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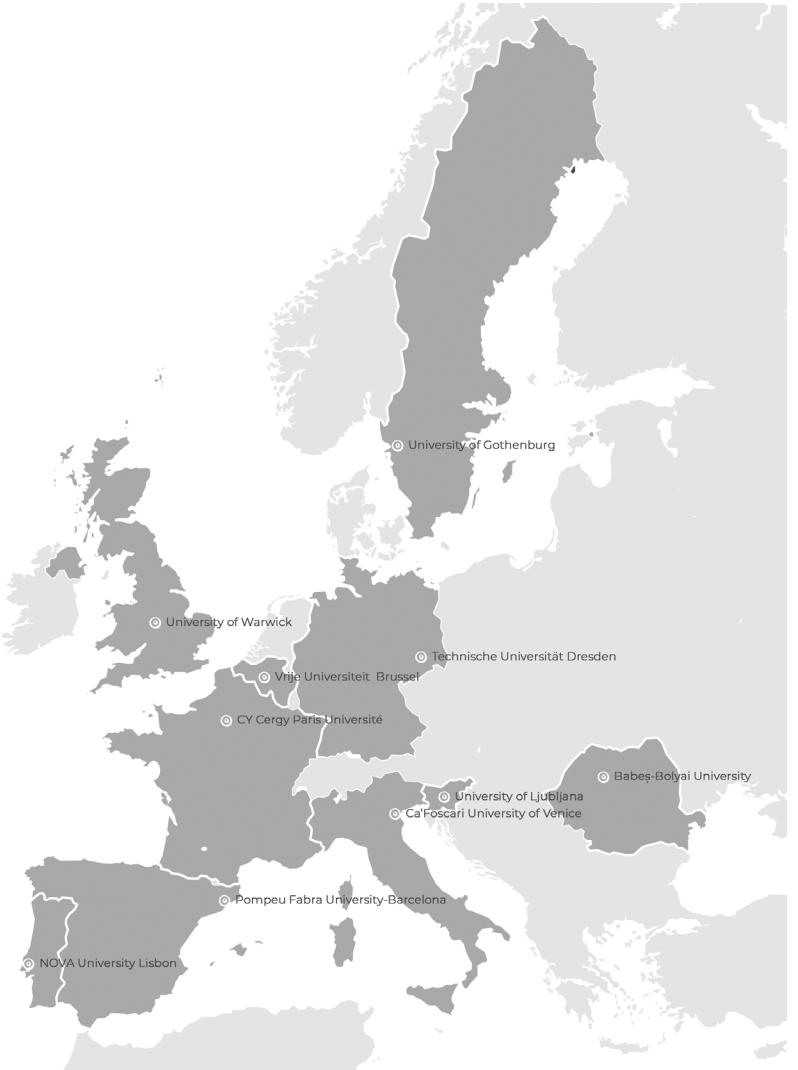

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Over the past two centuries, reviews have significantly shaped Europe's cultural and intellectual landscape. These publications have provided a platform for cultural dialogue, original thinking, and trans-frontier collaboration, leaving an enduring legacy on European thought and discourse.

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The *EUTOPIA Review* also aims to promote greater collaboration between our ten universities and six global partners, growing a more engaged, vibrant intellectual community by encouraging a sense of shared identity and expertise. Our mission is to publish high-quality, original

research and scholarship that focuses on interdisciplinary collaboration and innovation. We seek to facilitate a broad range of perspectives and voices, with scholars and researchers from different countries and cultures working in various languages and academic traditions. The review will prioritise articles that reflect academic excellence, rigour, and originality standards. It will also encourage contributions that challenge established disciplinary frontiers and seek to break new ground regarding theory, methodology, or empirical analysis.

The *EUTOPIA Review* will combine essays on a central topic, interviews, and articles dedicated to science diplomacy as one of the main tools of our international cooperation.

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Cities role in reducing global environmental pressures

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ABSTRACT

Our planet has capacity limits for air pollution, biodiversity, the extent of climate change, and other factors. These are boundaries that must be respected if we are to preserve the basis for human life. We have already overstepped some of these boundaries. The urban environment has the potential to become a major driving force for a green and just recovery—provided that architects, designers, spatial planners and engineers are actively involved in the decision-making process. It is time to transform the way we design cities so that future urban development works with nature.

Introduction

In recent decades, humans have changed the conditions on our planet dramatically. Our greenhouse gas emissions are driving climate change and causing ocean acidification. Our fields, roads, and houses change the landscape, our vehicles and factories pollute the air. Some of the new chemicals we are releasing into the environment have a health impact on humans and ecosystems. We affect the hydrological balance, change important cycles, and are responsible for the extinction of many species. If the Earth is to remain habitable for future generations, the critical Earth systems that support life must remain within healthy limits. The Planetary Boundary Framework (PBF) proposes science-based targets to define the limits of acceptable

alteration to nine key Earth systems - encompassing physical, chemical, and biological processes (Steffen et al., 2018). Climate change and biosphere integrity are recognised as 'core' boundaries through which all others operate.

Urbanisation has altered the way cities and the people that inhabit them interact with nature, but urban environments still rely heavily on Earth's systems to support urban life: fertile soils enable food production; rivers, lakes and oceans enable transport and provide core resources; forests regulate and purify water supplies while protecting against flooding; and nature broadly provides a space for leisure and wonderment fundamental to human wellbeing. Cities physically occupy just a few per cent of the Earth's surface, but they are home to more than half the global population. They play an outsized role in environmental degradation and are responsible for 70 % of carbon emissions. By understanding the thresholds set out in the PBF and how the built environment contributes to them, we can implement actions that drive meaningful change (Hoornweg et al., 2016). Cities are facing other crises, as well—from social to economic inequality. Despite these challenges, cities have the potential to become a major driving force for a green and just transition—provided that architects, designers, planners and engineers are actively involved in the decision-making process from the beginning. It is high time to transform the way we design cities, so that future urban development works with nature. This means improving air quality and soil health, creating carbon sinks and circular resource flows, fostering biodiversity and conserving water (ARUP, 2021). Incorporating environmental and sustainability assessments in projects, bringing diverse stakeholders to the table for project planning and implementation, respecting indigenous knowledge, and taking a systems-based planetary-centric approach are the most important actions landscape architects must take.

PLANETARY BOUNDARY	MAJOR DRIVERS IN URBAN ENVIRONMENT
BIOGEOCHEMICAL FLOWS DEGRADATION	• Sewage discharge is a major N and P pollution source • Landscaping runoff contributes to eutrophication (parks, lawns, gardens and other landscaped elements fertilisation) • Fossil fuel combustion increases N pollution • Cities are sinks for agricultural products demand for food, biofuels, cotton and other agricultural products
LOSS OF BIODIVERSITY	• Urban sprawl fragments habitats • Urban development destroys biodiversity hotspots • Urban areas are favourable for invasive species • Polluted waterways and soil cannot support life
LAND SYSTEM CHANGE	• Urban sprawl fragments and degrades forests and other land uses • Unsustainable timber products degrade forests • Cities are sinks for resources that degrade forests in extraction
WATER SYSTEM DEGRADATION	• Concentrated urban water use causes local ecological strain • Non-porous surfaces prevent ground water recharge and contribute to contamination • Illegal wells deplete the water table beyond regulated amounts
ATMOSPHERIC AEROSOL LOADING	• Cities are major energy consumers due to heating, cooling, transport, and industry • Construction and demolition produce particulate matter
NOVEL ENTITIES	• Building materials cause pollution throughout the supply chain (steel and precious metals extraction and refining process, toxic building materials) • Industrial sites are often contaminated (industrial land, shipyards, power plants, military testing areas, waste dumping sites)
OCEAN ACIDIFICATION	• CO2 emissions from transportation, energy production, and buildings • Sewage and urban runoff contribute to coastal acidity
STRATOSPHERIC OZONE DEPLETION	• Heat transfer fluids were ozone depleting ODS's are commonly used as a heat transfer agent in air conditioning, refrigeration, and other applications. • ODS's continue to be used illegally
CLIMATE CHANGE	• GHG emissions • Land use change • Urban albedo change

Table 1. *Planetary boundaries and major drivers of degradation in urban environment*

Planetary boundaries and major drivers of degradation in urban environment

Earth has a limited capacity to support the consumption patterns of modern humanity. The concept of planetary boundaries (PB) comprises nine categories that are crucial to the health and viability of human civilization (Table 1). Six of the nine PBs have now been transgressed, suggesting that Earth is now well outside the safe operating space for humanity (Richardson et al., 2023). We have warmed the atmosphere by 1.2oC globally and are on our way to overstepping a variety of irreversible tipping points in the climate system (Foster et al., 2023). Global diversity loss has accelerated such that we have already crossed this planetary boundary. Humans have also caused serious imbalances in nitrogen and phosphorus cycles. There is too much nitrogen and phosphorus in circulation. This boundary has been exceeded by a wide margin. The ability of soils to store water is also diminishing. Land use has a special role in the PB concept. As built-up areas expand and agriculture becomes both more extensive and intensive, landscapes are transformed, important ecosystem functions are lost. Oceans are becoming more and more acidic because of more and more CO2 entering the atmosphere, which dissolves in oceanic water. However, the planetary boundary for acidification has not yet been exceeded. Bold international policies ensured that the ozone layer planetary boundary was not exceeded.

What is driving climate change?

Climate change is the most important crisis at the moment since it is intrinsically linked with all essential Earth system processes through numerous feedback loops on multiple scales. While Earth's climate has never been static, the current extent and rate of change are unprecedented

in human history (IPCC, 2018). Climate change in the last 200 years is driven by elevated levels of CO2 and other GHGs. Sources include the combustion of fossil fuels and biomass, the release of stored carbon in biomass and soils through deforestation and land degradation, the release of nitrous oxides from fertiliser application, and the release of methane and CO2 from the microbial activity of decay. The reflectivity of the Earth's surface and atmosphere alters how much of the Sun's energy is absorbed or reflected. Changes in albedo include loss of reflective ice, land-system change and atmospheric aerosol loading. Climate change is also driven by positive feedback in the climate system, which may trigger irreversible changes to Earth systems driven by intrinsic biogeophysical feedback. Already observed examples of positive feedback in the climate system are loss of summer sea ice, permafrost thawing and weakening of terrestrial and aquatic carbon sinks.

Climate change has significant impacts on landscapes, including intensification of the urban heat island effect, particularly in summer, water shortages as a result of reduced rainfall and increased evapotranspiration, flooding, particularly in built environments and floodplains, rising sea levels leading to significant landscape impacts in coastal areas, including displacement of communities, social infrastructure, biodiversity and alterations to landform configurations. Changes in biodiversity as a consequence of new climatic conditions are also a problem. As some species increase in number and range whilst others decline, changes in food provision, the spread of diseases and our enjoyment of a healthy and aesthetically pleasing environment. Decreasing air quality as a result of higher temperatures and possible increases in ultraviolet radiation could also have consequences for human health and comfort. Climate change will also significantly impact the character of landscapes via environmental, cultural, social and economic factors which shape this character. Climate change has the potential to render some locations uninhabitable,

with conflict over access to water, energy and food, and this may lead to climate-related migration.

The form and function of urban development regarding mitigation and adaptation to climate change

The built environment is heavily contributing to climate change. Cities have an outsized contribution to GHG emissions; they house over half of the world's population, consume two-thirds of the world's energy and account for more than 70 % of CO2 emissions. Transportation, energy production, and buildings are the primary sources of these emissions. Furthermore, the 'urban heat island' effect occurs in cities due to the increased use of manmade materials, such as asphalt, cement and glass, that tend to absorb more solar radiation than vegetated land. Higher temperatures increase summertime peak energy demand due to air conditioning, further exacerbating cities' contribution to climate change.

The form and function of urban development are fundamental to mitigation and adaptation to climate change. Transitioning toward regenerative practices in cities can have cascading benefits locally, regionally, and globally. Through their training and expertise, landscape architects are well-positioned to provide holistic approaches to the planning and management of the built environment and rural areas. Sustainable landscape planning, design, and management are essential if we are to adapt our environments to a changing climate and mitigate future change. Mitigation and adaptation principles are often interlinked and mutually reinforcing whilst also providing wider socio-economic and environmental benefits. For example, the provision of urban green space will mitigate through carbon storage as well as reducing surface run-off, an important aspect of adaptation. Cities are dynamic systems, and the starting point in managing risks and building long-term resilience is for a city to understand its exposure and sensitivity and develop responsive

policies and investments that address these vulnerabilities. Adaptation is not a one-time effort but an ongoing cycle of preparation, response, and revision. Those cities that are able to integrate adaptation well with existing planning processes and goals—including priorities in disaster risk reduction, sustainable development, and poverty reduction—will be best positioned to thrive in the era of climate change.

The maximisation of renewable energy capacity as an essential aspect of climate change mitigation Renewable energy sources, such as wind and solar, emit little to no greenhouse gases, are readily available, but our technical responses to mitigate climate change will have additional implications. We will, therefore, increasingly be faced with the difficult task of making decisions relating to the scale, nature and location of renewable energy solutions and balancing such requirements with the values we attribute to landscapes. The expertise that landscape architects have in design and the use of landscape and visual impact assessments ensures that proposals for the development of renewable energy generation, including bioenergy, can respond to and be appropriately considered in their wider environmental context.

Some site-specific interventions can also contribute to mitigation, such as the creation of urban carbon sinks via the provision of green space, which removes carbon from the atmosphere via storage in biomass or the installation of green roofs and green walls, thereby improving the thermal efficiency of buildings and reducing the use of conventional heating and cooling systems, whilst also alleviating flood risk.

