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When the alarm bells ring: why the UN Sustainable Development Goals may not be achieved by 2030

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Abstract: When the United Nations (UN) Sustainable Development Goals (SDGs) were agreed upon by the UN General Assembly in 2015, and subsequently endorsed by most UN member States, there was a sense of optimism in respect of their timely implementation by 2030. This optimism has now become a concern. This is due to the fact that a combination of unfavourable circumstances and crises have so severely undermined the pursuit of the SDGs, that there are serious concerns about the probability of their achievement by 2030. This paper reports on an expert-driven literature review of the implementation of the SDGs and a bibliometric analysis, aimed at identifying some of the issues which have been slowing SDGs' progress. Based on the information gathered, it suggests some specific measures which may be deployed, in order to accelerate their implementation by 2030.

Keywords: Sustainable Development Goals. 2030 Agenda. United Nations. Barriers. Crises.

1. Introduction: a short overview of the UN Sustainable Development Goals

Although the concept of sustainable development, as it is currently known, was published in 1987 by the World Commission on Environment and Development (WCED, 1987), the initiatives towards it are still far from being satisfactory. The United Nations (UN) has been playing a critical role in the debates and actions towards sustainable development. Besides the creation of the WCED, in 2000, the UN proposed the eight Millennium Development Goals (MDGs) to be reached by 2015, which addressed poverty and hunger, basic education, gender inequality, child mortality, diseases, environmental sustainability, and global partnerships (UN, 2000). These goals were the first intent to address sustainable development issues as a global agenda (ElMassah & Mohieldin, 2020). In 2015, the UN led once more the debates on the topic and presented the 17 Sustainable Development Goals (SDGs) (UN, 2015).

The 17 SDGs are composed of 169 targets which include an ample range of issues related to sustainable development (UN, 2015). In fact, the SDGs further addressed the MDGs and expanded them. SDG 1 considers poverty problems, SDG 2 addresses hungry, SDG 3 focuses on health-related aspects, SDG 4 is about quality education, SDG 5 considers gender equality, SDG 6 focuses on water availability and management, SDG 7 is related to energy management, SDG 8 is about working conditions and economic growth, SDG 9 addresses innovation, infrastructure, and industrial aspects, SDG 10 considers inequalities, SDG 11 focuses on the sustainability of communities and cities, SDG 12 is about the sustainability of production and consumption, SDG 13 considers climate change, SDG 14 takes into account marine resources, ocean, and seas, SDG 15 addresses

land and biodiversity conservation, SDG 16 focuses on the peace and justice aspects of societies and institutions, and SDG 17 is about establishing partnerships worldwide (UN, 2015).

Despite their contributions to debates and knowledge dissemination regarding the sustainable development concept, the SDGs have received some criticism due to their amplitude and discrepancy. Some authors claim that much like the MDGs, the SDGs have ended up as vague or meaningless (Stokstad, 2015; Holden et al., 2017). Kerekes (2021) highlights that the UN calls for international cooperation for the SDGs' implementation, but the stakeholders involved do not even agree on the problems themselves.

Nevertheless, it is evident in the literature the relevance of the SDGs as a basis for research worldwide (Warchold et al., 2022). The interactions among the different SDGs can help to increase the resilience of social-ecological systems and generate benefits for more than one SDG simultaneously. Technology can also provide an important contribution to achieving the SDGs (Schwindenhammer & Gonglach, 2021; Saner et al., 2020). Actually, for Saner et al. (2020), technologies are crucial for monitoring data about actions towards the SDGs and sharing information among stakeholders. It is also worth mentioning the necessity of companies to develop business models aligning the SDGs and the digital transformation while delivering good performance levels and creating value for their stakeholders, as is emphasized in the European Foundation for Quality Management (EFQM) model (Fonseca, 2022; Fonseca et al., 2021; Murthy et al., 2022). This positive connection between digital transformation and sustainability has been evidenced in the literature (Ghobakhloo, 2020; Ejsmont et al., 2020) as well as the opportunities generated by circular economy towards sustainable development (Fonseca et al., 2018; Panchal et al., 2021; Terra dos Santos et al., 2022).

In addition, the aggregated data can have a relevant educational role in making people understand the need of establishing partnerships for sustainability practices. Nevertheless, integrated policies and international cooperation strategies are needed to establish a successful link between technologies and SDGs implementation (Schwindenhammer & Gonglach, 2021; Leal Filho et al., 2022e).

The purpose of the paper is to investigate the elements which have been preventing progress in the implementation of the UN SDGs. The aspects to be addressed in the article entail the degree of implementation of the SDGs and the factors which influence this process. The departing question from the paper is the fact that the SDGs may not be reached by 2030 due to various problems and the assumption is that, if a process of acceleration is not initiated, it is unclear if the goals may be achieved by the set deadline.

In this regard, through a mixed method that involved both a quantitative bibliometric review, qualitative document analysis, and literature review, this study aims to analyse the main challenges which have been hindering SDGs' progress and suggest measures which may be adopted in order to accelerate the SDGs' attainment by 2030. To address these objectives, this study conducted a qualitative analysis of UN reports and official documents, including an overview of the SDGs' achievements, and a bibliometric review of publications related to the SDGs and the 2030 Agenda and the barriers to their achievement. The findings of this study have both theoretical and practical contributions by offering an overview of the general state and current trends of the field, supporting

theoretical insights for the academic community, and helping to guide measures to be undertaken by different stakeholders.

2. The SDGs and world crises

Three core areas, namely implementation, governance, and stability, are critical to the achievement of the SDGs (UN, 2022a). As such, the implementation of SDG-related programmes should be adapted to local contexts and be accompanied by good governance regarding coordination within and among nations. The third core area, namely the stability of the social, economic, political, and environmental conditions, is vital to the SDGs' achievement. Historically, crises form the basis of the catalyst that initiates social, political, and economic change, either positive or negative, in society. Global crises demonstrate how interdependent and interlinked the components of sustainable development are, which can be extended to the SDGs' achievement (Priyadarshini, 2022; UN, 2022b). Currently, the dominant crises that have negatively impacted the SDGs' attainment include the COVID-19 pandemic, conflicts, the Russia-Ukraine war, and climate change. These issues are combined with additional factors that have hindered the implementation of the global goals, as presented in Figure 1.

The COVID-19 pandemic and all its associated impacts have caused a major disruption in the efforts towards the 2030 Agenda and reinforced the interconnection among SDGs. It also reverted progress observed in some areas, especially those connected with health, employment, and education, and created additional obstacles, such as globalisation degrowth (Zhao et al., 2022). Fenner and Cernev (2021) pointed out the pandemic's impacts on increasing poverty levels (SDG 1) and the importance of universal health coverage (SDG 3). Over 90 million people were pushed into living in extreme poverty due to the pandemic, increasing the global poverty rate to 9.2% in 2020 and erasing more than 4 years of progress (UN, 2022b). In addition to the shocking number of 15 million deaths directly or indirectly caused by the Coronavirus (UN, 2022b), the COVID-19 pandemic exposed the weaknesses and unpreparedness of health systems across the world, besides other problems, such as the increase in the incidence of mental health problems and cases of tuberculosis and malaria, for example, caused by disruption of basic health services.

Another goal that has been largely discussed in view of the pandemic is SDG 13 - climate action. On the one hand, the pandemic caused climate change to be a secondary concern; on the other hand, it could be seen as an opportunity to rethink a greener transition and value the environmental benefits of the economic shutdown, such as reduced emissions and pollution levels (Shulla et al., 2021; Manzanedo & Manning, 2020). These benefits lasted for a short period, and fossil fuel emissions rebounded to higher values as soon as economic activities started returning to normal levels (UN, 2022b), increasing the concerns about climate change worldwide.

Despite the major and prevalent negative impacts of the pandemic, it also created opportunities to discuss the impact of global crises on sustainable development and the importance of partnerships (Leal Filho et al., 2020; Mukarram, 2020). For instance, Pradhan et al. (2021) highlighted several lessons to be learned from the COVID-19 pandemic which can be opportunities to promote a sustainable transformation in society, such as 1) helped to promote public health and well-being (SDG 3) as well as raised awareness on sanitation and hygiene (SDG 6); 2) increased public awareness of

responsible consumption and production (SDG 12), due to limited food availability and waste management for maintaining hygiene, which also has a positive impact on food self-sufficiency (SDG 2) and on climate actions (SDG 13), with the development of urban rooftop gardens and use of local seeds impact; disclosed a lack of holistic disaster risk management plans and the need for urban transformations (SDG 11); among other measures to be considered and implemented towards sustainable development.

