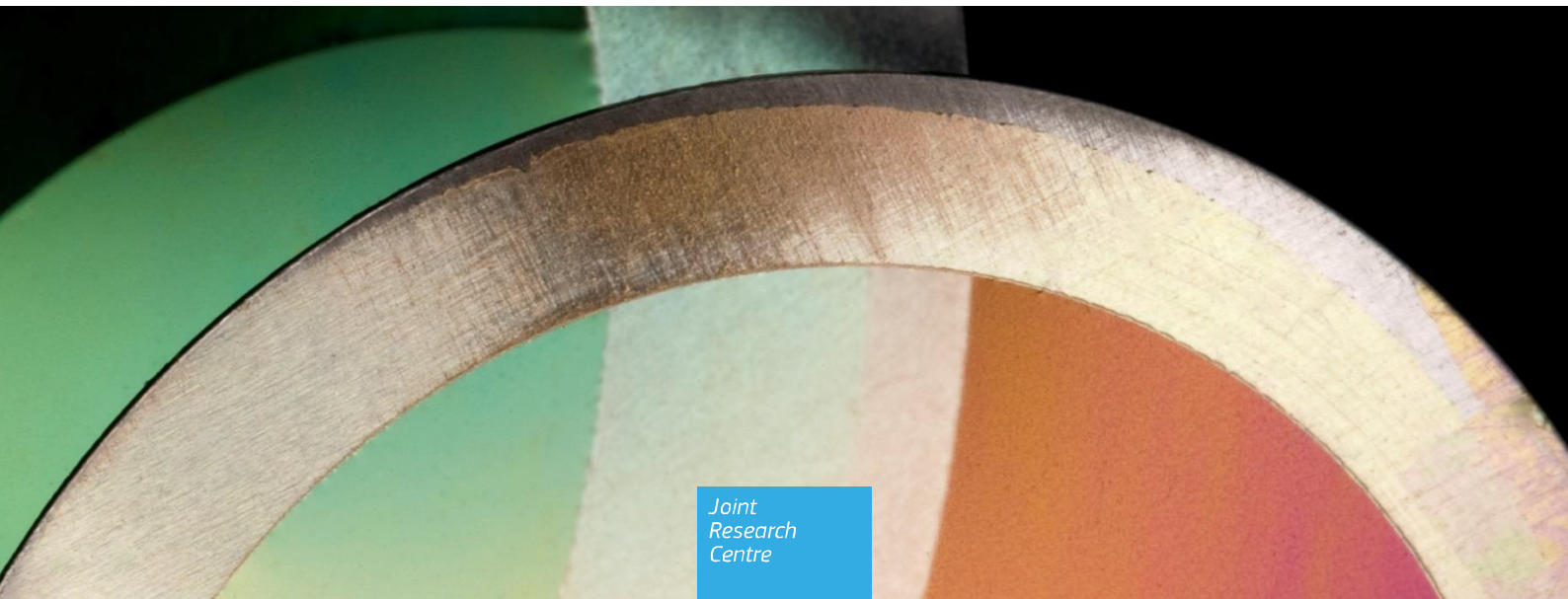
European Commission

Rethinking the Role of Universities in Place-Based Innovation Policies for Sustainability Transitions

M. Trippl, S. Schwaag Serger and K. Erdős

2023



Joint Research Centre

EU Science Hub
https://joint-research-centre.ec.europa.eu

JRC134249

Seville: European Commission, 2023

How to cite this report: M. Trippl, S. Schwaag Serger and K. Erdős, *Rethinking the Role of Universities in Place-Based Innovation Policies for Sustainability Transitions*, European Commission, Seville Spain, 2023, JRC134249.

Contents

Abstract

Territorial manifestations of multiple crises and the shift of place-based innovation policies towards tackling sustainability challenges have far-reaching implications for the role of universities in regional development. Drawing on various literatures on the contributions of universities to regional development, we explore the strategies and practices that would define a revised role for universities in light of increasing environmental, social but also economic challenges. The aim of this concept paper is to outline new tasks for universities, which enable them to leverage their potential to make significant contributions to regional sustainability transition processes and policies.

Acknowledgements

The authors would like to thank Luc Soete (Vrije Universiteit Brussel), Dimitrios Pontikakis, Koen Jonkers and other colleagues from the Joint Research Centre of the European Commission in Seville for very helpful comments on a previous version of this concept paper. The usual disclaimer applies.

Authors

Michaela Trippl, Sylvia Schwaag Serger and Katalin Erdős

University of Vienna, Austria; email: michaela.trippl@univie.ac.at

University of Lund, Sweden; email: Sylvia.schwaag_serger@ekh.lu.se

University of Pecs, Hungary; email: erdosk@ktk.pte.hu

1 Introduction

The reorientation of place-based innovation policies towards tackling territorial sustainability challenges (McCann and Soete, 2020; Pontikakis et al., 2022; Tödtling et al., 2022) has far-reaching consequences for the future role of universities in territorial innovation and development processes. The aim of this concept paper is to outline new tasks for universities, which enable them to leverage their potential to make significant contributions to regional sustainability transition processes and policies. Regional transitions, in turn, are an important, but hitherto underutilised, driver of national and even international transformations (see, e.g. Schwaag Serger et al., 2023).

In conventional approaches to innovation policy, universities are viewed as important engines of regional economic development. Next to their established missions of teaching and research, they are perceived to contribute to the growth and competitiveness of regional economies through so-called third-mission activities such as forging university-industry partnerships or promoting academic spin-offs. Arguably, this reflects a rather narrow interpretation of the third mission, one that is inspired by the concept/vision of the 'entrepreneurial university'[1], (Clark, 1998; Etzkowitz, 2002) which has gained popularity over the past decades, overshadowing broader interpretations propagated by the literature on 'the engaged (or civic) university' (Boyer, 1990; Breznitz and Feldman, 2012; Goddard et al., 2013; Trippl et al., 2015). The latter emphasises a developmental role of universities (and not only a knowledge-generative role; Gunasekara, 2006) and advocates the adaptation of university functions to territorial needs. It casts light on the social, political and civic roles of universities and accords attention to activities such as contributing to well-being, cultural enrichment, informing policy, and so on (Goddard et al., 2013).

