

Sustainable Competitiveness in Mediterranean Education and the Case for a Mediterranean Education Hub

Andreas Theodorakopoulos

Abstract: The Mediterranean is among the regions most exposed to climate change, environmental degradation and socio-economic inequality, and the interaction of these pressures raises demanding questions for education policy. This conceptual and policy-oriented paper examines how education systems in the region could contribute to resilient, equitable and climate-neutral development while strengthening their international standing. It develops the concept of sustainable competitiveness in education, understood as the capacity of an education system to generate durable social, economic and environmental value while maintaining international attractiveness and institutional resilience, and articulates the concept through five interrelated dimensions concerning learning quality and sustainability-related competencies, equity of access and inclusion, internationalization and mobility, innovation and labor-market relevance, and environmentally responsible and climate-neutral institutional operations. Building on this framework, the paper proposes a Mediterranean Education Hub, a regional knowledge ecosystem that would connect universities, research centers, vocational providers and policy institutions under shared governance arrangements oriented towards sustainability. The governance conditions, policy instruments and evaluation indicators through which such a hub could be pursued are then discussed. The paper contributes a framework in which sustainability and competitiveness in education are treated as mutually reinforcing objectives, together with a policy architecture through which regional cooperation in Mediterranean education could be organized.

Keywords: Sustainable competitiveness, education policy, sustainable development, Mediterranean region, education hub.

1. Introduction

The Mediterranean is widely recognized as one of the areas most exposed to climate change, environmental degradation and socio-economic inequality. The rate of warming in the region exceeds the global average, intensifying heatwaves, water scarcity, biodiversity loss and the frequency of extreme events such as droughts and wildfires (IPCC, 2022, 2023). These environmental pressures interact with demographic change, migration flows, urbanization and persistent economic asymmetries, producing interdependent challenges that no single policy field can resolve on its own (Alaimo et al., 2022; Ciommi et al., 2022; Salvati & Vardopoulos, 2025; UNEP/MAP, 2016).

Under such conditions, sustainability in the Mediterranean cannot be treated as a sectoral environmental concern or a narrowly defined climate objective. It constitutes a development challenge that requires systemic responses across economic structures, social institutions and governance mechanisms (Sachs, 2015). The capacity of Mediterranean societies to adapt to climate risks, reduce inequality and move towards climate-neutral development models depends to a large extent on their ability to generate, disseminate and apply knowledge (Clark & Harley, 2020).

Education occupies a central place in that capacity. Beyond its traditional role in human capital formation, education shapes institutional resilience, social cohesion and long-term adaptive capacity, and it conditions how societies understand sustainability problems, weigh trade-offs between growth and environmental protection, and design collective responses to risks that unfold slowly over long horizons (Cortese, 2003; UNESCO, 2021). In a region marked by structural vulnerability, these functions acquire particular weight.

Despite the growing international emphasis on Education for Sustainable Development (ESD), education policy in Mediterranean countries remains fragmented and uneven. Sustainability initiatives are often confined to curriculum additions,

Athens International College, Greece

Corresponding Author: Andreas Theodorakopoulos; E-mail address: attheo1963@gmail.com

Handling Editor: Alexandros Garefalakis

Received 22 September 2025, Accepted 28 November 2025; Published Online: 26 August 2026.

Citation:

Theodorakopoulos, A. (2025). Sustainable competitiveness in Mediterranean education and the case for a Mediterranean education hub. *Sustainability Research in the Mediterranean*, 1(3), 191–200. <https://doi.org/10.13052/srm2795-0514.014>

awareness campaigns or isolated pilot projects, and they are rarely embedded in broader development, competitiveness and internationalization strategies (Tilbury, 2011; UNESCO, 2020). The contribution that education could make to Mediterranean sustainability therefore remains only partly realized.

This paper argues that education in the Mediterranean can become internationally competitive precisely by embedding sustainability, equity and climate neutrality in its governance, its provision and its international positioning. The central thesis is that sustainability and competitiveness in education reinforce each other, because systems that internalize sustainability principles can improve their international attractiveness while contributing to resilient and inclusive development at home. To develop this argument, the paper introduces the concept of sustainable competitiveness in education and proposes a Mediterranean Education Hub, conceived as a regional knowledge ecosystem that would connect universities, research centers, vocational institutions and policy actors under a shared governance framework oriented towards sustainability. The paper pursues three aims. It first situates education within the sustainability challenges of the Mediterranean. It then redefines competitiveness in education through a sustainability lens and specifies the dimensions of the resulting concept. It finally sets out the conceptual and policy foundations of the proposed Hub, together with the governance arrangements, policy instruments and evaluation indicators through which it could be pursued.