In this sense, the trade-offs and synergies that exist between the SDGs can be explored by policymakers and decision-makers in the efforts towards economic growth that also take into consideration the environmental and social impacts generated (Fonseca et al., 2020; Gasper, 2019).

Figure 1. Some of the factors interfering with the SDGs.



Source: United Nations (2022)

Peace features prominently as part of the overall goal of the 2030 Agenda, namely to eradicate poverty and promote peace and prosperity for all on a healthy planet by 2030 (UN, 2015), while it is also specifically part of SDG 16 (Peace, Justice, and Strong Institutions). In fact, peace is central to the achievement of the SDGs (Zhao et al., 2022), but also pre-supposes stability, human rights, and effective governance (Kumar & Roy, 2018). Despite this requirement, Palik et al. (2022) reported that state-based conflicts reached a historic high in 2021, with nearly 85,000 battle-related deaths in 35 countries as a result of 85 state-based conflicts. These conflicts are concentrated in hotspots in the Middle East, and some areas in Africa and Asia. The number of these conflicts and associated deaths can be expected to increase further due to the impact of the Russia-Ukraine war that began in February 2022.

Related challenges include disruptions of supply chains, increased inflation, and a reduction in data collection used for monitoring the SDGs due to the combination of increased costs and a reduction of financial support by governments. The same authors also report a similar increasing trend in non-state conflict over recent years. The data show 76 non-state conflicts recorded in 2021, compared to 49 in 2012, with Africa and the Americas featuring high on the list. In the Americas, this boils down to fighting between highly organised actors, while communal conflicts are common in Africa. The consensus opinion is that these high levels of insecurity and armed violence around the world are increasingly exerting a devastating impact on the development of many countries and the achievement of the SDGs (Bin-Nashwan et al., 2022; Ben Hassen & El Bilali, 2022). Thus, economic growth is most negatively affected, since migrations and associated disruptions occur to escape from the atrocities of violence (Kumar & Roy, 2018). The Russia-Ukraine war is a prominent current example and is having alarming ripple impacts on the global economy, with particularly devastating effects for developing countries, leading to an increase in human suffering and adding to the alarm bells for the 2030 Agenda.

Climate change remains the biggest threat facing humanity nowadays, and it is making the world more dangerous. The impacts of a changing climate affect everyone, but especially the most vulnerable people. SDG 13 (Climate Action) has great synergy with other SDGs and the climate action response is interconnected with the achievement or failure of the other's goals, such as poverty reduction, water and food security, health and well-being, affordable water and energy, sustainable cities, settlements and infrastructure, and protection and preservation of life on water and land (Intergovernmental Panel on Climate Change, 2022). According to the recent SDGs Report (UN, 2022b), the current situation is a red code for humanity and the window to avoid a climate catastrophe is rapidly closing. In November 2022, the Government of the Arab Republic of Egypt hosted the 27th session of the Conference of the Parties of the UNFCCC (COP 27). This conference reinforced the urgency of the problem. It announced a historical fund, in which rich countries must pay the poor ones for climate-related 'losses and damages' resulting from droughts, floods, rising sea levels, and other disasters attributed to climate change (UN Environment Programme, 2022a).

The impact of global crises transcends national and international borders. Thus, the international community, in collaboration with academia and governments, should work together to develop common solutions in order to mitigate the impact of crises and encourage the pursuit of the SDGs targets by 2030 (UN, 2022b). The capacity of governments to plan, act, and support the SDGs should be enhanced, despite efforts to manage current crises and failure to do so.

3. Methods

This study aims to investigate the main challenges which have been hindering SDGs' progress and suggest actions which may be adopted in order to speed up the SDGs' attainment by 2030. For this purpose, an extensive document analysis of the UN reports and official documents was performed since it is a valuable research method that involves the systematic examination of existing documents to extract information and insights, contributing to triangulating the data obtained through using other methods and allowing a broad scope of analysis in order to provide the researcher with a deep understanding of the topic (Bowen, 2009).

The results obtained from the document analysis were further cross-checked against the findings of the bibliometric analysis, conducted using the co-occurrence technique. The bibliometric review is relevant to the goals of this paper since it can contribute, among several possibilities, to identifying major themes (thematic areas) of a research field (Viglia et al., 2022). Moreover, computer-aided analysis can help to identify emerging trends as well as reduce researcher bias (Wawak et al., 2020).

In this sense, the bibliometric analysis started with identifying search terms in the Scopus database, a well-known database of peer-reviewed academic literature (Piwowar-Sulej et al., 2021). Data collection was performed in January 2023 by using the combination of terms related to SDGs and barriers, and the Boolean operators “AND” and “OR”. The best combination of search strings was the following: (TITLE-ABS-KEY ("SDG*" OR "Sustainable Development Goal*" OR "2030 Agenda" OR "global goal*") AND TITLE-ABS-KEY ("barrier*" OR "constraint*")).

The initial search returned 1,846 documents considering all types of documents. Then a first exclusion criterion was applied, including only documents from 2020 to 25 January 2023. Since this study aims to investigate the current barriers to achieving the SDGs, the time frame was set up to three years, returning 1,205 documents. A second exclusion criterion was applied, i.e., only documents in English, and the search returned 1,184 documents. A third exclusion criterion was applied, i.e., only articles, books, reviews, and book chapters, and the search returned 1,051 documents, which consisted of the final sample of documents.

These were then analysed through a bibliometric analysis with the support of VOSviewer software (Van Eck & Waltman, 2021), version 1.6.17. The most frequent terms on the topic were identified by co-occurrence analysis. This analysis refers to the relationship proximity of two or more terms in a text unit, which allows the detection of the main research topics (Arita, 2017). Terms that appear close to each other are expected to be associated and correspond to thematic clusters due to their co-occurrence frequency (Van Eck & Waltman, 2021).

In this sense, to achieve the goals of this paper, both methods were deployed to access the intellectual field related to the main challenges hindering SDGs’ progress and the measures which may be adopted to accelerate the SDGs’ attainment by 2030. The authors believe, therefore, that by adopting the aforementioned methods, a comprehensive framework could emerge, contributing to the literature and developing evidence-informed knowledge for policymakers and practitioners (Seuring & Müller, 2008; Tranfield et al., 2003).

4. Results and Discussion

4.1. Analysis of UN reports and official documents

The COVID-19 pandemic and other multiple security, climate and financial crises have had disastrous effects on people’s lives (UN Economic and Social Council - ECOSOC, 2022b). Because of this, years or even decades of development advancement may have been stopped or reversed, leading to major obstacles for the SDGs and human development globally (Lafortune et al., 2022), putting the feasibility of accomplishing the

SDGs by 2030 in great danger (ECOSOC, 2022a). The COVID-19 outbreak put health systems at risk on a global scale. Healthcare facilities were overwhelmed, and many basic health services were disturbed, leading to major health threats, and even reversing years of progress in fighting other deadly diseases. In this context, it is estimated that 5.4 million people worldwide had died and that there were nearly 15 million excess deaths (UN, 2022b).

Nevertheless, as previously mentioned, the COVID-19 pandemic is generating negative consequences beyond the health sphere (UN Development Programme - UNDP, 2022). Regarding quality education, the pandemic has affected the prospects of achieving SDG 4 and the means of monitoring progress. In this regard, billions of children could not attend school because of lockdowns and lack of access to online and distance learning infrastructure, and over 100 million more fell below the basic proficiency level in reading and other areas. In addition to this, not only the standard instruments applied to monitor education progress were affected, but even the targets set regarding education may need reconsideration (UN Educational, Scientific and Cultural Organisation, 2022). It is estimated that this generation of students could face a total loss of \$17 trillion in lifetime income in present value (ECOSOC, 2022a).