In an era of complex and persistent ecological and social crises, there are growing calls on universities to make substantive commitments to sustainability (Stein, 2023), to transition towards a sustainable regional development role (Radinger-Peer et al., 2021), or to embrace the function of a societal transformer and co-creator (Trencher et al., 2014). Universities are seen as important change agents in regional sustainability transition processes (Schiller and Peer, 2021) who should deliver on transformative innovation policy missions (Parker and Lundgren, 2022). Examining EU policies affecting higher education institutions, Soete (2023) argues that there is a need for realigning these towards strengthening universities' contributions to regional sustainability processes and eco-systems.

The entrepreneurial university model restricts the focus and scope of universities' impact on society to the economic and commercial dimension. It might also partially explain, and provide a justification for, why universities which seem to perform well in international comparisons are sometimes detached from the needs or realities of their local or regional surroundings, in essence leaving their region behind.

The engaged university model captures the aspirations of universities addressing the needs of the local and regional communities – partly this explains why it (re-)gained attention in developed (see e.g. Breznitz and Feldman, 2012; Aronson and Webster, 2007; Pike et al., 2014) and less developed (Benneworth and Dawley, 2005; Thomas and Pugh, 2020; van Schalkwyk and de Lange, 2018) contexts alike. Nevertheless, market logic (van Schalkwyk and de Lange, 2018) and funding conflicts (Breznitz and Feldman, 2012; McDowell, 2003) can impede the realisation of this model. Also, the emphasis is usually on social and economic development of the region, while environmental sustainability is rarely mentioned. One might argue that it is implicitly included, since economic processes and human well-being ultimately rely on environmental resources, but in addition to being anthropocentric, this reasoning neglects the fact that many human needs and products offered to meet them are not necessarily sustainable from an environmental point of view (in many instances they are not). In addition, we would argue that an 'engaged' university conveys an image of an organisation that listens to and is empathetic to the needs of its surrounding society but might not necessarily actively contribute to its transformation towards more ecological sustainability. Consequently, engaged universities do not go far enough in playing their role in achieving a regional transformation with a focus on environmental sustainability.

[1] Importantly, our critique is certainly not directed against entrepreneurship per se. Persistent sustainability challenges and crises demand entrepreneurs who challenge the status quo and push for transitions to more environmentally sustainable, more equitable and more resilient economic structures and practices (Sanders, 2022). We rather question research commercialisation and knowledge transfer to firms as the primary (or only) goals of the so-called entrepreneurial university model and contend that this is not sufficient to tackle the complex sustainability challenges of our time. Instead, universities must expand their engagement activities, incorporating a focus on social and environmental impact.

Furthermore, the explicit focus on social, economic, and environmental sustainability has further implications. Even if sustainability on the local/regional level would be achieved, the global context should not be neglected. Globalisation and trade might hide unsustainable patterns by re-locating production and pollution that raises ethical considerations as well. Consequently, a proper conceptual approach would be a university that facilitates the transition of its region with an explicit and primary focus on sustainability through local/regional engagement and simultaneously globally contextualise its activities by assessing the impact of the regional transformation on other locations as well.

In this concept paper, we explore the strategies and practices that would define a revised role for universities in light of increasing environmental, social but also economic challenges. In pursuing these strategies and practices, a regional focus should be adopted, or, as Thomas and colleagues put it, a 'sense of place should be embedded in universities' … activities' (Thomas et al., 2023, p. 2).

The regional dimension – and why it matters

A key argument put forward in this concept paper is that universities need to undergo deep organisational transformations in order to play a major role in regional sustainability transitions. As we explain below, universities' more effective contribution to regional sustainability transitions is important not only for the region in question but also because as we have argued elsewhere, in the literature on transitions, there is an increasing recognition of regional or local change processes as important but hitherto under-recognised and under-utilised drivers of national and international transformations towards holistic sustainability (i.e. combining economic, social and environmental dimensions of sustainability) (see e.g. McCann and Soete, 2020; Schwaag Serger et al., 2023). In essence, therefore, when we call for a 'regional transformative mission' (see section 2.3) we are arguing for a transformative mission with a strong regional dimension. Put slightly differently, we argue that a transformative mission is not effective or credible without a strong regional dimension.

Taking on a regional perspective is important for a variety of reasons. To begin with, it is vital to acknowledge that there is not only a geography of innovation but also a geography of problems (McCann and Soete, 2020). Major challenges such as climate change, resource depletion, loss of biodiversity, rising inequalities and so on manifest themselves differently in different regional contexts. In other words: regions have different exposures to environmental, social and/or economic challenges; the problems caused by multiple sustainability crises tend to be region-specific. Consequently, actions need to be tailored to the regional/local context (McCann and Soete, 2020). That is why territorial perspectives on socio-technical-ecological transitions have gained increasing attention over the last years by policymakers (Pontikakis et al., 2022; Tödtling et al., 2022). This is backed by findings from the 'geography of sustainability transitions' (GeoST) literature, which has shown that regions are key arenas for developing innovations that help tackling sustainability challenges (Truffer et al., 2015). Regions have been found to play a crucial role in searching for and identifying place- and context-specific solutions to environmental, social and economic problems (Binz et al., 2020).

