

Review

Top Physical Sciences of Mediterranean Croatia for the Sustainable Development Goals Framework: A Case Study of the University of Split—Bibliometric Approach

Petra Jelic ¹, Tonka Petricevic ¹, Ana Matijasevic Renic ², Petra Zoranovic ², Ana Marusic ³ and Igor Jerkovic ^{1,4,*}

¹ Rector's Office, University of Split, Ruđera Boškovića 31, 21000 Split, Croatia; pjelic@unist.hr (P.J.); tpetricevic@unist.hr (T.P.)

² Department for Research and Development, University of Split Library, Ruđera Boškovića 31, 21000 Split, Croatia; amrenic@svkst.hr (A.M.R.); petra.zoranovic@svkst.hr (P.Z.)

³ Department of Research in Biomedicine and Health, School of Medicine, University of Split, Šoltanska 2A, 21000 Split, Croatia; ana.marusic@mefst.hr

⁴ Mediterranean Institute for Life Sciences, University of Split, Meštrovićevo šetalište 45, 21000 Split, Croatia

* Correspondence: igor.jerkovic@unist.hr

Abstract

The United Nations Sustainable Development Goals (SDGs) have been one of the benchmarks for academic research. This study addresses global SDG-related challenges through top research in physical sciences (PS) at the University of Split (UNIST). UNIST was selected as a case study of a small and relatively new EU university, with moderate funding and research capacity. A bibliometric approach was applied, and articles related to SDGs were presented (with 1 to 50 authors) in the top 5% Q1 journals within the Web of Science Core Collection (WoSCC) for Physical Sciences. Sixty-three of the eighty-three articles are related to SDGs (subcategories: Astronomy & Astrophysics, Chemistry, Geoscience, Multidisciplinary, Mathematics, Meteorology & Atmospheric Science, Multidisciplinary Sciences, Oceanography, Physics, Thermodynamics, and Water Resources). The study presents the following: (a) UNIST articles in the top 5% Q1 journals and corresponding SDGs up to 2022; (b) their citations; (c) their contribution to SDG achievement; (d) drivers of top performance in PS; (e) comparison with other universities in Mediterranean Croatia; (f) policy recommendations. The SDG-related research output in PS at UNIST has expanded through interdisciplinary approaches and international collaborations addressing complex global challenges. The highest citation impacts were found for SDG13 (191.88), SDG14 (167.4), and SDG6 (145.56). Although 26 articles were related to SDG3, their citation impact was lower (not targeting core biomedical research). For 10 articles related to SDG14, the citation impact was very high (167.4). The drivers of the top 5% performance of UNIST in PS are identified and policy recommendations as well as lessons learned are mentioned to improve the participation of small universities in EU or national research programs and foster international cooperation across the European Research Area (ERA) to address the SDGs.

Keywords: University of Split; physical sciences; sustainable development goals; citations; research strategy; policy recommendations

Academic Editor: Francesco Ferella

Received: 4 January 2026

Revised: 30 January 2026

Accepted: 10 February 2026

Published: 12 February 2026

Copyright: © 2026 by the authors.

Licensee MDPI, Basel, Switzerland.

This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution \(CC BY\)](https://creativecommons.org/licenses/by/4.0/) license.

1. Introduction

Most existing bibliometric analyses have focused either on global sustainability trends [1] or on individual Sustainable Development Goals (SDGs), e.g., SDG3 (Good Health and Well-Being) or SDG7 (Affordable and Clean Energy). Different aspects of recent bibliometric analysis can be considered [2,3]. Few studies provide a systematic, comparative perspective across all EU27 countries [4,5]. The prominence of SDG3, SDG7, and SDG12 (Responsible Consumption and Production) in European research is well documented. However, the comparative analysis identified regional disparities [5], e.g., Northern Europe performed better on SDG13 (Climate Action) than Southern, Central, and Eastern Europe. In Croatia, the distribution of SDG1–16 publications (total 17,053) in the top three institutions (2019–2023) was [4] as follows: University of Zagreb 8543 (50%), University of Split (UNIST) 1784 (10%), and University of Rijeka 1755 (10%). The annual growth rate of these publications in Croatia was 0.100, positioning it among the upper third of the rates in all EU countries [4]. Despite the rapidly expanding literature on global or EU trends or individual SDGs, a significant gap remains regarding the contribution of smaller or emerging EU economies or individual institutions to the SDG framework. This study used UNIST as a case of a relatively small and new EU university. We focused on the top physical sciences (PS) as a demanding STEM area requesting expensive research infrastructure, often unavailable at smaller universities. PS encompasses the non-living aspects of the natural world and is integral to the development of modern technology, providing the foundation for engineering, nanotechnology, and quantum computing important for technology development, medical advancements, environmental science, and space exploration.

Research is a fundamental path through which higher education institutions (HEIs) contribute to the achievement of SDGs by developing knowledge in areas critical to achieving the 2030 Agenda. UNIST was founded in 1974. Situated in an economically and scientifically underdeveloped region, UNIST has been expanding, particularly after 1995, following the Croatian Homeland War and the modernization process [6], reallocation to new premises, development of the campus, and acquisition of scientific equipment. The first UNIST research article indexed in the Web of Science (WoS) appeared in 1975 [7]. The quality of UNIST scientific publications [6] has been on the rise from 2000 on and reached the world average in 2009 as measured by Category Normalized Citation Impact (CNCI). Since then, the CNCI has increased more than 30% annually [6]. In the last 5 years, the majority of UNIST articles were published in the first quartile (Q1) WoS journals, meaning they were published in 25% of journals with the highest impact factor in a given subject area. In 2019, half of the UNIST articles were in Q1. This publication output has remained high, with 42% of the articles belonging to this category in 2022 [8]. In 2024, UNIST celebrated 50 years since its foundation. In general, there are not many public records about the publication output of UNIST besides partial data from the recent UNIST monography [8] or partial data for clinical and life sciences performance [9,10]. There is no systematic report of UNIST research publications related to the SDGs in general, particularly for the PS category of the Web of Science Core Collection (WoSCC), which is notably represented at UNIST.

The present descriptive and comparative study attempts, for the first time, to address the noted gap regarding the contribution of smaller or emerging EU universities to the SDG framework and investigates the cutting-edge academic research output within PS at UNIST for the 2030 Agenda for Sustainable Development. We present top PS research at UNIST within the SDG framework with respect to the following: (a) bibliometric analysis of articles in the top 5% Q1 journals for WoSCC PS published from UNIST's foundation until 2022; (b) the article titles, sources, and related SDGs; (c) their citations; (d) their specific contribution to the achievement of SDGs; (e) drivers of top performance in PS

within SDGs matching UNIST research strategy implementation; (f) comparison with other universities in Mediterranean Croatia; and (g) policy recommendations. This study showcases UNIST's research contribution to the implementation of SDGs and provides insights into the top PS output contributing to the SDG framework. This study illustrates how a relatively new and small university from a country that joined the EU in 2013 has been managing and addressing global SDG challenges through top research in PS, despite moderate funds and capacities. Addressing these gaps is essential for understanding structural differences within the European Research Area (ERA) to drive change and progress in higher education.

2. Scope and Methodology

The PS are predominantly represented in the following UNIST constituents: the Faculty of Science, the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, the Faculty of Civil Engineering, Architecture and Geodesy, and the Faculty of Chemistry and Technology.

To investigate the most prominent research publications, which reflect the excellence in research in PS, the selection of UNIST publications to be considered within PS was set to articles in the top 5% Q1 journals in WoS. The articles in the top 5% Q1 journals for each category, according to the JIF ranking, were selected for each year in order to address the annual changes (mainly increase) in the Journal Impact Factors (JIFs) over time, as well as variations in JIFs across different WoSCC categories. The rank for articles was established based on the year of publication, using data sourced from the Journal Citation Reports database (Rank by Journal Impact Factor) for each subcategory, with subsequent computation of the percentages. Additionally, the selected articles were presented not only as numbers but also descriptively as article title, journal source, corresponding SDG, and its brief description (Supplementary Material).

SDG categorization was performed using the Sustainable Development Goals research area schema implemented in the InCites Benchmarking & Analytics platform (Clarivate Analytics, Graz, Austria). This standardized system links each of the 17 UN SDGs to Micro Citation Topics, defined as citation-based clusters of related publications derived from the Web of Science database. Publications are assigned to one or more SDGs according to their association with these clusters, and the mapping is periodically updated as citation structures evolve. All document-level SDG assignments in this study were obtained directly from this predefined framework to ensure consistency and reproducibility.

The citation impact of a set of documents was calculated by dividing the total number of citations by the total number of publications, and it is shown as the average number of citations a document has received. The Highly Cited Papers indicator was used to show the number of articles classified as highly cited within the Essential Science Indicators (ESI), and they represented the top 1% of articles in each of 22 ESI categories per year, based on the last 10 years of published articles.

To assess the development of PS in Mediterranean Croatia, we compared the publication output of UNIST with that of other universities in the region (details in Section 2.1).

2.1. Data Source and Research Strategy

In this bibliometric study, the Incites research evaluation tool was accessed to analyze and benchmark data from the Web of Science Core Collection of the Croatian universities situated on the Adriatic coast: the University of Split, the University of Rijeka, the University of Zadar, the University of Dubrovnik, and the University of Juraj Dobrila Pula. The study incorporated data from the Incites dataset (Clarivate, Graz, Austria),

including documents indexed in the Emerging Sources Citation Index (ESCI), collected at the following steps:

- Step 1: Global Institution Profiles Project (GIPP) Research Areas schema was used to analyze universities.
- Step 2: Documents in Q1 journals were extracted from the Incites analytical tool.

The analysis by research areas was based on the GIPP schema focusing on PS as an academic discipline during the period from 1980 to 2022. The search in InCites was filtered by organization name, using the following keywords: “University of Split,” “University of Rijeka,” “University of Zadar,” “University of Dubrovnik,” and “University of Pula”. Additional filters regarding document type, the number of authors per document, and the JIF quartile were used to restrict the search results. We restricted the search to articles in the top 5% Q1 journals for each category, according to the JIF ranking for each year. The document types included were articles and reviews published in English with full-text availability. The authors screened the titles, abstracts, and full texts. Conference papers, abstracts, and editorials were excluded from the study. Collaborative research articles with more than 50 authors were excluded, because they do not represent the core UNIST research but large international collaborations, such as that in high-energy particle physics at the European Organization for Nuclear Research (CERN). The export function of Incites was used to download the bibliographic data of documents, such as the publication year, sources, times cited, and journal impact factor.

2.2. Manual Data Extraction

The following information was manually extracted from the Journal Citation Reports (JCR) published annually by Clarivate Analytics:

- Step 1: Attribution of rank by JIF per category for the publication year.
- Step 2: The percentage for each category was calculated based on JIF rank.
- Step 3: Documents in the top 5% Q1 journals in every category are included in the study.

The criteria were met by 83 articles for UNIST, 46 for the University of Rijeka, 3 for the University of Zadar, 2 for the University of Juraj Dobrila Pula and 1 for the University of Dubrovnik.

3. Results

A total of 544 UNIST articles and reviews in Q1 journals were published in WoSCC PS until 2022, of which 83 research articles were in the top 5% Q1 journals (Figure 1). The selected articles were published in 26 different WoSCC journals, and the first article in a top 5% Q1 was published in 2000.

Although the first UNIST research articles were indexed in WoS in 1975, UNIST progress within PS (with respect to the journal impact factor) started in 2000. Most UNIST articles in PS up to 2022 were published in *Energy* ($n = 16$), *MATCH Communications in Mathematics and Computer Chemistry* ($n = 12$), and *Energy Conversion and Management* ($n = 7$), with other journals such as *Computer Methods in Applied Mechanics and Engineering* and *Water Resources Research*, each featuring six articles. The remaining publications were distributed across a wide range of high-impact journals, each containing between one and four articles.

The total number of published articles within the top 5% Q1 journals in PS (WoSCC) for UNIST was 83, and their distribution within WoSCC subcategories is presented in Figure 2. The most represented journals with these articles are presented in Figure 3.

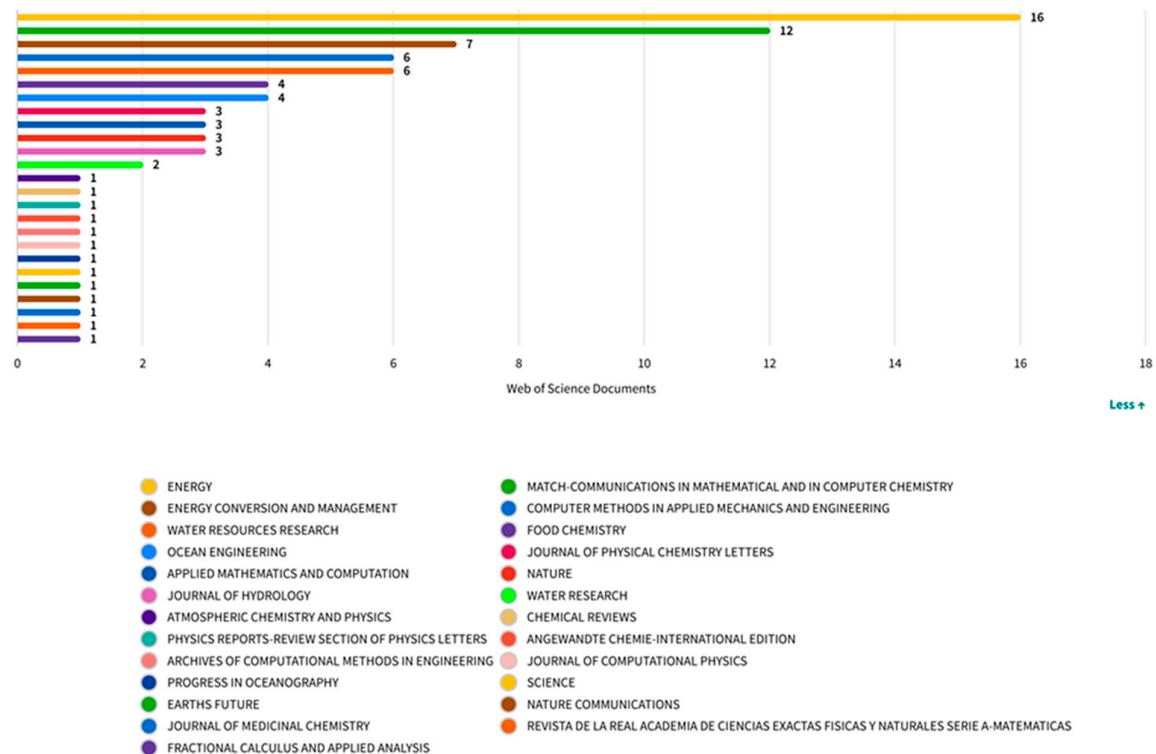


Figure 1. Number of UNIST articles (Q1, top 5% journals in JCR) within PS (WoSCC) published per journal until 2022 [11].