From an economic standpoint, the global economy began to recover in 2021, with global output increasing by 5.5 per cent. Nevertheless, new COVID-19 variants and vaccine imbalance between countries, along with growing inflation, supply chain disturbances, policy ambiguities, and unsustainable debt of developing countries, caused the global economy to again slow down at the end of 2021 (ECOSOC, 2022a). In addition to this, for the first time in decades, global poverty levels have increased, and millions of people have been pushed back into extreme poverty. In this context, it is calculated that an extra 75–95 million people will live in extreme poverty in 2023 compared with pre-pandemic levels (ECOSOC, 2022b).

Global economic recovery has experienced unequal trends in different countries and regions and global economic growth is confronting major risks. In this regard, slow economic growth, rising inflation, poverty, inequality, unsustainable production and consumption patterns, and the current disturbances in global supply chains, along with the escalation in food and commodity prices and the severe increase in global food insecurity, increase risks for development projections and contribute to a further difference in recovery, especially in the most vulnerable countries already affected by high poverty, food insecurity, and malnutrition rates. Therefore, recovery from the pandemic and fostering the SDGs will also demand a full-scale revolution of the international financial and debt architecture (ECOSOC, 2022b).

From a gender perspective, women have also been disproportionately touched by the socioeconomic upshot of the pandemic. Because women are struggling with lost jobs, increased burdens of unpaid care work, and domestic violence, extreme poverty is likely to increase for women and girls globally. Against this background, while public policies for protecting the most vulnerable increased during COVID-19, most were short-term and gender-blind. This may explain why phenomena such as food insecurity or deficient health care assistance have affected women to a larger extent than men. Also in this context, adolescent pregnancy increased during COVID-19 (UN, 2022b).

Furthermore, the world is experiencing the highest number of violent conflicts since 1945. Roughly 2 billion people today live in conflict-affected countries. In parallel to this, the absolute number of refugees was the maximum on record in 2021, and forced displacements have persisted – actually, the number has even increased. This phenomenon has been exacerbated by the war in Ukraine, which has triggered food, fuel, and fertiliser prices to rise steeply, disturbed supply chains and global trade, and caused distress in financial markets. In essence, these multiple crises led to a scenario in which the most vulnerable are being hit the hardest (ECOSOC, 2022a).

The impacts of climate change are already being felt across the world and, to make things worse, the COVID-19 pandemic has further delayed the indispensable transition to greener economies. Based on current national promises, global emissions are set to rise by nearly 14 percent over the present decade, which could generate a climate disaster unless Governments, private actors, and civil society cooperate to take urgent action (UN Environment Programme, 2022b).

4.1.2. SDGs achievements

The in-depth analysis requested by the Committee on Development (DEVE), European Parliament, and carried out by Shulla and Leal Filho (2023), entitled ‘Achieving the UN Agenda 2030: Overall actions for the successful implementation of the Sustainable Development Goals before and after the 2030 deadline’, acknowledges some SDGs’ progress concerning decreasing poverty, improving health, building energy infrastructures based on renewables, protecting marine areas, implementing policies to support sustainable urbanisation, and supporting efforts to cut carbon emissions. At the same time, it calls attention to the fact that the SDGs are not being achieved on a global scale. Actually, the main challenges behind the UN Agenda 2030 achievement are complex, and the COVID-19 pandemic and the war in Ukraine have contributed to making the SDGs achievement more challenging (Eurostat, 2022).

When it comes to assess the investment requirements to achieve the SDGs, all goes well with the richer countries, but the poorest countries face a very different situation, thus affecting the global SDGs scores at worldwide level. In developing countries, the SDGs’ achievements are below 10% in several SDGs, i.e., 1 to 5, 7, 9, and 14, affecting, in particular, SDG 6, on clean water and sanitation, and SDG 7, on renewable energy. The latest UN Sustainable Development Goals Report (UN, 2022) provides clear evidence of the destructive impacts of crises experienced so far. In this sense, Figure 2 shows the evolution of SDGs’ achievements, presenting that the situation has in fact significantly worsened and that progress has been mostly reversed in almost every single goal (UN, 2022).

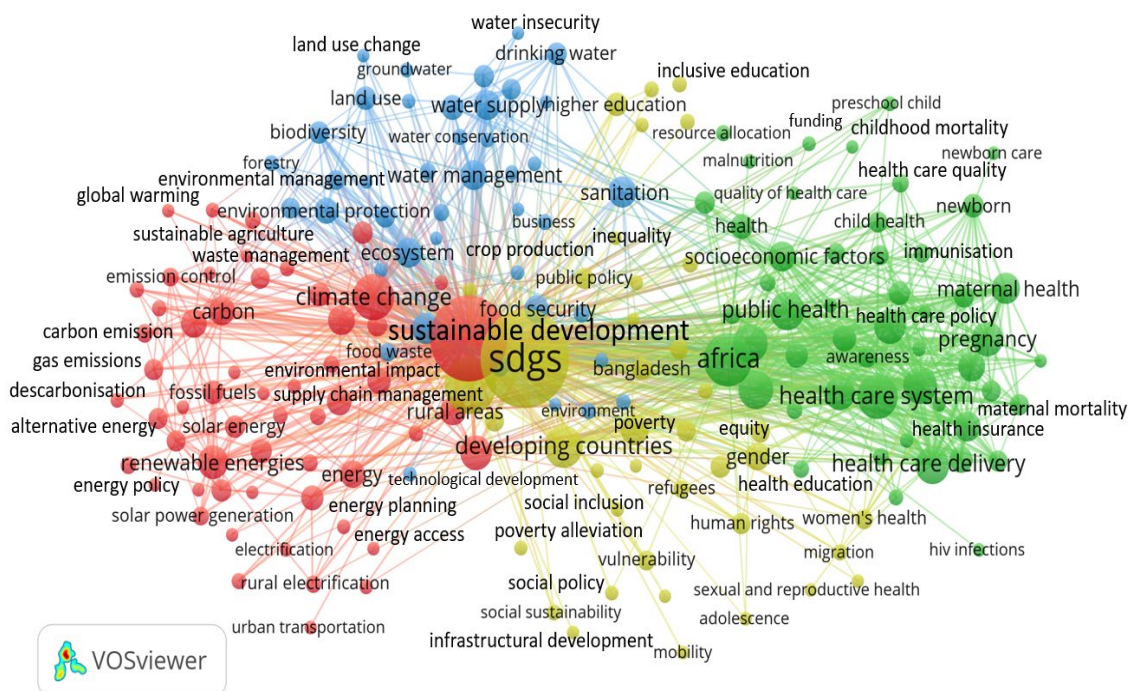
Figure 2. Sustainable Development Goals achievement progression estimation, according to the latest data from the United Nations (2022)



4.2. Bibliometric analysis

International initiatives aiming to reduce global poverty and address sustainable development issues as a global agenda are still far from satisfactory. Despite the advancements generated within the MDGs' framework, and the subsequent contribution of the 2030 Agenda to promote sustainability debates and awareness, recent events such as the COVID-19 pandemic and the war in Ukraine led to serious concerns about the probability of fully achieving the SDGs by 2030. As previously mentioned, the reasons for these concerns vary between developed and developing countries. However, according to Lopatkova (2021), while Europe leads the SDGs globally, none of its countries are on track for the SDGs' achievement. Moreover, the global SDG index shows that even the wealthiest European countries are facing difficulties in meeting their commitments to SDGs. Berg (2019) claimed that the main barrier to that is not related to a lack of data, information, and knowledge; instead, it refers to human behaviour, intentionality, preferences, values, and worldviews. In order to address the literature concerns about the topic, a keywords' co-occurrence analysis on relevant studies was carried out, followed by cluster analysis (Figure 3).

Figure 3. Keywords co-occurrence network



The yellow cluster is composed of topics related to poverty, vulnerability, social sustainability, developing countries, gender, human rights, migration, and public policies. These issues can be connected to many SDGs and are considered very complex to be solved since it involves a lot of factors and stakeholders. For instance, in developing countries, most people live under vulnerable conditions and do not have access to basic conditions (Khan et al., 2022). Women still face more critical challenges when accessing appropriate sanitation and hygiene. Some studies show that the lack of access to sanitation facilities, in Bangladesh, Zambia, and India, for example, hinders the participation of women in school and work, which contributes to exacerbating gender inequality and poverty, besides health implications (Tandon et al., 2022).