Universities are in principle well positioned to make significant contributions to sustainability transitions in their regions and beyond (see section 4). In order to fulfil their potential, universities must not only take on new tasks but also adopt a regional focus. Smaller-sized universities are often firmly embedded in their regions and display high levels of local/regional engagement, which is also reflected in their longer-term visions and strategies and results in a strong regional footprint (Tijssen et al., 2021, p. 6). Larger research-intensive universities, in contrast, do not consider the region as the primary 'delivery space' of their missions and activities. They tend to be 'spatially blind' in terms of pursuing a teaching or research agenda without an explicit municipal, metropolitan or regional focus' (Tijssen et al., 2021, p. 7). In fact, many universities have a strong national and international orientation but do not prioritise a regional mission (Tijssen et al., 2021). Box 1 summarises the dilemma and its connection to incentive systems in the higher education sector.

Box 1: The global reach of research-intensive universities

'Research-active universities usually have significant international networks through joint projects and publications, which are necessary to remain at the forefront of an academic field and to access funding. Internationalisation has also increased within higher education, with growing levels of mobility among students and staff (the Erasmus programme has accelerated this trend within Europe). On the one hand this is a challenge … because academics are called upon to educate 'citizens of the world' which are less likely to enter the local labour market. Research is targeted towards peers and when policy relevant usually national or supranational authorities rather than the regional level. These factors are built into the career incentives of individual academics as well as objectives for departments and faculties. However … universities can act as a link between the global and local levels, absorbing international knowledge and sharing this with other regional stakeholders. Institutional funding needs to recognise and value this role more.'
(Tijssen et al., 2021, p. 67-68).

Large-sized research intensive universities thus face the challenge of balancing global and regional priorities and avoiding clashes between global ambitions and regional responsibilities. At the same time, their disciplinary breadth and their global orientation and reach make them particularly adept to exploit global knowledge to promote regional sustainability transformations.

The new tasks for universities proposed in this concept paper are meant to complement rather than replace universities' traditional education, research and engagement activities, the latter of which have been dominated by technology transfer and research commercialisation as we have argued above.

Arguably, adding new tasks and functions to established ones might create tensions and could lead to a 'mission overload' (Benneworth and Fitjar, 2019). In fact, universities are confronted with the need to find ways to handle the expansion of (complementary and competing) missions and tasks. The notions of 'multi-mission universities' and 'multidextrous universities' (Thomas et al., 2023) reflect the challenge. Also, we have argued elsewhere that one of the problems universities face is that they 'compartmentalise' the different missions, leading to silos, fragmentation and frictions between the missions (Benner and Schwaag Serger, 2017). This problem is partially, but not entirely, caused by separate funding streams for teaching, research and outreach that can be found in some countries, e.g. in Sweden (ibid).

2 New roles of universities in an era of transformative change

Organisational sustainability efforts in higher education have thus far often been piecemeal rather than systemic and transformational (Stein, 2023; referring to Bieler and McKenzie, 2017; McKenzie and Wilson, 2022; see also Ralph and Stubbs, 2014; McCowan, 2020). Sustainability appears to be addressed in an uneven manner across different areas of the university, with a lot of attention given to campus operations (recycling, waste reduction, energy savings, etc.) and limited focus on other university activities such as teaching (incorporating sustainability into curricula), research (channelling more funding and other resources into sustainability-related research), or engagement and fostering public debate on (place-based) sustainability challenges (Stein, 2023; referring to McCowan, 2020).

Universities must embrace a holistic approach to fully leverage their potential to shape sustainability processes and policies in their regions and beyond. This requires not only a focus on university operations, but also new tasks related to their research, teaching and engagement activities (as explored in this section) and the integration of these activities into a comprehensive organisational vision and strategy (as detailed in section 3).

2.1 Educational activities

For universities to have a significant impact on regional sustainability transitions, they are compelled to complement their traditional teaching activities by new ones that align with a new educational paradigm. More precisely, the educational mission must evolve to ensure that courses and programmes are relevant, adaptive, and responsive to rapidly changing needs of society and to territorial sustainability challenges. The concepts of transformational and transformative education (see, for instance, Radinger-Peer et al., 2021) have surfaced as an essential strategy in this context. They acknowledge the significance of key competences (including interdisciplinary and cross-cutting competences and approaches that bridge traditional disciplines) needed for grasping and handling complex societal challenges. Rethinking the educational mission involves the systematic incorporation of relevant expertise (both internal to the university and external), into teaching and classroom settings to ensure that content and form of educational offerings meet the needs of regions in an era of rapid societal, and economic change. A guiding principle should be to equip students with the relevant skills and frameworks (including ethical considerations) to engage in various transformation processes.

A fundamental challenge with universities' current educational offerings is their dominant focus on programmes tailored to people who have not yet or only recently entered the labour market. To make a meaningful contribution to the urgent transformation needs, universities need to develop attractive and relevant offerings for upskilling and re-skilling people who are already in the labour force. Many of those who are shaping processes and making decisions today could benefit immensely from courses and modules that complement their existing knowledge in ways to improve their ability to contribute more effectively to transformation. Currently, for various reasons – including incentives and funding structures but also lack of understanding of societal demands and of competencies and formats necessary to meet them – lifelong learning ranks too low in the list of priorities of university administrators and teachers.

Currently, lengthy, administration-heavy and supply-driven processes for creating new courses and programmes – particularly at some of the large and comprehensive research-intensive universities – clash with the speed at which our world is changing, the urgency of the challenges we face and the societal demands for new educational offerings, both in terms of format and content. A publication by the Germany National Academy of Sciences Leopoldina argues that silos of academic disciplines (including scientific societies) and of academic and non-academic research are not conducive to understanding and developing solutions for a drastically changing and increasingly challenged planet. 2 Ramirez (2021) and Benner et al. (2021) provide some insights into drivers of educational renewal and point to some potential challenges.