Climate crisis requires a wide range of climate actions

Reducing urban GHG emissions in line with a 1.5°C trajectory requires a wide range of climate action at city, national and global levels from both public and private

actors. There are many ways, at a range of different scales, in which landscape architects can play an important role in helping to achieve these. Cities could have a significant impact on consumption-based emissions. The consumption interventions for food, buildings and infrastructure, private transportation, aviation, clothing and textiles, and electronics and household appliances have the highest potential to reduce emissions. On construction, cities need to change what types of buildings and infrastructure are built as well as what materials are used. On transport, private car ownership needs to end, and the shared vehicles that replace it have to use less material and be longer lasting. Urban residents will also need to adopt a largely plant-based diet, mostly replace flying with less energy-intensive forms of long-distance transport, change how clothes and textiles are consumed and keep electronics and household appliances for longer.

Reducing GHG emissions also requires significant behavioural changes. Individual consumers cannot change the way the global economy operates on their own, but many of the consumption interventions rely on individual action. It is ultimately up to individuals to decide what type of food to eat and how to manage their shopping to avoid household food waste. It is also largely up to individuals to decide how many new items of clothing to buy, whether they should own and drive a private car, or how many personal flights to catch every year. Furthermore, elected leaders respond to consumer demands and voter priorities. Signs of broad behavioural change will, therefore, support low-carbon corporate and political action. It is critical that behavioural changes occur as soon as possible and that governments and businesses support the transition to more sustainable consumption through policy incentives and new business models.

Carbon pricing is also an effective mechanism to reduce the carbon intensities of products and services in a flexible and cost-effective manner (World Bank, 2019).

Carbon pricing sends a price signal to consumers by making high-carbon goods more expensive, thereby triggering a positive behaviour change towards a lower-carbon alternative. Carbon pricing would be most effective at a global level, but it can be developed incrementally, region by region and sector by sector. Several cities have already introduced forms of carbon pricing on the built environment and private vehicles. Another important policy is to address the macro driver of consumption emissions: increased expenditure due to economic growth. GDP growth rates have a significant impact on emission levels in cities over time. Academics and thinkers question the viability of the dominant economic paradigm within which the global economy operates – to use the proxy of GDP as the primary indicator of development. However, GDP is incomplete and lacks the ability to address environmental degradation or climate change. Alternative socio-economic frameworks do exist. These concepts attempt to encapsulate an economy that allows societies to operate within planetary boundaries while ensuring that human needs are met. Policymakers would be agnostic about economic growth; it would not be an indicator of success or failure but merely one thing to consider alongside a wider range of social, economic and environmental factors.

Regenerative actions for the built environment

Fortunately many feasible regenerative solutions exist that may potentially deliver more positive planetary outcomes to restore natural systems. Built environment interventions can address multiple boundaries and may have synergies across multiple boundaries. Some, such as preventing urban sprawl, require regional approaches or policy changes while others, such as cool or green roofs, rain gardens, urban trees and native landscaping, occur at the local or buildings scale (Fig.1)

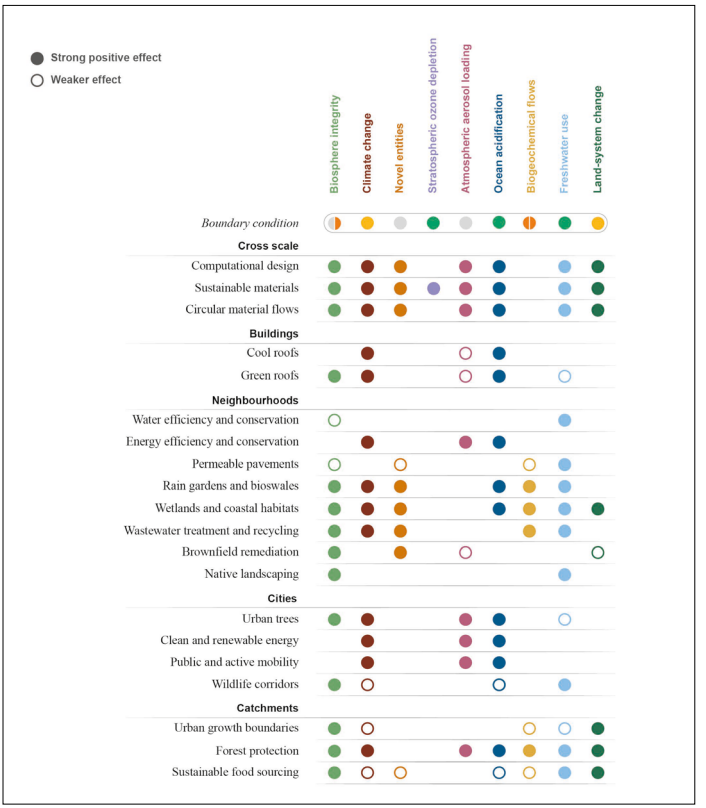

Fig. 1. *Response of the PBs to a range of built environment interventions (modified from ARUP, 2021)*

Conclusions

Civilisation is being threatened in ways it never has before, presenting new realities, new norms and new shocks. Humanity's collision with planetary boundaries requires a radical rethink of myths such as we can have infinite growth on a finite planet, markets are fair, prices tell the truth, self-interest drives ideal human behaviour, and more income equals more happiness. To achieve a flourishing life within ecological limits, we have to transform production

and consumption, which requires a rapid global, national and local alignment of climate policies, new business models and society-wide behavioural change that must deliver an unprecedented level of climate action by government, business and individuals.

City planners, landscape architects and engineers are in a unique position to address the risks associated with crossing Planetary Boundary thresholds. Design decisions and physical interventions influence how people travel, inhabit space, consume goods and use energy. If projects are rethought, re-considered, retrofitted and created to minimise impact on the natural environment, the benefits will be felt for decades to come.

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Sustainable tourism—What It Is and How To Progress Towards It

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ABSTRACT

Recent conceptualisations of sustainable tourism take as starting points the major societal challenges of our times. Sustainable tourism is about the relationship between tourism and the world we live in, where climate and environment, health and welfare, democracy and community building as well as digitalisation, are areas that tourism stakeholders must address. Sustainable tourism is thereby a response to real-world issues and opportunities (Jones & Walmsley, 2022) and a direction to transform societal systems and behaviours and contribute to resilient societies and sustainable development (Bramwell et al., 2017; Edgell Sr, 2019).

In this article, three members of the EUTOPIA Community on Tourism and Experiences outline some of the main characteristics of the sustainable tourism discourse; what they are and how stakeholders can address them. We retrace a selection of research and policy orientations for sustainable tourism in the context of current societal challenges, outlined in 10 parts. The selection is not all-encompassing but represents the most urgent and critical perspectives to tourism studies and is based on our own research, experiences and interpretations.

We discuss tourism's contribution to place development on larger and smaller scales, for example tax revenues, competence supply, and wellbeing of residents, tourists, companies and societies (part 1). We address climate and environmental degradation, where tourism is a key contributor (part 2), and the connected economic growth paradigm (part 3). Furthermore, tourism's role in inclusive and just futures is discussed (part 4) before bringing up the goal conflicts and wicked problems involved in tourism decision-making (part 5).

We propose that issues and opportunities must be handled through knowledge integration between actors, which we discuss from a systems theory perspective (part 6). The twin transition and smart tourism concepts are presented as part of digitalisation in tourism (part 7). Sustainable behaviour is another important aspect of sustainable tourism, for instance, how nudging initiatives and immersive experiences may benefit society (part 8). We also discuss and give examples of tools and instruments that contribute to sustainability in the tourism industry (part 9). Finally, we draw some main conclusions and briefly address ways forward (part 10).

1. Tourism and place development

Representing a major sector of the local, regional and global economy, tourism has a fundamental relationship with place development. The positive effects of tourism generally refer to an increase in jobs and tax income and that it stimulates the local economy through restaurants and other services and activities (Zaei & Zaei, 2013). It improves infrastructure development by building hotels, airports, roads and recreational facilities, benefiting both tourists and local residents (Kanwal et al., 2020; Zaei & Zaei, 2013). In addition, tourism promotes cultural exchange as people meet and learn from each other, which in turn can lead to place attachment, return visits and word-of-mouth communication (Chen & Rahman, 2018). Furthermore, the places and landmarks visited can shape future development paths and contribute to conservation efforts (Zaei & Zaei, 2013).

Sustainable development implies a holistic perspective: development can only be sustainable "if it is considered within a global political, socioeconomic and ecological context" (Sharpley, 2000, p. 8). It therefore appears necessary to critically engage with the wider contexts in which tourism occurs. The growth approach to tourism development has often contributed to reducing tourism to marketing and promotion activities. This narrow view fails to include spatial-functional, organisational and financial measures that instead would facilitate and improve tourism management interventions within a sustainable development framework (da Silva Oliveira, 2015).

Accordingly, there is a need "to re-establish a combined relational and bounded notion of place" (Marsden, 2013, p. 215) and to develop tourism according to place characteristics and local actors' values. Thus, tourism can contribute to inclusive, equal and tolerant places where visitors and residents feel welcome and safe. Related to this development, several tourism researchers align with the 'Beyond GDP agenda' and emphasise that local community well-being should be the fundamental ambition of destination development (Dwyer, 2023; Higgins-Desbiolles & Bigby, 2022).

2. Climate and environment

Europe is the global leader in international tourism, accounting for almost two-thirds of international tourist arrivals worldwide. In 2019, before the COVID-19 pandemic, Europe reported a peak of 745 million international visitors (Statista, n.d.). As such, tourism impacts both the climate and the environment. Consequently, tourism is an essential sector to address global challenges such as the climate crisis, environmental degradation and biodiversity loss, and thereby achieve the objectives of the green transition (Council of the EU, 2022).

The Intergovernmental Panel on Climate Change (IPCC) publishes assessment reports to guide global climate policymaking. In their sixth report (AR6), IPCC makes clear that the climate impacts the world faces are unavoidable and worsening and that it will not be enough with incremental mitigation and adaptation responses (IPCC, 2022). Human activities are responsible for global warming, and regions that generally contribute the least to climate change are the most vulnerable due to, for instance, extreme heat, sea level rise, thawing of permafrost, ocean acidification, as well as desertification and other land degradation (IPCC, 2022). Additional phenomena that affect natural environments, and thus tourism, include over-tourism, increased congestion, inappropriate use, and poor management (Newsome, 2021). As a result, the tourism sector will change rapidly over the coming decades, reshaping demand, competition, and sustainability (Scott et al., 2023).

Based on AR6, climate action in tourism is required to achieve climate justice and equitable responses, advance climate-resilient tourism development, and reduce emissions by legislation and regulations (Gössling et al., 2023; Scott et al., 2023). Other actions include addressing regional knowledge gaps and giving guidance and standards for destinations and tour operators (Scott et al., 2023).

3. The economic growth paradigm

The balance between the environmental, economic, and sociocultural aspects is seen as vital for sustainable tourism (UNEP & UNWTO, 2005). However, after decades of discussion on sustainable tourism strategies, success is still determined in terms of growth in tourist numbers, failing to consider the social and environmental limits of living on a finite planet (Higgins-Desbiolles, 2018). Indeed, for a long time tourism has been justified by the economic

growth it delivers, which is based on a neoliberal approach that emphasises economic value and regards companies as the main stakeholder (Eide & Hoarau-Heemstra, 2022). In particular, the UN Sustainable Development Goal 8 focuses on continuous economic growth, profit-making and competitiveness, clashing with the other SDGs which emphasise the need to respect planet boundaries and reduce resource use.

The paradox is that tourism is justifiable due to its place in the economic growth paradigm while at the same time being the metaphor for the negative consequences of the same (Sharpley, 2020). Critical scholars have pointed out that economic growth cannot be decoupled from environmental and social impacts in the long term. For example, in the inclusive growth paradigm, increasing employment opportunities and the size of the economy do not consider the redistribution of resources to the poor, hindering their development (Scheyvens & Biddulph, 2018).

To align the economic pillar to the sustainable tourism approach, tourism development should focus on the creation of workplaces, the reduction of seasonality, and the increase of social welfare (Streimikiene et al., 2021) rather than solely being based on economic profit-seeking criteria and using the sustainability concept to make their practices appear green (greenwashing). In short, being part of a sustainable degrowth paradigm would mean that a "global rebalancing" is needed, where, for example, the excessive consumption of tourism experiences, specifically air travel, is balanced by giving new meanings to consumption and production and through "institutional, structural and behavioural transformations" (Sharpley, 2020, p. 1942).

4. Inclusive and just futures

The 'polycrisis' of wars, climate change, and loss of biodiversity, democracy and security, calls for transformation

of tourism for the sake of "just, sustainable and equitable futures" (Rastegar et al., 2023, p. 2613). However, diverse worldviews and siloed thinking risk undermining the possibilities of solidarity through tourism (Rastegar et al., 2023) and instead increase power injustices and procrastination regarding the situation we are facing.

A focus on residents' interests in tourism has been significant in research on sustainable tourism since the 1970s (Kapoor et al., 2023). Studies include residents' perceptions and attitudes towards tourism development and the importance of resident involvement and participation in all stages of development (Kapoor et al., 2023). More recently, a focus on local communities has emerged, with a broader definition than residents, emphasising that current and future generations are embedded in the local ecology, which also has its own rights (Higgins-Desbiolles & Bigby, 2022).