The blue cluster is related to water management, water insecurity, water supply, land use, biodiversity, sanitation, ecosystems, etc. The UN highlights sanitation as an ideal indicator for the progress of human well-being, however, it is still a key issue around the world that has caused many diseases and raised mortality rates (Adhikari & Halden, 2022). In addition to it, water pollution causes about 2 million human deaths by year (Setioningtyas et al., 2022). Furthermore, Castañeda Camey et al. (2020) found an association between water availability and gender issues, considering that, in Kenya, a strategy often used to reduce families' economic stress is the marriage of child daughters.

The green cluster focuses especially on health and related topics, such as public health, HIV infections, pregnancy, maternal health, childhood mortality, malnutrition, etc. It is important to highlight that Africa is associated with these topics and is part of this cluster too. These topics are addressed mainly by SDG 3 (Good Health and Well-Being) and its targets. However, despite some diseases could be preventable, they are still a persisting challenge in low-income countries, especially in Africa, due to low quality of care, lack of well-trained healthcare professionals, lack of proper infrastructure, and barriers to accessing medical facilities (Dahab & Sakellariou, 2020). Moreover, recent crises faced by humankind, such as the COVID-19 pandemic, have intensified the already precarious scenario.

Finally, the red cluster refers to topics such as climate change, global warming, carbon emissions, energy policies, and renewable energies. According to Dhanapal et al. (2023), the main barriers to tackling climate change are lack of climate information, limited knowledge, the low capacity of actors and institutions, and institutional weaknesses. Furthermore, in the developing countries context, in an attempt to reduce the extreme level of poverty, the level of energy consumption is increasing as well as the environmental impact, since mostly the structure of the energy supply is based on fossil fuels (Khan et al., 2022).

The nature of the data collected does not cater for specificities particular to geographical regions. Therefore, it should be stated that there are differences among the continents, which were not captured in the study.

4.4 Discussion

4.4.1 Barriers hindering the Sustainable Development Goals' achievement

The findings of this study have shown that there are many obstacles hindering the achievement of the SDGs. Countries and their authorities are principally responsible for carrying out the 2030 Agenda. The 'leave no one behind' promise of the 2030 Agenda for Sustainable Development remains unfulfilled, according to the Global Civil Society Report on the 2030 Agenda and the SDGs (Spotlight on Sustainable Development, 2021).

Leal Filho et al. (2022f) claim that the SDGs' implementation is being compromised by the magnitude and extent of resource limitation. According to their study, SDGs 3, 7, 9, 14, and 17 show signs of progress, while SDGs 2, 11, 13, 15, and 16 progress has been less significant and needs to be boosted. The most recent European Union monitoring report on progress towards the SDGs (European Union, 2022) makes it clear that our way of life is entwined with many other areas, both influencing and being impacted by other issues. Thus, for instance, resource and energy efficiency (SDG 7) are significantly

impacted by SDG 12 (responsible production and consumption), while SDG 13 (climate action) and SDG 9 (industry, innovation, and infrastructure) are also greatly impacted.

Empowering women helps to alleviate poverty (SDG 1) and to decrease gender and global inequality (SDG 5 and 10) (Gu & Nie, 2021; Leal Filho et al., 2022c; Leal Filho et al., 2022d). Poverty alleviation has to do with governance and the role of governments in addressing energy poverty has profound effects at the societal level and affects SDG1 (no poverty) (Acheampong et al., 2022). SDG 1 also has implications for SDGs 3-6 and 10 (Leal Filho et al., 2021a).

Moreover, SDG 11 (sustainable cities and communities) addresses the urban dimension and is linked to many other SDGs (e.g., 1-5, 8, 10, 16, and 17) (Sianes & Vela-Jiménez, 2020). Reliable and sustainable energy systems are linked to sustainable mobility. SDG 13 and SDG 3 (good health and well-being) are synergistically connected, and SDG 11 influences SDG 13, as the boiling summer of 2022 also showed us. The same report adds that while there are no universally significant trade-offs at the European Union level, energy consumption was negatively correlated with real GDP per capita and employment rate in 10 out of the 27 member states. As the conflict in Ukraine has shown, energy dominates our lives, impacting many SDGs.

The recent war in Ukraine is the subject of a study conducted by Lim et al. (2022) to examine what is at stake in this war. They describe the extensive effects on society, with strong restrictions on access to necessities and financial resources, raising unemployment and lowering purchasing power, increasing the number of refugees, and affecting many more countries than the troublesome area. Accordingly, the advancement of SDGs on a global scale is hampered by factors including inflation, supply shortage, incorrect information, cyber war, cyberattacks, and short- and long-term sanctions, among others. We have seen that the Ukraine war increased food prices on both domestic and global markets, which is extremely punishing for low-income countries that import food. It also disrupted the energy market, which is also very punishing for countries that import both energy and food (Behnassi & El Haiba, 2022).

Furthermore, the COVID-19 pandemic has also significantly contributed to jeopardising the achievement of the SDGs at many different levels, with devastating effects for humankind (Leal Filho et al., 2020; Leal Filho et al., 2022f), such as income reduction and poverty acceleration (SDG 1), reduced access to food (SDG 2) and healthcare (SDG 3), lack of opportunities for school education (SDG 4), gender impacts (SDG 5), unemployment (SDG 8), inequality (SDG 10), and increased conflicts (SDG 16). SDGs' implementation in this context was uneven even before the COVID-19 pandemic, with some areas needing more attention and action. However, the pandemic increased the difficulty of achieving the SDGs both within the EU and globally (European Union, 2022). Eloquent data is included in the European Statistical Recovery Dashboard (Eurostat, 2022), demonstrating how the pandemic has impacted the SDGs' accomplishment. Accordingly, examples of some reasons justifying the hindering to the SDGs' advancement are highlighted in Figure 4.

Figure 4. Barriers opposing the Sustainable Development Goals' achievement

Some of the barriers hindering the Sustainable Development Goals' achievement



The **COVID-19 pandemic** has diverted international development aid from poverty alleviation works to measures to address the pandemic, especially vaccines (Leal Filho et al., 2021a). Many developing countries were forced to take international **loans**, increasing their **debt**, which, in turn, has often led to cuts in social welfare, worsening poverty (Leal Filho et al., 2020).



The **Ukraine war** has led to a visible drop in access to grains in many African countries, leading to further food shortages, especially in countries already experiencing famine (Behnassi & El Haiba, 2022). Moreover, **climate change** is leading to crop failure and a decreased availability of food, especially in developing countries (Campbell et al., 2016; Mtintsilana et al., 2021).



Non-affordable healthcare services act as barriers to achieving health-related SDGs (Derakhshani et al., 2020). Due to the **COVID-19 pandemic**, many countries were affected by a lack of **equipment and infrastructure**, with several implications to the health and well-being of the population (Leal Filho et al., 2020).



Students' **access to learning** was affected by the COVID-19 pandemic, increasing **dropout rates** (Leal Filho et al., 2020).



Women were especially affected by **COVID-19**, with a decline in economic empowerment and an increase in domestic violence (Leal Filho et al., 2020).



A large part of the worldwide population still **lacks access to adequate sanitation and drinking water** (DownToEarth, 2021; Leal Filho et al., 2020; Neto et al., 2022).



The **COVID-19 pandemic** and the **war in Ukraine** have severely affected affordable and clean energy, endangering communities and countries and disseminating energy poverty (Liu et al., 2022).



The **COVID-19 lockdowns** have forced companies to shutdowns, increasing **unemployment** and severely affecting the economy (Leal Filho et al., 2020). The **lack of manufacturing efficiency** hinders sustainable development, affecting decent work and economic growth (Govindan, 2022).



The **lack of innovation**, through **scaling technology**, hampers industry, innovation and infrastructure (Govindan, 2022). Technology is traditionally dominated by giant companies, prioritising consumption over sustainability (Leal Filho et al., 2022f).



The COVID-19 pandemic has contributed to **widening income and wealth inequality** (Leal Filho et al., 2020; Spotlight on Sustainable Development, 2021).