[2] https://www.leopoldina.org/fileadmin/redaktion/Publikationen/Zukunftsreport/2022_Zukunftsreport_Erdsystemwissenschaft_DE_web.pdf

Furthermore, encouraging students to engage in experimentation, and fostering explorative and reflexive learning among students is imperative. As argued above, another critical element is imparting knowledge of goals and processes of transformation based on systems knowledge (Radinger-Peer et al., 2021). Equipping students to understand and manage the complex interdependencies that shape the world around them, and the link between their own projects and interests and real-world sustainability challenges must be clearly established. Matching student projects and interests to sustainability challenges allows universities to create meaningful connections between their educational offerings and broader societal needs.

Finally, courses and programmes that provide teachers with new competences and knowledge about inter- and transdisciplinary approaches to complex topics of societal relevance (including sustainability, data, artificial intelligence, governance, etc.) are essential (Radinger-Peer et al., 2021). That way, both transformational education and transformative education become enduring features of curricula.

2.2 Research activities

Universities are challenged to incorporate transformational and transformative research into their portfolio of research activities. Such research prioritises approaches that foster the co-creation of knowledge for both regional and supra-regional sustainability challenges. Importantly, co-creation should not be limited to engineering and technical sciences but also involves 'research agendas, in which politics, sociology, history, and philosophy play a critical role in driving pathways for future social development and change' (Parker and Lundgren, 2022, p. 165). More precisely, universities are considered to play a vital role in problem definitions through the mobilisation of multiple disciplines and in contributing to search processes to solve societal challenges, beyond just scientific and/or technological solutions.

What is more, transdisciplinary and participatory approaches that give precedence to the co-production of knowledge together with non-academic regional stakeholders and ensure the integration of diverse perspectives become critical. It necessitates universities to engage and interact with a diverse array of actors, not limited to only industry and government (triple helix), but also with social organisations, regulators, advocacy groups and civil society organisations involved in societal transformation 'to facilitate open and critical debate regarding alternative societal futures' (Parker and Lundgren, 2022, p. 162; see also Engels et al., 2019; Pfotenhauer et al., 2019).

Special attention needs to be paid to the development of integrated, systemic perspectives that account for the co-evolution of complex systems and their environment. This approach offers significant potential for identifying innovative solutions to societal challenges in regions and beyond. Researchers must embrace a sense of social responsibility, ensuring that their work has a positive impact on society and aligns with the principles of sustainable development. To this end, the LeNA reflection framework for Germany (Radinger-Peer et al., 2021) or the NSF initiative Convergence Research[3] can guide research that promotes sustainability and social responsibility.

It is important to note that knowledge co-creation and research that is catalyzed by social rather than technical/scientific problems do not necessarily imply a shift towards more applied, as opposed to basic, research. The NSF initiative on convergence research provides a relevant example/illustration of how basic research and societal challenge orientation are not in conflict.

[3] https://beta.nsf.gov/funding/learn/research-types/learn-about-convergence-research

2.3 Engagement activities: complementing the entrepreneurship paradigm by co-creation for sustainability

The new education and research tasks identified above, which complement traditional university activities in these fields, provide a vital foundation for engagement initiatives that supplement the conventional activities associated with the entrepreneurial university model.

Such new forms of engagement reflect the (need for the) emergence of a new university function, that of co-creation for sustainability (Trencher et al., 2014). This involves cross-sector partnerships and collaborations between universities, local/regional governments, industry and civil society with the explicit aim to create or advance sustainability transformations in regions.

As detailed by Trencher and colleagues, the co-creative function combines – or systematically synergises – a range of well-known modes of societal engagement[4] (such as action and participatory research, transdisciplinarity, service learning, or living labs) 'into a systematic response to localised sustainability challenges, and most importantly, the integration of values of sustainable development' (Trencher et al., 2014, p. 152).

The organisational incorporation of this function is the transformative university that targets, as argued above, a broader objective than economic development: it aims to facilitate sustainable and social transformation through co-creation. This does not mean that economic aspects are neglected by the transformative university. There are many cases when economic and environmental development are mutually conducive (Huggins, 2013). A case in point are university contributions to green regional industrial path development. This can include the rise of new green economic activities that play an important role in energy transitions (e.g. photovoltaics, wind) or mobility transitions (e.g. electric vehicles, smart public transportation) as well as green shifts of mature industries (e.g., decarbonisation of energy- and emission-intensive sectors) (Trippl et al., 2020) and the assurance that regional path development is not only green but also just (Eadson and van Veelen, 2023). Furthermore, economic development that supports social development through poverty reduction can contribute to environmental development as well. 'A world in which poverty is endemic will always be prone to ecological and other catastrophes' (Brundtland, 1987, p. 25).

Since the interrelatedness of economic growth and poverty is complex (Sehrawat and Giri, 2018), its understanding and the development of appropriate policies might require contribution from a broad range of scientific fields. Thus, the transformative university is more inclusive in terms of disciplines than the entrepreneurial university. Beyond engineering and natural sciences it includes – among others – humanities and social sciences that are crucial in understanding the economic and social dynamics of the region and their impact on the feasibility of sustainability transitions.

This understanding is also supported by the open-model of innovation that relies on multiple methods and knowledge sources to analyse interrelated issues in a comprehensive and systematic way. It aims at co-creation in real-world settings in collaboration with a broad range of stakeholders, including actors beyond the triple helix of the entrepreneurial university, e.g., members of the civil society to solve sustainability or societal challenges.

We have used a table developed by Trencher and colleagues (2014) as our point of departure but amended it to capture a regional transformation mission (Table 1). Trencher et al. (2014) contrast what they term 'the entrepreneurial mission' – derived from the entrepreneurial university model – with what they entitle an 'emerging mission' which would be more in line with a 'transformative university'. Building on the

[4] These are exploited to varying degrees and combinations by a coalition built explicitly upon values of sustainable development and are used to drive any combination of technological, social or environmental transformation to sustainability in a specific location, region or societal sub-system' (Trencher et al., 2014, p. 153).

characteristics of Trencher et al. (2014) of a transformative university, we highlight the notion of multi-directional flows and multi-faceted sources of knowledge and the importance of their interaction in a mutually enriching manner. In contrast to Trencher et al. (2014) we also put significant emphasis on the role of education as a driver of transformation.