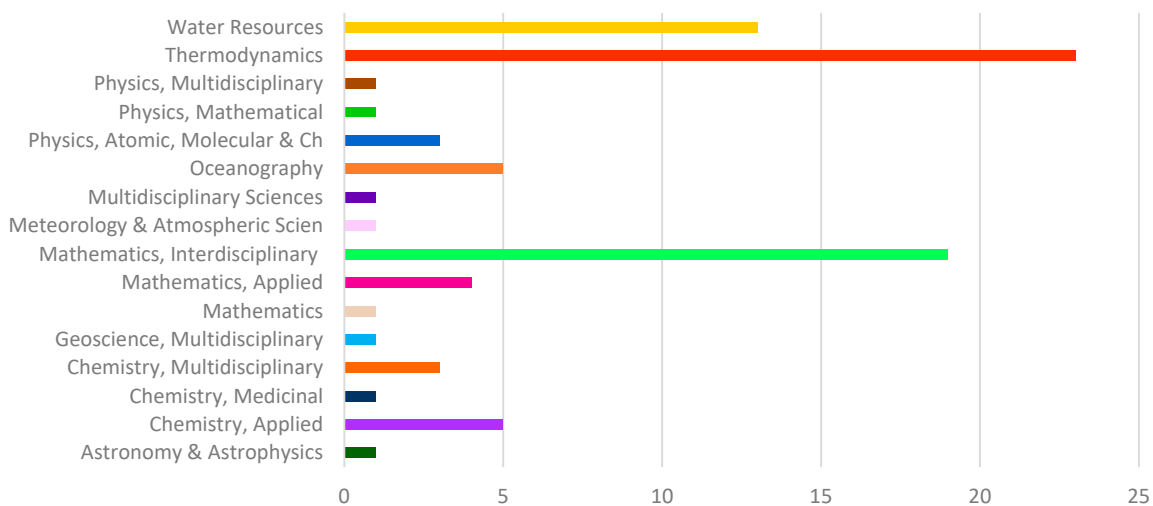


Figure 2. Distribution of UNIST articles in top 5% journals within WoSCC PS (1980–2022).

Most UNIST articles in PS were published in the fields of Thermodynamics ($n = 23$), Mathematics, Interdisciplinary ($n = 19$), and Water Resources ($n = 14$). Other categories such as Physics, Atomic, Molecular & Chemical; Chemistry, Applied; and Oceanography each contained five to six articles, along with fewer publications in the remaining fields.

Most UNIST articles in PS up to 2022 were published in *Energy* (25%), followed by *MATCH Communications in Mathematical and in Computer Chemistry* (18.6%), *Energy Conversion Management* (10.9%), *Water Resources Research* (9.4%), *Computer Methods in Applied Mechanics and Engineering* (9.4%), *Food Chemistry* (6.3%) and *Ocean Engineering*

(6.3%), as seen in Figure 3. Other journals, such as the *Journal of Physical Chemistry Letters*, *Nature*, and *Applied Mathematics and Computation*, each contributed 4.7% of the publications.

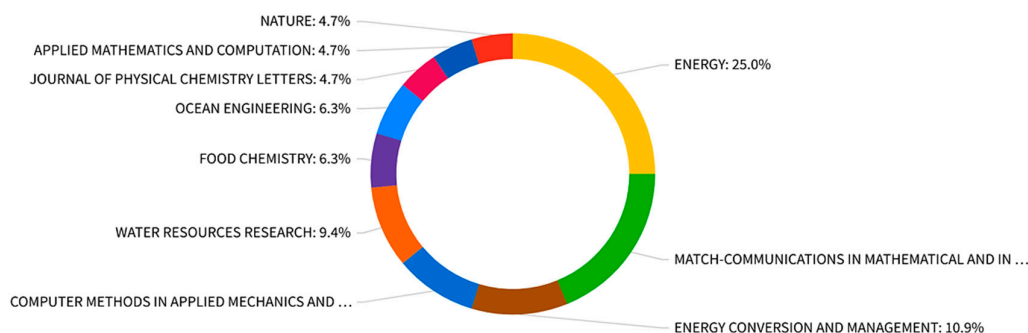


Figure 3. Distribution of UNIST articles in top 5% journals (WoSCC PS) within the corresponding journals (1980–2022) [12].

3.1. List of UNIST Articles in Top 5% Journals in WoSCC Physical Sciences

Detailed presentation of UNIST articles in the top 5% Q1 journals is given in Tables 1–10, containing the article titles, their sources, and related SDGs that were assigned to the articles as described in Section 2.

Table 1. UNIST articles in top 5% journals, WoSCC category PS, subcategory Astronomy & Astrophysics.

Article Title	Source, Year, Reference; SDG
Radiation-pressure mixing of large dust grains in protoplanetary disks	Nature, 2009 [13]

Table 2. UNIST articles in top 5% journals, WoSCC category PS, subcategory Chemistry.

Article Title	Source, Year, SDG, Reference
Chemistry; Applied	
A study of volatile flavor substances in Dalmatian traditional smoked ham: Impact of dry-curing and frying	Food Chemistry, 2007 [14]
Chemical composition and antioxidant capacity of free volatile aglycones from basil (<i>Ocimum basilicum</i> L.) compared with its essential oil	Food Chemistry, 2007, SDG3 [15]
Contribution to the characterization of honey-based Sardinian product abbamele: volatile aroma composition, honey marker compounds, and antioxidant activity	Food Chemistry, 2011, SDG3 [16]
Molecular diversity of volatile compounds in rare willow (<i>Salix</i> spp.) honeydew honey: identification of chemical biomarkers	Molecular Diversity, 2010, SDG3 [17]
Influence of the phenophase on the phenolic profile and antioxidant properties of Dalmatian sage	Food Chemistry, 2011, SDG3 [18]
Chemistry; Medicinal	
Antibacterial activity affected by the conformational flexibility in glycine-lysine based α -helical antimicrobial peptides	Journal of Medicinal Chemistry, 2018, SDG3 [19]
Chemistry; Multidisciplinary	
Functional roles of ubiquitin-like domain (ULD) and ubiquitin-binding domain (UBD) containing proteins	Chemical Reviews, 2009, SDG3 [20]
Doubly charged silver clusters stabilized by tryptophan: Ag_4^{2+} as an optical marker for monitoring particle growth	Angewandte Chemie-International Edition, 2011, SDG3 [21]
Ligand-induced substrate steering and reshaping of $[\text{Ag}_2(\text{H})]^+$ scaffold for selective CO_2 extrusion from formic acid	Nature Communications, 2016 [22]

Table 3. UNIST articles in top 5% journals, WoSCC category PS, subcategory Geoscience; Multidisciplinary.

Article Title	Source, Year, SDG, Reference
Geoscience; Multidisciplinary	
Implications of freshwater flux data from the CMIP5 multimodel output across a set of Northern Hemisphere drainage basins	Earths Future, 2015, SDG6, SDG13, SDG14 [23]

Table 4. UNIST articles in top 5% journals, WoSCC category PS, subcategory Mathematics.

Article Title	Source, Year, SDG, Reference
Mathematics	
A further extension of Mittag–Leffler function	Fractional Calculus and Applied Analysis, 2018 [24]
Lah–Ribaric type inequalities for $(h, g; m)$ -convex functions	Revista de la Real Academia de Ciencias Exactas Fisicas y Naturales Serie A-Matematicas, 2022 [25]
Mathematics; Applied	
A further extension of Mittag–Leffler function	Fractional Calculus and Applied Analysis, 2018 [24]
Bounds on metric dimensions of graphs with edge disjoint cycles	Applied Mathematics and Computation, 2021 [26]
Extremal mixed metric dimension with respect to the cyclomatic number	Applied Mathematics and Computation, 2021 [27]
Metric dimensions vs. cyclomatic number of graphs with minimum degree at least two	Applied Mathematics and Computation, 2022 [28]
Mathematics; Interdisciplinary	
A graph-theory approach to global determination of octet molecules	MATCH-Communications in Mathematical and in Computer Chemistry, 2007 [29]
Comparing variable Zagreb indices	MATCH-Communications in Mathematical and in Computer Chemistry, 2007, SDG3 [30]
Comparing Zagreb M1 and M2 indices for acyclic molecules	MATCH-Communications in Mathematical and in Computer Chemistry, 2007, SDG3 [31]
Comparing variable Zagreb M1 and M2 indices for acyclic molecules	MATCH-Communications in Mathematical and in Computer Chemistry, 2008, SDG3 [32]
Shape analysis of carbon nanotube junctions	MATCH- Communications in Mathematical and in Computer Chemistry, 2008 [33]
Trees with maximal second Zagreb index and prescribed number of vertices of the given degree	MATCH- Communications in Mathematical and in Computer Chemistry, 2008, SDG3 [34]
Note on the graphs with the greatest edge-Szeged index	MATCH-Communications in Mathematical and in Computer Chemistry, 2009, SDG3 [35]
On general Randic and general zeroth-order Randic indices	MATCH-Communications in Mathematical and in Computer Chemistry, 2009, SDG3 [36]

Variable Zagreb indices of Kr+1-free graphs	MATCH- Communications in Mathematical and in Computer Chemistry, 2009, SDG3 [37]
Comparing Zagreb indices of Cyclic graphs	MATCH-Communications in Mathematical and in Computer Chemistry, 2010, SDG3 [38]
Which generalized Randic indices are suitable measures of branching?	MATCH- Communications in Mathematical and in Computer Chemistry, 2010, SDG3 [39]
Wiener number of directed graphs and its relation to the oriented network design problem	MATCH- Communications in Mathematical and in Computer Chemistry, 2010, SDG3 [40]
Crack propagation in dynamics by embedded strong discontinuity approach: Enhanced solid versus discrete lattice model	Computer Methods in Applied Mechanics and Engineering, 2018 [41]
Lattice element models and their peculiarities	Archives of Computational Methods in Engineering, 2018 [42]
Novel re-parameterization for shape optimization and comparison with knot-based gradient fitting method	Computer Methods in Applied Mechanics and Engineering, 2018 [43]
Concrete meso-scale model with full set of 3D failure modes with random distribution of aggregate and cement phase. Part I: Formulation and numerical implementation	Computer Methods in Applied Mechanics and Engineering, 2019 [44]
2-D local hp adaptive isogeometric analysis based on hierarchical Fup basis functions	Computer Methods in Applied Mechanics and Engineering, 2022 [45]
Discrete element model for the analysis of fluid-saturated fractured poro-plastic medium based on sharp crack representation with embedded strong discontinuities	Computer Methods in Applied Mechanics and Engineering, 2016 [46]
Discrete element model for the failure analysis of partially saturated porous media with propagating cracks represented with embedded strong discontinuities	Computer Methods in Applied Mechanics and Engineering, 2022 [47]

Table 5. UNIST articles in top 5% journals, WoSCC category PS, subcategory Meteorology & Atmospheric Science.

Article Title	Source, Year, SDG, Reference
Meteorology and Atmospheric Science	
Phenomenology of convection-parameterization closure	Atmospheric Chemistry and Physics, 2013, SDG13 [48]

Table 6. UNIST articles in top 5% journals, WoSCC category PS, subcategory Multidisciplinary Sciences.

Article Title	Source, Year, SDG, Reference
Multidisciplinary Sciences	
Targeting the ubiquitin system in cancer therapy	Nature, 2009, SDG3 [49]

Table 7. UNIST articles in top 5% journals, WoSCC category PS, subcategory Oceanography.

Article Title	Source, Year, SDG, Reference
Oceanography	
Models for estimating photosynthesis parameters from in situ production profiles	Progress in Oceanography, 2017, SDG13, SDG14 [50]
Comparison of full-scale measurements and seakeeping calculations for two research vessels in the Adriatic Sea	Ocean Engineering, 2022, SDG7 [51]
Estimating the eruption-induced water displacement source of the 15 January 2022 Tonga volcanic tsunami from tsunami spectra and numerical modelling	Ocean Engineering, 2022, SDG11 [52]
Prediction of potential net panel selectivity in mesopelagic trawls	Ocean Engineering, 2022, SDG13, SDG14 [53]
Uncertainties of wave data collected from different sources in the Adriatic Sea and consequences on the design of marine structures	Ocean Engineering, 2022, SDG13, SDG14 [54]

Table 8. UNIST articles in top 5% journals, WoSCC category PS, subcategory Physics.

