Guest editorial: Special issue: Multidimensional sustainability – transitions and convergences

As society struggles to overcome urgent environmental, social and economic issues, sustainability is center stage in talks about how to ensure a prosperous future for everyone. Sustainability is not a static objective; rather, it is a dynamic process that necessitates constant adaptation and modification. The integrated and interconnected adjustments required to achieve sustainable development across time and across many areas of concern are included in multidimensional sustainability transitions. These transformations call for convergences at local, regional and global levels and include intricate connections between social, economic and environmental elements. The significance of convergences in building a sustainable future is here explored, along with the idea of multidimensional sustainability transitions.

For the purposes of this editorial, multidimensional sustainability transitions refer to transformative processes that include simultaneous and interrelated changes in social, economic and environmental systems. Rather than focusing on a single problem, these transitions address complex problems holistically and force us to recognize that the interdependencies and convergences introduce the possibility of unexpected consequences. Comprehensive approaches to sustainable development are essential to avoid unintended problems and to create lasting change. For instance, if we attempt to address poverty simply through economic practices, we may cause unintended environmental degradation, which, in turn, will exacerbate poverty in the long run.

Sustainability from a multidimensional perspective requires innovation. This is why it makes perfect sense to have a thematic issue of a scientific journal dedicated to innovation science as a means of encouraging worldwide sustainability relevance and impact. Innovation appeals to intelligent, rational and visionary goals concerning human, natural and technological resources, while seeking at the same time an increase in the quality of life of human beings at a planetary level, and an improvement in the condition of humans. New paths are being sought for emerging economies and impoverished populations in a vision of a shared future that is inseparable from the growth of the richest economies. Our vision of innovation focuses on sustainability as the fulcrum for understanding how economic development is closely linked to social and environmental sustainability. Increasingly, multidimensional sustainable development is forefront among academic, governmental, industry and community leaders.

Beyond coupling technological and managerial aspects, innovation should contribute to the common good and to the betterment of human life. Innovation should begin with a vision of, and commitment to, sharing. Digital transition in human societies is innovation involving technology, but innovation toward sustainability is mainly a cultural issue and implies a real programmatic revolution – mostly social – if we want to implement smarter scenarios in accordance with sustainable development objectives. Hence, we argue that "transitions and convergences" must be deeply integrated with "sustainability" concerns.

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Transitions

Several authors studied transitions toward sustainability. Some of the most influential studies are, Sen's (1981) work on entitlement theory, which has had a significant impact on comprehending poverty and hunger from a sustainability perspective. Jackson (2009) challenged the pursuit of perpetual economic growth and advocates for a more sustainable and equitable economy. Geels (2002, 2004, 2005, 2010, 2011, 2019), Verbong and Geels (2007), Schot *et al.* (2016) and Kompella (2019) brought the multilevel perspective of technological transitions and several of its confluences. Smith *et al.* (2010) connected innovation studies with sustainability transitions under the multilevel perspective. Grin *et al.* (2010) addressed transitions to sustainable development within long-term transformative change. Policy was another perspective widely discussed in the field. Stirling's (2010) work was devoted to the social-ecological resilience politics in sociotechnical transitions; Rotmans *et al.* (2001) invigorated transition management in public policy; and innovation policies toward sustainability transitions was the object for Kivimaa and Kern (2016). Markard *et al.* (2012) positioned sustainability transitions as a new field of study, whereas Smith and Loorbach *et al.* (2017) envisioned sustainability transitions as a vector of social change. Schot and Geels (2008) added strategic niche management and sustainable innovations into the equation, and Berkhout *et al.* (2004) driver was in sociotechnical regimes within transitions toward sustainability. In the digital transformation sphere, El Hilali *et al.* (2020) suggested that building data analytics skills, bringing innovation to the business model level and improving the customer experience and adopting customer centricity should be the key axes that drive sustainability.

Societies are being pushed into sustainability transitions by several factors. Unsustainable activities must be reevaluated in light of environmental issues such as climate change, resource depletion and biodiversity loss. Equity in development is essential, as social issues such as inequality, poverty and access to essential services demonstrate. Additionally, economic factors, including changing market dynamics and resource scarcity, influence the drive for sustainable economic models. Multidimensional sustainability transitions are complex and nonlinear processes. The interactions between various dimensions often lead to feedback loops, where changes in one aspect affect the others. Transitions toward sustainability can also be path-dependent because decisions made in one stage can have a big impact on what happens in later phases. These dynamics necessitate a systemic and adaptive approach to sustainability planning.

Transitions toward sustainability increase society's adaptability and resilience to deal with upcoming uncertainty. Communities are better able to resist shocks and disruptions, whether they are caused by environmental disasters, economic crises or social issues, by supporting varied and flexible systems. Adopting multidimensional sustainability transitions is critical for ensuring long-term prosperity. For securing long-term prosperity, multimodal sustainability transitions must be adopted. These transitions highlight the significance of striking a balance between the needs of the present and those of future generations rather than concentrating only on short-term rewards. Sustainable practices encourage intergenerational equity and enable populations now, and in the future, to have better lives.

Achieving sustainability is challenging. The transition is fraught with difficulties, including opposition to change, vested interests in maintaining the status quo and limited resources for implementing sustainable practices. Furthermore, reaching global collaboration and coordination among nations is frequently difficult due to divergent agendas and political factors. However, there are several possibilities for constructive transformation. Environmental issues have increased public knowledge and concern, boosting demand for sustainable products and activities. Advancements in technology and innovation provide new solutions and economic opportunities in the green economy.

Collaboration between governments, industry, civic society and people can result in significant sustainability initiatives.

