part of the course "Education for inclusive employability and well-being in work life", which is part of the Master in Management of Educational Services and Life Long Education, directed by the Professor Elisabetta Ghedin.

The third chapter explores the integration of the Transformative Innovation Policy (TIP) framework with the human capabilities approach, highlighting the practical benefits of experimental governance engagements for transforming university policies. It demonstrates how alternative configurations of regional universities can prioritize people and address local and regional challenges effectively. By examining the concept of directionality within the TIP framework, the chapter illustrates how experimental policy engagements at UI and Unaula were designed and executed. These engagements foster democratic deliberation, enhance agency, and expand epistemic capabilities by including non-academic actors, thus facilitating the assessment of multiple scenarios aligned with the SDGs through a highly contextualised approach.

The chapter also discusses how the development of institutional research policies and the narratives for Science, Technology, and Innovation (STI) in Unaula, as well as the aspirational capabilities list at Unibague, exemplify the mobilisation of broad university communities. This mobilisation encourages a politically nuanced perspective, viewing innovation as an irreducible plurality of possibilities in balanced ways (Stirling, 2024). Additionally, it demonstrates how experimentation in university governance can create opportunities for dialogue among university community members and leadership, fostering second-order learning and unlearning. This process challenges existing visions of desirability, equity, and pathways towards reparative futures (Walker et al., 2023).

Chapter Four introduces an analytical framework for assessing how universities can contribute to just transitions through their teaching, research, social outreach, and campus operations. The Peace and Region program exemplifies how a teaching program can influence research agendas, foster

engagement with regional social, governmental, and public service organisations, and redefine the concept of the campus beyond its physical boundaries. This chapter illustrates the practical application of core human development values through both the Peace and Region program and the development of the capabilities list.

Chapter Five provides actionable policy recommendations on fostering transformative innovation to achieve SDGs in the context of localised and specific challenges. Through the analysis of the Living Catchment Project, the chapter highlights the difficulties in establishing experimental spaces, particularly in securing alignment and commitment from involved actors, as well as in managing resources and navigating expectations. To address these issues, it is crucial to create conditions that support adequate time investment and the applicability of results to the target challenge. Ensuring these experimental spaces are well-protected from initial setbacks is essential for their success and for maintaining actor engagement. The chapter also underscores the importance of trust-building and sense-making processes, which require sufficient time and should be integral to the experiment's design.

This doctoral research has been a rewarding journey of discovery, continuously evolving and yielding new avenues for further exploration.

7.3. Further Research

Inspired by the reflections ignited by this research, new publications and ongoing research projects have also been developed with our participation. The notion of what is desirable and what kind of futures can be built to achieve just transitions require a de-colonial and reparative perspective so injustices are not replicated. Attending to this need, a book on reparative futures and transformative learning with Global North and Global South experiences in different systems and contexts was published and has been cited along the introduction, discussion, and conclusions chapters:

Walker, M., Boni, A., & Velasco, D. (2023). *Reparative Futures and Transformative Learning Spaces*. Springer.

Velasco, D., Acebillo-Baqué, M., Boni, A., & Fernández, T. (2023). Imaging and realising futures in Catalonia: shared agendas for just sustainability transitions. In M. Walker, A. Boni, & D. Velasco (Eds.), *Reparative Futures and Transformative Learning Spaces*. Palgrave Macmillan.

Additionally, we reflected on the essential conditions for advancing just sustainability transitions, emphasising the need for a constellation of knowledge and forming communities of practice. Collaborating with various colleagues, we developed insights into how to establish experimental spaces that are central to creating knowledge infrastructures capable of enabling transformative change:

Velasco, D., Ghosh, B., Boni, A., Schiller, K., & Winkler, L. (2024). Building a knowledge infrastructure for Transformative Innovation Policy (TIP). An analytical approach based on the experimental TIP conference 2022. *Environmental Science & Policy*, *160*, 103832. https://doi.org/https://doi.org/10.1016/j.envsci.2024.103832

More related to policy, but also inspired by this research, we reflected on the capabilities needed (more from an evaluator perspective, but applicable to the general design of experiments) to advance on experimental engagements related to understanding expectations, learning by doing, environment and resource constraints, and responding to emergent processes. It was highlighted as critical to have empathy and humility, be open to new ideas and ways of thinking and valuing different perspectives, be comfortable with ambiguity and unfamiliar situations, and be adaptable and have the ability to be cognitively nimble:

Boni, A., Velasco, D., Molas-Gallart, J., & Schot, J. (2023). Evaluating transformative innovation policy in a formative way: Insights from Vinnova's food mission experiment. *Research Evaluation*, *32*(3), 577–590. https://doi.org/10.1093/reseval/rvad029

New research strands are currently being developed on desirable futures and transforming the higher education regime rules, expanding the results from this doctoral journey.

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