Article Title	Source, Year, SDG, Reference
Physics; Atomic, Molecular, and Chemical	
Gas-phase synthesis and vibronic action spectroscopy of Ag_2H^+	Journal of Physical Chemistry Letters, 2011 [55]
Protein electrostatic properties predefining the level of surface hydrophobicity change upon phosphorylation	Journal of Physical Chemistry Letters, 2012, SDG3 [56]
Synthesis and spectroscopic characterization of diphenylargentate, $[(\text{C}_6\text{H}_5)_2\text{Ag}]^-$	Journal of Physical Chemistry Letters, 2012 [57]
Physics; Mathematical	
Lagrangian differencing dynamics for incompressible flows	Journal of Computational Physics, 2022 [58]
Physics; Multidisciplinary	
Physics of leptiquarks in precision experiments and at particle colliders	Physics Reports-Review Section of Physics Letters, 2016 [59]

Table 9. UNIST articles in top 5% journals, WoSCC category PS, subcategory Thermodynamics.

Article Title	Source, Year, SDG, Reference
Thermodynamics	
Experimental study on a hybrid energy system with small- and medium-scale applications for mild climates	Energy, 2014, SDG7 [60]
Energy efficiency evaluation of a hybrid energy system for building applications in a Mediterranean climate and its feasibility aspect	Energy, 2015, SDG7 [61]
Hybrid energy fuel cell-based system for household applications in a Mediterranean climate	Energy Conversion and Management, 2015, SDG7 [62]
Experimental and numerical investigation of a backside convective cooling mechanism on photovoltaic panels	Energy, 2016, SDG7 [63]
Water spray cooling technique applied on a photovoltaic panel: The performance response	Energy Conversion and Management, 2016, SDG7 [64]
Comprehensive analysis and general economic-environmental evaluation of cooling techniques for photovoltaic panels, Part I: Passive cooling techniques	Energy Conversion and Management, 2017, SDG7 [65]
Contribution to the research of an alternative energy concept for carbon free electricity production: Concept of solar power plant with short diffuser	Energy Conversion and Management, 2017, SDG6, SDG7, SDG11 [66]

Enhanced electrical performance in a solar photovoltaic module using V-trough concentrators	Energy, 2018, SDG7 [67]
Comprehensive analysis and general economic-environmental evaluation of cooling techniques for photovoltaic panels, Part II: Active cooling techniques	Energy Conversion and Management, 2018, SDG7 [68]
Concept of flexible vertical-axis wind turbine with numerical simulation and shape optimization	Energy, 2019, SDG7 [69]
Steady state analysis and modeling of the gas compressor station using the electrical analogy	Energy, 2019, SDG6 [70]
Numerical and experimental analysis of liquid water distribution in PEM fuel cells	Energy Conversion and Management, 2019 [71]
Numerical investigation of natural convection behavior of molten PCM in an enclosure having rectangular and tree-like branching fins	Energy, 2020, SDG7 [72]
The electrical analogy model of the gas pressure reducing and metering station	Energy, 2020, SDG7 [73]
Analysis and optimization of passive cooling approach for free-standing photovoltaic panel: Introduction of slits	Energy Conversion and Management, 2020, SDG7 [74]
Development of thermo-electrical model of photovoltaic panel under hot-spot conditions with experimental validation	Energy, 2021, SDG7 [75]
Global optimization of Savonius-type vertical axis wind turbine with multiple circular-arc blades using validated 3D CFD model	Energy, 2021, SDG7 [76]
Implementation of phase change materials for thermal regulation of photovoltaic thermal systems: Comprehensive analysis of design approaches	Energy, 2021, SDG7 [77]
Determination of the best air space value for installation of a PV façade technology based on 4E characteristics	Energy, 2022, SDG7 [78]
Energy saving and CO ₂ reduction potential of external building walls containing two layers of phase change material	Energy, 2022, SDG7 [79]
Investigation of personal thermal comfort in office building by implementation of smart bracelet: A case study	Energy, 2022, SDG7, SDG11, SDG13 [80]
Optimizing operation parameters of a spark-ignition engine fueled with biogas-hydrogen blend integrated into biomass-solar hybrid renewable energy system	Energy, 2022 [81]
Techno-economic and environmental evaluation of photovoltaic-thermal collector design with pork fat as phase change material	Energy, 2022, SDG7 [82]

Table 10. UNIST articles in top 5% journals, WoSCC category PS, subcategory Water Resources.

Article Title	Source, Year, SDG, Reference
Water Resources	
Trace metal accumulation in different grain size fractions of the sediments from a semi-enclosed bay heavily contaminated by urban and industrial wastewaters	Water Research, 2000, SDG3, SDG6, SDG14 [83]
A frequency domain approach to groundwater recharge estimation in karst	Journal of Hydrology, 2004, SDG14 [84]
Removal of zinc, copper and lead by natural zeolite—a comparison of adsorption isotherms	Water Research, 2004, SDG6 [85]
Nonlinear kernel functions for karst aquifers	Journal of Hydrology, 2006, SDG3, SDG6, SDG14 [86]
Flow and travel time statistics in highly heterogeneous porous media	Water Resources Research, 2009, SDG6 [87]
Significance of higher moments for complete characterization of the travel time probability density function in heterogeneous porous media using the maximum entropy principle	Water Resources Research, 2010, SDG6 [88]

Partial spectral analysis of hydrological time series	Journal of Hydrology, 2011, SDG14 [89]
Collapse of higher-order solute concentration moments in groundwater transport	Water Resources Research, 2013, SDG14 [90]
Flow-dependence of matrix diffusion in highly heterogeneous rock fractures	Water Resources Research, 2013, SDG6 [91]
Impact of aquifer heterogeneity structure and local-scale dispersion on solute concentration uncertainty	Water Resources Research, 2013, SDG6 [92]
On the upscaling of chemical transport in fractured rock	Water Resources Research, 2014, SDG3, SDG6, SDG14 [93]
Changing climate both increases and decreases European river floods	Nature, 2019, SDG7, SDG13 [94]
Changing climate shifts timing of European floods	Science, 2017, SDG7, SDG13 [95]

WoSCC category PS subcategories Astronomy & Astrophysics, subcategory Geoscience; Multidisciplinary, Meteorology & Atmospheric Science, and Multidisciplinary Sciences contained one article per category. This gap could be related to less available research equipment and funding at UNIST for these topics.

3.2. UNIST Articles Citations in Top 5% Q1 Journals

Alongside the overall number of articles and research topics, the citations of these articles are also an important quantitative indicator of research impact. The most cited articles (with more than 200 citations) were published within the subcategories Water Resources (Bloeschl et al., 2019 [94] with 769 citations, Bloeschl et al., 2017 [95] with 637 citations, and Peric, Trgo, and Medvidovic 2004 [85] with 491 citations); Multidisciplinary Sciences (Hoeller and Dikic 2009 [49] with 510 citations); Physics, Multidisciplinary (Dorsner et al. 2016 [59] with 465 citations); Thermodynamics (Nizetic et al., 2016 [63] with 336 citations); and Chemistry, Applied (Politeo, Jukic, and Milos 2007 [15] with 232 citations).

A total of 56% of overall citations were distributed among five journals, particularly *Nature* (22%) and *Science* (11%) (Figure 4).

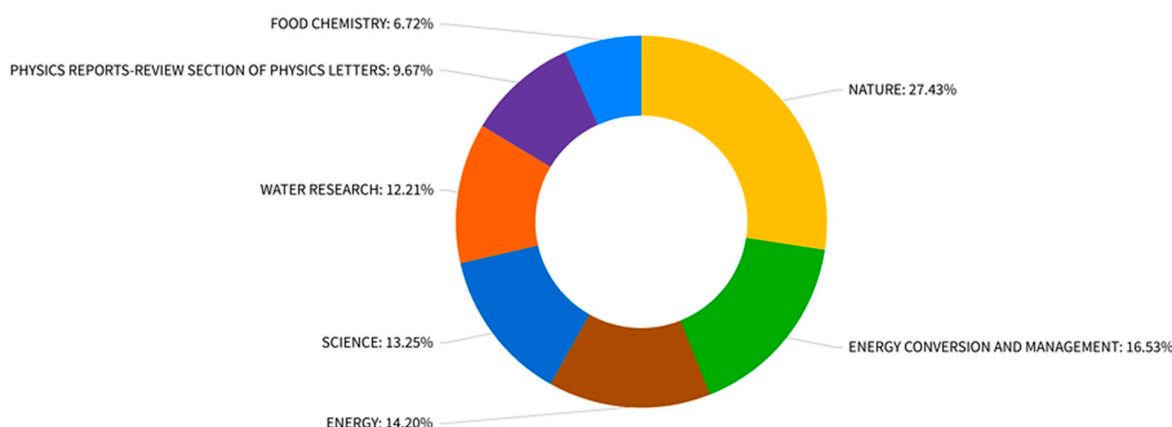


Figure 4. Distribution of overall citations within the most cited journals [96].

Figure 5 presents the citation distribution with regard to the most common source of funding for the articles citing UNIST articles in the top 5% Q1 journals (2000–2022) within PS. Most citations belonged to articles funded by the European Research Council and German Research Foundation (Figure 5).

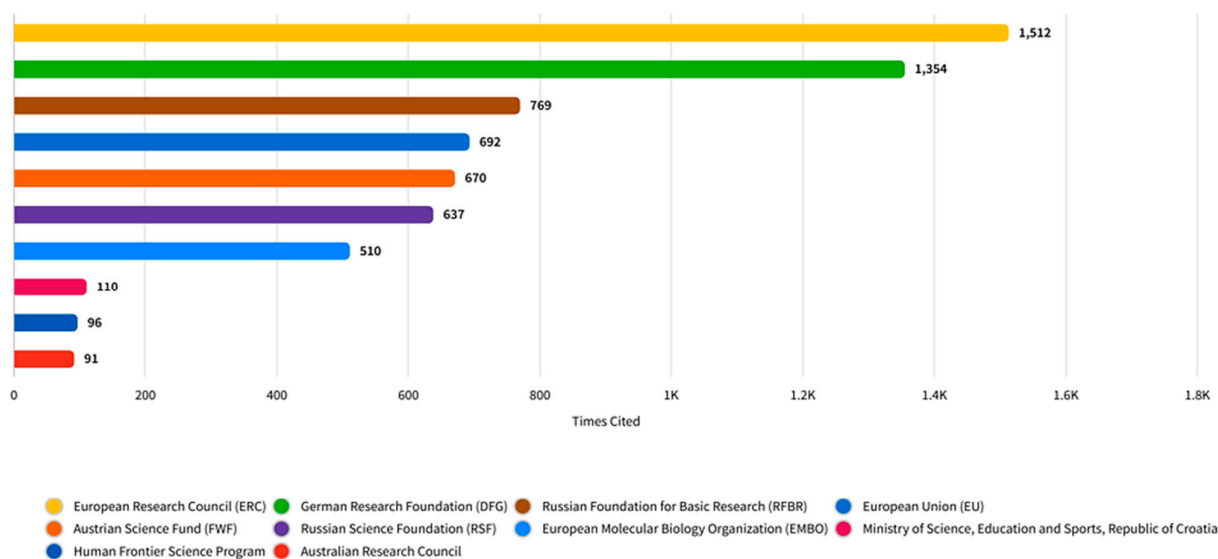
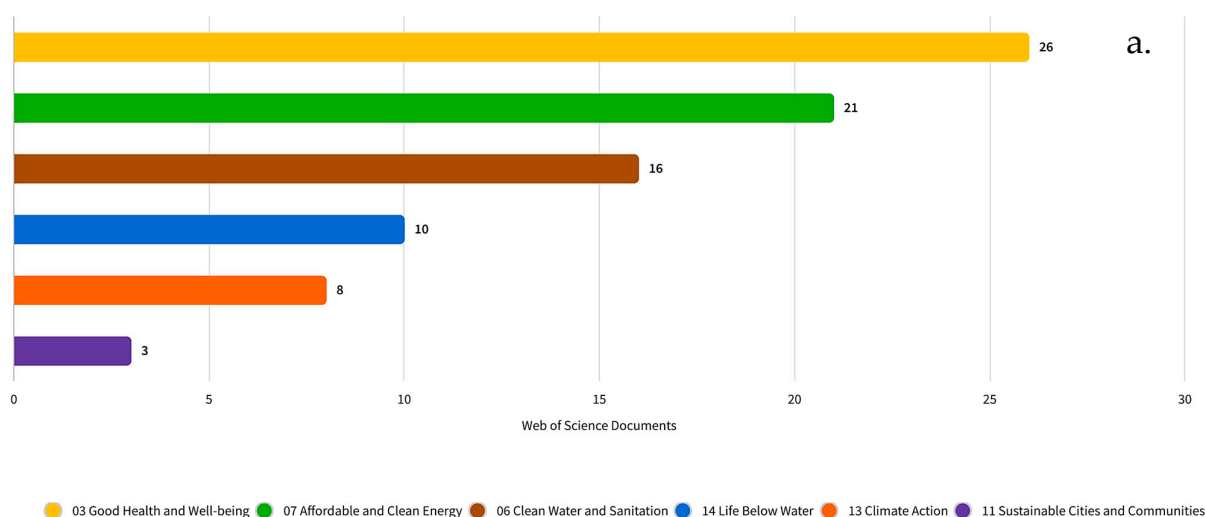


Figure 5. The citation distribution of UNIST articles in top 5% Q1 journals in PS according to the articles' funding organizations. Time period: 1980–2022 [97].