Marginalised urban areas caused by residential polarisation and social segregation hampering urban sustainable development, boosted by the COVID-19 pandemic (Sianes & Vela-Jiménez, 2020).



Insufficient investment in sustainable production and consumption, aimed at energy, water and resources industry consumption, as in minimising waste generation (Dinis et al., 2022), negatively affects the SDGs achievement (Neto et al., 2022).



SDG13 on climate change is heavily affected by **non-green consumerism**, with less environmentally friendly products negatively affecting resources and manufacturing (Setioningtyas et al., 2022). Climate change is affecting food security, threatening sustainable development at a global level (Campbell et al., 2016; 2018).



Anthropogenic activities are heavily endangering the ecosystem services provided by the oceans, as heat and carbon sinks, demanding better conservation planning and coordination (Katsanevakis et al., 2020; Molony et al., 2022).



In developing countries, the data availability and quality, as lack of human resources can contribute to hinder progress on SDG15 (Pirmana et al., 2019). The **trade-offs** among conservation (SDG15) (Huan & Zhu, 2022), equity (SDG10) and climate change (SDG13) need to be considered in terms of protecting sustainable development and SDGs achievement (Zhang et al., 2021).



The still ongoing COVID-19 pandemic increases the **likelihood of conflicts** taking place and compromises the pursuit of world peace and justice (Leal Filho et al., 2020).



Challenges to the partnerships for the goals are being compromised by economy, often taking precedence over the pursuit of SDGs (Leal Filho et al., 2020; Leal Filho et al., 2022g). Institutional and legal barriers under the form **bureaucratic or commercial protectionism** can seriously hinder cooperative efforts (Leal Filho et al., 2022g).

4.4.2 Measures to accelerate the Sustainable Development Goals' implementation by 2030

Achieving the SDGs is even more important now, trying to counterbalance the many effects of the crisis the world is currently experiencing at different levels (Derakhshani et al., 2020). In this context, there are various measures which can be considered -or indeed implemented- in order to accelerate the implementation of the SDGs.

One of the first measures is to foster international solidarity (Leal Filho et al., 2022e; Leal Filho et al., 2022g), which needs to be promoted to overcome the difficulties aroused from the challenges of today. This is especially important when considering developing countries, such as African or Latin American countries, that currently rely and will continue to need to rely on financial support from the international community.

In addition, further efforts need to be made towards pursuing the SDGs in synergy with worldwide objectives, such as global action for climate change (SDG 13) (Leal Filho et al., 2022f), education (Leal Filho et al., 2021b), food supply (Behnassi & El Haiba, 2022), and sustainable development as a whole, including the need for energy transition and moving towards a low-carbon economy. The relations between energy systems and well-being, infrastructure and the environment are massively complex, and demand integrative approaches from all actors (Kroll et al., 2019; Nerini et al., 2018), mainly researchers and policy-makers.

Moreover, SDG 13 actions to reduce CO₂ emissions may have a positive impact on SDGs 3, 6, 12, 14, and 15, but cannot compromise SDGs 1, 2, 5, and 10. Therefore, harmonizing trade-offs is critical for climate action, with SDG 12 at the forefront (Campbell et al., 2018). As concluded by these authors, important elements for this process demand, among others, more public-private partnerships, networking, climate-informed decision-making, low-emission technologies and capacity-building. Another key point for balancing trade-offs is the use of strategic tools to better understand the dynamics and manage interactions between dimensions and goals (Biggeri et al., 2019).

Education plays a crucial role in achieving the SDGs. Universities, in particular, are major shareholders and have important sustainability impacts on the surrounding cities (Leal Filho et al., 2022g). Without education, it is difficult to move forward, considering the technical expertise and skills required for the successful implementation of the SDGs (Gusmão Caiado et al., 2018). Despite that and also because of that, it is not clear that the UN has until now been able to successfully convey the message in terms of SDGs dissemination and a more efficient communication strategy is necessary to reach civil society, public and private sectors audiences (McEntee-Atalianis, 2017). Furthermore, there is a need for a larger emphasis on economic justice, based on human rights and equitable access to public services, including healthcare and education, given the ongoing pandemic, the conflict in Ukraine, the current energy crisis, and the experienced climate disaster.

One further measure which may be implemented is to couple efforts in the field of climate change adaptation with specific SDGs - such as gender equality (SDG 5) (Roy et al., 2022) and sustainable infrastructure and cities (SDG 9 and SDG 11), to which nature-based solutions can be a valuable approach (Fuldauer et al., 2022). For instance, the pledges made by the Paris Agreement to transfer US\$ 100 billion per year to support

developing countries in their climate change mitigation and adaptation efforts may be closely associated with specific SDGs, apart from SDG 13 (climate action) only. More concretely, funding to support the use of drought-resilient crops may not only be related to SDG 2 (no hunger) but also SDG 1 (no poverty) by paving the way for business opportunities in trading these crops and making them widely available for farmers. The opposite - agricultural expansion, deforestation and lack of resilience concerns - would bring about increased carbon emissions and food insecurity, worsened climate change impacts, and reduced yields (Moallemi et al., 2022).

The same applies to addressing the impacts of climate change on human health, which may assist in pursuing SDG 3. The provision of funding to projects is one of the key areas of action. The existence of the 'Sustainable Development Goals Fund' was not as widely known as it should be, and this has hindered organisations from applying for it. It has been replaced by the 'Joint SDGs Fund'. However, this has mobilised a total of US\$ 250 million for 3 years, still far short of the annual US\$ 290 million target envisioned by the UN Secretary-General and agreed to the Fund's Funding Compact (UN, 2021). Here, action is needed, since the provision of funds to support the direct implementation of the UN SDGs is now a priority, bearing in mind the 2030-time horizon.

Furthermore, many universities and research organisations in developing countries face severe difficulties accessing international project funds, which require technical and managerial skills not widely available. This, in turn, makes organisations in the Global South dependent on their counterparts in rich countries to apply for funding on their behalf. This problem could be addressed by lowering the barriers currently seen. This could lead to an intensification of international cooperation, to the advantage of developing countries, fostering the implementation of SDG 17 (international partnerships) through more intense and effective cooperation among governments, institutions, agencies, private sector and public organisations, and society at large, across different industries, locations, and levels (Fonseca et al. 2020).

5. Conclusions

As this paper has shown, various elements have been hindering the implementation of the UN SDGs. Their combined impact means that they may not be achieved by 2030. The reasons, as stated in this paper entail the overall ambitions associated with the goals, which require significant global collaboration and investments, to be achieved. Also, it is a fact that many countries lack the resources and infrastructure needed to implement the necessary policies and programmes to put the SDGs into practice.

This paper has some limitations. The first is the fact that it is based on a bibliometric analysis and gathering of trends from the international literature, with no interviews or other empirical data tools. Secondly, the paper did not analyse specific trends among geographical regions. Finally, the paper focused on the implementation of the SDGs as a whole and not on specific aspects (e.g. finances). Despite these constraints, the paper provides a welcome addition to the literature since it sheds light on a worrying trend. In this context, the implications of this paper are two-fold: it draws attention to a serious problem with worldwide implications, since a non-implementation of the SDGs may negatively influence the lives of millions of people round the world. Also, the paper outlines some of the actions which may be undertaken, in order to tackle the problem. It is expected that this study may inspire more research,

especially studies aimed at increasing the speed with which the SDGs are implemented.

A further matter important to reiterate is the fact that in many cases, the pursuit of the SDGs is hampered by corruption and mismanagement, as well as political instability in some countries and regions. These add to the current pressures. Moreover, the impacts of climate change, the current economic crises, and other environmental challenges may impede progress towards implementing these goals.

This state of affairs calls for measures to address the problem. Some of them may include:

1. Establishing a well-supplied SDGs Financing Facility, to provide a reliable and uncomplicated source of financing for countries to achieve the SDGs.
2. Strengthening international cooperation in the implementation of the SDGs, promoting good practice.
3. Encouraging partnerships between government, civil society, and the private sector to accelerate progress towards the SDGs.
4. Investing in quality education to ensure the next generation is equipped with the skills and knowledge needed to achieve the SDGs.
5. Strengthening data and monitoring systems to ensure accurate and timely reporting on progress towards the SDGs and disseminate successful examples of implementation.
6. Investing in infrastructure projects to ensure access to clean water, energy, and other essential services, since these demonstrate, in practice, how the SDGs may be achieved.
7. Improving governance systems and ensuring accountability for progress towards the SDGs, with checks of progress against pre-set targets.