The 'local turn' is seen as a "catalyst to changing our consciousness, relationships and activities to prevent and mitigate" crises (Higgins-Desbiolles & Bigby, 2022, p. 2). Thus, it offers an opportunity for greater justice that is grounded in social and ecological contexts. The 'local turn' shifts thinking and practice from 'hosts' and 'destinations', which implies tourists as invaders and places simply as societies where tourism occurs and tourists benefit, to a more responsive and answerable form of tourism (Higgins-Desbiolles & Bigby, 2022) that supports customs, desires and interests of local societies (Higgins-Desbiolles, 2020).

The concept of inclusive tourism has evolved from being mainly about accessibility for disabled groups to acknowledging that the consumption and creation of tourism products, as well as the benefits coupled with revenues and other types of outcomes, should be open for all groups in society, regardless of their characteristics and abilities (Jernsand et al., 2023; Scheyvens & Biddulph, 2018). Tourism patterns are embedded in privileges and

prejudice, which means that certain groups are included and excluded when tourism is consumed, planned, developed, controlled and communicated (Jernsand et al., 2023). Inclusion and exclusion must, therefore, be addressed in all parts and on local, regional, national and international levels (Higgins-Desbiolles & Bigby, 2022; Jernsand et al., 2023).

5. Goal conflicts

Sustainability thinking challenges conventional thinking and practice as it comprehensively covers the core issues of decision-making and the links and interdependencies between them. According to the UN World Tourism Organisation (UNWTO, n.d), tourism has the potential to contribute directly or indirectly to all Sustainable Development Goals (SDGs) and the entire Agenda 2030.

However, several goal conflicts exist and arise when different interests meet between economic growth, social justice and environmental protection (Campbell, 1996). Gentrification of residential areas due to tourism is an example of a property conflict, while there is a resource conflict when nature is exploited on behalf of economic interests. A development conflict arises when the livelihoods of communities are distorted as nature is regulated for its protection. Moreover, when residents perceive that tourism development proposals challenge their place's special qualities, conflicts can also emerge (Dredge, 2010).

Goal conflicts are also central to the concept of wicked problems (Rittel & Webber, 1973). Wicked problems have mutual dependencies and are contradictory as stakeholders understand problems differently due to stakeholders' variety of frames and worldviews. There is no single solution to wicked problems; they change over time and can never be solved definitively. Therefore, wicked problems require knowledge from different fields of expertise, and they

demand both creativity and the ability to see the big picture and understand complexity.

6. Actors and their relationships

Stakeholder-centric and bottom-up approaches are proposed in tourism research and the related fields of place branding, urban planning and political science. Such approaches include the involvement of various stakeholder groups into co-creative, participatory processes. Stakeholders include residents, tourists, business owners, governing agencies, politicians, promotion agencies, as well as non-profit, religious, social and academic organisations (Björner & Aronsson, 2022; Roxas et al., 2020; Yasir et al., 2021).

The complexity of sustainable tourism requires interdisciplinary and transdisciplinary approaches that integrate knowledge from diverse disciplines and actor groups to co-create strategies for sustainable tourism transitions (Bramwell et al., 2017; Lang et al., 2012). The approach diverges from traditional views of actors and their relationships in the tourism sector, which is based on partnerships, competitiveness, networks (Hall, 2019), and companies as central stakeholders (Eide & Hoarau-Heemstra, 2022).

Related to the transdisciplinary approach is systems thinking, an approach used within the sustainable tourism field to understand the structures and feedback mechanisms influencing tourism (Roxas et al., 2020). Similarly, the term ecosystem and the ecosystem theory have emerged to explain value creation in the context of sustainability and smart tourism (Jäckli & Meier, 2024). The variety of actors in systems theory is often visualised in helix models, where each type of actor represents a circle or spiral (helix) in DNA (Etzkowitz & Leydesdorff, 1995). In the helical framework, actors overlap, visualising how they interact with each other. In the triple helix model, universities, industries and governments are represented, while later conceptualisations

add the public, which represents civic society and media, into a quadruple helix model (Carayannis & Campbell, 2009). In the quintuple or penta helix model, the natural environment is added as an actor for the purpose of "transdisciplinary (and interdisciplinary) analysis of sustainable development and social ecology" (Carayannis & Campbell, 2010, p. 62).

Helix models provide guidance about the key actors, the mechanisms of interactions involved, and the conditions that enable them (Cai & Amaral, 2021).

7. Digitalisation and tourism

Digitalisation transforms the tourism industry and revolutionises tourism experiences, products, destinations, enterprises and business ecosystems (Dredge et al., 2019). The COVID-19 pandemic accelerated tourism digitalisation and further paved the way for disruptive and transformational technologies in tourism (Buhalis, 2022). To make tourism sustainable, the emerging concept of 'twin transition' is increasingly in focus. The twin transition explores how digital technologies can support addressing climate change and environmental degradation, to identify innovative solutions emerging from this synergy (Muench et al., 2022).

Another key concept in discussions of tourism digitalisation is 'smart tourism' (Gretzel et al., 2015), stemming from the slightly older term 'smart city' (e.g. Al Sharif & Pokharel, 2022). Sustainability is integrated into both concepts. Smart cities, like smart tourism, are often associated with the use of information and communication technologies (ICT) to optimise resources, enable efficient and fair governance, and develop sustainable places with a high quality of life (Al Sharif & Pokharel, 2022; European Commission, 2022). In recent years, smart solutions have been widely introduced in the tourism sector, as a response to new

challenges and demands in a rapidly changing world and industry, through the development of digital tools, products and services (European Commission, 2022). Today, various technologies are used in tourism, such as artificial intelligence/AI, robots (Tuomi et al., 2019), virtual reality/VR (Beck et al., 2019), augmented reality/AR (Jingen et al., 2019), and digital twins (Fischer-Stabel et al., 2021).

In short, digitalisation appears to offer opportunities for sustainable societies and destinations. It should, however, be mentioned that digital development also comes with risks, limitations and obstacles, which are still largely unexplored,including, for example, ethics, integrity, information overload, and dehumanisation (Femenia-Serra et al., 2022; Yallop et al., 2021).

8. Sustainable behaviour

Sustainable consumer behaviour is an important aspect of sustainable tourism as it eventually benefits society (Han, 2021). When individuals become aware and knowledgeable, this might stimulate a deeper understanding and the change of attitudes, behaviours, and actions in a sustainable direction (Jernsand et al., 2023). In their work and in their free time, these individuals can also influence the behaviour of other people and organisations. Therefore, strategies to enhance pro-sustainability learning effects and collective learning are essential for the work towards Agenda 2030 (Gössling et al., 2021).

Several theories address consumer behaviour and sustainability in tourism and hospitality: the theory of planned behaviour, the theory of reasoned action, and the value-belief-norm theory, to name a few (Han, 2021). Scholars also stress tourism experiences as a means to contribute to sustainable behaviour. Recent research points out that the shift towards sustainable behaviour might be enabled by different elements, as tourists today are more

knowledgeable (Schweinsberg & O'Flynn, 2022) and search for emotional and transformational circumstances (Volo, 2022). Moreover, technological developments increasingly create opportunities for experiencing, sharing, and learning (Han et al., 2018). In the context of tourist experiences, the importance of emotions, social belonging, trust and transparency make for immersive experiences, which in turn enhance learning effects (Jernsand & Goolaup, 2020).

Another stream of research emphasises nudging as a tool for sustainable behaviour. Nudging guides individuals, consciously or unconsciously, into better decisions but does not prevent them from choosing something else (Souza-Neto et al., 2023). Nudges trigger a behaviour by using people's feelings and prejudices, for example, by simplifying decision-making (intuitive thinking). It can also create opportunities for broader thinking and reflection through increased self-responsibility, which can be encouraged using reminders (reflexive thinking) (Beshears & Gino, 2015). Intuitive and reflexive thinking can also be used in combination.

9. Sustainability tools in tourism

There are various instruments that contribute to increased quality and sustainability in tourism and destinations, including rankings, indexes, certifications, labels, monitoring systems, standards, reporting, handbooks and guides. Destinations and tourism organisations can use such instruments to gain inspiration, new insights and lessons, which can contribute to a more strategic approach to sustainability work. Benchmarking and measurements of impacts can, for example, clarify strengths, weaknesses and values and provide increased transparency. The instruments can also be used to showcase sustainability achievements and contribute to the narrative of the destination or organisation as sustainable and responsible (Jørgensen, 2023).

The Global Sustainable Tourism Council Criteria (GSTC-C) and the European Tourism Indicator System for Sustainable Destinations (ETIS) are two principal examples of destination indexes (Jørgensen, 2023). Moreover, the World Economic Forum's index Travel and Tourism Competitiveness Index (TTCI) is commonly used to measure tourism competitiveness (Rodríguez-Díaz & Pulido- Fernández, 2019) while also focusing on sustainability and resilience (World Economic Forum, 2022). Global Destination Sustainability Index (GDS) is another index evaluating destinations with regards to the SDGs and inre- lation to four areas of performance: environmental, social, supplier (e.g. hotels, restaurants, airports) and destination management (e.g. strategy, policy, certification, governance, measurements and reports) (Jørgensen, 2023; GDS, n.d.).

In recent decades, certifications and labels have emerged as imperative management tools in the tourism industry (Buckley, 2002). A core idea with certifications and labels is to guarantee that an independent assessment has been carried out based on a set of sustainability criteria. For example, Norway has a long tradition of working with sustainability certifications. Here, destinations and tourism organisations that wish to be certified and maintain their certification must keep the negative impact of tourism to a minimum, demonstrate a constant commitment to sustainable practices, and continue the long-term process to be more sustainable (Eide & Hoarau-Heemstra, 2022; Visit Norway, n.d.). Finland, in turn, launched the Sustainable Tourism Finland label in 2019, aiming to help the tourism industry adopt sustainable practices with the help of concrete management tools and a 7-step development path (Visit Finland, n.d.)

10. Conclusion

The current "poly-crisis" humanity is facing emphasises the need for urgency in responding to global challenges (Rastegar et al., 2023). In this article, we point out current research strands and policy issues in the context of sustainable tourism, emphasising tourism's potential to contribute to sustainable development and just and equitable societies (Bramwell et al., 2017; Rastegar et al., 2023).

Viewing tourism as part of a larger system means that it is no longer possible to reduce it to the tourism industry, or to marketing and promotion activities. Tourism development and management means transforming institutions, structures and behaviours (Sharpley, 2020). The key to achieving this is a stakeholder-centric approach involving a range of actors and stakeholders in co-creation and knowledge integration processes. Furthermore, we see a need for a more responsive and answerable form of tourism that supports local communities in a wider sense (Higgins-Desbiolles & Bigby, 2022). A globally rebalanced tourism (Sharpley, 2020) distributes the benefits of tourism to all groups in society regardless of their characteristics and abilities (Jernsand et al., 2023; Scheyvens & Biddulph, 2018) and advances tourism development towards climate resilience (Gössling et al., 2023; Scott et al., 2023).

To reiterate, when going forward and continuing the path towards sustainable tourism we emphasise the need to see tourism as interconnected with the natural and social context in which it occurs. In coming years it will also be vital to address and closely follow the twin transition, particularly the development and impacts of AI in tourism, and its opportunities and risks with regards to sustainability issues.

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The Pompeu Fabra University-Barcelona contribution to Planetary Wellbeing

CARLA LANCELOTTI, ARIADNA MORENO GAY AND THE BOARD OF THE CENTRE FOR STUDIES ON PLANETARY WELLBEING (SPAIN)

ABSTRACT

We live in a time of crisis and radical social and environmental transformations. The challenges we face, as a collective, are complex and urgent, and can be approached exclusively form a holistic point of view, recognising that all the actors (human beings, non-human animals and geo- and bio-spheres) are intertwined and the wellbeing of one collective is strictly dependent on the wellbeing of the others. Universities should be amongst the primary actors in guiding the changes we need to face these challenges as they incorporate all the necessary resources: Research, to find creative solutions; Teaching, to raise generations that will do better; Institutional presence, to provide an example.

Stemming from a prior initiative active since 2017, the Pompeu Fabra University-Barcelona (UPF) Centre for Studies on Planetary Wellbeing was launched in 2022 with the aim of creating synergies between different stakeholders working on Planetary Wellbeing within Universitat Pompeu Fabra. The activities promoted by the Centre encompass the different levels of UPF involvement in Planetary Wellbeing, and foster its commitment to SDGs. In this paper we will describe the UPF's journey to the creation of the Centre for Studies on Planetary Wellbeing and the University's commitments for a more sustainable future.

Within this transformative context, the Pompeu Fabra University is also planning to establish an Institute for Research and Innovation in Planetary Wellbeing in Barcelona as part of the "Ciutadella del

Coneixement" initiative. The Institute will serve as a focal point for national and international research, and will drive interdisciplinary and mission-oriented projects in critical areas related with the wellbeing of individuals, societies and the Planet.

Introduction: The Planetary Wellbeing initiative at UPF

In 2015, the Rockefeller Foundation and *The Lancet* introduced the term "Planetary Health" to describe the highest level of human health that can be achieved without putting the Earth's natural systems at risk (Whitmee et al., 2015). Building on this concept, the Universitat Pompeu Fabra-Barcelona recognized that focusing solely on human health is under-inclusive and that the attention should be extended beyond human lives. To incorporate this perspective, a more inclusive concept was required. This led to the adoption of the term 'planetary wellbeing,', understood as the highest attainable standard of wellbeing for human and non-human beings and their social and natural systems (Antó et al., 2021). This definition suggests that achieving prosperity in concert with other beings, whether human or non-human, is only possible by addressing the political, legal, economic, cultural, and social structures influencing the Earth's natural systems (Antó et al., 2021)

The Planetary Wellbeing Initiative (PWI) initially included a task force composed by researchers and institutional profiles, which supported the idea. This collaboration ultimately resulted in a paper published in the journal Sustainability, an open-access journal on environmental, cultural, economic, and social sustainability of human beings. This paper defines the concept of planetary wellbeing as envisioned by UPF and discusses how universities and other academic institutions should take a leading position in forming future leaders and professionals in both

education and research to advance planetary wellbeing (Antó et al., 2021).