3.3. Contribution of Articles in Top 5% Journals to SDGs

The total number of published articles in PS related to the corresponding SDGs is presented in Figure 6. From total of 83 articles, 63 articles (75.9%) are related to SDGs. The increase in SDG-related research from 2015 is noted, when SDGs were formally launched. The highest number of articles ($n = 26$) are related to SDG3 Good Health and Well-being, followed by 21 articles related to SDG7 Affordable and Clean Energy and 16 articles related to SDG6 Clean Water and Sanitation. Distribution (%) of the articles within SDGs is as follows: SDG7 (26.9%), SDG3 (25.0%), and SDG6 (19.2%).



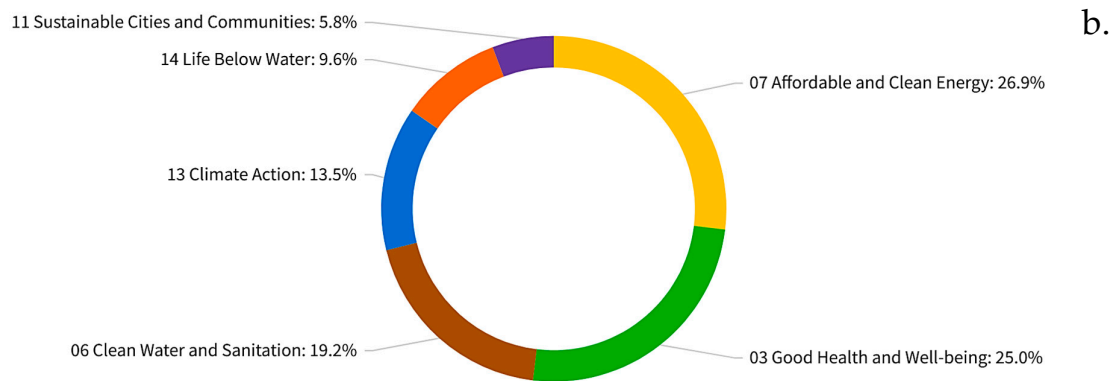
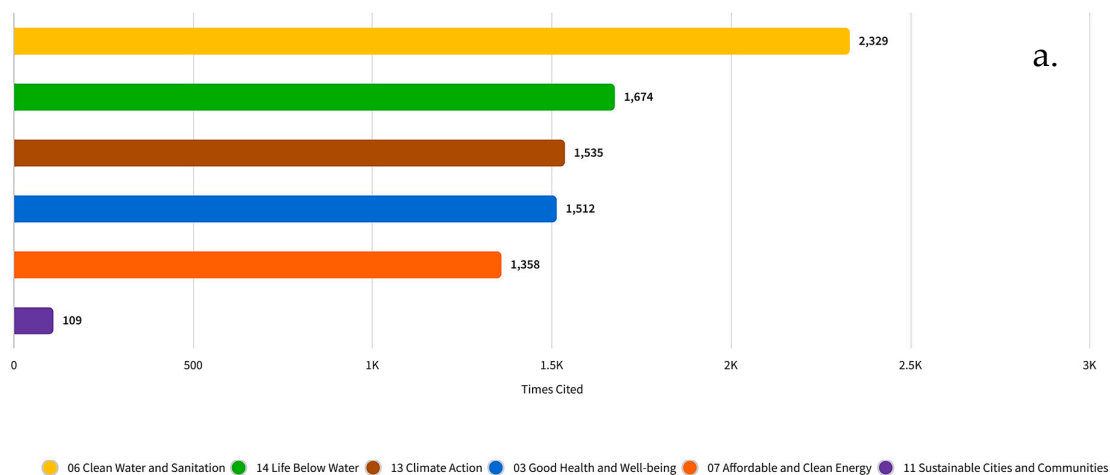


Figure 6. Total number of selected articles in PS related to SDGs (a) and (b) their distribution percentages (%) within SDGs [98].

For SDG3, most articles were published in *MATCH Communications in Mathematical and Computer Chemistry* ($n = 10$). For SDG7, most articles were published in *Energy* ($n = 16$). Six articles for SDG6 were published in *Water Resources Research*, with three in *Hydrology*, two in *Water Research*, and one in each of the other five journals. For SDG14 Life Below Water, three articles were published in *Journal of Hydrology*, with two in *Ocean Engineering* and one in each of the other five journals.

3.3.1. The Articles' Citations, Citation Impact, and Highly Cited Articles

The total number of the article citations related to SDGs is presented in Figure 7. The highest number of citations was for SDG6 (27%), followed by SDG14 (19.7%), SDG13 Climate Action (18%), SDG3 (17.8%), and SDG7 (15.9%), indicating the more relevant/influential research. The strategic meaning of this pattern is relevant for future planning within PS research policies at UNIST and funding.



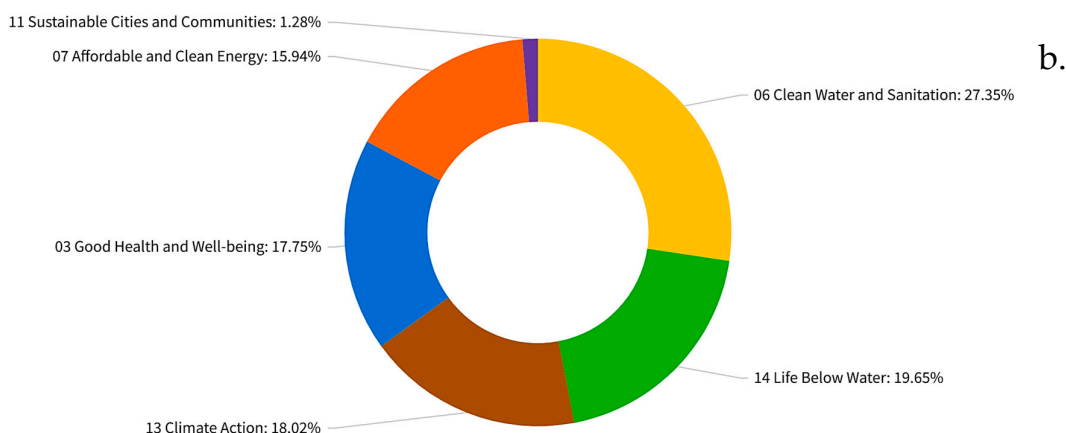


Figure 7. Total number of citations of the articles in PS within SDGs (a) and their percentage distribution within SDGs (b) [99].

The citation impact of the articles within SDGs is presented in Figure 8.

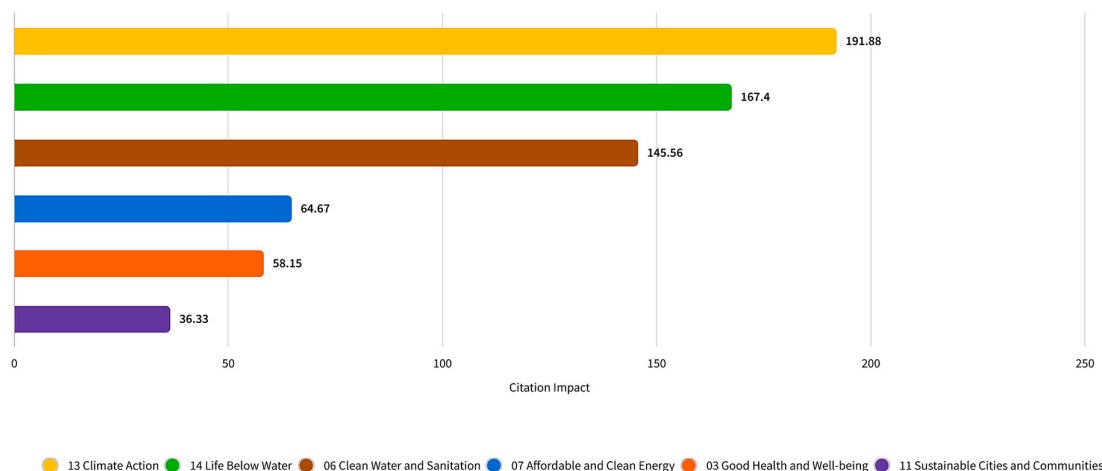


Figure 8. The citation impact of the articles in PS within SDGs [100].

The highest citation impact (191.88) was found for SDG13, followed by the impact for SDG14 (167.4) and the impact for SDG6 (145.56). Although the highest overall number of published articles was related to SDG3, the citation impact was lower for this SDG that was expected since research articles in PS are not dominantly targeting the core biomedical research. Although the total number of published articles was lower for SDG14 ($n = 10$, Figure 6), their citation impact is very high (167.4), indicating that the performed research output is significantly influential. For SDG6, the number of published research articles ($n = 16$) was at the third position (Figure 6), the same as for the citation impact (145.56), demonstrating strong research influence. Although the overall number of published articles was high for SDG7 ($n = 21$, Figure 6), their citation impact was lower (64.67, Figure 8). For SDG13 and SDG11, the number of published articles (Figure 6) and their citation impact (Figure 8) was the lowest.

Three articles were highly cited: one for SDG7 [60]; one for SDG13, SDG14, and SDG6 [90]; and one for SDG13, SDG14, and SDG6 [91]. These articles are considered indicators

of excellent scientific relevance. It is interesting to note that from the total of eight articles related to SDG13, two were highly cited; from the total of 10 articles connected with SDG14, two were highly cited; and two highly cited articles for SDG6 from the total of 16 published were found.

3.3.2. The Articles with International Collaborations

The number of articles related to SDGs with international collaboration is presented in Figure 9.

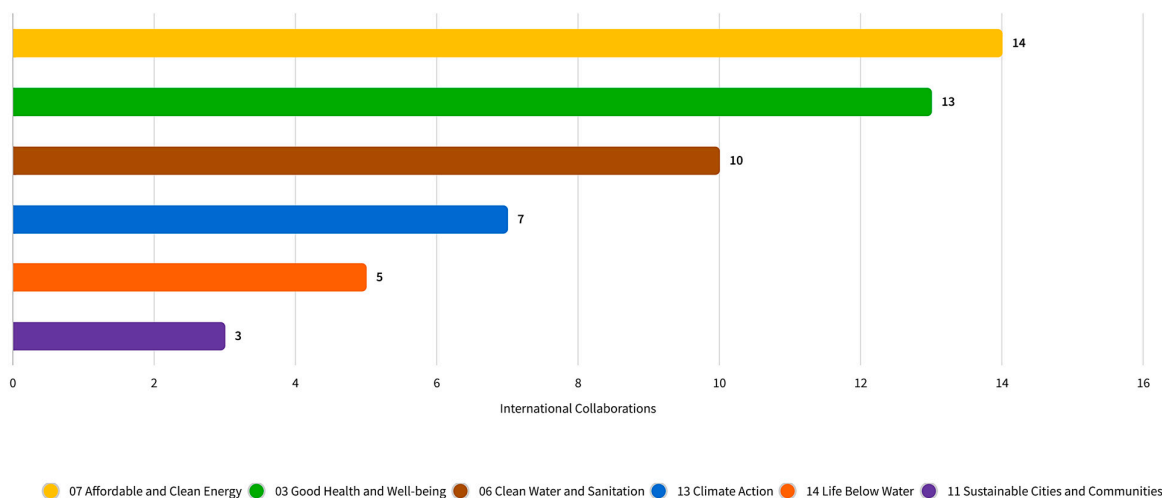


Figure 9. Number of the articles in PS with international collaborations within SDGs [101].

More details on international collaborations are available in Section 3.4.1.

3.4. Drivers of Top Performance in PS Within SDGs at UNIST

The challenges for UNIST from its foundation have been related to regional disparities with respect to the overall UNIST environment (human resources, infrastructure, scientific equipment, and funding). In overcoming adversity, UNIST has been developing strong collaborations with other national and international stakeholders (universities, institutes, and companies). In addition, the regional and state governments have been supporting the development of UNIST, particularly with campus infrastructure and human resources.

The role and contribution of the SDGs as a transformative framework for UNIST was reported previously [102]. With a qualitative longitudinal methodology, we examined how UNIST has engaged with the SDG agenda while overcoming the challenges of institutional disintegration, resource scarcity, and cultural change. Data from UNIST strategies, action plans, and interviews revealed a significant change and evolution in UNIST strategic alignment with the SDGs, from initial compliance to a more integrated and systemic approach. Strategic planning and policymaking were key drivers, and fragmented governance and cultural resistance were barriers. Practical, case-based experiences with sustainability reporting for UNIST were studied [103] with a focus on the integration of sustainability activities into strategic planning and quality management. Figure 10 presents the current management schema of the top PS of UNIST for the SDG framework.

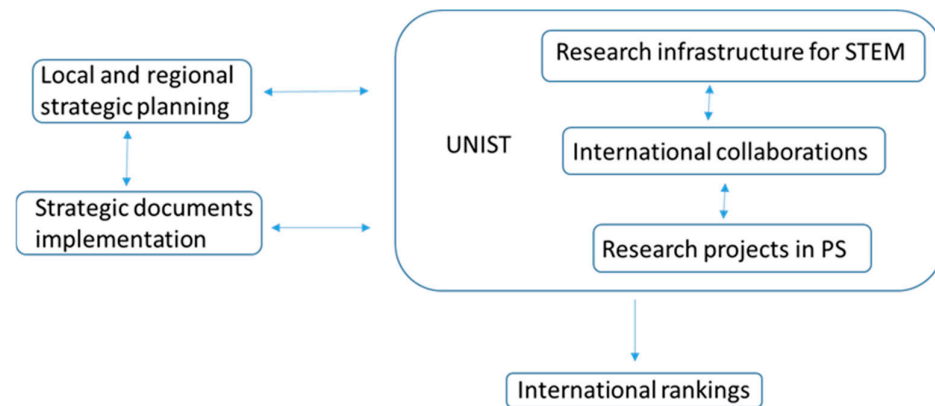


Figure 10. Management schema of top performance in PS within SDGs at UNIST driving toward sustainability.