2. Mediterranean Sustainability Challenges and their Implications for Education

Sustainable development, as articulated in the Brundtland Report, rests on intergenerational equity and on the recognition of environmental, social and institutional limits to growth (WCED, 1987). Later work on the Sustainable Development Goals has reinforced the systemic character of the agenda, in which economic, social and environmental objectives are pursued jointly (Barbier & Burgess, 2017; United Nations, 2015). In the Mediterranean these limits are unusually pronounced. Ecological fragility combines with high population density, intensive land use and a strong dependence on climate-sensitive activities such as agriculture and tourism, creating structural constraints that conventional development models struggle to accommodate (Simoniello et al., 2025; Vardopoulos & Karytsas, 2019).

Sustainability in the region is best understood as the joint pursuit of environmental protection, social cohesion and economic transformation (Elkington, 1997). The environmental dimension involves climate mitigation and adaptation, water resource management, the containment of land degradation and desertification risk, biodiversity conservation and the protection of coastal and marine ecosystems (IPCC, 2022; Maialelli et al., 2024; Salvati et al., 2026). Wildfire dynamics at the urban fringe illustrate how climate pressures and land use change combine to raise exposure to hazard (Salvati et al., 2024). The social dimension concerns the reduction of inequality, access to basic services and cohesion in increasingly diverse societies, in a region where socio-economic disparities follow distinct spatial patterns and where urban decline and demographic imbalance have accompanied successive economic shocks (Ciommi et al., 2022; Escrivà Saneugenio et al., 2025; Vinci et al., 2023). The economic dimension concerns the transition towards low-carbon, knowledge-intensive and resilient structures, a transition whose pace and quality have differed markedly across Mediterranean economies (Doukas et al., 2025; Zorpas et al., 2026).

These dimensions are deeply interconnected. Climate change worsens social inequality by affecting vulnerable populations disproportionately, while economic instability weakens the capacity of states to invest in environmental protection and social welfare. Tensions between environmental protection and growth are visible across Mediterranean landscapes, and unpriced environmental externalities continue to distort development choices (Imbrenda et al., 2025; Kopsidas et al., 2026). Addressing such interdependencies requires policy frameworks capable of managing them over long time horizons, since isolated sectoral measures leave the underlying interactions untouched.

Knowledge and learning are central to this task. The ability of Mediterranean societies to design, implement and sustain effective sustainability policies depends on the availability of skills, expertise and institutional learning mechanisms, and education systems shape both individual competencies and collective problem solving capacity (Clark & Harley, 2020; Sterling, 2011). International policy frameworks increasingly acknowledge this role. ESD promotes an approach to learning that emphasizes systems thinking, critical reflection, ethical reasoning and participatory governance, and it seeks to reorient education systems towards sustainability outcomes across curricula, pedagogy, institutional governance and community engagement, instead of confining sustainability to a discrete subject area (European Commission, 2021; UNESCO, 2020).

The translation of these principles into practice in the Mediterranean nevertheless remains uneven. Sustainability is frequently invoked in national development strategies, yet education systems often lack mechanisms for embedding it in governance structures, quality assurance processes and institutional incentives, a gap that research on higher education has documented repeatedly (Lozano et al., 2015; Xenaki et al., 2026). The distance between sustainability discourse and educational practice constitutes a significant policy gap in its own right.

Sustainability strategies in the region also tend to overlook the regional dimension of education. Climate risks, water scarcity and ecosystem degradation cross national borders, and regional experience in other policy fields shows that coordinated responses can achieve what national action alone cannot (D'Agata, Vardopoulos, & Sateriano, 2024; Ribeiro Hoffmann et al., 2024; Union for the Mediterranean, 2021). Cross-border cooperation, knowledge exchange and joint capacity building in education nevertheless remain limited, even though Mediterranean cities and regions share long-standing structural similarities in their development trajectories (Salvati & Vardopoulos, 2024; Vardopoulos et al., 2024). Education systems in the Mediterranean, although organized nationally, are potential components of a wider regional knowledge ecosystem, and the recognition of this potential frames the analysis that follows.

3. Education in Sustainable and Resilient Development

Education performs a dual function that is central to sustainability in the Mediterranean. Socially, it operates as a mechanism of inclusion, mobility and cohesion. Economically, it functions as a productive input that supports innovation, labor market adjustment and institutional effectiveness. Connecting both functions to sustainability objectives is a precondition for resilient development pathways.

From a social perspective, unequal access to quality education reinforces existing socio-economic disparities and weakens the collective capacity to address sustainability challenges. Populations with limited educational opportunities are more exposed to climate risks, less able to adjust to economic restructuring and less likely to take part in democratic decision making (Sen, 1999). Comparative evidence confirms that participation and attainment gaps of this kind persist across education systems, including those of the Mediterranean (OECD, 2023). Policies that seek a durable contribution of education to sustainability must therefore give priority to equity, inclusion and lifelong learning, so that participation in the sustainability transition is broadly shared.

From an economic perspective, education underpins the movement towards knowledge-based and low-carbon economies. Several Mediterranean countries remain dependent on sectors characterized by low productivity and high environmental intensity, including mass tourism, construction and forms of agriculture with heavy resource demands (Astara et al., 2026; Karytsas et al., 2019; Salvati & Vardopoulos, 2025). Moving beyond these models calls for skills related to renewable energy (Vardopoulos, Vannas, et al., 2023), climate adaptation, sustainable urban development (Vardopoulos, Ioannides, et al., 2023), environmental management and digital innovation (Petropoulou et al., 2024), and the demands that the green transition places on production systems and labor markets are considerable (Papademetriou et al., 2023; Zorpas et al., 2026).