Within this context, at the end of 2017 Jaume Casals, then rector of UPF, announced the University's will to promote transversal, multidisciplinary and interdisciplinary actions in the field of Planetary Wellbeing in order to provide the institution with a vision committed to the great challenges of global society in the 21st century and, at the same time, generate transformative energies between the University itself and the urban environment in which it is located, the city of Barcelona (Antó et al., 2021). The proposal was born with the main objective of contributing to the knowledge and understanding of the set of complex, interrelated and systemic problems faced by human, animal and the planet, as a global ecosystem, and to the identification of integrated, innovative and interdisciplinary solutions.

The Planetary Wellbeing Initiative is thus strictly connected to the Sustainable Development Goals (SDGs), a United Nations initiative that aims to achieve global improvements in 17 areas that include: poverty, hunger, health, education, global warming, gender equality, water, sanitation, energy, urbanisation, environment and social justice (United Nations, 2023).

The UPF Planetary Wellbeing Initiative is based on four premises:

a) We live in a complex, interconnected system: the health and wellbeing of all humans and non-humans are intrinsically linked to the state of the planet's natural systems.
b) The challenges and threats in today's world are changing, complex and increasingly difficult to predict, while the responses we need to provide are more urgent than ever.
c) A qualitative leap is needed in our capacity for knowledge and understanding, as well as in global governance

and collective decision-making to find and implement effective solutions. This qualitative leap can only come from a change in focus that allows us to work integrated from the various disciplines of our current knowledge.

d) These solutions exist, and finding them is not an impossible challenge.

With this vision, Universitat Pompeu Fabra pledges a commitment to contribute to this planetary objective, and to do so it proposes crossing the borders between disciplines, departments and units. Thus, the initiative aims to internally generate spaces for scientific and teaching collaboration between the various fields of knowledge present within the University; stimulate new research aimed at contributing to some of the major axes of Planetary Wellbeing; and train new students and researchers who have a more transversal and interdisciplinary vocation. For all this, it is necessary to ensure that students of all degrees and postgraduate degrees and new generations of researchers have access to precise and plural knowledge about the great planetary challenges and the possible responses and solutions.

The established initiative aims at becoming a reference actor promoting the idea of Planetary Wellbeing widely outside the University. To make this possible, the University is opening spaces for collaboration with other institutions and international organisations to advance together on the frontiers of knowledge, its dissemination and coordinated actions, that allows taking advantage of this knowledge for the benefit of Planetary Wellbeing.

Why Planetary Wellbeing?

Firstly, the concept of Planetary Wellbeing aspires to generate new knowledge that can respond to current and future global challenges based on a very clear premise: the wellbeing of the planet and all living beings are closely

intertwined elements. During the last century humanity has made great progress in improving the wellbeing of society, such as increasing life expectancy or reducing poverty or infant mortality rates on a global scale (Our World in Data, 2021). This qualitative leap has been a consequence of the exploitation of natural resources at an unprecedented rate as indicated by the increase in carbon dioxide emissions, ocean acidification, deforestation or water consumption, among others (Rockström et al., 2009). Likewise, the exploitation and use of these resources has not necessarily resulted in the wellbeing of the population from which they have been expropriated, which also requires addressing the unacceptable inequalities in health and wealth that occur within the environmental limits of the Earth (Antó et al., 2021, Whitmee et al., 2015). Consequently, the study of Planetary Wellbeing and the generation of new knowledge that is derived, is a necessary step for the implementation of fair policies, with decisive actions and inspiring leadership.

Because of their complexity, Planetary Wellbeing challenges can only be addressed in an integrated manner, combining current knowledge on health, biology, economics, law, governance, technology and, obviously, communication, culture, art and humanities. This approach, which integrates contributions from all the areas of knowledge covered at UPF, also seeks to appeal to global actors such as large foundations, supra-state organisations and even governments.

A useful framework to achieve the goal of integrating different disciplines working towards Planetary Wellebeing, is that of socio-ecological systems. Socio-ecological systems (SES) represent the intricate interplay between human societies and their surrounding environments, emphasising the interconnectedness of social and ecological dynamics (Berkes & Folke, 1998). This concept, rooted in resilience theory and sustainability science, recognizes that human wellbeing is intimately linked to the health of ecosystems. SES frameworks highlight the reciprocal relationships

between human activities and the environment, acknowledging that changes in one component can have cascading effects throughout the system (Lauerburg et al., 2020). Scholars like Elinor Ostrom have significantly contributed to understanding how communities can govern common pool resources sustainably, illustrating the importance of local knowledge and adaptive governance structures in fostering resilience (Ostrom, 1990). The study of socio-ecological systems has become imperative in addressing contemporary global challenges, such as climate change, biodiversity loss, and the sustainable management of natural resources, emphasising the need for interdisciplinary approaches that integrate social, economic, and ecological dimensions for effective decision-making and policy formulation (Anderies, 2004).

Why now?

The climate crisis has undeniably escalated into an emergency, marked by alarming statistics and unprecedented environmental shifts. The World Meteorological Organization reports that in 2019, the global average temperature surpassed pre-industrial levels by 1.1 degrees Celsius, concluding a decade characterised by exceptional heat, diminishing ice, and record sea levels—all attributed to human-generated greenhouse gases (World Meteorological Organization (WMO, 2020). Shockingly, 30% of the global population faces life-threatening heat waves for over 20 days annually, according to the United Nations Environment Programme (UNEP, 2023). Greenhouse gas emissions, totalling 59.1 gigatons of carbon dioxide equivalent in 2019, reached an alarming peak (UNEP, 2020). These are only some of the dire indicators that collectively underscore the urgent need for comprehensive and immediate action to address the climate emergency.

Thus, as a direct response to the urgent and alarming climate crisis, a 21st century university like UPF must find its space in a framework of global collaboration for the creation and transfer of knowledge. The challenge is to make UPF a central and leadership node in a global network of interdisciplinary research and higher education centres. It is necessary to collaborate with other Universities as well as with social organisations and government institutions. Dialogue serves as an educational tool, helping people comprehend the urgency of the situation, the impact of our actions, and the collective responsibility to work towards sustainable solutions, creating a shared sense of responsibility.

The Centre for Studies on Planetary Wellbeing

Within this context, the UPF Centre for Studies on Planetary Wellbeing was created in 2022 with the objective of structuring the UPF initiative for Planetary Wellbeing that has existed since 2017 and creating the necessary capacities and synergies inside and outside the University to successfully develop the initiative. The Centre for Studies is structured in 3 areas: education, research, and dissemination, including internal and external relationships. In these areas, a series of programs on Planetary Wellbeing are being developed for students and researchers from inside and outside the University. The main objective is to promote inter and transdisciplinary research between the different departments of the UPF and with other institutions and highlight the pioneering role of the UPF in a local, national and international level. In addition, the Centre accelerates UPF's commitment to the SDGs and its institutional transformation to respond effectively to global challenges, fostering a dialogue between different disciplines as a key to promoting socio-environmental change towards a more sustainable and equitable future (Patterson et al., 2017). Following are some examples of the

activities developed so far by the centre, which might serve as inspiration for future potential collaborations with partner within the EUTOPIA network.

Education

At the heart of the Centre's initiatives lies a commitment to education. Through innovative and interdisciplinary programs, the Centre wants to empower students with the knowledge and skills necessary to address the complex challenges facing our planet. The Centre is involved in various educational activities that cover a broad spectrum of subjects. These include environmental science, sustainable development, social justice, and the understanding of how global systems are interconnected. By providing students with this knowledge, we aim to inspire the next generation of change-makers dedicated to fostering Planetary Wellbeing. Some of our educational activities include:

A) A MINOR IN PLANETARY WELLBEING
Universitat Pompeu Fabra educational offer includes the possibility for undergraduate students to enrol in Minors. These programs are conceived as an opportunity to gain specific knowledge in an area different from the student's core studies (here). The Minor in Planetary Wellbeing aims at expanding students' knowledge and understanding of the complex, interrelated and systemic problems threatening human and animal wellbeing as well as the wellbeing of the planet itself as a global ecosystem. It also aims to identify integrated, innovative and interdisciplinary solutions to these problems. The Minor in Planetary Wellbeing has been part of the University's offer since 2021.

B) A MOOC IN PLANETARY WELLBEING
The University has been working on the design and

development of a MOOC entitled 'Introduction to Planetary Wellbeing' (here). The objective of this MOOC is to provide introductory knowledge on fundamental concepts, challenges and solutions related to the wellbeing of the planet and sustainability. The MOOC is divided into five modules including an overview of the challenges that we are facing at a global scale, an introduction to the concept of planetary wellbeing, a description of the causes and consequences of climate change and its impact on human health and the current relationship between food production and growth models in cities. The University has recognized this training with academic credits making it part of its official academic offer.

c) A MASTER'S DEGREE IN PLANETARY HEALTH

The Inter-University Master's Degree in Planetary Health (here) aims to provide graduates with the skills necessary to promote health at global level while respecting the limits of the planet's natural systems, by analysing the challenges facing humanity that are linked to the global climate and environment crisis, designing solutions and implementing these solutions in our societies, from the respective areas of knowledge. The Master is offered online, in Catalan and Spanish, (English version is currently being considered), and is promoted by the Universitat Oberta de Catalunya (UOC, coordinator), the Pompeu Fabra University (UPF) and the Barcelona Institute for Global Health (ISGlobal).

Research

In terms of research, the Centre is dedicated to fostering collaborations and synergies among researchers, both within and outside the University. The aim is to break

down traditional disciplinary boundaries and encourage interdisciplinary cooperation. By bringing together experts from various fields, the Centre seeks to create an environment that promotes a holistic understanding of Planetary Wellbeing. This approach allows us to explore diverse perspectives, expertise, and methodologies, enriching our research and capacity to address complex planetary challenges. Some of our research activities include:

A) SEMINAR SERIES

The seminar series are intended, on one side, to showcase UPF research on Planetary Wellbeing themes and, on the other side, to forge closer relations with researchers of other institutions. The talks have been organised once a month in hybrid format. These talks are open to anyone interested and the recordings are made available to the public after the recording here.

B) PROJECTS FUNDED BY THE PLANETARY WELLBEING INITIATIVE

This internal call aims to promote interdisciplinary collaborations to provide seed funding opportunities to activities related to the Planetary Wellbeing concept. Since 2019, the Planetary Wellbeing initiative has funded more than 50 proposals divided into different categories: call for funding for doctoral students, for postdoctoral researchers, for pilot research projects and the establishment of research collaborations on Planetary Wellbeing and for organising workshops and conferences on the topic here.

C) PRIZES FOR BEST BACHELOR'S, MASTER'S DEGREE FINAL PROJECTS AND DOCTORAL THESIS ON PLANETARY WELLBEING

The Centre collaborates in the awarding of prizes for the best Bachelor's, Master's Degree Final Projects and Doctoral Thesis on Planetary Wellbeing is

jointly given by Universitat Pompeu Fabra, the School of International Trade Consortium (hereafter ESCI), and the Continuing Education Institute Foundation (hereafter FIDEC). Projects related to Planetary Wellbeing which contribute to developing new knowledge in areas such as, but not limited to, co-beneficiaries for health and the environment, global governance or clean energies among other topics, can opt for the prize (here). The awards are open to any student at the University, regardless of their discipline, that through their Final Degree Projects or Doctoral Thesis, have contributed to the research of Planetary Wellbeing from their corresponding fields of knowledge.

Dissemination

In terms of dissemination, the goal of the Centre is to bridge the gap between academia and the wider community, fostering a shared understanding of the challenges and opportunities surrounding Planetary Wellbeing. Through various channels, including publications, conferences, workshops, social media and public engagement events, we disseminate our research findings and educational resources to diverse audiences. Some of our past dissemination activities have included:

A) THE EUROPAEUM WINTER SCHOOL ON PLANETARY WELLBEING
This international event was organised in 2022 with the aim to discuss the role and impact of higher education institutions in the transition to sustainability (here). It included a session by Will Steffen, Professor Emeritus at the National University of Australia, from which the concept of "planetary boundaries" arose (Rockström et al., 2009) , and John Elkington, founder of Volans (Volans, 2023) and writer, creator of the "triple bottom line"(Miller, 2020).

B) THE (IN)CORPORATE SUSTAINABILITY CONFERENCE

This conference on sustainability has been organised yearly since 2020 and focuses on the synergies that are to be created from combining the insights on sustainability challenges and solutions from different disciplines (here). It highlights the need for an interdisciplinary and multidisciplinary approach for creating a systemic change towards sustainability. Participants were invited to present their new research, exchange information, and discuss the current issues.

C) PROMOTING POSTGRADUATE EDUCATION IN PLANETARY HEALTH IN EUROPE

Recently in 2023, the Centre, in collaboration with the Open University of Catalonia (UOC), the Barcelona Institute for Global Health (ISGlobal) and the Planetary Health Alliance European Hub co-organized a workshop to share and discuss recent developments in Postgraduate Education in Planetary Health in Europe. The main aim was to bring together various stakeholders from academic institutions in Europe to present their new developments in Planetary Health in Postgraduate Education and establish collaboration with different postgraduate programs at our University that are working towards Planetary Wellbeing (here).

