Committee: United Nations Environment Programme (UNEP)

Issue: The contribution of technology to sustainable development

Student Officer: Ilianna Mavroeidi

Position: Deputy President

INTRODUCTION

Personal Introduction

Dear delegates,

My name is Ilianna Mavroeidi, and I am currently attending the 11th grade of Pierce-The American College of Greece. This year, I will have the absolute honor to serve as a Deputy President of the United Nations Environment Programme (UNEP) in the 7th Arsakeia-Tositseia Schools Model United Nations conference.

I started MUN last year and since then I have fallen in love with it because it is advantageous for the future, it provides you with knowledge of the world and useful experience, and it contributes to fostering long-lasting friendships. This is going to be my second time chairing and I am particularly delighted that it is going to be in the UNEP committee seeing as it is one of my favorite committees.

This year's topics in the UNEP are extremely heated and prominent since they refer to issues related to technology and technological advancements. I am going to have the utmost pleasure to serve as the expert chair on the topic of "The contribution of technology to sustainable development".

This study guide will serve as a basis of your preparation and at this point, I would like to stress that you should not limit it only to this document but also, conduct further research on your own. To do this, you can also take advantage of the bibliography, which you will find towards the end of the study guide. Should you have any inquiries, do not hesitate to contact me at: Ilianna.mavroeidi@acg.edu.

I wish you all a fruitful debate and I look forward to meeting you at the conference in November!

Yours truly,

Ilianna Mavroeidi

Topic Introduction

Ban Ki-Moon, the eighth Secretary General of the United Nations (UN), once remarked that "Sustainable Development is the pathway to the future we want for all". We live in a world which constantly strives to achieve sustainability, and which is characterized by dependency on technology. Many argue that we should try to use technology to achieve sustainability, but at the same time, others support that this could be proven detrimental.

Undeniably, technology has been the root of many of the current problems which hinder humanity's attempts for sustainable development. Nevertheless, we must try to transform our weaknesses to our strengths and take advantage of technological advancements to accelerate our journey towards sustainability.

As to how we can do that, it has been proven through experimenting and researching, that modern, innovative technologies can indeed contribute to the world's attempts for sustainable development. Some of the hundreds of examples where this is applicable are, inter alia, water purification and filtration systems in addition to hygiene technologies which could help more people gain access to clean water and sanitation facilities and electric vehicles which could help mitigate harmful emissions and result in a less toxic, bearable environment. Other examples include algorithms, data analysis and examination for the efficient, responsible use of natural resources, renewable energy technologies (such as, photovoltaics, wind turbines and hydropower generators) for the exploitation of renewable energy sources. Evidently, there are limitless ways in which the world can take advantage of technology to accomplish its goal for sustainability.

To conclude, as the principle of sustainable development becomes increasingly popular globally and as the field of technology expands and is being gradually incorporated into all our lives, it is time to understand that only if we use technology to realize sustainable development, will we be able to light up the road ahead of us and eventually, find the pathway to the ideal future.

DEFINITION OF KEY TERMS

Artificial Intelligence (AI) [1]

"Artificial intelligence (AI) is the ability of a computer, or a robot controlled by a computer to do tasks that are usually done by humans because they require human intelligence and discernment."

Big data

Big data refers to larger and more complicated sets of data, particularly those derived from new data sources. These data sets are deemed complex and standard data processing technologies cannot control them. However, these huge amounts of data can be utilized to tackle business challenges that were previously unsolvable. It is characterized by four words, the four Vs, namely: high volume (size and storage), high variety (many types of data), fast velocity (frequency of collection) or variable veracity (confidence).

Blockchain

A blockchain is a category of database or regulated collection of information, stored by electronic means, with a special type of data structure. In a blockchain, the information is gathered in groups (blocks) with a specific storage capacity so that when all available storage is occupied, another group is being created, attached onto the previous one, forming a kind of chain. Due to its complex structure and thorough analysis of data, blockchain allows users to track a piece of information all the way to and from its initial source while remaining encrypted so as to ensure security and trust.

Citizen science [2]

"Citizen science is the practice of public participation and collaboration in scientific research to increase scientific knowledge. Through citizen science, people share and contribute to data monitoring and collection programs."

Financial technology

Financial technology or "fintech" is a term which first surfaced in the 21st century and is used to refer to modern, innovative technologies, primarily used by businesses, which facilitate financial transactions and improve financial services. Examples of financial

[1] Copeland, B. J. "Artificial Intelligence | Definition, Examples, and Applications." Encyclopedia Britannica, www.britannica.com/technology/artificial-intelligence.
[2] National Geographic Society. "Citizen Science." National Geographic Society, 9 Oct. 2012, www.nationalgeographic.org/encyclopedia/citizen-science/.

technology are, inter alias, Artificial Intelligence (AI), the Internet of Things (IoT), big data and blockchain.

Information and Communications Technology (ICT)

Information and Communications Technology (ICT) refers to the software, hardware and infrastructure which grant access to data through telecommunications. It comprises devices that save, analyze, transmit, change, copy or retrieve electronic data. For instance, mobile phones, video equipment, applications, desk products are types of ICTs.