Finally, there is a perceived need to tackle inequalities, to ensure that all individuals have access to the resources they need to reach their full potential. Inequalities are also among the major barriers to implementing the SDGs and need to be properly addressed.

In respect of future trends, the fact that the year 2030 is rapidly approaching means that there is no time to waste. The fact that there are many plans in place means that it is important to begin implementing them- or intensify their implementation- as soon as possible. This involves investing more in infrastructure, improving access to services, and creating new jobs. Finally, it is important to ensure that the progress made is sustained over the long term by continuously evaluating the effectiveness of the current strategies and making adjustments as needed.

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References

- Acheampong, A. O., Shahbaz, M., Dzator, J., & Jiao, Z. (2022). Effects of income inequality and governance on energy poverty alleviation: Implications for sustainable development policy. *Utilities Policy*, 78, 1-30. <https://doi.org/10.1016/j.jup.2022.101403>
- Adhikari, S., & Halden, R. U. (2022). Opportunities and limits of wastewater-based epidemiology for tracking global health and attainment of UN sustainable development goals. *Environment International*, 163, 1-9. <https://doi.org/10.1016/j.envint.2022.107217>
- Arita, H. T. (2017). Multisite and multispecies measures of overlap co-occurrence and co-diversity. *Ecography*, 40, 709-718. <https://doi.org/10.1111/ecog.01942>
- Behnassi, M., & El Haiba, M. (2022). Implications of the Russia-Ukraine war for global food security. *Nat Hum Behav*, 6(6), 754-755. <https://doi.org/10.1038/s41562-022-01391-x>
- Ben Hassen, T. and El Bilali, H., 2022. Impacts of the Russia-Ukraine war on global food security: towards more sustainable and resilient food systems? *Foods*, 11(15), 1-17. <https://doi.org/10.3390/foods11152301>
- Berg, C. (2019). Sustainable Action: Overcoming the Barriers (1st ed.). Routledge. <https://doi.org/10.4324/9780429060786>
- Biggeri, M., Clark, D. A., Ferrannini, A., & Mauro, V. (2019). Tracking the SDGs in an 'integrated' manner: A proposal for a new index to capture synergies and trade-offs between and within goals. *World Development*, 122, 628-647. <https://doi.org/10.1016/j.worlddev.2019.05.022>
- Bin-Nashwan, S.A., Hassan, M.K. and Muneeza, A., 2022. Russia–Ukraine conflict: 2030 Agenda for SDGs hangs in the balance. *International Journal of Ethics and Systems*, 1-14. <http://dx.doi.org/10.1108/IJOES-06-2022-0136>
- Bowen, G. A. (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*, 9(2), 27–40. <https://doi.org/10.3316/QRJ0902027>
- Campbell, B. M., Hansen, J., Rioux, J., Stirling, C. M., Twomlow, S., & Wollenberg, E. (2018). Urgent action to combat climate change and its impacts (SDG 13): transforming agriculture and food systems. *Current Opinion in Environmental Sustainability*, 34, 13-20. <https://doi.org/10.1016/j.cosust.2018.06.005>
- Castañeda Camey, I., Sabater, L., Owren, C., & Boyer, A. E. (2020). Gender-based violence and environment linkages: The violence of inequality. In J. Wen (Ed.), IUCN, International union for conservation of nature. 272 p. <https://doi.org/10.2305/IUCN.CH.2020.03.en>
- Dahab, R., & Sakellariou, D. (2020). Barriers to Accessing Maternal Care in Low Income Countries in Africa: A Systematic Review. *International Journal of Environmental Research and Public Health*, 17(12), 1-16. <https://doi.org/10.3390/ijerph17124292>
- Derakhshani, N., Doshmangir, L., Ahmadi, A., Fakhri, A., Sadeghi-Bazargani, H., & Gordeev, V. S. (2020). Monitoring Process Barriers and Enablers Towards Universal Health Coverage Within the Sustainable Development Goals: A Systematic Review and

- Content Analysis. *Clinicoecon Outcomes Research*, 12, 459-472.
<https://doi.org/10.2147/CEOR.S254946>
- Dhanapal, G., Gupta, D., & Prakash, A. (2023). Barriers and opportunities in achieving climate and sustainable development goals in India: A multilevel analysis. *Journal of Integrative Environmental Sciences*, 20(1), 1–16.
<https://doi.org/10.1080/1943815X.2022.2163665>
- Ejsmont, K., Gladysz, B., & Kluczek, A. (2020). Impact of Industry 4.0 on Sustainability—Bibliometric Literature Review. *Sustainability*, 12(14), 1-29.
<https://doi.org/10.3390/su12145650>
- ElMassah, S., & Mohieldin, M. (2020). Digital Transformation and Localizing the Sustainable Development Goals (SDGs). *Ecological Economics*, 169, 1-12.
<https://doi.org/10.1016/j.ecolecon.2019.106490>
- European Union. (2022). *Sustainable development in the European Union — Monitoring report on progress towards the SDGs in an EU context*. Publications Office of the European Union. <https://doi.org/10.2785/313289>
- Eurostat. (2022). *European Statistical Recovery Dashboard*.
<https://ec.europa.eu/eurostat/cache/recovery-dashboard/>
- Fenner, R., & Cernev, T. (2021). The implications of the Covid-19 pandemic for delivering the Sustainable Development Goals. *Futures*, 128, 1-12.
<https://doi.org/10.1016/j.futures.2021.102726>
- Fonseca, L. (2022). The EFQM 2020 model. A theoretical and critical review. *Total Quality Management & Business Excellence*, 33(9–10), 1011–1038.
<https://doi.org/10.1080/14783363.2021.1915121>
- Fonseca, L. M., Domingues, J. P., & Dima, A. M. (2020). Mapping the Sustainable Development Goals Relationships. *Sustainability*, 12(8), 1-15.
<https://doi.org/10.3390/su12083359>
- Fonseca, L., Amaral, A., & Oliveira, J. (2021). Quality 4.0: The EFQM 2020 Model and Industry 4.0 Relationships and Implications. *Sustainability*, 13(6), 1-20.
<https://doi.org/10.3390/su13063107>
- Fonseca, L., Domingues, J., Pereira, M., Martins, F., & Zimon, D. (2018). Assessment of Circular Economy within Portuguese Organizations. *Sustainability*, 10(7), 1-24.
<https://doi.org/10.3390/su10072521>
- Fuldauer, L. I., Thacker, S., Haggis, R. A., Fuso-Nerini, F., Nicholls, R. J., & Hall, J. W. (2022). Targeting climate adaptation to safeguard and advance the Sustainable Development Goals. *Nature Communications*, 13(1), 1-15.
<https://doi.org/10.1038/s41467-022-31202-w>
- Fuso Nerini, F., Tomei, J., To, L. S., Bisaga, I., Parikh, P., Black, M., ... & Mulugetta, Y. (2018). Mapping synergies and trade-offs between energy and the Sustainable Development Goals. *Nature Energy*, 3(1), 10-15. <https://doi.org/10.1038/s41560-017-0036-5>
- Gaspar, D. (2019). The road to the Sustainable Development Goals: building global alliances and norms. *Journal of Global Ethics*, 15(2), 118–137.
<https://doi.org/10.1080/17449626.2019.1639532>