D) ART PROJECTS

The Centre recognizes the power of the humanities and arts as a means of communication and expression, and as such, it aims to invest in art projects that creatively depict and address global challenges. We believe that art can play a crucial role in raising awareness and catalysing positive change by making these complex and urgent issues more visible to a wider audience. To provide a recent example, former resident artist at UPF, Martin Bonadeo and his colleague Xavier Bou, ornithography

photographer, presented an exhibition of their work at the University, showcasing the work they did in the 'Old Fish Market' in Ciutadella. The space where this market was, destroyed in the past and converted into a parking lot, is now being used to build three new buildings linked to science and Planetary Wellbeing. Martín Bonadeo proposed as part of his residency at UPF two interventions, before the destruction of the parking lot, to reflect on the public spaces and a collective DNA (here).

The Future Institute of Research and Innovation in Planetary Wellbeing

The University is strengthening its commitment to Planetary Wellbeing by establishing the Institute of Research and Innovation in Planetary Wellbeing as part of the "Antic Mercat del Peix" project (here). The "Antic Mercat del Peix" project, promoted by the Spanish National Research Council (CSIC), the Barcelona Institute of Science and Technology (BIST) and the Pompeu Fabra University-Barcelona (UPF), consists of the creation of a new complex of research and innovation, focused on biomedicine, biodiversity and planetary wellbeing. It will be located on the land near the Ciutadella Park where until a few years ago the central fish market of Barcelona existed. In these new spaces the different institutions will promote interdisciplinary research and innovation in the fields of biomedicine, biology, economics, political and social sciences, law, humanities or technology; will reinforce the range of institutions already present in the Ciutadella area; and will make possible a unification of objectives committed to the important and urgent needs of the Planet. In the Antic Mercat del Peix area, the UPF will locate the Institute of Research and Innovation in Planetary Wellbeing, which

will become an aggregation centre for national and international research and innovation people, teams and institutions that will develop interdisciplinary collaboration and mission-oriented projects in critical areas related with the wellbeing of individuals, societies and the Planet.

This project represents the first visible action of the "Ciutadella del Coneixement" initiative. This scientific, cultural and urban planning initiative aims to convert the surroundings of the Ciutadella park, in the very center of Barcelona, into a reference urban knowledge node in southern Europe. The "Ciutadella del Coneixement" initiative (here) is promoted by Barcelona City Council, the Generalitat of Catalonia, the Spanish Government, and has the participation of CSIC, BIST, UPF, the University of Barcelona (UB), the Autonomous University of Barcelona (UAB), the Pasqual Maragall Foundation (FPM) and the Barcelona Biomedical Research Park (PRBB).

Conclusions and the Future of Planetary Wellbeing at UPF

The establishment of the UPF Centre for Studies on Planetary Wellbeing in 2022 reflects a crucial recognition of the pressing challenges our world faces in terms of social and environmental crises. The complexity and urgency of these issues need a holistic approach that acknowledges the interconnectedness of all actors.

Universities, with their research and teaching activities as well as their institutional presence, stand as pivotal actors in guiding the transformative changes required to address these challenges. The UPF Centre for Studies on Planetary Wellbeing embodies this commitment by creating synergies among stakeholders within and beyond Universitat Pompeu Fabra. The continuous support that the Centre, and the initiative on Planetary Wellbeing at large, is receiving by the university's governing body, testifies of the commitment of UPF to current challenges. With

this institutional backing, the Centre will keep contributing to existing initiatives like the MOOC and the Minor on Planetary Wellbeing, while also fostering the development of new programs through collaborations with international teaching programs. In essence, the UPF Centre for Studies on Planetary Wellbeing embodies the University's commitment to a more sustainable and interconnected future, emphasising the integral role of education, research, and institutional presence in shaping a collective response to the challenges of our time. Furthermore, the "Antic Mercat del Peix" project reinforces the University's position towards contributing to the advancement of knowledge and the pursuit of sustainable solutions for the wellbeing of our planet and its inhabitants.

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Reconsidering Narratives: Speculative Fiction's Role in Addressing Climate Change in the Anthropocene

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ABSTRACT

This article investigates the essential role of speculative narratives in tackling the climate crisis within the Anthropocene. It advocates a shift away from traditional anthropocentric stories that have split humans and the environment into opposing forces. Through an examination of speculative fiction and film in the Anglophone world and contemporary Türkiye, the study emphasises the pressing call to confront our growing ecological predicament. It suggests that the disciplines of literary studies, film studies, and the environmental humanities are strategically placed to help shape a more sustainable future by redefining our environmental narrative. Employing an interdisciplinary perspective, this study calls for a profound re-evaluation of our ecological interactions, envisioning a future imbued with hope and geared towards sustainability.

Climate change has significantly influenced numerous facets of our existence, a reality underscored particularly during and after the COVID-19 pandemic. The pandemic has exposed and highlighted our susceptibility to a virus that originated in Wuhan, China, in December 2019, causing the loss of millions of lives. It is thus imperative that we refrain from perceiving climate change merely as a natural occurrence, as anthropocentric activities have precipitated detrimental consequences, including but not limited to pandemics, epidemics, heatwaves, escalating sea

levels, wildfires, and droughts. Paul J. Crutzen and Eugene F. Stoermer suggested the term Anthropocene to denote the "current geological epoch," emphasising "the central role of mankind in geology and ecology," bearing "growing impacts of human activities on earth and atmosphere" in mind (484). Crutzen and Stoermer argued that "mankind will remain a major geological force for many millennia, maybe millions of years, to come" (485). In this context, the focus on finding the necessary means to achieve an ecologically sustainable future has and must become a pivotal issue in both academic and non-academic circles.

Interdisciplinary, multidisciplinary, and transdisciplinary approaches, both in theory and practice, have been discussed to address ecological breakdown, climate change, and their pressing urgency in constructing a climate-resilient and sustainable future. Discussions on the essence of being human have played a pivotal role, influenced by theoretical frameworks such as posthumanism, which "addresses the human as a species, and thus underlines the urgency to reflect on these topics in pluralistic and mediated ways" (Ferrando 4) and critical posthumanities, offering "a diversified array of the changing perceptions and formations of the 'human' in the posthuman era" (Braidotti 53). In this respect, these discussions underscore the pressing necessity to "renounce the conventional belief in our alleged innate supremacy over the non-human world" and adopt a perspective that is "non-anthropocentric, non-androcentric, non-dichotomous, nonhierarchical, and egalitarian" (Komsta and Atasoy 61).

Without a transformative shift in our current lifestyles and perspectives on our connection with nature and the non-human world—both at an individual and collective level—we are destined to fall short of achieving our environmental goals. Simplifying this intricate relationship into binary terms such as culture-nature and human-nonhuman perpetuates the problematic status quo, posing a significant obstacle for future generations to thrive. It is imperative

that we reconsider and reshape our narrative, fostering a more sustainable approach that transcends traditional boundaries and embraces a harmonious coexistence with the natural world. Only through such a paradigm shift can we hope to create a lasting legacy for generations to come, as Serpil Oppermann asserts: "Reconnecting with the storied planet and its numerous narrative agencies may be one of the paths to redemption, which begins with redirecting attention to planetary ecosystems from which we have been disconnected and reimagining human–non-human relationalities on our wounded planet to ensure a livable future" (11). Oppermann further argues that it is "possible to rewrite our earthly tale furnished with nonanthropocentric meanings, which can materialise with new forms of resistance, new narratives, and new imaginative vocabularies that heed the unheard voices of disrupted non-human entities as well as human communities" (11).

Given the overarching impact of climate change across all disciplines, scholars in the social sciences and humanities have engaged in dialogues on how best to contribute to this pressing crisis. In this sense, literary studies, film studies, and environmental humanities have strong potential to offer innovative and transformative perspectives. An increasing number of films and TV series are now conveying the urgency of the climate crisis by depicting futuristic scenarios that showcase fictional dystopian and/or utopian world orders, as seen in works like Soylent Green (1973), *The Day After Tomorrow* (2004), *2012* (2009), *The Colony* (2013), *Mad Max: Fury Road* (2015), *Into the Forest* (2015), *Before the Flood* (2016), *Snowpiercer* (2013; 2020-2022), *2040* (2019), *Eating Our Way to Extinction* (2021), *Don't Look Up* (2021), *Dune* (2021), *How to Blow Up A Pipeline* (2023), and *Leave the World Behind* (2023). Moreover, speculative narratives, especially those delving into alternative world scenarios, prove invaluable as they vividly portray the impacts of climate change and ecological breakdown within fictional future landscapes. Literary works from both Anglophone

and non-Anglophone literature such as Octavia E. Butler's *Parable of the Sower* (1993), Margaret Atwood's *Oryx and Crake* (2003), Emmi Itäranta's *Memory of Water* (2012), Jeff VanderMeer's *Annihilation* (2014), Claire Vaye Watkins's *Gold Fame Citrus* (2015), N. K. Jemisin's *The Fifth Season* (2015), Amitav Ghosh's *The Great Derangement* (2016) and *The Nutmeg's Curse: Parables for a Planet in Crisis* (2021), Paolo Bacigalupi's *The Windup Girl* (2009) and *The Water Knife* (2016), Kim Stanley Robinson's *New York 2140* (2017) and *The Ministry for the Future* (2020), Neal Stephenson's *Termination Shock* (2021), and Stephen Markley's *The Deluge* (2023) can be encompassed within this scope.

In addition to these examples, contemporary Turkish literature and culture feature authors who, as noted by Merve Tabur, "integrate formal and thematic elements of myths, legends, and folktales into climate change narratives" (3). This growing trend is evident in the works of writers such as Zülfü Livaneli's *Son Ada* (2008; *The Last Island*, 2022), Oya Baydar's *Çöplüğün Generali* (2009, *The General of the Garbage Dump*) and *Köpekli Çocuklar Gecesi* (*The Night of Children with Dogs*, 2019). The fusion of imagination and reality in these narratives serves a cautionary purpose, presenting not only the stark realities but also suggesting potential solutions and innovative approaches to our relationship with nature and the non-human world. In the context of the Anthropocene and the looming climate crisis, which has the potential to "catalyse an existential crisis," these narratives spotlight the intricate connection between humans and the non-human world (Atasoy and Horan 239). They serve as an urgent signal, sounding alarms about potential destructive consequences that may unfold in the future. In this respect, these works reveal the "tension between belief in the power of human imagination to shape environments and humans' inability to manage and control elemental forces" (Parham 23). Through these futuristic narratives, the prospect of "an environmentally sustainable and emancipated society" is interrogated, as

these stories "help us to think about how it might feel to live in a different and more ecologically responsible kind of world (Garforth 94).

Within the scope of this study, speculative fiction serves as a comprehensive umbrella term, covering a range of subgenres, including utopia, dystopia, critical dystopia, science fiction, apocalyptic fiction, post-apocalyptic fiction, climate fiction or cli-fi, and Anthropocene fiction. Within this fiction, there exists a plethora of relevant literary works that undertake a critical examination of climate change and the associated climate crisis. Examining how such literary works depict climate change and ecological breakdown, Marco Caracciolo highlights that "[i]ntegrating climate change into a novelistic plot—not as a mere concept but as a force shaping the progression of narrative—involves embracing the improbable nature and unthinkable scale of its consequences" (140). By highlighting this 'improbable nature and unthinkable scale,' these speculative works of climate fiction, critical dystopia, science fiction, and post/apocalyptic fiction—whether on page or screen—fulfil several crucial roles. They serve as warnings, critiques of anthropogenic activities, challenges to conventional beliefs and approaches, catalysts for subsequent transformation, providers of alternative lifestyles and world orders, and generators of discussions that have the potential to foster sustainable and resilient futures. Thus, through their imaginative temporal and spatial settings, these literary and cinematic creations possess considerable potential to captivate both scholarly and general audiences. By presenting futuristic scenarios set in a distant future, these works are almost always influenced by the prevailing contextual atmosphere. Consequently, they hold significant promise in reshaping the narrative surrounding our historically problematic relationship with nature and the non-human worlds. This, in turn, has the potential to offer solutions to the climate crisis in the Anthropocene, both in the immediate and long-term. It underscores the

substantial contribution that literary studies, film studies, and environmental humanities can make towards cultivating a sustainable future for a different tomorrow.

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Interdisciplinarity to face global challenges
A conversation with François Taddéi

François Taddéi is an evolutionary systems biologist and educator. He's a researcher at the French National Institute of Health and Medical Research (INSERM), where he was awarded the Fundamental Research Prize. He founded the *Learning Planet Institute* to develop new ways of learning, teaching, doing research and mobilising collective intelligence to tackle the challenges of our time. He is the author, with Catherine Becchetti-Bizot and Guillaume Houzel of *Towards A Learning Society*, report on the research & development of Life Long Learning submitted to the Minister of National Education, Higher Education and Research (2017), of *Learning in the 21st Century* (2018), of *A plan to build a learning society together / Catalyzing Collective Intelligence For a Learning Planet*, report submitted to the French Minister for Labour, the Minister for National Education and the Minister for Higher Education, Research and Innovation, on 2018, of the *Learning Planetizen Manifesto - Tackling Together the Challenges of the 21st Century* (2021), and with Emmanuel Davidenkoff of *Game-Changing* (2022). This interview was conducted by Armando Uribe-Echeverría.

Can you explain the path, the shape, the reasoning, and the connections you went through, from biology and genetics to the art of learning and even the education of curiosity?