Strategic planning and strategy implementation have been the key drivers of the top PS at UNIST. SDG research output in PS at UNIST has expanded in the last 10 years, particularly through interdisciplinary approaches that address complex global challenges like climate change, environmental issues, water resources, and energy (Tables 1–10). This expansion has been closely related to the development and implementation of strategic documents of UNIST, particularly scientific strategies since 2009. The Science Strategy of UNIST (2009–2014) [104] states as strategic goal 1 to define scientific activities of UNIST and centers of excellence and as strategic goal 4 to increase scientific activities at the University (task 12: to increase the number of international scientific publications). The Science Strategy of UNIST (2017–2021) [105] affirms strategic goal 1, UNIST is a research university recognized in the European and global research areas; strategic goal 2, UNIST scientific research activities contribute to the development of the region, the European Union, and society as a whole; and strategic goal 3, interdisciplinary cooperation of scientists is encouraged through the functional integration of scientific research activities at UNIST in cooperation with other domestic and foreign scientific research institutions and the economy. The first strategic goal in the UNIST science strategy (2021–2026) is scientific excellence for academic and social impact (Science Strategy of University of Split) [106]. The SDGs are embedded in all aspects of UNIST strategic documents, including teaching, research, operations, and partnerships. Regular reports on yearly action plans according to the strategy are crucial for successful strategy implementation, pointing out the achievements as well as weak points and improvement measures. In addition, UNIST output has been important for policy and regional development from its foundation until present, as evidenced in the current UNIST strategy through task 3.1., “Participate in the creation of strategic decisions and the development of the City of Split and the Split-Dalmatia County”; task 3.2, “Involve representatives of society in strategic planning at UNIST”; and task 3.3., “Contribute to the balanced development of the County.” Recently, UNIST has been involved in the creation of different strategic documents at local and regional levels (e.g., Development Strategy of the City of Split until 2030). In addition, UNIST importance and impact have been emphasized in the current strategic development plan of the Split-Dalmatian County 2022–2027 (Specific objective 2.2. Support for the development of a modern education system that will be able to respond to contemporary challenges with the measure M3: Encouraging the development of higher education through strong support to UNIST). The UNIST management has been implementing interconnections among local and regional strategic planning and UNIST strategic documents’ planning and implementation (Figure 10).

The implementation of the strategies was particularly supported by competitive research grants (Figure 10) funded by the Croatian Science Foundation, international scientific projects, and development projects that have been continuously increasing, particularly since 2014. The number of grants increased from 36 in 2018 to 82 in 2022. Three grants co-financed by the European Union from the European Regional Development Fund contributed to equipping UNIST with scientific research infrastructure fundamental for PS (around €30 million) that supported the increased scientific output in the last 5 years. These were as follows: “Functional Integration of the University of Split Faculty of Science, Faculty of Maritime Studies, and Faculty of Chemistry and Technology through the Development of Scientific Research Infrastructure at the Three Faculties Building” (KK.01.1.1.02.0018), “Implementing Modern Scientific Research Infrastructure at the Faculty of Civil Engineering, Architecture, and Geodesy toward Smart Specialization in Green and Energy-Efficient Construction” (KK.01.1.1.02.0027), and “University Research Animal Facility” (KK.01.1.1.02.0026).

3.4.1. International Collaborations—Number of Affiliations

Another driver of top PS performance at UNIST has been international collaborations (Figure 11), particularly due to the limited research equipment at UNIST for PS. The average ratio of number of affiliations (NAf) to number of all UNIST research articles in the top 5% Q1 journals in PS was 5.1. The total number of affiliations ranged from 1 to 36, and the number of countries ranged from 1 to 24. Besides Croatia, the authors originated from 39 countries.

The average ratio of Naf to number of articles (NP) was 3.8, and 14 articles had only UNIST affiliation. Two articles contained more than 15 authors, while the average ratio of number of authors (NAu) to number of articles (NP) for the rest of the publications was 4.1 (Table 2). In the subcategory Mathematics, the main UNIST collaborative countries were Bosnia and Herzegovina, France, Hungary, People’s Republic of China, Russia, and Slovenia. The average ratio of Nau to NP was 2.4, ranging from one to four authors per article. Six articles had only UNIST affiliation, and five of those were with a single author. The average ratio of Nau to NP was 2.2 (Table 4). The articles in this subcategory contributed to SDG3. For UNIST, the main collaborative countries in the subcategory Oceanography were Denmark, England, and Norway, and the articles in this subcategory contributed to SDG13 and SDG14. The average ratio of Nau to NP was 5.2, ranging from four to seven authors. The number of affiliations was from three to five, with an average ratio of Naf to NP of 3.8 (Table 7). Germany, France, and Australia were the main UNIST collaborative countries in the Physics subcategory. The average ratio of Nau to NP was 6.4, ranging from two to eleven total authors and two to six affiliations (Table 8). In the subcategory Thermodynamics, the main UNIST collaborative countries were Greece, Italy, Turkey, and Vietnam. The average ratio of Nau to NP was 4.3, with the number of authors ranging from three to ten authors and total affiliations ranging from 1–8 (Table 9). The articles in this subcategory contributed to SDG6, SDG7, SDG11, and SDG13. UNIST collaborative countries in the subcategory Water Resources were Austria, Albania, Bulgaria, Czech Republic, England, Finland, France, Germany, Hungary, Ireland, Italy, North Macedonia, Norway, Poland, Serbia, Slovakia, Spain, Sweden, Switzerland, Russia, Slovenia, Turkey, and Ukraine. Two articles (Table 10) counted 46 and 48 authors, while the average ratio of Nau to NP was 2.7 for the rest of the articles. The articles in this subcategory contributed to SDG6, SDG13, and SDG14. The average ratio of Naf to NP was 1.8, and two articles had only UNIST affiliation.

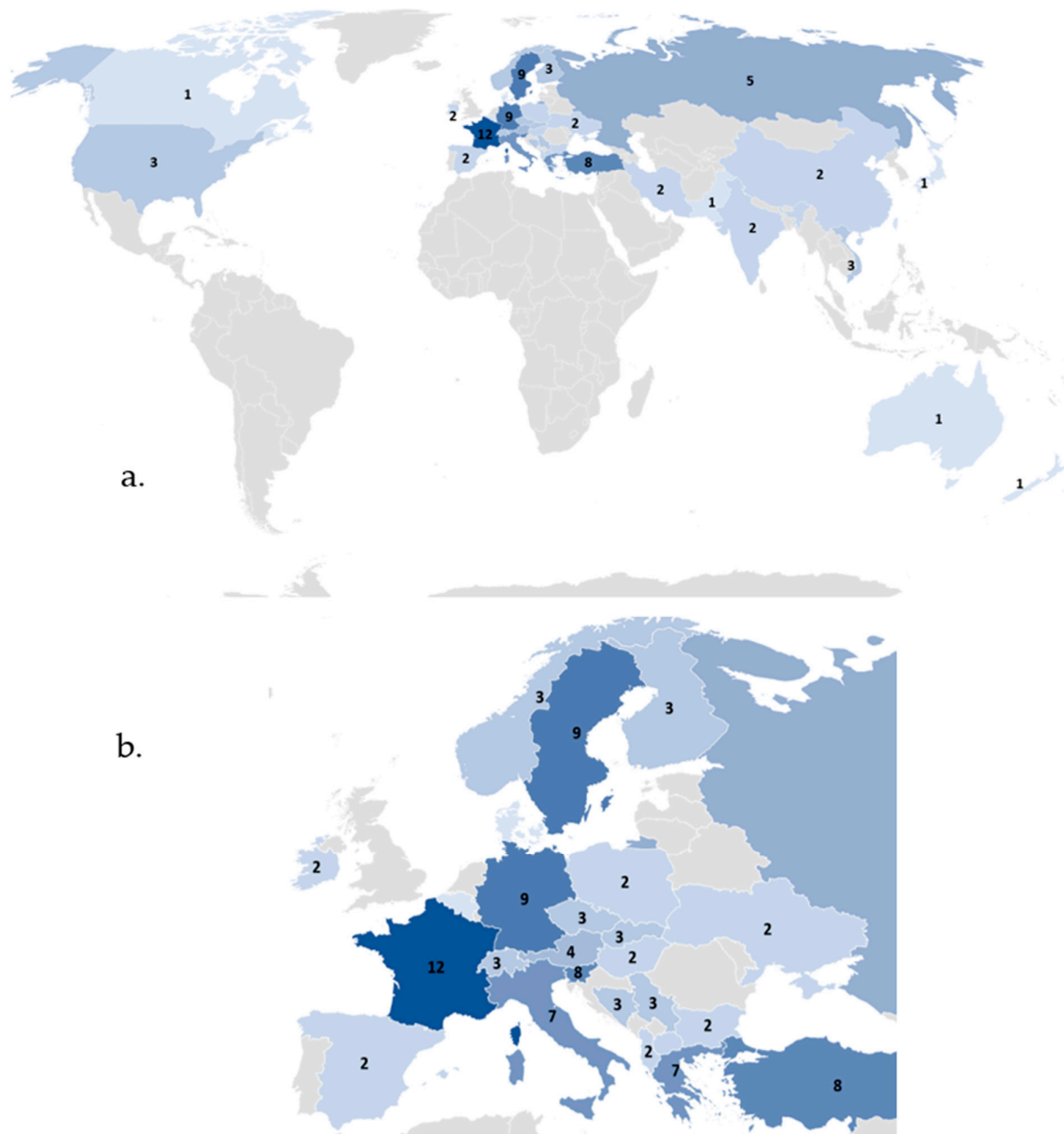


Figure 11. Worldwide distribution of authors of selected articles in PS (a) and their distribution across Europe (b).

3.4.2. UNIST Rankings

Scientific research, including in the top PS, has been attracting top-class researchers and students, boosting the quality of overall education and influencing the international academic rankings of UNIST, such as the Times Higher Education World University Ranking (position 1201–1500 in 2024), the Times Higher Education Impact Ranking (position 401–600 in 2023 and 201–300 in 2024), The World University Rankings for Innovation (WURI), the QS World University Ranking (position 1201–1400 in 2023), the QS World University Rankings by Subject, QS Sustainability Rankings, and Academic Ranking of World Universities—ARWU [8]. UNIST Q1 research output is important for international rankings, but it is not the only criterion. Other relevant ranking criteria include teaching (the learning environment), including teaching reputation, students-to-staff ratio, doctorate-to-bachelor's ratio, doctorates-awarded-to-academic-staff ratio, and institutional income; international outlook, including proportion of international

students, proportion of international staff, and international collaboration; cooperation with industry, including industry income and patents; and sustainable development goals activities, employment outcomes, employer reputation, international research network, and others. UNIST's position in different rankings has been among the leading universities in Croatia, particularly in the Mediterranean region. With respect to overall human resources, infrastructure, and finances, the ranking position of UNIST is relevant.

3.5. Comparison to Other Universities in Adriatic Croatia

The research activities within PS for the University of Rijeka, the University of Zadar, the University of Juraj Dobrila Pula, and the University of Dubrovnik are presented in Table 11.

Table 11. Articles in the top 5% Q1 journals in PS and their citations for the University of Rijeka, the University of Juraj Dobrila Pula, the University of Zadar, and the University of Dubrovnik according to set-up parameters iSection 2.

WoSCC Category Physical Sciences, Subcategory	University of Rijeka			University of Juraj Dobrila Pula			University of Zadar			University of Dubrovnik		
	Q1	5% Q1	C	Q1	5% Q1	C	Q1	5% Q1	C	Q1	5% Q1	C
Astronomy & Astrophysics	40	1	430							2		
Chemistry	99 *	11	353	1			1			5		
Crystallography	1			1								
Geochemistry and Geophysics	1											
Geology	1											
Geography, Physical							2					
Geoscience; Multidisciplinary	23	1	21	1			17	1	29	4		
Mathematics	112 *	20	246	6	1	20	1			7	1	13
Meteorology & Atmospheric Science	3											
Mineralogy	2											
Multidisciplinary Sciences	7			1								
Nanoscience & Nanotechnology	7	3	55				1					
Oceanography	15	2	20	2			3	1	21	1		
Optics	18	1	26							1		
Physics	125 *	12	893	2	1	9	14			1		
Polymer Science	7											
Quantum Science & Technology	3											
Spectroscopy	4									2		
Statistics & Probability	2											
Thermodynamics	30	5	144									
Water Resources	11	1	26				2	1	30	1		
Total	457 *	46 *	2019 *	12 *	2	29	28 *	3	80	23 *	1	

* Without duplications (same articles in different subcategories); Q1—number of articles in Q1 journals; 5% Q1—number of articles in top 5% Q1 journals; C—citations.