Finally, we introduce the notion of the university acting as a 'knowledge curator' for society. By this, we mean that universities should assume greater responsibility not just in communicating individual research results but in helping society and decision-makers make sense of the rapidly increasing body of knowledge that spans a wide range of disciplines. This requires developing a knowledge curating function, which includes providing overviews or compilations of knowledge – in various forms – on complex issues of relevance to decision-makers, creating fora in which scientists from a range of disciplines can interact with decision-makers, civil society and other stakeholders on specific societal challenges, and generally working to make knowledge more accessible, understandable and relevant to society from a multi-disciplinary perspective.

Table 1: Comparison of characteristics in entrepreneurial and regional transformative missions

	Entrepreneurial mission	**Regional transformative mission**
Function	Technology transfer, science communication	Co-creation for sustainability and transformation
Objective	Contribute to economic development	Contribute to societal / sustainability transformation
Model	Entrepreneurial university	Transformative university
Paradigm	Market logic and commercialisation	Sustainability and transformation
Disciplines	Mainly natural sciences and engineering	Broad range of fields including humanities and social sciences, in addition to natural sciences and engineering
Approach	- Closed-model innovation - Device orientated - Response to problems in isolation - Knowledge interaction between universities and firms - University as the primary source of knowledge	- Open-model innovation - Place and stakeholder-oriented - Comprehensive, systematic response to several, interwoven problems - Systematic use of various methods and channels - Multi-directional knowledge flows across a wide range of stakeholders - Many sources of knowledge interact for mutual benefit and knowledge enhancement
Collaboration type	Actors from academia, industry and government	Large-scale coalition with actors from academia, industry, government and civil society
Determinants of impact	- Specialised scientific knowledge - Technological innovation - Education: long-term impact in shaping professions (eg through degree programs) and skill sets in society	- Specialised and multi-disciplinary scientific knowledge - Technological and social innovation - Socially embedded knowledge and transdisciplinary mutual learning - Environmental transformations - Education: both long-term impact and short-/medium-term impact e.g. through lifelong learning

		- University as curator of knowledge (incl. convenor of relevant conversations) in a world where expertise is increasingly specialised at the same time as problems are increasingly complex and span many sectors and disciplines
Setting	Laboratory/controlled environment (technology park, ventures, incubators)	Real-world setting: specific location (community, city, region etc.)
Catalyst	Technical or scientific problem	Sustainability/societal problem
Channels	- Patents/inventions/licenses - Spin-off firms, technology parks - Conferences, publications - Consultation, supply of graduates	- Knowledge management and curation - Technology transfer or economic development - Technical demonstration projects and experiments - Reform of built and natural environment - Socio-technical experiment - Involvement in policy processes - Renewal of education (content and form) for a society in crisis and transformation

Source: Developed from Trencher et al. (2014, p. 158)

Such a knowledge curating function is particularly important in a world in which societal challenges are characterised by increasing complexity and uncertainty (SAPEA, 2019), at the same as scientific knowledge production is becoming increasingly specialised. The Covid-19 pandemic exposed tensions at the interface between science and policymaking and cast into stark relief the need for a form of knowledge curation as we have argued in Sahlin and Schwaag Serger (2021). Policymakers were struggling with having to make decisions with far-reaching consequences on people's lives, livelihoods and individual freedoms under great time pressure. They were inundated by advice and opinions from scientists from many different disciplines which recommended a wide range of – often contradictory – courses of action. Covid-19 highlighted the need for fora or functions that could have helped policymakers and the public make sense of the plethora of different expertise and gain a holistic view of the problem.

3 University operations and governance

Universities hold promise for influencing regional sustainability transitions through their operations. They must accord priority to sustainable operations, which can be achieved through a variety of means, including implementing operational environmental management systems (EMAS) that reduce their environmental impact (Radinger-Peer et al., 2021). Universities can drive transformation by embracing sustainable practices in their operations, such as energy efficiency, waste reductions, and sustainable procurement. Importantly, they can contribute to advancing regional sustainability transitions through their demand, through testing, experimenting with and producing new solutions, and through contributing to collective risk-taking and risk-sharing. This points to the potential roles of universities as lead users and in market creation in regional sustainability transitions and policies.

Finally, changes in university governance are fundamentally important. Universities are faced with the imperative to place social commitment and sustainable development centre stage, adhere to principles of good governance and responsible use of resources, and adopt strategic sustainability management as dynamic and continuous practices (see, e.g., Radinger-Peer et al., 2021). A crucial aspect is the participative integration of sustainability and territorial problems into the university's vision and strategy. Embracing a transformative role implies to be sensitive to, engaged in, and share responsibility for addressing local and regional challenges, such as unemployment, integration, environmental degradation, and polarisation (ibid.). (Re-)establishing and nurturing relationships to their local and regional environments is particularly important for larger top-universities, which seem to be somewhat disconnected from the needs of their home regions.

Emphasising the role of universities' visions and strategies is vital as recent debates about individual versus organisational sustainability efforts in the higher education system show. Empirical evidence suggests that sustainability initiatives (integration of sustainability challenges in teaching, research, engagement activities, etc.) are often driven by committed individual actors within universities, often with little or no support by their organisation (Kempton, 2016; Radinger-Peer et al., 2021). In fact, many larger traditional research-intensive universities are poorly equipped to cultivate these endeavours. As discussed further below (section 4), their structures (particularly the focus on disciplines, traditional degrees, and on research performance) create tensions and a bias against such initiatives. This clearly calls for changes to universities' internal structures, the development of a longer-term organisational vision and strategy and leadership by university management. There is a need for strategies and measures to encourage, support and scale bottom-up initiatives that contribute to sustainability and transformation in research, teaching, external engagement, and operations. In other words: transformative activities need to be elevated to an organisational ambition and priority (Trencher et al., 2014).