My scientific journey is not simply linear. I began with what many French students do—mathematics and physics in preparatory class, followed by an engineering school, and even two, first at the École Polytechnique, then at the École du Génie rural, des Eaux et des Forêts. After that, I pursued a master's in genetics, a doctoral thesis in molecular and cellular genetics, and post-doc work in

evolutionary biology. Eventually, my team became known as the "Systems Engineering and Evolutionary Dynamics". I worked on biological systems and their evolution. My focus was on how evolution develops—how factors like the mutation rate, one of the drivers of evolution, transform itself, its ability to cooperate, facilitating various evolutionary processes, and the evolution of the information exchange, as these aspects evolve—genetic exchanges, recombination, mutation. I also researched the degeneration of biological systems and ageing. We demonstrated that bacteria, unlike viruses, exhibit ageing or a decreased probability of survival with age, very much like humans. However, for us, it doubles every eight years, whereas, for them, it's more like every 8 hours. I studied the dynamics of biological systems and their evolution, reflecting the randomness of life.

On September 11, 2001, I was in New York. It was a very personal turning point. I was in an ivory tower, specifically at Rockefeller University in Manhattan. From the top floor, I witnessed the falling Twin Towers. From that moment, my perspective on the world changed. I had children aged one and three, and I thought I didn't want them to grow up in a world where such things happened. I couldn't have prevented the events that have occurred since, but on a small scale, I tried to do what I could to create a different framework.

In 2002 and 2003, I received the Inserm (French National Institute for Health and Medical Research) Fundamental Research Award, followed by the Liliane Bettencourt Prize for Life Sciences. This led to a collaboration with the Bettencourt Foundation, which has been unique. They assisted us in supporting young people in original, creative, interdisciplinary projects.

Things went well, and step by step, they provided us with more resources. We attracted more students and established a master's program, a doctoral school, a bachelor's program, and an entire interdisciplinary program, including funding to support the transformation of universities.

We now have a research unit on learning transitions. It is significant that, in the face of the unknown, biological systems, especially bacteria I extensively studied, explore possibilities through mutation and recombination, while human brains do so through creativity and learning.

Bacteria like us can exchange information. But, where there's no intention in them, we have one. Whereas we try to organise things, it's utterly spontaneous for them. Yet, they can spontaneously generate antibiotic resistance, something we all regret. From their perspective, it's understandable because we use massive doses of antibiotics in hospitals, industries, and especially in farming. Multiple resistances usually come from ten different genes from ten different species. There has been, in fact, an information flow between these species. Their ability to explore possibilities and resist the challenges we impose with our excessive use of antibiotics leads them to develop their ability to evolve, and consequently, we face unprecedented challenges that we have partly imposed on ourselves. The question is, how do we learn to face these challenges? How can we, in an era of growing information flows, learn to cooperate, to do things together that we can't do alone? That's the underlying theme.

Did your father's academic background and experience as a university president influence your perspective on creativity in education?

Not directly. My father influenced me in many ways, but I was very young when he was the university president. As an economist, he was curious about many subjects and interested in history, evolution, and astrophysics. He still follows these topics, and that is certainly an attitude that enriched me. The École Polytechnique is also a very open-minded institution in terms of disciplines, and I had the chance not to specialise too early. My mother, my grandmother and my aunt took courses at the University of Vincennes, which was a unique place in terms of openness,

but I was in daycare, so I can't say it directly influenced me. However, mine was a family culture of forms of learning. My parents authorised great freedom of exploration throughout my childhood. This freedom led me to continue exploring in adulthood. If there's a clear family contribution to my way of seeing things, it's the benevolence towards the child, which seems natural because I was fortunate to experience it.

Do you still work in genetics and biology?

I occasionally provide assistance or share ideas with colleagues, but I've practically stopped genetic research. My role in the Learning Planet Institute is that of the Chief Exploration Officer, so I continue to explore; it's the simplicity of life—life explores possibilities, those of every researcher's specialities. What may differentiate us here is being somewhat more aware of these processes and seeking to explore new ways of exploring—both in new fields, emerging fields that seem essential, and in new ways by involving, for example, the younger generation, citizens, and different actors, thus introducing interdisciplinary approaches. Let's say every researcher explores. Some individuals explore by the rules while we explore new ways of exploring.

Have you studied or worked in the United States? I read that you incorporate best practices from abroad, particularly in the United States

I've travelled a lot, but as my status since leaving École Polytechnique is being a General Engineer for Waters and Forests, spending extended periods abroad is challenging. However, I could go abroad for every vacation, seminar, conference, or academic collaboration. Thus, I've spent years abroad without spending more than a few consecutive months. I was fortunate to visit some of the best international universities in Asia, Europe, the United States,

and Canada. The atmosphere at Oxford and Cambridge, for example, was so inspiring that on our tiny scale here, we tried to create a place where we could co-construct a dynamic with the students themselves, breaking down some of the hierarchical and formal barriers to engage in discussions about projects that inspire these young people and see what we can do to help them.

The EUTOPIA Review*'s first issue is centred around climate change, climate crisis, sustainability, resilience, and related topics. How can we address the environmental threats, natural disasters, energy resource depletion, predicted chaos, mass migration and unemployment? Can we move away from the current paradigm of infinite growth? Do you have any suggestions?*

As an evolutionary biologist, I worked with John Maynard Smith, who wrote an essential work called *The Major Transitions in Evolution*. He studied how life originated and how the first self-replicating molecules assembled and cooperated. How the first cells were born? How did the first multicellular organisms appear? How could the first animals with brains emerge and create social organisms? Later, I became interested in the significant transitions in human history, especially the advent of democracy, concurrent with philosophy, science, debate, arts, and citizenship. Then, all this was reinvented during the Enlightenment. Looking at it broadly, we realise we are now facing a new transition, and this time it's global. Today, we have digital technology and artificial intelligence. While the Athenians had writing and the enlightenment printing. The Greeks sought to address the problems of the city with only armed men being citizens, constituting only 15% of the inhabitants of Athens, the Enlightenment scaled up the idea nationwide mainly to defend against external threats.

We now have to manage public goods at both scales, mainly to defend against external threats. Today, we face

a crisis of global common goods. Climate, environment, water and air quality, and pollutants reaching Antarctica indicate a planetary emergency of natural, biological, physical, and chemical common goods. Additionally, cultural common goods such as education, democracy, science, and quality information are under attack from various sides. Today, we also have digital common goods like the Internet, Wikipedia, and rapidly developing artificial intelligence. So, when dealing with common goods, the question is: how do we manage them? If some exploit them excessively to the detriment of all, we all head towards a dead end. I used to study these things with bacteria: game theory and cooperation, both experimentally and theoretically.

The global governance is in crisis. Today, we need help with the administration of common goods. How do we manage the planetary common goods? Even the Secretary-General of the UN admits that the 1945 model is not functional for addressing today's conflicts, climate change, and all its issues. So, the question is: how do we reinvent a way to handle the commons? Did Athens or the Enlightenment design an answer? Citizenship was a way of running commons as we collectively establish governments, laws, and institutions to manage them. But the walls of the city, which are the reference for Athens, also separated humans from nature and excluded anyone not born in that city and who did not have the status of armed men capable of defending the city walls.

We try to rethink these concepts, considering that we should go beyond citizenship and its historical and geographical constraints, moving towards what we call *planetizenship* or *planetary citizenship*. Instead of using the city as a geographical reference, it uses the planet as a its reference, which is inclusive, encompassing all living beings and ecosystems with which we are interdependent. And we increasingly see we've always been interdependent, but now we are becoming more aware of it. This understanding

of interdependence, the need to manage common goods, the need to be what some call good ancestors—people capable of leaving a positive trace of their passage on Earth beyond the amount of CO2 we emit. Has our presence on this Earth, on average, improved the destiny of future generations or not? We can all ask ourselves the question. None of us is perfect in this regard, if only because we consume too much carbon, but we can all try to improve. We witness that we won't make it if everyone doesn't play the game. That is why the notion of the common good invites us and imposes on us to create new institutions that do not yet exist but that we need to deal with our global tragedy of the commons.

We are working on what a planetary university would be since, historically, universities preceded, and by far, the advent of the Enlightenment. It was a place where intellectual debate, research, and the education of young generations allowed exploring possibilities and played an essential role during the Enlightenment for some. I think especially of Scottish universities, while at the same time, French universities did not particularly shine for their openness. The university is a necessary place, but not necessarily adequate to allow the emergence of debates around these common goods. Universities are typically where we can learn how these common goods function. We can learn how to nurture them, how to protect them. We may understand that the university itself can become a common good, especially if it works systematically in an open source logic and can invite each student to create new elements, new knowledge, new algorithms, and new educational content so that others can use them. If the university is a place where we learn about common goods and learn to create new common goods, it can be one of the places where some of the necessary reinvention can take place.

Obviously, it will not be enough. It will require a whole lot of other things and other institutions. But we hope that such a university contributes to training those who will

create these future institutions and collaborate with all those, in other universities, who want to progress on these paths.

Before moving towards an ambitious planetary university, you have already changed the scale in France. How do you shift from local experiments and experiences to national policy?

We had the opportunity to welcome the French Minister of Higher Education and Research, M[me] Sylvie Retailleau, during the closing of the Learning Planet Festival. She came because we had been inspired by a speech she gave in Bordeaux on a national policy in favour of transitions and the teaching of transitions. I had the pleasure of interviewing her and asking her: if we want to teach transitions, don't we need a transformation in education? And she responded very positively. We are trying to see how we can collaborate and create a learner ecosystem around this transition, meaning that researchers, students, scholars, and teachers can collaborate to facilitate ways of acquiring the skills associated with this transition. None of us has the perfect knowledge on the subject. Certainly not me. However, quite a few of us have started thinking about these issues and experimented and prototyped locally. Creating an ecosystem means creating a place where there are flows of knowledge and information in particular. Typically, it is a digital platform. We developed "welearn," an artificial intelligence that scans quality content while quoting articles as a quality guarantee. The academic world maintains quality requirements and, from there, ensures that when we search for something, we can immediately find a colleague or a group that has created inspiring content and has entered into a logic that has always been that of universities. Since the Middle Ages, it has been said that to see far, one must stand on the shoulders of giants. It implies that we must build upon what others have done and not reinvent the wheel to move faster. If we manage to share

what each of us does, if there is assistance when starting a project, knowing that we are not the first ones, , that we can climb on others shoulders, and that we can contact a colleague and rely on freely accessible content to move faster, we obviously save time. This logic can occur at the national level and can also happen at the European and even international levels under the auspices of UNESCO, with whom we collaborate closely to develop this idea of planetary university. This is the logic of what we call *the learning planet*. So, a learning community that are not only local but exist on an international scale.

Returning to your collaboration with the Liliane Bettencourt Foundation and including people who have yet to be drawn to the circle of learners: how do you overcome the barrier of the constantly renewed temptation of elitism and differentiation, which is prevalent worldwide and often leads to the exclusion of specific individuals rather than their inclusion?

We are heirs to an ultra-competitive system, but this competition is for knowledge of the past when the answers and this knowledge are stored today in devices. If the only thing we are trained for is how to do something that machines do better than us, it is not sure that our employability is guaranteed in the medium to long term. So, instead of competing over past knowledge, we should learn from a young age and at all ages to cooperate on today's challenges between humans from different backgrounds, disciplines, and countries, and possibly cooperate between humans and machines, since if with devices we can solve problems that we could not solve without them, it would be wrong not to take advantage of them. Similarly, the machine cannot do many things without us.

If we want intelligent solutions to today's crises, we need more intelligence; therefore, we must co-develop human, individual, collective, and artificial intelligence. And this co-evolution requires dialogue, cooperation, and other

ways of learning and researching. We have prototyped them on a small scale. Many communities have done this at different scales, and I think, for example, the Internet is the product of a distributed cooperation of thousands or even millions of coders who each, in open source logic, contributed to sharing things and de facto reinventing this logic of standing on the shoulders of giants. These principles, which are the principles of universities, which are the principles of open source and open science communities, are the best chances of emerging solutions to our crises. We are heading for a dead end if we stay in the exclusive logic of competition and overexploitation of intellectual or natural resources.

To discuss the concept of creativity *that you emphasized as the core of everything, how can we transition from a focus on one discipline to an interdisciplinary approach, from being passive receivers to active questioners? How do we set up new maieutics? How can we change our perspective from viewing research as the ultimate goal of education to an approach that educates through research?*

Creativity has been studied by many researchers, especially by Alison Gopnik at Berkeley, and it has been shown to peak at around five years old and again in adolescence. It's interesting to understand that the youngest are indeed particularly creative and that knowing how to develop intergenerational collaborations is one of the best ways to inject more creativity—because, with age, we tend to reproduce the systems in which we grew up. What's also interesting is that Gopnik shows it's true in many species with a big brain and a slow maturation time, like us. The maturation phase is an exploration phase. It's true for mammals but also for crows, for example. A book describes these facts: *Animal Innovation* (Simon M. Reader, Kevin N. Laland,2003). We see that the youngest macaques often experiment the most. That's the first point. The second is that if we want to do this, we have to get beyond the logic

of power and domination, which is that as we get older, we have more power, therefore, dominate others and, thus, impose a system on them that may not necessarily maximise their creativity or well-being. We need to design what I call evolving and fertile frames of freedom. We human beings always need frameworks. How do we increase the degrees of freedom within these frameworks? How do we enlarge windows and open doors extending beyond the walls? How do we build bridges? And how can we shift the existing framework within this framework of freedom? For instance, here at the Learning Planet Institute, we moved the framework of what it takes to earn a master's or a doctoral degree, stating it was possible to write an interdisciplinary thesis, relying on two solid disciplinary bases, with two mentors from two different disciplines in two laboratories. We stated that disciplines are a great way of making progress from an academic point of view, but it is not necessarily the best way of solving problems that are themselves interdisciplinary because the world's complexity knows no discipline. We need a multidisciplinary approach to tackle a complex, multifaceted, multi-dimensional problem. If we start from the challenges we face, individually, collectively and at a global level, and look at which disciplines can make a contribution, and if we train students to work in collaboration with experts from these different disciplines to set up original projects, well, we can step out of this context.