Among other Mediterranean universities from Croatia, only the University of Rijeka (UNIRI) has been developing relevant research within PS, predominantly in Physics, Mathematics, and Chemistry. The University of Zadar published overall three articles in top 5% WoSCC PS, the University of Juraj Dobrila Pula published two, and the University of Dubrovnik published one article. When comparing the overall number of Q1 publications within PS, UNIST published 2.7 times more articles than UNIRI. When comparing articles in the top 5% Q1 journals, UNIRI published 46 articles compared to 83 from UNIST. The majority of UNIRI articles in the top 5% Q1 journals were distributed

among WoSCC subcategories Mathematics ($n = 20$), Physics ($n = 12$), Chemistry ($n = 11$), and Thermodynamics ($n = 5$). The articles in the top 5% Q1 journals of UNIST were present in the following subcategories: Mathematics ($n = 25$), Thermodynamics ($n = 23$), Water Resources ($n = 14$), Chemistry ($n = 9$), and Oceanography ($n = 5$). When comparing the articles with more than 200 citations, UNIRI published one article [107] in Nature within Astronomy & Astrophysics with 430 citations, one in Physics Multidisciplinary in Physics Reports-Review Section of Physics Letters [108] (395 citations), and Nature Physics [109] (245 citations). UNIST published seven articles with more than 200 citations, among them one in Physics, Multidisciplinary. With respect to the articles related to SDGs, the University of Rijeka is relevant (25 articles in total) within the following WoSCC categories: Astronomy & Astrophysics for SDG13 ($n = 1$), Chemistry for SDG3 ($n = 7$), Mathematics for SDG3 ($n = 5$), Oceanography for SDG7 ($n = 1$) and SDG11 ($n = 1$), Physics for SDG 3 ($n = 4$) and SDG 10 ($n = 1$), Thermodynamics for SDG7 ($n = 3$) and SDG13 ($n = 2$), SDG8 ($n = 1$), SDG 9 ($n = 1$), and SDG12 ($n = 1$), and Water Resources for SDG 3 ($n = 1$), SDG11 ($n = 1$), SDG6 ($n = 1$), and SDG14 ($n = 1$). The University of Zadar published three articles related to SDGs, and there was only one by the University of J. D. Pula.

The reasons for the performance differences compared to UNIST are related to their overall capacities, infrastructure, and strategic development. The University of Rijeka is the largest among selected universities, and therefore its performance is better in PS in comparison to the University of Zadar, the University of Dubrovnik, and the University of Pula, which are smaller and less oriented toward PS.

3.6. The Study Limitations

It should be taken into consideration that the journals in which these articles were published have often been listed in other WoSCC categories and corresponding subcategories, but it is out of scope of the present study to discuss the journals' performance in other WoSCC categories. JIF was used as a single metric, which may not be the most accurate measure of influence since it evaluates a journal rather than an article. Complementary indicators such as the SCImago Journal Rank (SJR) or others could be applied in further research. Alternative thresholds (e.g., top 10% or total Q1 articles) could demonstrate whether the observed institutional strengths and their alignment with SDGs are statistically robust or merely sensitive to the chosen top 5% cutoff. In addition, the limitation to a 50-author threshold was set up (it is difficult to evaluate individual UNIST researchers' contributions to these articles). However, the limitations of excluding collaborative mega-authored articles are connected only to the specific research fields, mainly related to the collaboration with the European Organization for Nuclear Research (CERN). In addition, the majority of the selected articles in PS are thematically aligned with SDGs according to the predefined SDG classification available within the InCites Benchmarking & Analytics (Clarivate Analytics) environment but are not designed for SDGs.

The UNIST experience, as a single institution, may not be generalizable across the diverse landscape of European higher education without a proper comparative framework, and therefore the policy recommendations should be considered as "lessons learned" or a "proposed framework for peer institutions" rather than definitive policy mandates for the ERA. The language bias in favor of English is negligible.

3.7. Policy Recommendations—Lessons Learned

Considering the disparities identified, several targeted policy recommendations and lessons learned can be mentioned for PS research in smaller EU universities important for regional-level influence on the development of modern science, technology, and sustainability.

For management of the PS for SDGs, it is crucial to promote sustainability in research, teaching, and community through information sharing to the media and interactive events (e.g., workshops) and to develop and implement strategic documents with emphasis on the STEM area. In addition, the mapping of research activities according to SDGs can help in promotion, similar to what was done at UNIST [110]. These documents should be followed by yearly action plans and reports on its implementation, pointing out the achievements (particularly new projects and funding schemes, the research output, and its relevance (Q1/Q2 publications)) as well as weak points and improvement measures. SDGs should be implemented in the strategy goals and all aspects of the institutional activities. A significant change and evolution in UNIST strategic alignment with the SDGs, from initial compliance to a more integrated and systemic approach [102], could be a model for other smaller universities. The strategic planning and policymaking that enabled research infrastructure and focused projects in the STEM area were key drivers resulting in top PS output at UNIST.

Smaller universities that are not integrated could apply functional integration of resources (e.g., research equipment, researchers, others) and perform interdisciplinary and multidisciplinary research to achieve more impact in the STEM area and SDGs. Functional integration is particularly important for targeting larger projects and funding and achieving top research impact. In addition, there is a need to support new project applications in the STEM area and to reward the positive project evaluation even if not approved for funding to motivate new applications to reduce the gap in PS research and prevent unattainable discrepancies with respect to the oldest and largest universities.

The gap of contribution and potential of small and relatively new EU universities to the SDG agenda through PS could be supported by establishing dedicated funding schemes at national and regional levels with emphasis on decentralization. Namely, smaller EU countries showed a high degree of institutional centralization in sustainability research in general [2] focused on the oldest and largest universities. In contrast, larger EU research ecosystems (e.g., in Germany, Italy, and Spain) demonstrate a more-distributed pattern across multiple institutions [2]. This trend is also noted for PS research output distribution in Mediterranean Croatia, where only UNIST and the University of Rijeka have been developing top research in PS. Such policies would promote more strategic resource allocation and decentralization and foster a research culture oriented toward excellence and relevance of PS within different regions and institutions focused on smaller and relatively new institutions with moderate funds and capacities.

Strengthening cross-border networks—such as Mediterranean countries or university EU alliances—may help mitigate resource constraints and reduce fragmentation, particularly among smaller or less-integrated EU member states and universities. Such measures would also enhance visibility and citations in PS.

4. Conclusions

The present review represents a continuation of our studies [102,103] on the role and contribution of the SDGs as a transformative framework for UNIST and practical, case-based experiences on sustainability reporting for UNIST. The focus of the study was related to the contribution of articles in the top 5% Q1 journals in PS to the SDGs framework. The study provides insights into how a relatively new and small EU university through top research in PS has been addressing global challenges of SDGs to drive progress in higher education although with moderate funds and capacities. Addressing these gaps is essential for understanding structural differences within the European Research Area (ERA).

The cutting-edge UNIST research within PS commenced in 2000 and has been consistently increasing. The most represented subcategories were Mathematics,

Thermodynamics, Water Resources and Chemistry, and Oceanography, with 63 out of a total 83 articles related to SDGs. They contribute to a number of SDGs, particularly those related to clean energy, water and sanitation, and health and well-being. In addition to promoting scientific excellence, the University actively supports the global goal for sustainable development by mapping its research outcomes to the SDGs. Research output in PS related to SDGs at UNIST has expanded in the last 10 years, particularly through interdisciplinary approaches that address complex global challenges like climate change, environmental issues, water resources, and energy.

The most cited articles were published in the subcategories Water Resources; Thermodynamics; Multidisciplinary Sciences; Physics, Multidisciplinary; and Chemistry, Applied. The highest citation impact was found for SDG13, SDG14, and SDG6. Although 26 articles were related to SDG3, their citation impact was lower (since they are not targeting core biomedical research). For 10 articles related to SDG14, the research impact was very high.

This study provides insights into the top PS output contribution to the SDG framework to drive progress in higher education. The increase in UNIST scientific output has been closely associated with acquisition of scientific equipment since 2014 and the development and implementation of strategic documents, in particular the UNIST 5-year Science Strategies from 2009. These strategies defined scientific activities, established centers of excellence, and promoted interdisciplinary cooperation among scientists. Their implementation was of particular importance to obtain competitive projects and new research equipment.

Considering the disparities and emerging trends identified in this study, several targeted policy recommendations based on lessons learned can be formulated. Addressing the gap of contribution and the potential of a small and relatively new EU university, with moderate funds and capacities, could be supported by establishing dedicated funding schemes with emphasis on decentralization.

Supplementary Materials: The following supporting information can be downloaded at <https://www.mdpi.com/article/10.3390/su18041926/s1>: Tables S1–S10 containing the brief description of performed research in selected articles.

Author Contributions: Conceptualization, I.J. and A.M.; methodology, P.J. and T.P.; software, A.M.R. and P.Z.; formal analysis, I.J. and A.M.; investigation, P.J., I.J., and A.M.; data curation, P.J., A.M.R., and P.Z.; writing—original draft preparation, I.J. and P.J.; writing—review and editing, I.J. and A.M.; visualization, P.J.; supervision, I.J. and A.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the European Union (NextGenerationEU) under the Croatian Recovery and Resilience Plan 2021–2026 (NRRP), through the University of Split institutional project IP-UNIST-33 “Building research and innovation capacity in biomedicine and natural sciences (PIKBIO),” approved by the Ministry of Science, Education and Youth of the Republic of Croatia. The APC was funded by I.J.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: All data are presented in the manuscript.

Acknowledgments: We would like to thank the European Union (NextGenerationEU) under the Croatian Recovery and Resilience Plan 2021–2026 (NRRP), through the University of Split institutional project IP-UNIST-33 “Building research and innovation capacity in biomedicine and natural sciences (PIKBIO)” for funding the research. The views and opinions expressed in this study are solely those of the authors and do not necessarily reflect the official views of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

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

References

- Griggs, D.; Stafford-Smith, M.; Gaffney, O.; Rockstrom, J.; Ohman, M.C.; Shyamsundar, P.; Steffen, W.; Glaser, G.; Kanie, N.; Noble, I. Policy: Sustainable development goals for people and planet. *Nature* **2013**, *495*, 305–307.
- Passas, I. Bibliometric Analysis: The main steps. *Encyclopedia* **2024**, *4*, 1014–1025. <https://doi.org/10.3390/encyclopedia4020065>.
- Song, Y.; Diao, X.; Xu, R.; Wang, X.; Han, Y.; Shi, T.; Fang, B.; Liu, Y.; Corr, D.J. A Comprehensive review of mineral carbonation of civil engineering materials: A bibliometric analysis. *Environ. Sci. Technol.* **2025**, *59*, 26917–26944. <https://doi.org/10.1021/acs.est.5c03561>.
- Belenyesi, E.; Sasvari, P. Research performance on the UN sustainable development goals in the EU27 (2019–2023). *Adm. Sci.* **2025**, *15*, 361. <https://doi.org/10.3390/admsci15090361>.
- Sena, M.B.; Costa, L.; Leitão, A.; Silva, M.C.A. The United Nations SDG13 and the EU27 countries performance: A comparative analysis. *Environ. Dev. Sustain.* **2024**, *17*, 1–24. <https://doi.org/10.1007/s10668-024-05057-8>.
- Ljutic, D.; Marusic, M. *O Sveučilištu i Gradu u Prigodi 45 Godina Sveučilišta u Splitu*; University of Split: Split, Croatia, 2019.
- Mekjavic, I.; Tominic, I. Thermodynamics of hydrobromic acid in 10 wt. per cent 2-propanol water mixture from electromotive force measurements. *Croat. Chem. Acta* **1975**, *47*, 25–34.
- Ljutic, D.; Marusic, M. *Pola Stoljeća Sveučilišta u Splitu*; University of Split: Split, Croatia, 2024.
- Puljak, L.; Vukojevic, K.; Lovric Kojundzic, S.; Sapunar, D. Assessing clinical and life sciences performance of research institutions in Split, Croatia, 2000–2006. *Croat. Med. J.* **2008**, *49*, 164–174. <https://doi.org/10.3325/cmj.2008.2.164>.
- Marusic, A.; Jerkovic, I.; Jelic, P.; Ljutic, D. Bibliometric and clinical trial registry analysis of the University of Split medical research from 1997 to 2022. *Croat. Med. J.* **2025**, *66*, 153–163.
- Clarivate Analytics. Number of UNIST Articles (Q1, Top 5%) Within Physical Sciences (WoSCC) Published per Journal Until 2022. InCites. Dataset Updated 28 March 2025. Includes WoS Content Indexed Through 28 February 2025. 2025. Available online: <https://clarivate.com/> (accessed on 25 April 2025).
- Clarivate Analytics. Distribution of UNIST Top 5% Research Articles Within the Corresponding Journals, for the Period of 1980–2022, Q1, Research Area: Physical Sciences. InCites. Dataset Updated 28 March 2025. Includes WoS Content Indexed Through 28 February 2025. 2025. Available online: <https://clarivate.com/> (accessed on 25 April 2025).
- Vinkovic, D. Radiation-pressure mixing of large dust grains in protoplanetary disks. *Nature* **2009**, *459*, 227–229. <https://doi.org/10.1038/nature08032>.
- Jerkovic, I.; Mastelic, J.; Tartaglia, S. A study of volatile flavour substances in Dalmatian traditional smoked ham: Impact of dry-curing and frying. *Food Chem.* **2007**, *104*, 1030–1039. <https://doi.org/10.1016/j.foodchem.2007.01.013>.
- Politeo, O.; Jukic, M.; Milos, M. Chemical composition and antioxidant capacity of free volatile aglycones from basil (*Ocimum basilicum* L.) compared with its essential oil. *Food Chem.* **2007**, *101*, 379–385. <https://doi.org/10.1016/j.foodchem.2006.01.045>.
- Jerkovic, I.; Kasum, A.; Marijanovic, Z.; Tuberoso, C.I.G. Contribution to the characterisation of honey-based Sardinian product abbamele: Volatile aroma composition, honey marker compounds and antioxidant activity. *Food Chem.* **2011**, *124*, 401–410. <https://doi.org/10.1016/j.foodchem.2010.06.047>.
- Jerkovic, I.; Marijanovic, Z.; Tuberoso, C.I.G.; Bubalo, D.; Kezic, N. Molecular diversity of volatile compounds in rare willow (*Salix* spp.) honeydew honey: Identification of chemical biomarkers. *Mol. Divers.* **2010**, *14*, 237–248. <https://doi.org/10.1007/s11030-009-9164-6>.
- Generalic, I.; Skroza, D.; Ljubenkov, I.; Katalinic, A.; Burcul, F.; Katalinic, V. Influence of the phenophase on the phenolic profile and antioxidant properties of Dalmatian sage. *Food Chem.* **2011**, *127*, 427–433. <https://doi.org/10.1016/j.foodchem.2011.01.013>.