4 Change processes within universities as prerequisite for taking on new roles

As outlined above, universities face increasing pressures to take on new tasks and bring about changes in the fields of university operations and governance to play an important role in regional transitions towards sustainability. A crucial question is: are universities up to this task? Are they organised, funded and governed in ways that allow them to take on this task?

Universities are said to be well positioned to embrace transformative activities and make significant contributions to regional sustainability transitions. This potential is accrued to freedom for research and teaching (Radinger-Peer et al., 2021) and a distinctive culture that values and encourages learning (Stephens and Graham, 2010). Further, they can mobilise and link a broad array of disciplinary expertise and activities across society (Trencher et al., 2014; Tijssen et al., 2021). Furthermore, due to their pronounced organisational stability, they are said to have unique capacities for longer-term visioning and strategic thinking (Trencher et al., 2014; Parker and Lundgren, 2022). Finally, they are sites for neutral convening, participatory processes, innovation and experimentation (Stephens and Graham, 2010).

However, there are also various tensions and barriers that constrain universities in undergoing change and taking on new roles. These include amongst others

- omnipresence of excellence, conventional incentives and reward systems[5] that underpin academic careers (Trippl et al., 2015; Deleye et al., 2019) and could work against embracing regional transformative goals;
- rigid disciplinary cultures, academic silos and compartmentalisation (fragmented organisational structure) that impede interdisciplinary and transdisciplinary approaches in research, teaching and engagement (Stephens and Graham, 2010; Ralph and Stubbs, 2014; Deleye et al., 2019);
- independence of faculty (Stephens and Graham, 2010);
- competition between universities ('race' for students, funding, and prestige) and between individual academics, often in the context of limited financial resources (Deleye et al., 2019; Radinger-Peer et al., 2021);
- conventional performance measurements and conventional performance-based funding schemes linked to traditional 'university outputs' (Blume et al., 2017);
- lack of a collective vision/strategy (partially due to competition between faculties and between research and teaching activities for funding, strong path dependencies in funding, etc.);
- lack of sense of urgency, pressure to contribute to transformation, strong inward focus.

[5] There has been an increasing recognition in recent years of the need to rethink and reform systems of recognition and rewards in academia (for a concrete initiative, see, for instance, https://urldefense.com/v3/__https:/www.universiteitenvannederland.nl/recognitionandrewards/wp-content/uploads/2019/11/Position-paper-Room-for-everyone**Bs-talent.pdf__;4oCZ!!DOxrgLBm!AXwHzBCKNWB8tPCWtWOcCF0VK5zpe1Rhd2A1FMbq5BC_S4j7FJMsYxcvTg1m6WHBS8dUffjT6XVWxJD5DsE2n51QvLTSDPLfXQuUkDtaGkk$;4oCZ!!DOxrgLBm!AXwHzBCKNWB8tPCWtWOcCF0VK5zpe1Rhd2A1FMbq5BC_S4j7FJMsYxcvTg1m6WHBS8dUffjT6XVWxJD5DsE2n51QvLTSDPLfXQuUkDtaGkk$. However, alternative methods for evaluating research that move beyond traditional output indicators like number of publications, h-index and journal impact factor (see, for instance, the San Francisco Declaration on Research Assessment – DORA), and assessment systems for education and engagement/societal impact have not diffused widely yet.

Freeland (1992) highlights that attempts to foster change in universities tend to be only 'successful when the change is incentivized and internalized into the culture and reward system of higher education institutions' (Stephens and Graham, 2010, p. 612). Here, universities' organisational strategies and leadership, and policies of national/regional governments (including but not restricted to higher education policies) play a vital role in initiating and consolidating change.

5 Conclusions

Territorial manifestations of multiple crises and the shift of place-based innovation policies towards tackling sustainability challenges have far reaching implications for the role of universities in regional development:

- Concepts and practices centred around traditionally oriented educational and research activities and the vision of the 'entrepreneurial university' with their distinctive focus on universities' contributions to economic development through third mission activities such as knowledge transfer to firms and academic spin-offs do no longer suffice.

- Place-specific environmental, social and economic sustainability challenges and changing policy landscapes prompt universities to play a significant role in sustainability transitions. This requires complementing conventional activities by new ones that place sustainability problems and territorial challenges centre stage.

- Universities are confronted with the need to incorporate new elements and approaches in their teaching, research and engagement portfolios, and undertake changes in the fields of university operations and governance. It involves expanding research and teaching on transformation processes (transformational research and education), engaging in the active co-design of such processes (transformative research and education) and curating knowledge in, with and for society. Further, it entails the development of longer-term visions and strategies, and a move towards sustainable university operations.

- Importantly, piecemeal and merely individually driven activities are insufficient; the goal of contributing to regional sustainability transitions needs to be pursued by adopting a holistic approach and it should be elevated to an organisational priority.

Are universities capable of meeting the demands placed upon them?

- As leading sites of knowledge generation, education, innovation, and societal change, universities show a unique potential to catalyse and accelerate (regional) sustainability transitions.

- However, various barriers residing inside universities and constraints found in their external environment inhibit an expansion of their missions. This calls for new leadership approaches, an internalisation of change into the culture and reward system of universities, and policy reforms.

In this concept paper, we built a persuasive case for why the traditional activities and functions of universities must be complemented by new tasks to respond to the sustainability crises and territorial needs. For universities to become societal transformers and co-creators of (regional) sustainability (Trencher et al., 2014), a fundamental shift in thinking is required. Only by doing so can universities fulfil their role as key agents of change and contribute to regional sustainability transformations.