Education systems are well placed to support this restructuring by aligning curricula, research agendas and training programs with the skill requirements of an economy oriented towards sustainability, and earlier work on curricula for environmental and occupational safety competencies shows that such alignment is feasible in practice (Kavouras et al., 2022; Theodoropoulou et al., 2019). The alignment nevertheless remains weak in many Mediterranean settings. Skills mismatches, limited investment in applied research and insufficient collaboration between education providers and labor market actors constrain the contribution of education to sustainable development, and graduate pathways into employment remain fragile under conditions of economic stress (OECD, 2024; Ragazou et al., 2022).

The contribution of education to sustainability also extends beyond formal degree programs. Environmental education centers, non-formal learning schemes and community initiatives broaden participation in sustainability learning and reach groups that formal provision often misses, as experience in Cyprus and Greece illustrates (Eliades et al., 2022; Moustairas et al., 2022; Stylianou et al., 2023). Such provision matters for the lifelong learning orientation that a sustainability transition requires.

Internationalization adds a further layer. The geographic position, cultural diversity and thematic relevance of the Mediterranean to sustainability questions make it an attractive destination for international students and researchers, and

fields such as climate science, environmental policy and sustainable tourism offer scope for differentiation in a competitive global education market (UNESCO, 2022). Without deliberate coordination, however, internationalization risks becoming detached from sustainability objectives. Attracting international students contributes little to sustainable development unless programs, institutional practices and governance structures are aligned with sustainability principles, which argues for approaches that connect internationalization, quality assurance and sustainability outcomes within a single policy frame (European Commission, 2022). This requirement leads directly to the question of what competitiveness should mean for education systems that take sustainability seriously, and the next section addresses that question.

4. Meaning and Dimensions of Sustainable Competitiveness in Education

Competitiveness has traditionally been associated with efficiency, cost reduction and market position. Applied to education, it is commonly assessed through international rankings, enrolment volumes, research output and funding levels. Such indicators convey useful information about relative performance, yet they capture the long-term capacity of education systems to contribute to sustainable development only partially, and reliance on them can reproduce the shortcomings that conventional development metrics display in other domains (OECD, 2023; Panagiotopoulos et al., 2024).

Conceptual precision is needed before an alternative can be formulated, because several related notions are easily conflated. Sustainability in education refers to the integration of sustainability content and practice across an education system. ESD denotes a pedagogical orientation that cultivates systems thinking, ethical reasoning and the capacity to act under uncertainty (Sterling, 2011; UNESCO, 2020). The sustainability of educational institutions concerns the continuity and environmental performance of the organizations themselves (Lozano et al., 2015). The competitiveness of education systems, finally, describes their relative standing in attracting students, staff, funding and recognition. These notions are connected, yet none of them alone captures the relationship between sustainability and long-term system performance.

Sustainable competitiveness in education is defined here as the capacity of an education system to generate durable social, economic and environmental value while maintaining international attractiveness and institutional resilience. The definition brings quality, equity, innovation and environmental responsibility into a single analytical frame and treats sustainability as a source of differentiation and resilience, in a manner comparable to the way organizational sustainability agendas have moved from peripheral reporting concerns to central components of performance and accountability (Elkington, 1997; Passas, 2024). Sustainable competitiveness does not prioritize short-term performance gains. It emphasizes durability, inclusiveness and adaptability in the face of systemic risks such as climate change and socio-economic instability.

For the Mediterranean this reconceptualization carries particular weight. Education systems in the region operate under fiscal constraint, demographic pressure and environmental vulnerability. Competing on cost efficiency or on volume-based internationalization alone risks reinforcing the very development trajectories that the region needs to leave behind. Sustainable competitiveness instead offers a path of differentiation grounded in regional strengths and in the sustainability needs that Mediterranean societies share.

The concept is articulated here through five interrelated dimensions. The first dimension concerns learning quality and sustainability-related competencies. Systems that pursue sustainable competitiveness cultivate disciplinary knowledge together with systems thinking, critical analysis, ethical reasoning and problem solving applied to sustainability challenges, competencies that European reference frameworks have begun to codify and that improve the ability of graduates to operate in complex and uncertain environments (European Commission, 2021; Tilbury, 2011).

The second dimension is equity of access and inclusion. Sustainable competitiveness cannot be achieved where educational opportunity is distributed unevenly, since inequality erodes social cohesion, reduces aggregate human capital and weakens the legitimacy of education systems (OECD, 2024; Sen, 1999). Inclusive education policy is accordingly a constitutive element of the concept and cannot be treated as an optional supplement to it.