19. Roncevic, T.; Vukicevic, D.; Ilic, N.; Krce, L.; Gajski, G.; Tonkic, M.; Goic-Barisic, I.; Zoranic, L.; Sonavane, Y.; Benincasa, M.; et al. Antibacterial activity affected by the conformational flexibility in glycine-lysine based α -helical antimicrobial peptides. *J. Med. Chem.* **2018**, *61*, 2924–2936. <https://doi.org/10.1021/acs.jmedchem.7b01831>.
20. Grabbe, C.; Dikic, I. Functional roles of ubiquitin-like domain (ULD) and ubiquitin-binding domain (UBD) containing proteins. *Chem. Rev.* **2009**, *109*, 1481–1494. <https://doi.org/10.1021/cr800413p>.
21. Kulesza, A.; Mitric, R.; Bonacic-Koutecky, V.; Bellina, B.; Compagnon, I.; Broyer, M.; Antoine, R.; Dugourd, P. Doubly Charged silver clusters stabilized by tryptophan: Ag_4^{2+} as an optical marker for monitoring particle growth. *Angew. Chem. Int. Ed. Engl.* **2011**, *50*, 878–881. <https://doi.org/10.1002/anie.201005419>.
22. Zavras, A.; Khairallah, G.N.; Krstic, M.; Girod, M.; Daly, S.; Antoine, R.; Maitre, P.; Mulder, R.J.; Alexander, S.-A.; Bonacic-Koutecky, V.; et al. Ligand-induced substrate steering and reshaping of $[\text{Ag}_2(\text{H})]^+$ scaffold for selective CO_2 extrusion from formic acid. *Nat. Commun.* **2016**, *7*, 11746. <https://doi.org/10.1038/ncomms11746>.
23. Bring, A.; Asokan, S.M.; Jaramillo, F.; Jarsjoe, J.; Levi, L.; Pietron, J.; Prieto, C.; Rogberg, P.; Destouni, G. Implications of freshwater flux data from the CMIP5 multimodel output across a set of Northern Hemisphere drainage basins. *Earths Future* **2015**, *3*, 206–217. <https://doi.org/10.1002/2014EF000296>.
24. Andric, M.; Farid, G.; Pecaric, J. A further extension of Mittag-Leffler function. *Fract. Calc. Appl. Anal.* **2018**, *21*, 1377–1395. <https://doi.org/10.1515/fca-2018-0072>.
25. Andric, M.; Pecaric, J. Lah-Ribaric type inequalities for (h, g, m) -convex functions. *Rev. R. Acad. Cienc. Exactas Fis. Nat. A Mat.* **2022**, *116*, 39. <https://doi.org/10.1007/s13398-021-01180-7>.
26. Sedlar, J.; Skrekovski, R. Bounds on metric dimensions of graphs with edge disjoint cycles. *Appl. Math. Comput.* **2021**, *396*, 125908. <https://doi.org/10.1016/j.amc.2020.125908>.
27. Sedlar, J.; Skrekovski, R. Extremal mixed metric dimension with respect to the cyclomatic number. *Appl. Math. Comput.* **2021**, *404*, 126238. <https://doi.org/10.1016/j.amc.2021.126238>.
28. Sedlar, J.; Skrekovski, R. Metric dimensions vs. cyclomatic number of graphs with minimum degree at least two. *Appl. Math. Comput.* **2022**, *427*, 127147. <https://doi.org/10.1016/j.amc.2022.127147>.
29. Vukicevic, D.; Hefferlin, R. A graph-theory approach to global determination of octet molecules. *MATCH Commun. Math. Comput. Chem.* **2007**, *57*, 557–572.
30. Vukicevic, D. Comparing variable zagreb indices. *MATCH Commun. Math. Comput. Chem.* **2007**, *57*, 633–641.
31. Vukicevic, D.; Graovac, A. Comparing Zagreb M1 and M2 indices for acyclic molecules. *MATCH Commun. Math. Comput. Chem.* **2007**, *57*, 587–590.
32. Vukicevic, D.; Graovac, A. Comparing variable Zagreb M1 and M2 indices for acyclic molecules. *MATCH Commun. Math. Comput. Chem.* **2008**, *60*, 37–44.
33. Graovac, A.; Laszlo, I.; Pisanski, T. Shape analysis of carbon nanotube junctions. *MATCH Commun. Math. Comput. Chem.* **2008**, *60*, 917–926.
34. Vukicevic, D.; Rajtmajer, S.M.; Trinajstic, N. Trees with maximal second Zagreb index and prescribed number of vertices of the given degree. *MATCH Commun. Math. Comput. Chem.* **2008**, *60*, 65–70.
35. Vukicevic, D. Note on the graphs with the greatest edge-Szeged index. *MATCH Commun. Math. Comput. Chem.* **2009**, *61*, 673–681.
36. Zhou, B.; Vukicevic, D. On general Randic and general zeroth-order Randic indices. *MATCH Commun. Math. Comput. Chem.* **2009**, *62*, 189–196.
37. Vukicevic, D. Variable Zagreb Indices of K_{r+1} -free graphs. *MATCH Commun. Math. Comput. Chem.* **2009**, *62*, 715–724.
38. Caporossi, G.; Hansen, P.; Vukicevic, D. Comparing Zagreb indices of cyclic graphs. *MATCH Commun. Math. Comput. Chem.* **2010**, *63*, 441–451.
39. Vukicevic, D. Which generalized Randic indices are suitable measures of branching? *MATCH Commun. Math. Comput. Chem.* **2010**, *64*, 443–452.
40. Pesek, I.; Rotovnik, M.; Vukicevic, D.; Zerovnik, J. Wiener number of directed graphs and its relation to the oriented network design problem. *MATCH Commun. Math. Comput. Chem.* **2010**, *64*, 727–742.
41. Nikolic, M.; Do, X.N.; Ibrahimbegovic, A.; Nikolic, Z. Crack propagation in dynamics by embedded strong discontinuity approach: Enhanced solid versus discrete lattice model. *Comput. Methods Appl. Mech. Eng.* **2018**, *340*, 480–499. <https://doi.org/10.1016/j.cma.2018.06.012>.
42. Nikolic, M.; Karavelic, E.; Ibrahimbegovic, A.; Miscevic, P. Lattice element models and their peculiarities. *Arch. Comput. Methods Eng.* **2018**, *25*, 753–784. <https://doi.org/10.1007/s11831-017-9210-y>.

43. Curkovic, M.; Curkovic, A.; Vucina, D. Novel re-parameterization for shape optimization and comparison with knot-based gradient fitting method. *Comput. Methods Appl. Mech. Eng.* **2018**, *336*, 304–332. <https://doi.org/10.1016/j.cma.2018.03.018>.
44. Karavelic, E.; Nikolic, M.; Ibrahimbegovic, A.; Kurtovic, A. Concrete meso-scale model with full set of 3D failure modes with random distribution of aggregate and cement phase. Part I: Formulation and numerical implementation. *Comput. Methods Appl. Mech. Eng.* **2019**, *344*, 1051–1072. <https://doi.org/10.1016/j.cma.2017.09.013>.
45. Kamber, G.; Kozulic, V.; Gotovac, B.; Gotovac, H. 2-D local hp adaptive isogeometric analysis based on hierarchical Fup basis functions. *Comput. Methods Appl. Mech. Eng.* **2022**, *398*, 115272. <https://doi.org/10.1016/j.cma.2022.115272>.
46. Nikolic, M.; Ibrahimbegovic, A.; Miscevic, P. Discrete element model for the analysis of fluid-saturated fractured poro-plastic medium based on sharp crack representation with embedded strong discontinuities. *Comput. Methods Appl. Mech. Eng.* **2016**, *298*, 407–427. <https://doi.org/10.1016/j.cma.2015.10.009>.
47. Nikolic, M. Discrete element model for the failure analysis of partially saturated porous media with propagating cracks represented with embedded strong discontinuities. *Comput. Methods Appl. Mech. Eng.* **2022**, *390*, 114482. <https://doi.org/10.1016/j.cma.2021.114482>.
48. Yano, J.-I.; Bister, M.; Fuchs, Z.; Gerard, L.; Phillips, V.T.J.; Barkidija, S.; Piriou, J.-M. Phenomenology of convection-parameterization closure. *Atmos. Chem. Phys.* **2013**, *13*, 4111–4131. <https://doi.org/10.5194/acp-13-4111-2013>.
49. Hoeller, D.; Dikic, I. Targeting the ubiquitin system in cancer therapy. *Nature* **2009**, *458*, 438–444. <https://doi.org/10.1038/nature07960>.
50. Kovac, Z.; Platt, T.; Sathyendranath, S.; Antunovic, S. Models for estimating photosynthesis parameters from in situ production profiles. *Prog. Oceanogr.* **2017**, *159*, 255–266. <https://doi.org/10.1016/j.pocean.2017.10.013>.
51. Gledic, I.; Petranovic, T.; Katalinic, M.; Vujicic, S.; Matic, P.; Catipovic, I.; Parunov, J. Comparison of full-scale measurements and seakeeping calculations for two research vessels in the Adriatic Sea. *Ocean Eng.* **2022**, *266*, 113135. <https://doi.org/10.1016/j.oceaneng.2022.113135>.
52. Heidarzadeh, M.; Gusman, A.R.; Ishibe, T.; Sabeti, R.; Sepic, J. Estimating the eruption-induced water displacement source of the 15 January 2022 Tonga volcanic tsunami from tsunami spectra and numerical modelling. *Ocean Eng.* **2022**, *261*, 112165. <https://doi.org/10.1016/j.oceaneng.2022.112165>.
53. Grimaldo, E.; Herrmann, B.; Brcic, J.; Cerbule, K.; Brinkhof, J.; Grimsmo, L.; Jacques, N. Prediction of potential net panel selectivity in mesopelagic trawls. *Ocean Eng.* **2022**, *260*, 111964. <https://doi.org/10.1016/j.oceaneng.2022.111964>.
54. Corak, M.; Mikulic, A.; Katalinic, M.; Parunov, J. Uncertainties of wave data collected from different sources in the Adriatic Sea and consequences on the design of marine structures. *Ocean Eng.* **2022**, *266*, 112738. <https://doi.org/10.1016/j.oceaneng.2022.112738>.
55. Mitric, R.; Petersen, J.; Kulesza, A.; Roehr, M.I.S.; Bonacic-Koutecky, V.; Brunet, C.; Antoine, R.; Dugourd, P.; Broyer, M.; O'Hair, R.A.J. Gas-phase synthesis and vibronic action spectroscopy of Ag_2H^+ . *J. Phys. Chem. Lett.* **2011**, *2*, 548–552. <https://doi.org/10.1021/jz101733v>.
56. Polyansky, A.A.; Zagrovic, B. Protein electrostatic properties predefining the level of surface hydrophobicity change upon phosphorylation. *J. Phys. Chem. Lett.* **2012**, *3*, 973–976. <https://doi.org/10.1021/jz300103p>.
57. Roehr, M.I.S.; Petersen, J.; Brunet, C.; Antoine, R.; Broyer, M.; Dugourd, P.; Bonacic-Koutecky, V.; O'Hair, R.A.J.; Mitric, R. Synthesis and spectroscopic characterization of diphenylargentate, $[(\text{C}_6\text{H}_5)_2\text{Ag}]^-$. *J. Phys. Chem. Lett.* **2012**, *3*, 1197–1201. <https://doi.org/10.1021/jz300280f>.
58. Basic, J.; Degiuli, N.; Blagojevic, B.; Ban, D. Lagrangian differencing dynamics for incompressible flows. *J. Comput. Phys.* **2022**, *462*, 111198. <https://doi.org/10.1016/j.jcp.2022.111198>.
59. Dorsner, I.; Fajfer, S.; Greljo, A.; Kamenik, J.F.; Kosnik, N. Physics of leptiquarks in precision experiments and at particle colliders. *Phys. Rep.* **2016**, *641*, 1–68. <https://doi.org/10.1016/j.physrep.2016.06.001>.
60. Nizetic, S.; Coko, D.; Marasovic, I. Experimental study on a hybrid energy system with small- and medium-scale applications for mild climates. *Energy* **2014**, *75*, 379–389. <https://doi.org/10.1016/j.energy.2014.07.087>.
61. Nizetic, S.; Duic, N.; Papadopoulos, A.M.; Tina, G.M.; Grubisic-Cabo, F. Energy efficiency evaluation of a hybrid energy system for building applications in a Mediterranean climate and its feasibility aspect. *Energy* **2015**, *90*, 1171–1179. <https://doi.org/10.1016/j.energy.2015.06.053>.
62. Nizetic, S.; Tolj, I.; Papadopoulos, A.M. Hybrid energy fuel cell based system for household applications in a Mediterranean climate. *Energy Conv. Manag.* **2015**, *105*, 1037–1045. <https://doi.org/10.1016/j.enconman.2015.08.063>.
63. Nizetic, S.; Grubisic-Cabo, F.; Marinic-Kragic, I.; Papadopoulos, A.M. Experimental and numerical investigation of a backside convective cooling mechanism on photovoltaic panels. *Energy* **2016**, *111*, 211–225. <https://doi.org/10.1016/j.energy.2016.05.103>.