As we conclude, a few noteworthy remarks should be highlighted. The arguments on required changes in universities' tasks are more general in nature, while having larger research-intensive top universities in Europe in mind. It is crucial to add that universities will need to undergo a tailored reorientation that considers the distinct features of each organisation. There are strong reasons to assume that much depends on the size, research-intensity and type of universities (comprehensive versus more specialised ones). Furthermore, the role that universities can play and the impact they have on regional sustainability transitions are contingent upon the unique characteristics of the regions in which they operate. The opportunities to contribute to sustainable development, catalyse transformative initiatives, and drive challenge-oriented innovation processes (Tödtling et al., 2022; Trippl, 2023) differ considerably across territories. The extent to which

universities can contribute to regional sustainability transitions depends on several factors, including the nature of the challenges the region is facing, its asset base, and, most importantly, the 'absorption capacity' of regional stakeholders for academic knowledge and other outputs produced by universities. In order to make a meaningful impact, universities must take these factors into account and tailor their activities accordingly, leveraging their expertise and resources to help address the specific needs and opportunities found in their host region.

References

Aronson, K. R. and Webster, N. (2007) Model for Creating Engaged Land-Grant Universities: Penn State's Engagement Ladder Model. Innovative Higher Education, 31, 265–277. https://doi.org/10.1007/s10755-006-9031-7

Benner, M. and Schwaag Serger, S. (2017) A European dilemma? The disintegration of education, research and collaboration. In: Austrian Council for Research and Technology Development (ed). Prospects and future tasks of universities. Digitalization – Internationalization – Differentiation. Zurich: LIT Verlag, pp. 211-226.

Benneworth, P. and Dawley, S. (2005) Managing the University Third Strand Innovation Process? Developing Innovation Support Services in Regionally Engaged Universities. Knowledge, Technology, & Policy, 18(3), 74–94.

Benneworth, P. and Fitjar, R.D. (2019) Contextualising the role of universities to regional development: introduction to the special issue. Regional Studies, Regional Science, 6(1), 331-338.

Breznitz, S. M. and Feldman, M. (2012) The engaged university. Journal of Technology Transfer, 37, 139-157.

Bieler, A. and McKenzie, M. (2017) Strategic Planning for Sustainability in Canadian Higher Education. Sustainability, 9, 161.

Binz, C., Coenen, L., Murphy, J. and Truffer, B. (2020) Geographies of transition — From topical concerns to theoretical engagement: A comment on the transitions research agenda. Environmental Innovation and Societal Transitions, 34, 1-3.

Blume, L., Brenner, T. and Buenstorf, G. (2017) Universities and sustainable regional development. Review of Regional Research, 37, 103-109.

Boyer, E. (1990) Scholarship Reconsidered: The Priorities of the Professoriate. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

Breznitz, S. and Feldman, M. (2012) The engaged university. Journal of Technology Transfer, 37(2), 139–157.

Brundtland, G. H. (1987) Report of the World Commission on Environment and Development: Our Common Future. United Nations General Assembly document A/42/427. Available: https://digitallibrary.un.org/record/139811/files/A_42_427-EN.pdf?ln=en. Accessed: 29.04.2023

Chankseliani, M. and McCowan, T. (2021) Higher education and the Sustainable Development Goals. Higher Education, 81, 1-8.

Clark, B. (1998) Creating Entrepreneurial Universities: Organizational Pathways of Transformation. New York, NY: Elsevier.

Deleye, M., van Poeck, K. and Block, T. (2019) Lock-Ins and Opportunities for Sustainability Transitions. A Multi-Level Analysis of the Flemish Higher Education System. International Journal of Sustainability in Higher Education, 20, 1109–1124.

Eadson, W. and van Veelen, B. (2023) Green and just regional path development. Regional Studies, Regional Science, 10(1), 218-233.

Engels, F., Wentland, A. and Pfotenhauer, S. (2019) Testing Future Societies? Developing a Framework for Test Beds and Living Labs as Instruments of Innovation Governance. Research Policy, 48, 103826.

Etzkowitz, H. (2002) MIT and the Rise of Entrepreneurial Science. Routledge: London.

Freeland R. (1992) Academia's golden age. Oxford: Oxford University Press.

Goddard, J., Kempton, L. and Vallance, P. (2013) The civic university: Connecting the global and the local. In: Cappello, R., Olechnicka, A. and Gorzelak, G. (eds). Universities, Cities and Regions, Loci for Knowledge and Innovation Creation, London: Routledge, pp. 43–63.

Gunasekara, C. (2006) Reframing the role of Universities in the development of regional innovation systems. Journal of Technology Transfer, 31(1), 101–113.

Huggins, L. E. (2013) Environmental Entrepreneurship. Cheltenham, UK: Edward Elgar Publishing.

Kempton, L. (2016) Institutional challenges and tensions. In: Goddard, J., Hazelkorn, E., Kempton, L., and Vallance, P. (eds). The Civic University: The Policy and Leadership Challenges. Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, 281–297.

McCann, P. and Soete, L. (2020) Place-based innovation for sustainability. Publications Office of the European Union, Luxembourg, 2020, JRC121271.

McCowan, T. (2020) The impact of universities on climate change: A theoretical framework. Working paper no. 55. Oxford: Centre for Global Higher Education, Oxford University.

McDowell, G. R. (2003) Engaged Universities: Lessons from the Land-Grant Universities and Extension. The ANNALS of the American Academy of Political and Social Science, 585(1), 31–50. https://doi.org/10.1177/0002716202238565

McKenzie, M. and Wilson, A. (2022) Sustainability as wild policy: Mobile SDG interventions and land-informed policy in education. Discourse: Studies in the Cultural Politics of Education. https://doi.org/10.1080/01596306.2022.2091519

Parker, L. and Lundgren, P. (2022) The role of universities in transformative innovation policy. Science and Public Policy, 49, 159-167.