The third dimension concerns internationalization and mobility. International engagement supports knowledge exchange, cultural understanding and institutional learning (UNESCO, 2022). Within a framework oriented towards sustainability, however, mobility must remain consistent with environmental responsibility and with regional development objectives, which excludes purely extractive or carbon-intensive models of student and staff circulation.

The fourth dimension addresses innovation and labor-market relevance. Education systems must respond to changing economic structures and to the transitions that sustainability requires, which presupposes close interaction with labor

markets, applied research ecosystems and innovation networks engaged in green and digital transformation (Papademetriou et al., 2023; Petropoulou et al., 2024; Ragazou et al., 2022).

The fifth dimension concerns environmentally responsible and climate-neutral institutional operations. Educational institutions are themselves significant consumers of energy and resources, and the operation of their buildings and campuses in Mediterranean conditions raises well documented questions of energy performance, renovation and renewable energy integration (Barone et al., 2024; Georgiou et al., 2025; Vardopoulos & Vassiliades, 2025). Pursuing climate neutrality through energy efficiency, renewable energy adoption and sustainable campus management aligns institutional practice with educational content and strengthens the credibility of the sustainability commitments that institutions profess (Lozano et al., 2015).

These five dimensions form one analytical framework for assessing and strengthening sustainable competitiveness in Mediterranean education systems. Within this framework sustainability functions as an asset that supports resilience, legitimacy and international standing, and the framework in turn supplies the conceptual foundation for the regional policy architecture proposed in the next section.

5. Mediterranean Education Hub as a Regional Knowledge Ecosystem

Building on the concept of sustainable competitiveness, the paper proposes a *Mediterranean Education Hub*, a regional knowledge ecosystem intended to support sustainable development. The Hub is a conceptual and policy proposal. No such structure currently exists, its effects have not been evaluated empirically, and its institutional form would have to be negotiated among participating countries. It is conceived as a structured network connecting universities, research centers, vocational education providers, policy institutions and private actors across Mediterranean countries.

The Hub would operate as a governance ecosystem whose purpose would be to enable cooperation, resource sharing and joint value creation in education and research oriented towards sustainability. By pooling expertise and infrastructure, it would seek to overcome the fragmentation described earlier and to raise the collective capacity of Mediterranean education systems, in the same way that regional cooperation has been advanced in other Mediterranean policy domains and in interregional climate initiatives (D'Agata, Vardopoulos, & Sateriano, 2024; Ribeiro Hoffmann et al., 2024; Salvati & Vardopoulos, 2024).

The Hub would rest on five principles. *Complementarity* implies that participating institutions contribute distinct strengths, whether disciplinary expertise, regional knowledge or applied research capability, so that duplication is reduced and joint work becomes possible. *Shared governance* requires transparent decision making, clear accountability and stakeholder participation. *Quality assurance and common standards* would rest on shared sustainability benchmarks and evaluation criteria, ensuring consistency and continuous improvement across the network. *International openness* would give the Hub visibility as a platform for education and research focused on sustainability and open to partners beyond the region. *Commitment to climate neutrality*, finally, would apply both to educational content and to institutional operations, in line with the fifth dimension of the framework.

The Hub would cover the full span of lifelong learning. Alongside degree programs, it would support professional training, micro-credentials and reskilling schemes aligned with sustainability transitions, a breadth that matters in the Mediterranean because labor markets are undergoing structural change and continuous skills adaptation is required (OECD, 2024; Stylianou et al., 2023).

By joining education, research and innovation within one cooperative structure, the Mediterranean Education Hub could contribute to regional development directly. It would allow Mediterranean countries to treat education as a high-value activity that is exportable and, at the same time, tied to the sustainability problems and solutions of the region itself. Whether these effects materialize would depend on the governance arrangements, policy instruments and evaluation mechanisms examined in the following section.

6. Governance, Policy Instruments and Evaluation Indicators

Effective governance is a precondition for any attempt to realize the Mediterranean Education Hub. Given its multi-actor and cross-border character, governance arrangements would need to balance coordination with institutional autonomy, which

points to multilevel structures linking European frameworks, national policies and institutional strategies. At the European level, education and sustainability agendas supply a normative and strategic context, and experience in other European policy fields shows how union-level frameworks can steer national sustainability transitions over time (Doukas et al., 2023, 2026; European Commission, 2022). At the national level, governments align education policy, funding mechanisms and regulation with Hub objectives. At the institutional level, universities and training providers operationalize sustainability through curricula, research agendas and campus management.

A central element of governance would be a common evaluation framework. Indicators create transparency, support accountability and guide improvement, and they help prevent sustainability from becoming a rhetorical label detached from measurable outcomes, a risk that the literature on the verification of sustainability claims has documented in the corporate field (Passas et al., 2022; Zopounidis et al., 2020). Experience with sustainability indicators in other domains shows both that operational measurement is feasible and that indicator quality demands sustained attention, since the coherence and comparability of measures cannot be assumed (D’Agata, Cudlin, et al., 2024; Loizia et al., 2021; Papamichael et al., 2023; Vardopoulos et al., 2026). Table 1 links each dimension of the framework to indicative indicators through which progress could be observed.