64. Nizetic, S.; Coko, D.; Yadav, A.; Grubisic-Cabo, F. Water spray cooling technique applied on a photovoltaic panel: The performance response. *Energy Conv. Manag.* **2016**, *108*, 287–296. <http://doi.org/10.1016/j.enconman.2015.10.079>.
65. Nizetic, S.; Papadopoulos, A.M.; Giam, E. Comprehensive analysis and general economic-environmental evaluation of cooling techniques for photovoltaic panels, Part I: Passive cooling techniques. *Energy Conv. Manag.* **2017**, *149*, 334–354. <http://doi.org/10.1016/j.enconman.2017.07.022>.
66. Nizetic, S.; Penga, Z.; Arici, M. Contribution to the research of an alternative energy concept for carbon free electricity production: Concept of solar power plant with short diffuser. *Energy Conv. Manag.* **2017**, *148*, 533–553. <http://doi.org/10.1016/j.enconman.2017.05.062>.
67. Michael, J.J.; Iqbal, S.M.; Iniyar, S.; Goic, R. Enhanced electrical performance in a solar photovoltaic module using V-trough concentrators. *Energy* **2018**, *148*, 605–613. <https://doi.org/10.1016/j.energy.2018.01.101>.
68. Nizetic, S.; Giam, E.; Papadopoulos, A.M. Comprehensive analysis and general economic-environmental evaluation of cooling techniques for photovoltaic panels, Part II: Active cooling techniques. *Energy Conv. Manag.* **2018**, *155*, 301–323. <http://doi.org/10.1016/j.enconman.2017.10.071>.
69. Marinic-Kragic, I.; Vucina, D.; Milas, Z. Concept of flexible vertical-axis wind turbine with numerical simulation and shape optimization. *Energy* **2019**, *167*, 841–852. <https://doi.org/10.1016/j.energy.2018.11.026>.
70. Vidovic, D.; Sutlovic, E.; Majstrovic, M. Steady state analysis and modeling of the gas compressor station using the electrical analogy. *Energy* **2019**, *166*, 307–317. <https://doi.org/10.1016/j.energy.2018.10.081>.
71. Penga, Z.; Bergbreiter, C.; Barbir, F.; Scholta, J. Numerical and experimental analysis of liquid water distribution in PEM fuel cells. *Energy Conv. Manag.* **2019**, *189*, 167–183. <http://doi.org/10.1016/j.enconman.2019.03.082>.
72. Yildiz, C.; Arici, M.; Nizetic, S.; Shahsavari, A. Numerical investigation of natural convection behavior of molten PCM in an enclosure having rectangular and tree-like branching fins. *Energy* **2020**, *207*, 118223. <https://doi.org/10.1016/j.energy.2020.118223>.
73. Vidovic, D.; Sutlovic, E.; Majstrovic, M. The electrical analogy model of the gas pressure reducing and metering station. *Energy* **2020**, *198*, 117342. <https://doi.org/10.1016/j.energy.2020.117342>.
74. Marinic-Kragic, I.; Nizetic, S.; Grubisic-Cabo, F.; Coko, D. Analysis and optimization of passive cooling approach for free-standing photovoltaic panel: Introduction of slits. *Energy Conv. Manag.* **2020**, *204*, 112277. <http://doi.org/10.1016/j.enconman.2019.112277>.
75. Grubisic Cabo, F.; Marinic-Kragic, I.; Garma, T.; Nizetic, S. Development of thermo-electrical model of photovoltaic panel under hot-spot conditions with experimental validation. *Energy* **2021**, *230*, 120785. <https://doi.org/10.1016/j.energy.2021.120785>.
76. Marinic-Kragic, I.; Vucina, D.; Milas, Z. Global optimization of Savonius-type vertical axis wind turbine with multiple circular-arc blades using validated 3D CFD model. *Energy* **2021**, *241*, 122841. <https://doi.org/10.1016/j.energy.2021.122841>.
77. Nizetic, S.; Jurcevic, M.; Coko, D.; Arici, M.; Hoang, A.T. Implementation of phase change materials for thermal regulation of photovoltaic thermal systems: Comprehensive analysis of design approaches. *Energy* **2021**, *228*, 120546. <https://doi.org/10.1016/j.energy.2021.120546>.
78. Sohani, A.; Sayyaadi, H.; Miremadi, S.R.; Yang, X.; Doranehgard, M.H.; Nizetic, S. Determination of the best air space value for installation of a PV facade technology based on 4E characteristics. *Energy* **2022**, *262*, 125386. <https://doi.org/10.1016/j.energy.2022.125386>.
79. Arici, M.; Bilgin, F.; Krajcik, M.; Nizetic, S.; Karabay, H. Energy saving and CO₂ reduction potential of external building walls containing two layers of phase change material. *Energy* **2022**, *252*, 124010. <https://doi.org/10.1016/j.energy.2022.124010>.
80. Culic, A.; Nizetic, S.; Solic, P.; Perkovic, T.; Andelkovic, A.; Congradac, V. Investigation of personal thermal comfort in office building by implementation of smart bracelet: A case study. *Energy* **2022**, *260*, 124973. <https://doi.org/10.1016/j.energy.2022.124973>.
81. Bui, V.G.; Bui, T.M.T.; Ong, H.C.; Nizetic, S.; Bui, V.H.; Nguyen, T.T.X.; Atabani, A.E.; Stepanec, L.; Pham, L.H.P.; Hoang, A.T. Optimizing operation parameters of a spark-ignition engine fueled with biogas-hydrogen blend integrated into biomass-solar hybrid renewable energy system. *Energy* **2022**, *252*, 124052. <https://doi.org/10.1016/j.energy.2022.124052>.
82. Jurcevic, M.; Nizetic, S.; Coko, D.; Arici, M.; Anh, T.H.; Giam, E.; Papadopoulos, A. Techno-economic and environmental evaluation of photovoltaic-thermal collector design with pork fat as phase change material. *Energy* **2022**, *254*, 124284. <https://doi.org/10.1016/j.energy.2022.124284>.
83. Ujevic, I.; Odzak, N.; Baric, A. Trace metal accumulation in different grain size fractions of the sediments from a semi-enclosed bay heavily contaminated by urban and industrial wastewaters. *Water Res.* **2000**, *34*, 3055–3061. [https://doi.org/10.1016/S0043-1354\(99\)00376-0](https://doi.org/10.1016/S0043-1354(99)00376-0).

84. Jukic, D.; Denic-Jukic, V. A frequency domain approach to groundwater recharge estimation in karst. *J. Hydrol.* **2004**, *289*, 95–110. <https://doi.org/10.1016/j.jhydrol.2003.11.005>.
85. Peric, J.; Trgo, M.; Medvidovic, N.V. Removal of zinc, copper and lead by natural zeolite—A comparison of adsorption isotherms. *Water Res.* **2004**, *38*, 1893–1899. <https://doi.org/10.1016/j.watres.2003.12.035>.
86. Jukic, D.; Denic-Jukic, V. Nonlinear kernel functions for karst aquifers. *J. Hydrol.* **2006**, *328*, 360–374. <https://doi.org/10.1016/j.jhydrol.2005.12.030>.
87. Gotovac, H.; Cvetkovic, V.; Andricevic, R. Flow and travel time statistics in highly heterogeneous porous media. *Water Resour. Res.* **2009**, *45*, W07402. <https://doi.org/10.1029/2008WR007168>.
88. Gotovac, H.; Cvetkovic, V.; Andricevic, R. Significance of higher moments for complete characterization of the travel time probability density function in heterogeneous porous media using the maximum entropy principle. *Water Resour. Res.* **2010**, *46*, W05502. <https://doi.org/10.1029/2009WR008220>.
89. Jukic, D.; Denic-Jukic, V. Partial spectral analysis of hydrological time series. *J. Hydrol.* **2011**, *400*, 223–233. <https://doi.org/10.1016/j.jhydrol.2011.01.044>.
90. Srzic, V.; Andricevic, R.; Gotovac, H.; Cvetkovic, V. Collapse of higher-order solute concentration moments in groundwater transport. *Water Resour. Res.* **2013**, *49*, 4751–4764. <https://doi.org/10.1002/wrcr.20371>.
91. Cvetkovic, V.; Gotovac, H. Flow-dependence of matrix diffusion in highly heterogeneous rock fractures. *Water Resour. Res.* **2013**, *49*, 7587–7597. <https://doi.org/10.1002/2013WR014213>.
92. Srzic, V.; Cvetkovic, V.; Andricevic, R.; Gotovac, H. Impact of aquifer heterogeneity structure and local-scale dispersion on solute concentration uncertainty. *Water Resour. Res.* **2013**, *49*, 3712–3728. <https://doi.org/10.1002/wrcr.20314>.
93. Cvetkovic, V.; Gotovac, H. On the upscaling of chemical transport in fractured rock. *Water Resour. Res.* **2014**, *50*, 5797–5816. <https://doi.org/10.1002/2014WR015505>.
94. Bloeschl, G.; Hall, J.; Viglione, A.; Perdigao, R.A.P.; Parajka, J.; Merz, B.; Lun, D.; Arheimer, B.; Aronica, G.T.; Bilibashi, A.; et al. Changing climate both increases and decreases European river floods. *Nature* **2019**, *573*, 108–111. <https://doi.org/10.1038/s41586-019-1495-6>.
95. Bloeschl, G.; Hall, J.; Parajka, J.; Perdigao, R.A.P.; Merz, B.; Arheimer, B.; Aronica, G.T.; Bilibashi, A.; Bonacci, O.; Borga, M.; et al. Changing climate shifts timing of European floods. *Science* **2017**, *357*, 588–590. <https://doi.org/10.1126/science.aan2506>.
96. Clarivate Analytics. Distribution of Overall Citations Within the Most Cited Journals, Time Period: 1980–2022. InCites. Dataset Updated 25 July 2025, Includes WoS Content Indexed Through 30 June 2025. 2025. Available online: <https://clarivate.com/> (accessed on 22 August 2025).
97. Clarivate Analytics. The Citation Distribution of 5% UNIST Research Articles in Physical Sciences According to the Articles Funding Organizations, Time Period: 1980–2022. InCites. Dataset Updated 25 July 2025, Includes WoS Content Indexed Through 30 June 2025. 2025. Available online: <https://clarivate.com/> (accessed on 22 August 2025).
98. Clarivate Analytics. Total Number of Published Articles in Physical Sciences Related to SDGs and Their Distribution Percentages (%) Within SDGs. InCites. Dataset Updated 25 July 2025, Includes WoS Content Indexed Through 30 June 2025. 2025. Available online: <https://clarivate.com/> (accessed on 22 August 2025).
99. Clarivate Analytics. Total Number of Citations of the Articles in Physical Sciences Within SDGs (a) and Their Percentage Distribution Within SDGs. InCites. Dataset Updated 25 July 2025, Includes WoS Content Indexed Through 30 June 2025. 2025. Available online: <https://clarivate.com/> (accessed on 22 August 2025).
100. Clarivate Analytics. The Citation Impact of the Articles in Physical Sciences Within SDGs. InCites. Dataset Updated 25 July 2025, Includes WoS Content Indexed Through 30 June 2025. 2025. Available online: <https://clarivate.com/> (accessed on 22 August 2025).
101. Clarivate Analytics. Number of Articles in Physical Sciences with International Collaborations Within SDGs. InCites. Dataset Updated 25 July 2025, Includes WoS Content Indexed Through 30 June 2025. 2025. Available online: <https://clarivate.com/> (accessed on 22 August 2025).
102. Skokic, V.; Jelic, P.; Jerkovic, I. The Role and contribution of sustainable development goals as a transformative framework in higher education: A case study of the University of Split. *World* **2025**, *6*, 22. <https://doi.org/10.3390/world6010022>.
103. Alfirevic, N.; Jerkovic, I.; Jelic, P.; Piplica, D.; Rendulic, D. Sustainability reporting and international rankings in higher education: A case of the University of Split, Croatia. *World* **2024**, *5*, 107–118. <https://doi.org/10.3390/world5010006>.
104. University of Split. *Science Strategy of University of Split (2009–2014)*; University of Split: Split, Croatia, 2009.
105. University of Split. *Science Strategy of University of Split (2017–2021)*; University of Split: Split, Croatia, 2017.
106. University of Split. *Science Strategy of University of Split (2021–2026)*; University of Split: Split, Croatia, 2021.

107. Cassan, A.; Kubas, D.; Beaulieu, J.-P.; Dominik, M.; Horne, K.; Greenhill, J.; Wambsganss, J.; Menzies, J.; Williams, A.; Jorgensen, U.G.; et al. One or more bound planets per Milky Way star from microlensing observations. *Nature* **2022**, *481*, 167–169. <https://doi.org/10.1038/nature10684>.
108. Jusup, M.; Holme, P.; Kanazawa, K.; Takayasu, M.; Romic, I.; Wang, Z.; Gecek, S.; Lipic, T.; Podobnik, B.; Wang, L.; et al. Social Physics. *Phys. Rep.* **2022**, *948*, 1–148. <https://doi.org/10.1016/j.physrep.2021.10.005>.
109. Majdandzic, A.; Podobnik, B.; Buldyrev, S.V.; Kenett, D.Y.; Havlin, S.; Stanley, H.E. Spontaneous recovery in dynamical networks. *Nature Phys.* **2014**, *10*, 34–38. <https://doi.org/10.1038/nphys2819>.
110. Jerković, I.; Jelić, P.; Marušić, A. 50 years of the University of Split: Striving to reach sustainable development goals. *ST-OPEN* **2024**, *5*, e2024.2419.17.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.