- Ghobakhloo, M. (2020). Industry 4.0, digitization, and opportunities for sustainability. *Journal of Cleaner Production*, 252, 1-21. <https://doi.org/10.1016/j.jclepro.2019.119869>
- Gu, R., & Nie, F.-y. (2021). Does empowering women benefit poverty reduction? Evidence from a multi-component program in the Inner Mongolia Autonomous Region of China. *Journal of Integrative Agriculture*, 20(4), 1092-1106. [https://doi.org/10.1016/s2095-3119\(20\)63436-0](https://doi.org/10.1016/s2095-3119(20)63436-0)
- Gusmão Caiado, R. G., Leal Filho, W., Quelhas, O. L. G., Luiz de Mattos Nascimento, D., & Ávila, L. V. (2018). A literature-based review on potentials and constraints in the implementation of the sustainable development goals. *Journal of Cleaner Production*, 198, 1276-1288. <https://doi.org/10.1016/j.jclepro.2018.07.102>
- Holden, E., Linnerud, K., & Banister, D. (2017). The Imperatives of Sustainable Development: The Imperatives of Sustainable Development. *Sustainable Development*, 25(3), 213–226. <https://doi.org/10.1002/sd.1647>
- Intergovernmental Panel on Climate Change – IPCC. (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. Cambridge University Press, Cambridge, UK and New York, NY, USA, 3056 pp. <http://dx.doi.org/10.1017/9781009325844>.
- Kerekes, S. (2021). Chasing the Impossible. Sustainable development is a wicked problem, but it can be and should be tamed! *World futures*, 1–12. <https://doi.org/10.1080/02604027.2021.1974263>
- Khan, S., Yahong, W., & Zeeshan, A. (2022). Impact of poverty and income inequality on the ecological footprint in Asian developing economies: Assessment of Sustainable Development Goals. *Energy Reports*, 8, 670–679. <https://doi.org/10.1016/j.egyr.2021.12.001>
- Kroll, C., Warchold, A., & Pradhan, P. (2019). Sustainable Development Goals (SDGs): Are we successful in turning trade-offs into synergies? *Palgrave Communications*, 5(1), 1-11. <https://doi.org/10.1057/s41599-019-0335-5>
- Kumar, R. and Roy, P., 2018. War and peace: Is our world serious about achieving Sustainable Development Goals by 2030? *Journal of Family Medicine and Primary Care*, 7(6), 1153-1156. https://doi.org/10.4103%2Fjfmmpc.jfmmpc_231_18
- Lafortune, G., Fuller, G., Bermont Diaz, L., Klope-Lesch, A., Koundouri, P., & Riccaboni, A. (2022). *Achieving the SDGs: Europe's Compass in a Multipolar World. Europe Sustainable Development Report 2022*.
- Leal Filho, W., Brandli, L. L., Lange Salvia, A., Rayman-Bacchus, L., & Platje, J. (2020). COVID-19 and the UN Sustainable Development Goals: Threat to Solidarity or an Opportunity? *Sustainability*, 12(13), 1-14. <https://doi.org/10.3390/su12135343>
- Leal Filho, W., Caughman, L., Pimenta Dinis, M. A., Frankenberger, F., Azul, A. M., & Salvia, A. L. (2022a). Towards symbiotic approaches between universities, sustainable development, and cities. *Scientific Reports*, 12(1), 1-8 <https://doi.org/10.1038/s41598-022-15717-2>

- Leal Filho, W., Dinis, M. A. P., Ruiz-de-Maya, S., Doni, F., Eustachio, J. H., Swart, J., & Paço, A. (2022b). The Economics of the UN Sustainable Development Goals: does sustainability make financial sense? *Discover Sustainability*, 3, 1-8. <https://doi.org/10.1007/s43621-022-00088-5>
- Leal Filho, W., Eustachio, J. H. P. P., Dinis, M. A. P., Sharifi, A., Venkatesan, M., Donkor, F. K., Doni, F., Abubakar, I. R., Cichos, K., & Vargas-Hernández, J. (2022c). Transient Poverty in a Sustainable Development Context. *International Journal of Sustainable Development & World Ecology*, 29(5), 415-428. <https://doi.org/10.1080/13504509.2022.2029612>
- Leal Filho, W., Kovaleva, M., Tsani, S., Țircă, D.-M., Shiel, C., Dinis, M. A. P., Nicolau, M., Sima, M., Fritzen, B., Salvia, A. L., Minhas, A., Kozlova, V., Doni, F., Spiteri, J., Gupta, T., Wakunuma, K., Sharma, M., Barbir, J., Shulla, K., . . . Tripathi, S. (2022d). Promoting gender equality across the sustainable development goals. *Environment, Development and Sustainability*, 1-22. <https://doi.org/10.1007/s10668-022-02656-1>
- Leal Filho, W., Lovren, V. O., Will, M., Salvia, A. L., & Frankenberger, F. (2021a). Poverty: A central barrier to the implementation of the UN Sustainable Development Goals. *Environmental Science & Policy*, 125, 96-104. <https://doi.org/10.1016/j.envsci.2021.08.020>
- Leal Filho, W., Sima, M., Sharifi, A., Luetz, J. M., Salvia, A. L., Mifsud, M., Olooto, F. M., Djekic, I., Anholon, R., Rampasso, I., Donkor, F., Dinis, M. A. P., Klavins, M., Finnveden, G., Chari, M. M., Molthan-Hill, P., Mifsud, A., Sen, S. K., & Lokupitiya, E. (2021b). Handling climate change education at universities: an overview. *Environmental Sciences Europe*, 33, 1-19. <https://doi.org/10.1186/s12302-021-00552-5>
- Leal Filho, W., Vasconcelos, C. R. P., Dinis, M. A. P., & Trevisan, L. V. (2022e). Commentary - empty promises: why declarations and international cooperation on sustainable development often fail to deliver. *International Journal of Sustainable Development & World Ecology*, 29(8), 850-857. <https://doi.org/10.1080/13504509.2022.2107108>
- Leal Filho, W., Vidal, D. G., Chen, C., Petrova, M., Dinis, M. A. P., Yang, P., Rogers, S., Álvarez-Castañón, L. d. C., Djekic, I., Sharifi, A., & Neiva, S. (2022f). An assessment of requirements in investments, new technologies and infrastructures to achieve the SDGs. *Environmental Sciences Europe*, 34, 1-17. <https://doi.org/10.1186/s12302-022-00629-9>
- Leal Filho, W., Wall, T., Barbir, J., Alverio, G. N., Dinis, M. A. P., & Ramirez, J. (2022g). Relevance of International Partnerships in the Implementation of the UN Sustainable Development Goals. *Nature Communications*, 13(1), 1-4. <https://doi.org/10.1038/s41467-022-28230-x>
- Lim, W. M., Chin, M. W. C., Ee, Y. S., Fung, C. Y., Giang, C. S., Heng, K. S., Kong, M. L. F., Lim, A. S. S., Lim, B. C. Y., Lim, R. T. H., Lim, T. Y., Ling, C. C., Mandrinos, S., Nwobodo, S., Phang, C. S. C., She, L., Sim, C. H., Su, S. I., Wee, G. W. E., & Weissmann, M. A. (2022). What is at stake in a war? A prospective evaluation of the Ukraine and Russia conflict for business and society. *Global Business and Organizational Excellence*, 23-36. <https://doi.org/10.1002/joe.22162>