The transition to sustainability is an ongoing and complex process that requires all stakeholders to work together and commit to common sustainability goals. It entails rethinking and changing our economic, social and environmental systems to build a more just, resilient and environmentally harmonious world. By adopting sustainability, we can assure a prosperous future for future generations while also protecting the health of our planet. The journey may be challenging, but the benefits of a sustainable world make it a worthy pursuit for the well-being of both current and future generations.

Perhaps the greatest challenge to sustainability is the UN's target of active redistribution until 10% of the richest control less than 40% on income. While it is easy to say we want good outcomes for everyone, when we ask the wealthy to forgo a significant measure of their economic advantage, many will resist (Beteille, 1965/2022). Research has shown that this dynamic is overcome when privileged stakeholders choose to empower underprivileged stakeholders – often as a means of achieving self-interests (Mair *et al.*, 2016). This is one manner by which the goals of the privileged and the underprivileged can converge. Other possibilities also exist.

Convergences

Convergence of stakeholders from various sectors is one of the essential components in achieving multidimensional sustainability transitions. Sustainability convergences refer to the coming together of different stakeholders, sectors and ideas to address sustainability challenges collectively. These convergences are required for effective and comprehensive solutions to complicated global concerns. Sustainability convergences entail multiple actors working together to achieve common sustainability goals through collaboration, integration and coordination. They can happen at the local, regional, national or global levels and they are critical in driving sustainability transitions and producing a more sustainable future.

To effectively solve sustainability concerns, governments, corporations, civil society organizations and local communities must work together. By combining resources, knowledge and viewpoints, collective action can produce more thorough and original answers. Consequently, effective sustainability transitions require policy integration across various sectors. Policies addressing social, economic and environmental issues are frequently established independently, resulting in competing goals. Policy convergence can harmonize efforts and coordinate goals, boosting the potential for long-term outcomes.

Advancements in technology and scientific knowledge also play a pivotal role in sustainability transitions. Convergences between these domains enable the development of innovative solutions that promote efficiency, reduce resource consumption and mitigate environmental impacts. Again, several authors studied sustainability-related convergences.

An interesting perspective is presented by Rauter *et al.* (2019) referring to the concept of open innovation and relating it to the performance of innovation in sustainability. This approach highlights the benefits for organizations of integrating an ecosystem of partners to internally benefit from innovation built on a reticular logic. External integration of customers, suppliers, research institutions, NGOs, among others, are the most important competences that allow companies to successfully execute innovations in sustainability. Sovacool *et al.* (2020) and Kivimaa (2014) underline the importance of intermediaries in the transition to sustainability, as well as their role in linking and enabling the collaborative efforts of various players and their resources. Manders *et al.* (2020) addressed the convergence of specific

capabilities required for transitions. According to Kivimaa and Martiskainen (2018), the intermediation process involves intermediaries participating in policy-making processes.

Fisher and Newing (2016) divided system actors into distinct levels of governance in various social realms. Specifically in decarbonized energy systems, der Schoor *et al.* (2016) view local communities as social innovation catalysts. Rosenbloom and Meadowcroft (2022) stated that the state, politics and intermediaries play a critical role in the creation of essential transformative methods to speed transition paths. Gruba *et al.* (2022) brought the confluence of strategy, resource management and entrepreneurial innovation. Hutman *et al.* (2015) ascertained that important energy-related technological changes are influenced by noneconomic variables, where strategy is a subjacent component in both approaches. As an additional benefit, Burgelman *et al.* (2017) and Mackay *et al.* (2021) argued that the convergence between strategy processes and strategy practice is critical to the formation of strategy in a firm.

Multidimensional sustainability transitions require global cooperation and knowledge sharing. Convergences between countries and regions facilitate the exchange of best practices, lessons learned and technological innovations. International collaborations can accelerate progress toward sustainability goals, particularly in areas with transboundary environmental challenges. Many countries have begun complex transitions to sustainability in their energy sectors, where convergence among governments, corporations and communities has expedited the use of renewable energy sources such as solar, wind and hydroelectric electricity. These transitions not only address climate change, but they also promote social inclusion and economic opportunity. Another example of the importance of convergences in multidimensional sustainability transition is the shift toward a circular economy. Circular economy approaches reduce waste generation, reduce resource consumption and promote long-term economic growth through rethinking production and consumption habits. Governments, industry and consumers work together to create products that are long-lasting and recyclable, thereby contributing to a more sustainable future.

Sustainability convergences are critical in addressing the complexities of sustainability concerns. Stakeholders may work together to create a more sustainable future by encouraging collaboration, integrating efforts and coordinating policies and activities. Convergence is critical for achieving sustainability transitions and safeguarding the well-being of current and future generations as we face enormous environmental and social constraints. Accepting sustainability as a common global endeavor allows us to successfully address interconnected concerns and create a world that flourishes in harmony with nature.

Conclusion

The challenges of sustainability are enormous, as is the responsibility of human beings to safeguard the planet and its environment. Technology must be linked to financial goals, but much more than that. The task facing mankind is much more complex. Multidimensional sustainability transitions are critical for tackling humanity's multifaceted and interconnected concerns. Societies can attain resilience, adaptation and long-term prosperity by adopting a holistic approach to sustainable development. Convergence among stakeholders, policy domains, technology and global communities is critical to easing these changes. We can collaboratively work toward a sustainable future that benefits all species on our planet by learning from successful case studies and supporting collaborative efforts. The criticality of solving sustainability concerns necessitates quick and coordinated action, emphasizing the importance of convergences

in creating a society that thrives with the interconnectedness and balance of ecological systems, species and natural processes.

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