Policy instruments complement evaluation. Targeted funding for programs oriented towards sustainability, incentives for institutional collaboration and regulatory support for joint degrees and micro-credentials constitute the principal levers available to governments. European cooperation instruments can provide structural support for such measures, yet the durability of the Hub would rest on national commitment and institutional ownership (European Commission, 2022).

7. Conclusions and Policy Implications

This paper has argued that sustainability in Mediterranean education is a prerequisite for long-term resilience and for a credible form of competitiveness. By embedding sustainability principles in governance, provision and international positioning, Mediterranean countries could develop education into a climate-neutral, inclusive and internationally attractive knowledge sector, and the conceptual ground for doing so is supplied by the notion of sustainable competitiveness developed here.

The concept reconciles quality, equity, innovation and environmental responsibility within one framework, and the Mediterranean Education Hub translates that framework into a policy architecture for regional cooperation and capacity building. The Hub remains a proposal. Its realization would require the multilevel governance arrangements, policy instruments and evaluation mechanisms discussed above, and its effects would need to be established through experience.

Two implications follow. For policy, strategies at regional and national level should connect education explicitly with sustainability objectives, so that curricula, funding, quality assurance and institutional operations pull in the same direction. For research, future studies should assess the effectiveness of education hubs empirically, through comparative analysis of regional cooperation arrangements and through quantitative evaluation of sustainability indicators of the kind outlined in Table 1.

Table 1. Indicative indicators for the five dimensions of sustainable competitiveness in education

Dimension	Indicative indicators
Learning quality and sustainability-related competencies	Attainment of sustainability-related learning outcomes and graduate competencies
Equity of access and inclusion	Participation rates of underrepresented groups
Internationalization and mobility	Balance of incoming and outgoing mobility flows and joint programs
Innovation and labor-market relevance	Graduate employability in green sectors
Environmentally responsible and climate-neutral institutional operations	Institutional carbon footprint and energy use

Investment in education aligned with sustainability is, in the end, investment in the long-term prospects of the Mediterranean itself. Education systems that pursue competitiveness through sustainability can support development in the region that is resilient, equitable and climate neutral.

References

- Alaimo, L. S., Ciommi, M., Vardopoulos, I., Nosova, B., & Salvati, L. (2022). The medium-term impact of the COVID-19 pandemic on population dynamics: The case of Italy. *Sustainability*, 14(21), 13995. <https://doi.org/10.3390/su142113995>
- Astara, O.-E., Tsirmpinis, Z., Kopsidas, O., & Vardopoulos, I. (2026). Tourism as a catalyst for economic stability and environmental sustainability in Mediterranean landscapes. In *Sustainable Landscapes across the Mediterranean* (pp. 235–246). Springer. https://doi.org/10.1007/978-3-032-07255-9_25
- Barbier, E. B., & Burgess, J. C. (2017). The Sustainable Development Goals and the systems approach to sustainability. *Economics*, 11(1), 1–22. <https://doi.org/10.5018/economics-ejournal.ja.2017-28>
- Barone, G., Vardopoulos, I., Attia, S., & Vassiliades, C. (2024). Optimizing energy-efficient building renovation: Integrating double-skin façades with solar systems in the Mediterranean landscape. *Energy Reports*, 12, 2933–2945. <https://doi.org/10.1016/j.egyr.2024.08.032>
- Ciommi, M., Egidi, G., Vardopoulos, I., Chelli, F. M., & Salvati, L. (2022). Toward a “migrant trap”? Local development, urban sustainability, sociodemographic inequalities, and the economic decline in a Mediterranean metropolis. *Social Sciences*, 12(1), 26. <https://doi.org/10.3390/socsci12010026>
- Clark, W. C., & Harley, A. G. (2020). Sustainability science: Toward a synthesis. *Annual Review of Environment and Resources*, 45, 331–386. <https://doi.org/10.1146/annurev-environ-012420-043621>
- Cortese, A. D. (2003). The critical role of higher education in creating a sustainable future. *Planning for Higher Education*, 31(3), 15–22.
- D’Agata, A., Cudlin, P., Vardopoulos, I., Schinaia, G., Corona, P., & Salvati, L. (2024). Assessing the spatial coherence of forest cover indicators from different data sources: A contribution to sustainable development reporting. *Ecological Indicators*, 158, 111498. <https://doi.org/10.1016/j.ecolind.2023.111498>
- D’Agata, A., Vardopoulos, I., & Sateriano, A. (2024). Interdisciplinary insights into sustainable development and socio-environmental change in Mediterranean landscapes. In A. Sateriano, A. D’Agata, & I. Vardopoulos (Eds.), *Socio-Environmental Change: The Path toward Sustainability* (pp. 1–18). Nova Science Publishers.
- Doukas, Y. E., Maravegias, N., Ioannides, S., Salvati, L., & Vardopoulos, I. (2025). Economic resilience and sustainability in the European Union: A comparative analysis of pre- and post-economic crisis. In L. Salvati (Ed.), *Environmental Sustainability and Global Change* (pp. 257–273). Elsevier. <https://doi.org/10.1016/B978-0-443-31596-1.00018-0>
- Doukas, Y. E., Maravegias, N., Zorpas, A. A., Sotiropoulos, A., & Vardopoulos, I. (2026). Integrating circular economy principles in the European farm-to-fork strategy for food waste prevention. *Journal of Agribusiness in Developing and Emerging Economies*, 1–24. <https://doi.org/10.1108/JADEE-10-2025-0512>
- Doukas, Y. E., Salvati, L., & Vardopoulos, I. (2023). Unraveling the European agricultural policy sustainable development trajectory. *Land*, 12(9), 1749. <https://doi.org/10.3390/land12091749>
- Eliades, F., Doula, M. K., Papamichael, I., Vardopoulos, I., Voukkali, I., & Zorpas, A. A. (2022). Carving out a niche in the sustainability confluence for environmental education centers in Cyprus and Greece. *Sustainability*, 14(14), 8368. <https://doi.org/10.3390/su14148368>
- Elkington, J. (1997). *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*. Capstone Publishing.
- Escrivà Saneugenio, F., Alhussen, A., Marucci, A., Salvati, L., Alaimo, L. S., & Vardopoulos, I. (2025). Swimming in the pools’ landscape: A canonical analysis of socioeconomic disparities, suburbanization models, and sustainable development in Mediterranean Europe. *Environment and Planning B: Urban Analytics and City Science*, 52(2), 322–338. <https://doi.org/10.1177/23998083241259817>
- European Commission. (2021). *GreenComp: The European Sustainability Competence Framework*. Publications Office of the European Union. <https://doi.org/10.2760/13286>