We created a derogatory doctoral school because it allows just these kind of experiments to happen. It enables researchers and students to explore possibilities beyond what they usually do. We set up a research lab with CY Cergy Paris University called *Learning Transitions*, in which we are trying to understand these transitions and transitions in the way we learn. We seek to understand the transitions of the individual and the collective, the transitions imposed on us by the climate, environmental and societal crises, and the transitions imposed on us by the arrival of artificial intelligence.

How can we think about these transitions? How can we create a framework in which researchers from all disciplines who want to take the time to think about these transitions can do so? Suppose you want to do something that doesn't exist, and you want to supervise a doctoral student on new subjects. In that case, if you're going to do different research yourself, you need to create this framework of evolving freedom and make the usual framework of doctoral schools, the standard framework of laboratories, evolve to offer new degrees of freedom to doctoral students as well as to directors and more experienced researchers. We allow them to explore subjects that they feel are essential and vital to our collective dynamic while offering them the status and opportunities that the academic world offers to all those who want to carry out high-quality research.

To your knowledge, are there other people doing this elsewhere in Europe?

The Scandinavians are way ahead on many of these issues, as are the Swiss and, in their own way, the British, who have known how to combine tradition and modernity for a very long time. If you take Oxford or Cambridge, for example, they have disciplinary departments and interdisciplinary colleges, so there has been a flow of meetings there for a long time. We have been networking with all the parties to explore initiatives, some of them worldwide, in Singapore, Shenzhen, New York, California, and Arizona. The Arizona State University, for example, has created 40 interdisciplinary research centres in 20 years.

What do you mean by a "learning society"? Does it involve taking knowledge out of institutions that produce it and sharing it with society, or does it mean transforming society into a knowledge generator?

Everyone, every living thing, is a learner because we learn from our experiences and try to avoid making the

same mistakes again. We learn from others in a community, and collective learning exists on every scale. It exists in ants and a range of other species, including ours. We create these communities on a local level where we know each other; we can make them on an institutional level, create learning organisations, and create learning societies.

It's almost fractal, so we can do it on all these scales. One of the best ways of learning is to learn and to learn how to learn, to develop reflexivity about what we learn.

What is a learning society? It's a society aware of the need to improve the learning capacities of individuals and community to meet new challenges. It could mean deciding to invest in research into how we learn individually, collectively and at a societal and global level. It could mean creating artificial intelligence tools to facilitate individual and collective learning. It can mean celebrating learning.

That's why we've created the Learning Planet Festival and a National Education Day with UNESCO. That's why we need to invest in institutions that enable people to learn and invite them to do some research about their own transformation. The French education system, for example, does far less research than the health sector, even though the budgets are roughly equivalent. Universities do research on many subjects but seldom on themselves. We observe that this reflexivity and putting resources into improving our individual and collective capacity to learn are one of the dynamics needed to create a learning society.

We can also draw inspiration from the best international practices. How is learning organised in countries that number one in PISA in their continent, for example, Canada, Finland and Singapore ? These are typically places where funds are invested in these areas and where the idea of a learning society is much more widely shared than in a country like ours.

This ability to learn from each other is essential, and we need to encourage everyone once again because each of us can reflect on what we have learned. But it takes time

and both individuals and institutions need time to reflect on this.

You mentioned earlier maieutics, a new type of maieutics. Socrates understood that reflection and questioning are the basis of learning and critical thinking, so this mix of curiosity, critical thinking, questioning and reflexivity is essential if we really intend to develop a learning society.

If I understand you correctly, a learning society is also an intelligent society, therefore, not a submissive one. In your writings, you suggest learning to be curious instead of learning to be submissive. The statement is political. To put the question in 18th-century style, although today it's not a question for an academic prize: How would a society of free and intelligent people be governed?

It's a question that Condorcet put particularly well when he said there can be no democracy without education and no education without science. The package reinvented by the Enlightenment, the initial package from Athens that I mentioned at the beginning, is the building block of a society of free human beings, not just free men because historically that's a very gendered discourse.

To give you the source of my personal commitment, when my son arrived at school, his teacher said to me, "He's a charming child, but he asks questions", and this "but he asks questions" clearly describes a desire of the institution—for the teacher was simply reproducing a social pattern in which curiosity is a bad habit and teachers don't have the opportunity to encourage children's natural curiosity. Since that day, I've been questioning our educational system and one thing leading to another, I've ended up questioning society, because a society where we can't question ourselves is a society that's heading for the wall and won't be able to change course. If we know how to question ourselves, we can say: Do you realise we're heading for the wall? And possibly: Can we think of ways to avoid this wall and go over it, under it, to the right or to the left?

We need to create new ways of moving forward, so we need to question ourselves. I'd like to return to planetizens. For me, planetizens are a way of thinking not just about a local society but about a global community. I am not saying we have the solution. It's just a word, but it gives us a conceptual framework to start thinking. What I find especially interesting is that the younger generations are very quick to pick up on this kind of idea and that international institutions such as UNESCO, the UN, and the United Nations University, for example, are interested in this kind of concept, because they can see that when you take a step back, which is the case for these international institutions, or for young people who feel less constrained by the existing system and are looking for something else; after all, they can see that the dominant trajectory is not correct.

We can ask ourselves how we can co-construct a real alternative. We can do it with these young people, with the support of these institutions, in a way that sociologists of innovation call the middle-ground, which is more or less the way we've been going for the last 20 years. For sociologists of innovation, a middle-ground is between the upperground, which is the institution, and the underground, where there are the players, including the underground filled with activists looking for something different. But there's very little dialogue between the underground and the upperground, thus the middle-ground appears as a fertile framework of freedom in which those who want to play collectively on the ground and those who want to look for new avenues in the upperground, in the institution, can explore alternatives together. And we'll be able to prototype other things, to refine ideas, methods and tools in a benevolent, accessible environment. And then, once we have reached a certain level of maturity, we can disseminate them more widely in the field. They can be supported by the institution to speed up the necessary transitions.

This concept of planetizen was discussed by the institutional upperground at the UN during the debates on the

reinvention of the UN Charter, and it was also addressed by students. All this took place in September during the UN General Assembly. Seeing that these kinds of ideas are beginning to percolate upwards as well as downwards, and ideally as horizontally as possible, gives me hope.

I want to conclude with a poet's words. As early as the eighteenth century, Hölderlin wrote that "where the danger is, also grows the saving power" *(Patmos)*, and that resonates with what we need. The more of us who see the dangers that lie ahead, the more of us will look for something different and try to organise ourselves and offer alternatives.

EUTOPIAn Science Diplomacy: From Historical Roots to Climate Change Frontiers

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ABSTRACT

This article delves into the evolution of science diplomacy, from its historical underpinnings to its pivotal role in contemporary global challenges. It begins by underscoring the myriad existential threats the world faces, from geopolitical tensions to environmental crises, and posits science diplomacy as a crucial tool in transcending national boundaries to address these issues. By tracing the interplay between scientific advancements and diplomatic efforts through significant periods in the narrative of EUTOPIA, such as the Renaissance and the Enlightenment, the article then illustrates the longstanding synergy between these domains. The modern framework of science diplomacy is then explored through the four dimensions of science diplomacy. The article emphasizes the role of universities and university alliances in advancing science diplomacy, with EUTOPIA exemplifying this through various initiatives aimed at fostering interdisciplinary collaboration and strategic engagement in global challenges, especially climate change. The (hitherto hypothetical) vision of EUTOPIA's impact on European climate policy underscores the potential of science diplomacy to drive significant advancements in sustainability and climate mitigation, advocating for a collective effort to leverage knowledge and foster global cooperation for a sustainable and secure future.

Introduction

The world is facing an overwhelming set of existential dangers, ranging from the spread of nuclear weapons and armed conflict to infectious diseases. From the decline of objective discourse and the ascent of political polarization to rising food insecurity and the profound impact of artificial intelligence. These issues are further exacerbated by the triple planetary threat of climate change, diminishing biodiversity, and pollution, leaving many with a grim outlook. However, we must not let despair keep us from finding solutions. Upon examination of these existential predicaments, two key insights emerge: (1) they are not confined by national boundaries, and (2) science can play a pivotal role in lessening their impact to varying extents.

This brings us to the concept of science diplomacy, an intersection between scientific endeavour and international relations. While not a panacea, science diplomacy provides a collaborative platform that unites researchers, scientists, students, diplomats, and policymakers, blending their expertise to tackle the collective challenges we confront. In light of the challenges facing the world and EUTOPIA's commitment to addressing them, it is hardly surprising that we have embraced science diplomacy as part of our vision for a new European renaissance driven by the principles of connectivity, curiosity, and openness.[1]

Indeed, the narrative of EUTOPIA evokes a regeneration of monumental European intellectual epochs like the Renaissance and the Enlightenment. This article starts by delving into the maturation of science diplomacy during pivotal junctures in European history, establishing a solid grounding for its incorporation into EUTOPIA's toolbox for a new European renaissance. Subsequently, we transition to modern interpretations of the field, followed by a

1. See the speech by the VUB rector at the 2023 Academic Opening in the European Parliament, which touches on the need for a new European renaissance encapsulated by these principles.

discussion on the imperative for universities and academic networks like EUTOPIA to adopt science diplomacy. This includes means for effective deployment and a hypothetical case study on addressing climate change.

Given the complex, interconnected challenges the world faces today, strengthening the framework of science diplomacy is not merely beneficial—it is imperative. Through strengthening their understanding and commitment to science diplomacy, consortia like EUTOPIA stand to lead the charge towards impactful change that ensures a more sustainable and secure future for everyone.

From the Renaissance to the Enlightenment: Milestones of Science and Diplomacy Interplay

From the dawn of recorded history, scientific advancements have arguably been the greatest catalysts for change on the global stage. Be it the irrigation that nourished the cradle of civilization, the cutting-edge metallurgy that forged weapons of conquest, or the compasses and quadrants that navigated explorers to new worlds, the rise and fall of empires are closely linked to science. Meanwhile, diplomacy has been present from the moment people were required to work together towards common goals–in other words, from the caveman age (Fletcher, 2016). Given their seasoned existences, it is unsurprising that these two fields would overlap and influence each other throughout history. The Roman Empire's scientific prowess was key in advancing and sustaining its imperial ambitions, while the Silk Road transported countless scientific innovations from East to West and back that had profound impacts on diplomacy. Perhaps most revolutionary was the cheap and easy Chinese method of producing paper, which shattered the spatial, monetary, and temporal limitations of powers communicating with one another. Meanwhile, the envoys of antiquity, like Rabban Bar Sauma of the Mongol

Il-Khanate, helped further trade between the Occident and the Orient, carrying both goods and scientific knowledge (Carter, 1955).

Indeed, science and diplomacy have been intertwining for so much of history that it would take volumes and much of a life's work to document it with diligence. Thus, for the sake of coherence, we will consider the origins of science diplomacy to lie in early modernity, as this is the period in which four chapters with monumental impacts on both science and diplomacy occurred. The first is the Renaissance, where the scholasticism of the ancient world was revived by such minds as Aquinas, Bacon, and Da Vinci to seek answers to questions about the natural world. This was also the time when diplomacy established itself as a concrete practice. Cosimo de' Medici of Florence established the first permanent embassy in Milan, while several decades later, Machiavelli published *The Prince*, the leader's guide to governance and diplomacy. This was also the time when Sir Thomas More penned the famed *Utopia*, a book that inspired the name of this university alliance that seeks to revive the Renaissance through adherence to the core values of creativity, curiosity, and openness.

The second is the Protestant Reformation, which brought the explanative authority previously reserved for the clergy and elite to the common man. Scholars like Weber have argued that the Reformation birthed the economic practice of capitalism. This, in turn, has been credited as a driving force for modern science for its existential need for innovation and its introduction of the "knowledge worker" into society (Hessen & Grossman, 2009). The Reformation was facilitated by Guttenberg's printing press, which also revolutionized the practice of diplomacy through its erosion of the Catholic Church's information monopoly; political actors could now sidestep the Vatican's gatekeepers in their pursuits to disseminate the written word. The impact that this had on diplomacy was anything but subtle (Mattingly, 1989).

The third is the end of the Thirty Years War in the mid-17th century, which ushered in the Peace of Westphalia. This is credited by many international relations scholars as the birth of the modern nation-state for its application of national sovereignty into practice (Patton, 2019). What resulted from the peace talks at Osnabrück and Münster–the ancestors of the modern multilateral summit–was a new world order (in the European sense) that exemplified a balance of powers. States were now defined by their relative power and not by the title of their leaders. The implications that this reordered system had on diplomacy were potent: small principalities were now actors free from the assumption that they must bow to an emperor and could thus serve as their own vessels for conducting foreign relations. States turned to science as a means of innovation that supported trade, military power, and diplomacy. A gleaming example is Otto von Guericke, a diplomat from Magdeburg who attended the Westphalian negotiations and seduced his fellow delegates with his vacuum prototypes (Harsch, 2007). The end of the Thirty Years War was also an era characterized by international cooperation, as the 1648 peace agreements marked the commencement of extensive collaboration among the major European powers in areas such as technology and science, illustrated by the exchange of knowledge among cartographers, engineers, and hydraulic experts.