- Lopatkova, Y. (2021). Achieving sustainable development: A baseline analysis of Western and Eastern European countries. *R-Economy*, 7(1), 18–27. <https://doi.org/10.15826/recon.2021.7.1.002>
- Manzanedo, R. D., & Manning, P. (2020). COVID-19: Lessons for the climate change emergency. *Science of the Total Environment*, 742, 1-4. <https://doi.org/10.1016/j.scitotenv.2020.140563>
- McEntee-Atalianis, L. J. (2017). “Leave no one behind”. *Language Problems and Language Planning*, 41(3), 217-244. <https://doi.org/10.1075/lplp.00001.mce>
- Moallemi, E. A., Hosseini, S. H., Eker, S., Gao, L., Bertone, E., Szetey, K., & Bryan, B. A. (2022). Eight Archetypes of Sustainable Development Goal (SDG) Synergies and Trade-Offs. *Earth's Future*, 10(9), 1-21. <https://doi.org/10.1029/2022EF002873>
- Mukarram, M. (2020). Impact of COVID-19 on the UN sustainable development goals (SDGs). *Strategic Analysis*, 44(3), 253-258. <https://doi.org/10.1080/09700161.2020.1788363>
- Murthy, M. A. N., Sangwan, K. S., & Narahari, N. S. (2022). Tracing evolution of EFQM and its relationship with Industry 4.0. *Total Quality Management & Business Excellence*, 33(15–16), 1737–1776. <https://doi.org/10.1080/14783363.2021.1999802>
- Palik, J., Obermeier, A.M. and Rustad, S.A., 2022. Conflict Trends: A Global Overview, 1946–2021. *PRIO Paper*. Oslo: PRIO.
- Panchal, R., Singh, A., & Diwan, H. (2021). Does circular economy performance lead to sustainable development? – A systematic literature review. *Journal of Environmental Management*, 293, 1-21. <https://doi.org/10.1016/j.jenvman.2021.112811>
- Piwowar-Sulej, K., Krzywonos, M., & Kwil, I. (2021). Environmental entrepreneurship – Bibliometric and content analysis of the subject literature based on H-Core. *Journal of Cleaner Production*, 295, 1-25. <https://doi.org/10.1016/j.jclepro.2021.126277>
- Pradhan, P., Subedi, D. R., Khatiwada, D., Joshi, K. K., Kafle, S., Chhetri, R. P., et al. (2021). The COVID-19 pandemic not only poses challenges, but also opens opportunities for sustainable transformation. *Earth's Future*, 9, 1-14. <https://doi.org/10.1029/2021EF001996>
- Priyadarshini, P., 2022. The COVID-19 Pandemic has derailed the Progress of the Sustainable Development Goals, *Anthropocene Science*, 1, 410-412. <https://doi.org/10.1007/s44177-022-00032-2>
- Roy, J., Prakash, A., Some, S., Singh, C., Bezner Kerr, R., Caretta, M. A., ... & Tandon, I. (2022). Synergies and trade-offs between climate change adaptation options and gender equality: a review of the global literature. *Humanities and Social Sciences Communications*, 9(1), 1-13. <https://doi.org/10.1057/s41599-022-01266-6>
- Saner, R., You, L., & Nguyen, M. (2020). Monitoring the SDGs: Digital and Social Technologies to Ensure Citizen Participation, Inclusiveness and Transparency. *Development Policy Review*, 38(4), 483–500. <https://doi.org/10.1111/dpr.12433>
- Schwindenhammer, S., Gonglach, D. (2021). SDG Implementation through Technology? Governing Food-Water-Technology Nexus Challenges in Urban Agriculture. *Politics and Governance*, 9(1), 176–86. <https://doi.org/10.17645/pag.v9i1.3590>

- Setioningtyas, W. P., Illés, C. B., Dunay, A., Hadi, A., & Wibowo, T. S. (2022). Environmental Economics and the SDGs: A Review of Their Relationships and Barriers. *Sustainability*, 14(12), 1-24. <https://doi.org/10.3390/su14127513>
- Seuring, S., & Müller, M. (2008). From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production*, 16(15), 1699–1710. <https://doi.org/10.1016/j.jclepro.2008.04.020>
- Shulla, K., & Leal Filho, W. (2023). *Achieving the UN Agenda 2030: Overall actions for the successful implementation of the Sustainable Development Goals before and after the 2030 deadline*. E. Parliament. [https://www.europarl.europa.eu/thinktank/en/document/EXPO_IDA\(2022\)702576](https://www.europarl.europa.eu/thinktank/en/document/EXPO_IDA(2022)702576)
- Shulla, K., Voigt, B. F., Cibian, S., Scandone, G., Martinez, E., Nelkovski, F., & Salehi, P. (2021). Effects of COVID-19 on the sustainable development goals (SDGs). *Discover Sustainability*, 2(1), 1-19. <https://doi.org/10.1007/s43621-021-00026-x>
- Sianes, A., & Vela-Jiménez, R. (2020). Can Differing Opinions Hinder Partnerships for the Localization of the Sustainable Development Goals? Evidence from Marginalized Urban Areas in Andalusia. *Sustainability*, 12(14), 1-20. <https://doi.org/10.3390/su12145797>
- Spotlight on Sustainable Development. (2021). *Demanding justice beyond rhetoric*. <https://www.2030spotlight.org/en/book/2495/chapter/demanding-justice-beyond-rhetoric>
- Stokstad, E. (2015). Sustainable goals from U.N. under fire. *Science*, 347(6223), 702–703. <https://doi.org/10.1126/science.347.6223.702>
- Tandon, I., Wallace, C., Caretta, M. A., Vij, S., & Irvine, A. (2022). Urban water insecurity and its gendered impacts: On the gaps in climate change adaptation and Sustainable Development Goals. *Climate and Development*, 1–12. <https://doi.org/10.1080/17565529.2022.2051418>
- Terra dos Santos, L. C., Giannetti, B. F., Agostinho, F., & Almeida, C. M. V. B. (2022). Using the five sectors sustainability model to verify the relationship between circularity and sustainability. *Journal of Cleaner Production*, 366, 1-11. <https://doi.org/10.1016/j.jclepro.2022.132890>
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. *British Journal of Management*, 14(3), 207–222. <https://doi.org/10.1111/1467-8551.00375>
- United Nations Development Programme - UNDP. (2022). *Human Development Report 2021/2022* (N° 9789211264517).
- United Nations Economic and Social Council - ECOSOC. (2022a). *High-Level Political Forum Ministerial Declaration*. <https://doi.org/10.1093/oxfordhb/9780199560103.003.0007>
- United Nations Economic and Social Council - ECOSOC. (2022b). *Progress towards the Sustainable Development Goals. Report of the Secretary-General* (N° 9780191577468; April).

- United Nations Educational, Scientific and Cultural Organisation. (2022). Non-state actors in education. Who chooses? Who loses? *Global Education Monitoring Report* (N° 9789231005060).
- United Nations Environment Programme (2022a). COP27 ends with announcement of historic loss and damage fund. Available at <https://www.unep.org/>.
- United Nations Environment Programme. (2022b). *Emissions Gap Report 2022: The Closing Window—CLimate crisis calls for rapid transformation of societies* (N° 9789280739794).
- United Nations. (2000). Millennium Development Goals. <https://www.un.org/millenniumgoals>
- United Nations. (2015). Sustainable Development Goals (SDGs). <https://sdgs.un.org/>
- United Nations. (2021). *Financing United Nations Catalytic Action to 'Rescue' the Sustainable Development Goals*. 2021 Annual Report. United Nations, New York.
- United Nations. (2022a). Convergence of conflicts, COVID and climate crises, jeopardize global goals. <https://news.un.org/en/story/2022/07/1122112>.
- United Nations. (2022b). *The Sustainable Development Goals Report 2022*. United Nations, Department of Economic and Social Affairs. <https://www.un.org/development/desa/dspd/2022/07/sdgs-report/>
- Van Eck, N. J., & Waltman, L. (2021). Manual for VOSviewer Version 1.6.16. CWTS Meaningful Metrics, Universiteit Leiden.
- Viglia, G., Kumar, S., Pandey, N., & Joshi, Y. (2022). Forty years of The Service Industries Journal: A bibliometric review. *The Service Industries Journal*, 42(1–2), 1–20. <https://doi.org/10.1080/02642069.2021.2003341>
- Warchold, A., Pradhan, P., Thapa, P., Putra, M. P. I. F., Kropp, J. P. (2022). Building a Unified Sustainable Development Goal Database: Why Does Sustainable Development Goal Data Selection Matter? *Sustainable Development*, 30(5), 1278–93. <https://doi.org/10.1002/sd.2316>
- Wawak, S., Rogala, P., & Dahlggaard-Park, S. M. (2020). Research trends in quality management in years 2000-2019. *International Journal of Quality and Service Sciences*, 12(4), 417–433. <https://doi.org/10.1108/IJQSS-12-2019-0133>
- World Commission on Environment and Development (WCED). (1987). *Our Common Future*. World Commission on Environment and Development. Oxford University Press, Oxford.
- Zhao, W., Yin, C., Hua, T., Meadows, M.E., Li, Y., Liu, Y., Cherubini, F., Pereira, P. and Fu, B., 2022. Achieving the Sustainable Development Goals in the post-pandemic era. *Humanities and Social Sciences Communications*, 9(1), 1-7. <http://dx.doi.org/10.1057/s41599-022-01283-5>