- European Commission. (2022). *Progress towards the Achievement of the European Education Area* (COM(2022) 700 final). European Commission.
- Georgiou, C., Maialetti, M., Zorpas, A. A., Salvati, L., & Vardopoulos, I. (2025). Policy and planning for “zero-net energy” real estate development in rural and exurban districts. In L. Salvati (Ed.), *Environmental Sustainability and Global Change* (pp. 291–303). Elsevier. <https://doi.org/10.1016/B978-0-443-31596-1.00020-9>
- Imbrenda, V., Rontos, K., Salvati, L., Maialetti, M., Vardopoulos, I., Alhussen, A., & Ciaschini, C. (2025). Traditional landscapes in Mediterranean areas: Environmental protection vs economic growth. In C. Ciaschini & V. Imbrenda (Eds.), *Local Development and Socio-Environmental Systems: Experiences and Practices toward Sustainability in Mediterranean Europe* (pp. 19–38). River Publishers. <https://doi.org/10.1201/9788770047616-2>
- IPCC. (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability*. Cambridge University Press. <https://doi.org/10.1017/9781009325844>
- IPCC. (2023). *Climate Change 2023: Synthesis Report*. Intergovernmental Panel on Climate Change. <https://doi.org/10.59327/IPCC/AR6-9789291691647>
- Karytsas, S., Vardopoulos, I., & Theodoropoulou, E. (2019). Factors affecting residents’ attitude toward sustainable tourism development. *Tourismos*, 14(1), 1–40. <https://doi.org/10.26215/tourismos.v14i1.558>
- Kavouras, S., Vardopoulos, I., Mitoula, R., Zorpas, A. A., & Kaldis, P. (2022). Occupational health and safety scope significance in achieving sustainability. *Sustainability*, 14(4), 2424. <https://doi.org/10.3390/su14042424>
- Kopsidas, O., Panagiotopoulos, P., Passas, I., Doukas, Y. E., Salvati, L., & Vardopoulos, I. (2026). Integrating externalities into economic systems for long-term environmental sustainability. In L. Salvati (Ed.), *Spatial Analysis for Complex Territorial Systems* (pp. 201–213). Elsevier. <https://doi.org/10.1016/B978-0-443-44133-2.00018-1>
- Loizia, P., Voukkali, I., Zorpas, A. A., Navarro Pedreño, J., Chatziparaskeva, G., Inglezakis, V. J., Vardopoulos, I., & Doula, M. (2021). Measuring the level of environmental performance in insular areas, through key performed indicators, in the framework of waste strategy development. *Science of The Total Environment*, 753, 141974. <https://doi.org/10.1016/j.scitotenv.2020.141974>
- Lozano, R., Ceulemans, K., Alonso-Almeida, M., Huisingh, D., Lozano, F. J., Waas, T., Lambrechts, W., & Hugé, J. (2015). A review of commitment and implementation of sustainable development in higher education: Results from a worldwide survey. *Journal of Cleaner Production*, 108, 1–18. <https://doi.org/10.1016/j.jclepro.2014.09.048>
- Maialetti, M., Halbac-Cotoara-Zamfir, R., Vardopoulos, I., & Salvati, L. (2024). Early desertification risk in advanced economies: Summarizing past, present and future trends in Italy. *Earth*, 5(4), 690–706. <https://doi.org/10.3390/earth5040036>
- Moustairas, I., Vardopoulos, I., Kavouras, S., Salvati, L., & Zorpas, A. A. (2022). Exploring factors that affect public acceptance of establishing an urban environmental education and recycling center. *Sustainable Chemistry and Pharmacy*, 25, 100605. <https://doi.org/10.1016/j.scp.2022.100605>
- OECD. (2023). *Education at a Glance 2023: OECD Indicators*. OECD Publishing. <https://doi.org/10.1787/e13bef63-en>
- OECD. (2024). *Education at a Glance 2024: OECD Indicators*. OECD Publishing. <https://doi.org/10.1787/c00cad36-en>
- Panagiotopoulos, P., Vardopoulos, I., Maialetti, M., Ciaschini, C., Koundouri, P., & Salvati, L. (2024). Reimagining sustainable development and economic performance indicators: A human-centric Maslow-Bossel blueprint. *Economies*, 12(12), 338. <https://doi.org/10.3390/economies12120338>
- Papademetriou, C., Ragazou, K., Garefalakis, A., & Passas, I. (2023). Green human resource management: Mapping the research trends for sustainable and agile human resources in SMEs. *Sustainability*, 15(7), 5636. <https://doi.org/10.3390/su15075636>
- Papamichael, I., Voukkali, I., Loizia, P., Stylianou, M., Economou, F., Vardopoulos, I., Klontza, E. E., Lekkas, D. F., & Zorpas, A. A. (2023). Measuring circularity: Tools for monitoring a smooth transition to circular economy. *Sustainable Chemistry and Pharmacy*, 36, 101330. <https://doi.org/10.1016/j.scp.2023.101330>
- Passas, I. (2024). The evolution of ESG: From CSR to ESG 2.0. *Encyclopedia*, 4(4), 1711–1720. <https://doi.org/10.3390/encyclopedia4040112>
- Passas, I., Ragazou, K., Zafeiriou, E., Garefalakis, A., & Zopounidis, C. (2022). ESG controversies: A quantitative and qualitative analysis for the sociopolitical determinants in EU firms. *Sustainability*, 14(19), 12879. <https://doi.org/10.3390/su141912879>