The fourth point in history that had a monumental impact on the intersection of science and diplomacy is the Enlightenment, a period that heralded a new focus on reason, empiricism, and scepticism towards traditional authority. Philosophers like Voltaire, Locke, and Montesquieu advocated for the separation of powers, freedom of thought, and the scientific method. This paradigm shift was mirrored in the realm of international relations, as diplomacy began to focus more on rational self-interest rather than divine right or hereditary power. During the Enlightenment, the scientific academies played an

instrumental role in global diplomacy. The Royal Society in England and the Académie des Sciences in France became centres for the international exchange of scientific ideas. The importance of these institutions could be seen not only in their advancement of science but also in the international outlook they developed. In fact, the Royal Society appointed a foreign secretary in 1723, 50 years before the first national foreign secretary (Royal Society, 2010). Scientists from different countries would share findings, discuss theories, and even coordinate expeditions. The sharing of meteorological, astronomical, and cartographic data among these academies had direct implications for navigation, trade, and military strategy (Headrick, 2000). The Enlightenment witnessed the birth of unmistakable science diplomacy, where science became an instrument of diplomatic relations. For instance, Benjamin Franklin's scientific reputation helped him in diplomatic endeavours, gaining him unprecedented access to the French Court, which ultimately played a role in France's decision to support the American Revolution (Augur, 1956).

Modern Science Diplomacy and the Three Dimensions

Accelerating through history, we pass by plentiful examples at the nexus of science and diplomacy, especially during the Cold War. However, it is in the 21st century that science diplomacy gains a more defined theoretical structure, sparked by a groundbreaking report by the British Royal Society and the American Association for the Advancement of Science (AAAS). Entitled New Frontiers in Science Diplomacy, the report broke down the intersection of science and foreign policy into a succinct taxonomy of three parts:

SCIENCE **IN** DIPLOMACY
SCIENCE **FOR** DIPLOMACY
DIPLOMACY **FOR** SCIENCE

Science in diplomacy refers to the inclusion of scientific knowledge in diplomatic processes. This can be seen in climate negotiations, which would have little impact without the science that guides them. Similarly, the Joint and Comprehensive Plan of Action, colloquially known as the Iran Nuclear Agreement negotiated under the Obama administration, did not conclude with diplomats arbitrarily capping uranium enrichment at 3.67%. Rather, it was the scientists embedded in the diplomatic process. Science in diplomacy can also be illustrated by scientific advisors in foreign ministries or science counsellors posted in diplomatic missions.

Science for diplomacy involves using scientific collaboration as a means to foster diplomatic relations. This approach aligns with the concept of Track II diplomacy, where informal dialogues and negotiations occur outside of official government channels (Track I). In this model, scientists, researchers, and academics play a pivotal role in initiating and facilitating formal diplomatic interactions. Notable instances of this include the Intergovernmental Panel on Climate Change (IPCC) meetings, where global scientific discussions lay the groundwork for diplomatic agreements. In addition to its soft power generation, science can also be a powerful tool for peacebuilding, as evidenced by Israeli academics participating in the early Oslo talks in the 1990s and scientists gathering at the Pugwash Conferences to address nuclear disarmament.

Diplomacy for science, on the other hand, is the process by which diplomatic actions pave the way for more scientific cooperation. Here, we can see Track I activities facilitating more Track II initiatives. It has been argued in one of EUTOPIA's seminars that diplomacy for science is a prerequisite for the other iterations of science diplomacy.[2] Without the government-backed-sourcing of science (diplomacy for

2 The seminar mentioned was hosted by Prof. Rasmus Gjedssø Bertelsen from the Arctic University of Norway, and can be seen here.

science), there will be less supply for scientists to serve as track II diplomats (science for diplomacy) and advisors in foreign policy institutions (science in diplomacy). Be that as it may, examples of diplomacy for science are broad and include the European Organization for Nuclear Research (CERN), which was established after negotiations between 12 founding member states and represents a significant collaboration in the field of particle physics. Another example is the SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) project, a collaboration that brings together scientists from nations like Israel and Palestine amidst regional complexities to focus on the study of synchrotron light.

While this tripartite classification system is helpful–as can be interpreted from its spanning application–it does fall short of being a panacea for all of science diplomacy's conceptualization needs. For example, there are many instances of science diplomacy that can easily fit into all of the tenets simultaneously. Take the Antarctic Treaty of 1959, which designated the southernmost continent as a global common to be spared from any military or political purpose and instead reserved it for peaceful scientific pursuits by all of its signatories. On the one hand, this could be an example of diplomacy for science due to the diplomatic action that paved the way for scientific collaboration. On the other, by virtue of scientists of myriad nationalities working together despite any animosity between their governments, science for diplomacy. Meanwhile, the scientific research generated in Antarctica is an important consideration in climate negotiations, so it could thus fall under science in diplomacy as well. In the next section, we will take a closer look at some of the other conceptual shortcomings.

Acknowledging the Conceptual Ambiguity

The current conceptualization of science diplomacy

faces several challenges. As we have touched upon, science diplomacy, in its broad definition, risks becoming an overly inclusive term encompassing a wide array of activities. This includes attracting foreign scientists through government incentives, promoting international scientific exchanges, appointing science advisors in foreign ministries, and involving scientists in conflict resolution. The term has been used to describe a diverse range of actions, from scientific policy statements by governments to scientists' involvement in international agreements, leading to ambiguity about what actually falls outside its scope.

Furthermore, there is a tendency to view science diplomacy through an idealized lens, portraying science as a pursuit of pure inquiry and neutral discovery. However, history reveals a more complex picture (Müller & Bona, 2018). For instance, international scientific collaborations have sometimes led to destructive outcomes, as seen in the Manhattan Project. Additionally, the recruitment of scientific talent has not always been for peaceful purposes, exemplified by operations like the US Operation Paperclip and the Soviet Operation Osoaviakhim, which were strategic moves by the rival superpowers of the Cold War to get the scientific upper hand.

This idealization also overlooks the dual nature of science as both cooperative and competitive. Science diplomacy is often romanticized as a harmonious global effort, but the reality is marred by political agendas, intellectual property issues, and geopolitical tensions, evidenced in scenarios like the chip wars, the 5G technology debate, and the vaccine nationalism that unfolded during the COVID-19 pandemic.

The question of who owns science diplomacy also remains unresolved. While its theoretical roots lie in soft power strategies of states, the global nature of contemporary challenges like climate change and pandemics necessitates a broader approach. Scientists need to assert more control over science diplomacy, moving it away from purely national

interests to address global issues. However, the scientific community is still adapting to the nascent concept of science diplomacy. The inherent differences in the cultures of science and diplomacy complicate this relationship. For example, a scientist is less likely to be as literate as a diplomat in the context of international relations, while it is unsurprising if a diplomat falls behind a scientist when it comes to knowledge of science, technology, and innovation (STI) policy (Melchor, 2020). Bridging these divergent mindsets is essential for science diplomacy to evolve beyond its current conceptual limitations and become an effective tool for global problem-solving.

The Fourth Dimension and the Role of Universities

Traditionally, the value of knowledge was seen primarily in terms of its contribution to national innovation systems and knowledge-based economies. This perspective often overlooks the broader concept of knowledge as a global commons. However, in the current global context, there is a growing need for advocates who can represent this global commons of knowledge. Van Langenhove and Burgelman, scholars from the Vrije Universiteit Brussel, suggested that scientists can fulfil this role and act as diplomatic representatives for the global knowledge commons. This approach would recognize and promote the universal importance of knowledge beyond national interests. It constitutes the fourth dimension of science diplomacy: diplomacy in science. This dimension is needed to fight anti-science sentiments, bridge knowledge gaps, promote systematic dissemination of scientific knowledge, and professionalize science-policy dialogues (Van Langenhove & Burgelman, 2021).

The fourth dimension will not just occur on its own, however. To materialize it, universities must step up to the plate and invigorate their underutilized potential as

science diplomacy actors. As key global knowledge centres, universities can play a crucial role in leveraging this knowledge to tackle global challenges, advocating for science and influencing policy. This includes encouraging researchers to embrace diplomatic roles and developing mechanisms to implement and monitor university-led science diplomacy practices. Moreover, universities are vital for science diplomacy at all levels—global, regional, national, and local—through their contributions to global governance, cross-border academic collaborations, and local implementations of global visions like the Sustainable Development Goals. Finally, given the lack of a deliberate science diplomacy culture (entering the field is still marked by a degree of serendipity), universities are crucial for developing curricula that amalgamate international relations with the sciences, training future generations of science diplomats (Piaget et al., 2022; Mauduit & Soler, 2020). This comprehensive role of universities in advancing science diplomacy was a key consideration for EUTOPIA's commitment to this field.

EUTOPIAn Science Diplomacy

EUTOPIA distinguishes itself among 50 European university alliances by uniquely embracing the fourth dimension of science diplomacy. As the sole alliance of its kind with a dedicated focus on this area, it conjures pioneering notions. EUTOPIA underscores its commitment through a series of science diplomacy seminars, which provide a vibrant forum for discussion and enhanced understanding within the field. It is also hoped that these seminars inspire newcomers to the growing world of science diplomacy. Additionally, EUTOPIA is actively shaping its impact on the global knowledge commons through the efforts of its Science Diplomacy Task Force, which is crafting a strategic approach to maximize the alliance's influence in this domain.

EUTOPIA's explicit commitment to science diplomacy will have to draw upon all the implicit science diplomacy that goes on within the alliance. Initiatives like the Connected Communities emphasize interdisciplinary collaboration across borders, fostering a comprehensive approach to an array of challenges. The Science and Innovation Fellowships (SIF) support emerging scientists embarking on international careers. The Young Leaders Academy (YLA) brings researchers together from across borders to address questions of shared concern. The Student Think Tank engages students in critical policy discussions. The Impact School imparts critical science communication skills amongst its participants. These initiatives collectively equip EUTOPIA with a dynamic arsenal for science diplomacy, underscoring the imperative to strategically refine and deploy them towards achieving a pivotal stance in the global science diplomacy arena.

Envisioning EUTOPIA's Science Diplomacy Impact

Think if, in the near future, EUTOPIA leveraged its unique constellation of interdisciplinary expertise and commitment to science diplomacy to spearhead a transformative initiative in European climate policy. This envisioned scenario delves into how the alliance could catalyze significant advancements in sustainable development and climate mitigation.

Picture EUTOPIA is convening a series of visionary workshops that assemble a diverse tapestry of stakeholders, including environmental scientists, policy experts, and forward-thinking students. These collaborative sessions, fueled by curiosity and a shared commitment to sustainability, spark innovative discussions on the integration of cutting-edge scientific research into practical, scalable climate solutions. Now, envision a breakthrough emerging from this collaborative milieu—say, a groundbreaking approach to carbon

capture technology developed by researchers supported by the Science and Innovation Fellowships or Young Leaders Academy. This novel solution offers an unprecedented opportunity to reduce global carbon emissions and align with Europe's ambitious climate targets.

Imagine the potential as EUTOPIA bridges the gap between this scientific innovation and policy application. The Science Diplomacy Task Force could orchestrate a series of strategic dialogues, bringing the researchers face-to-face with key policymakers. The climax of this initiative might take place at a major climate policy summit, where EUTOPIA delegates present this pioneering carbon capture technology. Their presentations, refined and compelling thanks to the critical science communication skills honed at the Impact School, capture the attention and imagination of policymakers and stakeholders alike.

In this envisioned scenario, the adoption of EUTOPIA's work into the EU's climate action framework marks a watershed moment in the fight against climate change. It is a testament to the power of interdisciplinary collaboration and science diplomacy, showcasing how academic alliances like EUTOPIA can become pivotal players in supporting the global commons of knowledge and shaping a sustainable future. While this scenario is unfortunately just hypothetical at the moment, the foundations are in place for it to transcend into reality.

Conclusion

We have now journeyed through historical milestones of science diplomacy, navigated the complexities of its modern challenges, and glimpsed into potential future contributions this alliance can make in this field. Despite the daunting array of unprecedented global challenges ahead, EUTOPIA points the way towards a collaborative, sustainable, and enlightened future. After all, EUTOPIA

is not just an alliance of institutions but a confluence of shared values and commitments, echoing the intellectual fervour of the Renaissance and the Enlightenment's pursuit of reason. EUTOPIA's initiatives, from fostering interdisciplinary research to facilitating policy dialogues, exemplify the actionable pathways through which science diplomacy can manifest tangible impacts. While the vision of integrating groundbreaking climate solutions into European policy remains an aspiration, it is grounded in the real potential of EUTOPIA's collaborative model and strategic initiatives. As we look forward, it is essential to recognize that the journey of the alliance and the broader pursuit of science diplomacy are not just about lofty ideals but about concrete actions and measurable outcomes. The hypothetical scenario of climate policy innovation serves not as a distant dream but as a call to action, illustrating the practical possibilities that lie within EUTOPIA's reach.

In sum, EUTOPIA stands as a vanguard for the integration of science and diplomacy to address complex global issues. It beckons a collective effort to harness knowledge, foster understanding, and drive meaningful change. As we move forward, let us draw inspiration from history and continue committing to the principles of connectivity, curiosity, and openness. By doing so, we can pave the way for a future where science diplomacy is not just an ideal but a fundamental practice in crafting a more sustainable, secure, and enlightened world for all.

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