Pike, G. R., Bringle, R. G. and Hatcher, J. A. (2014) Assessing Civic Engagement at Indiana University–Purdue University Indianapolis. New Direcions for Institutional Research, 162, 87-97.

Pontikakis, D., González Vázquez, I., Bianchi, G., Ranga, M., Marques Santos, A., Reimeris, R., Mifsud, S., Morgan, K., Madrid, C. and Stierna, J. (2022) Partnerships for Regional Innovation – Playbook. Luxembourg: Publications Office of the European Union.

Pfotenhauer, S., Juhl, J. and Aarden, E. (2019) Challenging the "deficit model" of innovation: Framing Issues under the Innovation Imperative. Research Policy, 48, 895-904.

Radinger-Peer, V., Pflitsch, G., Kanning, H., and Schiller, D. (2021) Establishing the Regional Development Role of Universities – From the Multilevel-Perspective (MLP) and Beyond. Sustainability, 13, 6987.

Ralph, M. and Stubbs, W. (2014) Integrating environmental sustainability into universities. Higher Education, 67, 71-90.

SAPEA, S. A. f. P. b. E. A. (2019) Making Sense of Science for Policy under Conditions of Complexity and Uncertainty. Evidence Review Report 6, Berlin.

Sahlin, N. E. and Schwaag Serger, S. (2021) Ofrånkomliga beslut i en tid av spinn och outtalade värderingar. In: Eliasson, J. and Unemo, L. (eds). I en tid av pandemi – en ESO-antologi med samhällsvetenskapliga reflektioner, Expertgruppen för Studier i Offentlig Ekonomi 2012:3, Statens Offentliga Utredningar, pp. 37-57.

Sanders, M. (2022) Enter the Prince of Denmark: Entrepreneurship for a Resilient and Sustainable Economy. Small Business Economics, 59, 773-779.

Schiller, D. and Radinger-Peer, V. (2021) Introduction: The Role of Universities in Regional Transitions towards Sustainability. Sustainability, 13, 7940.

Schwaag Serger, S., Soete, L. and Stierna, J. (eds) (2023). The Square: Putting place-based innovation policy for sustainability at the centre of policymaking. Luxembourg: Publications Office of the European Union.

Sehrawat, M. – Giri, A. K. (2018) The impact of financial development, economic growth, income inequality on poverty: evidence from India. Empirical Economics, 55, 1585-1602. https://doi.org/10.1007/s00181-017-1321-7

Soete, L. (2023) Europe's higher education sustainability challenge: from prioritizing mobility to creating a local sustainability ecosystem. In: Schwaag Serger, S., Soete, L. and Stierna, S. (eds). The Square: Putting place-based innovation policy for sustainability at the centre of policymaking. Luxembourg: Publications Office of the European Union, pp. 141-149.

Stein, S. (2023) Universities confronting climate change: beyond sustainable development and solutionism. Higher Education (online first), https://doi.org/10.1007/s10734-023-00999-w

Stephens, J. and Graham, A. (2010) Toward an empirical research agenda for sustainability in higher education: exploring the transition management framework. Journal of Cleaner Production, 18, 611-618.

Tijssen, R., Edwards, J. and Jonkers, K. (2021) Regional innovation impact of universities. Cheltenham: Edward Elgar.

Thomas, E. and Pugh, R. (2020) From 'entrepreneurial' to 'engaged' universities: social innovation for regional development in the Global South. Regional Studies, 54(12), 1631-1643.

Thomas, E., Pugh, R., Soetanto, D. and Jack, S. (2023) Beyond ambidexterity: universities and their changing roles in driving regional development in challenging times. The Journal of Technology Transfer. https://doi.org/10.1007/s10961-022-09992-4

Tödtling F., Trippl, M. and Desch, V. (2022) New directions for RIS studies and policies in the face of grand societal challenges. European Planning Studies, 30(11), 2139-2156.

Trencher, G., Yarime, M., McCormick, K., Doll, C., and Kraines, S. (2014) Beyond the third mission: Exploring the emerging university function of co-creation for sustainability. Science and Public Policy, 41, 151-179.

Trippl, M., Sinozic, T. and Lawton Smith, H. (2015) The role of universities in regional development: conceptual models and policy institutions in the UK, Sweden and Austria. European Planning Studies, 23(9), 1722-1740.

Trippl, M., Baumgartinger-Seiringer, S., Frangenheim, A., Isaksen, A. and Rypestol, J.O (2020) Unravelling green regional industrial path development: Regional preconditions, asset modification and agency, 111, 189–197

Trippl, M. (2023) Challenge-oriented regional innovation systems and strategies for sustainability transitions. In: Schwaag Serger, S., Soete, L. and Stierna, S. (eds). The Square: Putting place-based innovation policy for sustainability at the centre of policymaking. Luxembourg: Publications Office of the European Union, pp. 62-69.

Truffer, B., Murphy, J. and Raven, R. (2015) The geography of sustainability transitions: Contours of an emerging theme. Environmental Innovation and Societal Transitions, 17, 63-72.

van Schalkwyk, F. and de Lange, G. (2018) The engaged university and the specificity of place: The case of Nelson Mandela Metropolitan University. Development Southern Africa, 35(5), 641-656.

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en).

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

— by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),

— at the following standard number: +32 22999696,

— via the following form: european-union.europa.eu/contact-eu/write-us_en.

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (european-union.europa.eu).

EU publications

You can view or order EU publications at op.europa.eu/en/publications. Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (european-union.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

Open data from the EU

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

The European Commission's science and knowledge service

Joint Research Centre

JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.

EU Science Hub
joint-research-centre.ec.europa.eu

@EU_ScienceHub

EU Science Hub - Joint Research Centre

EU Science, Research and Innovation

EU Science Hub

EU Science