- Petropoulou, A., Angelaki, E., Rompogiannakis, I., Passas, I., Garefalakis, A., & Thanasas, G. (2024). Digital transformation in SMEs: Pre- and post-COVID-19 era: A comparative bibliometric analysis. *Sustainability*, 16(23), 10536. <https://doi.org/10.3390/su162310536>
- Ragazou, K., Passas, I., Garefalakis, A., Kourgiantakis, M., & Xanthos, G. (2022). Youth's entrepreneurial intention: A multinomial logistic regression analysis of the factors influencing Greek HEI students in time of crisis. *Sustainability*, 14(20), 13164. <https://doi.org/10.3390/su142013164>
- Ribeiro Hoffmann, A., Sandrin, P., & Doukas, Y. E. (Eds.). (2024). *Climate change in regional perspective: European Union and Latin American Initiatives, Challenges, and Solutions*. Springer Nature. <https://doi.org/10.1007/978-3-031-49329-4>
- Sachs, J. D. (2015). *The Age of Sustainable Development*. Columbia University Press.
- Salvati, L., & Vardopoulos, I. (2024). Intricacies of Mediterranean urban and regional dynamics. *Euro-Mediterranean Journal for Environmental Integration*, 9(1), 277–292. <https://doi.org/10.1007/s41207-023-00434-7>
- Salvati, L., & Vardopoulos, I. (2025). Into the kaleidoscopic urbanization of Southern Europe: Modelling “form-function” relationships through partial least squares regression. *Cities*, 162, 105933. <https://doi.org/10.1016/j.cities.2025.105933>
- Salvati, L., D'Agata, A., Vardopoulos, I., & Escrivà Saneugenio, F. (2024). Land-use dynamics and wildfires in Mediterranean peri-urban landscapes: A burning issue. In *Sprawl and the City: Realizing a Sustainable Mediterranean Urbanization* (pp. 129–148). Nova Science Publishers.
- Salvati, L., Maravegias, N., Doukas, Y. E., & Vardopoulos, I. (2026). Land degradation dynamics and sustainability in advanced Mediterranean economies. In *Sustainable Landscapes across the Mediterranean* (pp. 343–350). Springer. https://doi.org/10.1007/978-3-032-07255-9_36
- Sen, A. (1999). *Development as Freedom*. Oxford University Press.
- Simoniello, T., Lanfredi, M., Coluzzi, R., D'Emilio, M., Salvati, L., Vardopoulos, I., Imbrenda, V., & Samela, C. (2025). Climate-driven dynamics in the Mediterranean agroecosystems: A pre-2007 economic crisis satellite-based sustainability analysis. In L. Salvati (Ed.), *Environmental Sustainability and Global Change* (pp. 57–68). Elsevier. <https://doi.org/10.1016/B978-0-443-31596-1.00005-2>
- Sterling, S. (2011). Transformative learning and sustainability: Sketching the conceptual ground. *Learning and Teaching in Higher Education*, 5, 17–33.
- Stylianou, M., Gavriel, A., Papamichael, I., Voukkali, I., Loizia, P., Vardopoulos, I., & Zorpas, A. A. (2023). SWOT analysis for non-formal education through environmental volunteering involvement in non-profit organizations. *IOP Conference Series: Earth and Environmental Science*, 1196(1), 012085. <https://doi.org/10.1088/1755-1315/1196/1/012085>
- Theodoropoulou, E., Vardopoulos, I., Sardanou, E., Mitoula, R., & Kavouras, S. (2019). Sustainable development: Setting the curricula for environmental and occupational safety and health skills and education. In *Proceedings of the 270th International Institute of Engineers and Researchers (IIER) International Conference on Natural Science and Environment* (pp. 22–26). International Institute of Engineers and Researchers.
- Tilbury, D. (2011). *Education For Sustainable Development: An Expert Review of Processes and Learning*. UNESCO.
- UNEP/MAP. (2016). *Mediterranean Strategy for Sustainable Development 2016–2025*. United Nations Environment Programme/Mediterranean Action Plan.
- UNESCO. (2020). *Education for Sustainable Development: A Roadmap*. UNESCO. <https://doi.org/10.54675/YFRE1448>
- UNESCO. (2021). *Reimagining Our Futures Together: A New Social Contract for Education*. UNESCO. <https://doi.org/10.54675/ASRB4722>
- UNESCO. (2022). *Knowledge-Driven Actions: Transforming Higher Education for Global Sustainability*. UNESCO.
- Union for the Mediterranean. (2021). *Towards 2030: Agenda for a Greener Med*. Union for the Mediterranean.
- United Nations. (2015). *Transforming our World: The 2030 Agenda for Sustainable Development*. United Nations.
- Vardopoulos, I., & Karytsas, S. (2019). An exploratory path analysis of climate change effects on tourism. *Sustainable Development, Culture, Traditions Journal*, Special Volume, 132–152. <https://doi.org/10.26341/issn.2241-4002-2019-sv-13>
- Vardopoulos, I., & Vassiliades, C. (Eds.). (2025). *Energy-Efficient Buildings in the Mediterranean: Challenges, Strategies, and Innovations*. River Publishers. <https://doi.org/10.1201/9788743809784>

- Vardopoulos, I., Egidi, G., & Salvati, L. (2026). Socioenvironmental resilience and applied economics: From theory to indicators. In L. Salvati (Ed.), *Spatial Analysis for Complex Territorial Systems* (pp. 189–200). Elsevier. <https://doi.org/10.1016/B978-0-443-44133-2.00008-9>
- Vardopoulos, I., Escrivà Saneugenio, F., Sateriano, A., & Salvati, L. (2024). *Homage (and Criticism) to the Mediterranean City: Regional Sustainability and Economic Resilience*. River Publishers. <https://doi.org/10.1201/9781003517306>
- Vardopoulos, I., Ioannides, S., Georgiou, M., Voukkali, I., Salvati, L., & Doukas, Y. E. (2023). Shaping sustainable cities: A long-term GIS-emanated spatial analysis of settlement growth and planning in a coastal Mediterranean European city. *Sustainability*, 15(14), 11202. <https://doi.org/10.3390/su151411202>
- Vardopoulos, I., Vannas, I., Xydis, G., & Vassiliades, C. (2023). Homeowners' perceptions of renewable energy and market value of sustainable buildings. *Energies*, 16(10), 4178. <https://doi.org/10.3390/en16104178>
- Vinci, S., Vardopoulos, I., & Salvati, L. (2023). A tale of a shrinking city? Exploring the complex interplay of socio-demographic dynamics in the recent development of Attica, Greece. *Cities*, 132, 104089. <https://doi.org/10.1016/j.cities.2022.104089>
- WCED. (1987). *Our Common Future*. Oxford University Press.
- Xenaki, M., Dimou, I., Drakaki, E., & Passas, I. (2026). SIRAF: From sustainability assessment tools to reflective sustainability implementation in higher education. *Sustainability*, 18(7), 3208. <https://doi.org/10.3390/su18073208>
- Zopounidis, C., Garefalakis, A., Lemonakis, C., & Passas, I. (2020). Environmental, social and corporate governance framework for corporate disclosure: A multicriteria dimension analysis approach. *Management Decision*, 58(11), 2473–2496. <https://doi.org/10.1108/MD-10-2019-1341>
- Zorpas, A. A., Economou, F., Naddeo, V., Stylianou, M., Voukkali, I., Vardopoulos, I., Tsiarta, N., Samanides, C. G., Zarra, T., Wern, B., Vyzikas, T., Inglezakis, V. J., & Samaras, P. (2026). The darkest shade of green transition. *Energy Reports*, 15, 109099. <https://doi.org/10.1016/j.egy.2026.109099>