Internet of Things (IoT)

The IoT refers to a network of devices connected to the internet, with the capability to transfer data without the requirement of human intervention.

Smart technology

The SMART in smart technology stands for Self-Monitoring, Analysis and Reporting Technology and the term refers to all the inanimate items which, in a way, interact with humans and steer their actions. Some examples would be the smart watch, smart TV and smart home.

Sustainability[3]

"Sustainability is a term that indicates the quality of causing little or no damage to the environment and therefore able to continue for a long time". Sustainability refers to a long-term objective.

Sustainable development[4]

"Sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs". It is related to the means through which we can accomplish the long-term goal of sustainability.

Sustainable technology

Sustainable technology or "Cleantech" refers to innovations that utilize natural resources while also promoting economic and social growth. Such technologies aim to significantly decrease environmental and ecological concerns as well as to produce long-term, sustainable results. It is outlined by three main characteristics: substitution (from non-

[3] "Sustainability." Cambridge Dictionary | English Dictionary, Translations & Thesaurus, dictionary.cambridge.org/dictionary/english/sustainability.
[4] IISD. "Sustainable Development." International Institute for Sustainable Development, www.iisd.org/about-iisd/sustainable-development.

renewable to renewable resources), efficiency (savings in the amounts of resources and energy) and prevention (of pollution, harmful emissions, and other detrimental environmental consequences).

BACKGROUND INFORMATION

Millions of years ago, in the Early Stone Age, technology made its first appearance in the form of tools, a slightly dissimilar type of technology than what most people have in mind nowadays. Regardless, it has helped humanity evolve and survive and it will continue to do so for the years to come. In an era when the planet is facing innumerable challenges, it is time for it to be utilized as a mean to save the environment and guide the Earth towards prosperity. Technology and its derivatives can contribute to humanity's attempts to achieve sustainable development in various ways and through various methods.

Financial Technology (Fintech)

Fintech consists of four main technology families: the internet of things (IoT), big data, artificial intelligence (AI) and blockchain. All of the aforementioned can be found extremely useful for sustainable development. Financial technologies are often used in water science and management, doing actions such as tracking fish, predicting the future of various freshwater sources, measure sea level and temperature rise. There have been many projects taking advantage of those technologies to examine the above and many more examples.

To begin with, the IoT accumulates an abundance of data by devices or users and is then able to perform, or help scientists perform, a variety of actions which facilitate the world's journey towards sustainability. With the help of sensors and other special infrastructure and devices, it can, among others, track weather changes, atmosphere and ocean temperatures, sea level rise, endangered species, precipitation and evaluate information to predict future events and disasters. The IoT collects an immense amount of data which results in voluminous data sets known as big data. Big data contains a variety and huge amount of information, and it is reliable and fast, thus it can help people store, find and examine the data easily in order to make predictions about future environment challenges as

well as discover ways to solve them. However, big data can sometimes be complex and costly to use, even for specialists, let alone for the public.

Figure 1[5]***:*** *Image depicting the impact of AI on the targets of the SDGs within the environment sector.*

AI is what facilitates the whole process. It gathers information from big data to learn what actions it has to do. It processes the data collected from big data and the build their own intelligence, predicting the future. AI can predict and project everything, from the impact of ice melting on the sea to population growth, and it has been proven extremely valuable in regard to the accomplishment of the sustainable development goals (SDGs). Nevertheless, there are many factors which adulterate the correct and credible results AI can usually produce. To address those factors, a key is to use blockchain which can trace a product from its source and examine its course. Considering it is encrypted, blockchain is very trustworthy and makes sure users can rely on the information obtained from AI machines. It is commonly used in cases with fishing issues since, by tracking its journey all the way to the beginning, it can discover if a fish was illegally caught or if it came from a "legal" source.

Application of Smart Technology (Smart Cities)

Smart technology can be harnessed for the development of green, smart, sustainable cities. To address urban development issues, it is necessary to turn cities into smart ones, ones that rely on smart, green technology. Nonetheless, there will be many obstacles and challenges which will rise in the way, such as limited resources and management, a lack of infrastructure, and the digital gap among citizens. The key to problems similar to the above are smart solutions: evidence-based planning, planning that relies on knowledge obtained from sets of data and information and used for the achievement of optimum results as well

[5] Vinuesa, Ricardo, et al. "The Role of Artificial Intelligence in Achieving the Sustainable Development Goals." Nature Communications, 13 Jan. 2020, www.nature.com/articles/s41467-019-14108-y.

as efficient urban management. Those are actions that smart cities will be, eventually, able to perform for their maintenance and preservation. Moreover, smart cities will be eco-friendly, since they will contain all kinds of smart technology capable to mitigate harmful emissions and waste and find the most ecological pathways through evidence-based planning, to ultimately achieve sustainable development.

A typical example poses the second largest city in Japan, Yokohama, which struggled with many urban challenges (air pollution, traffic, dysfunctional sewage system etc.), in the past. Now, it has transformed into a leader for smart city development by planning and undertaking redevelopment projects-even with insufficient resources and experience.

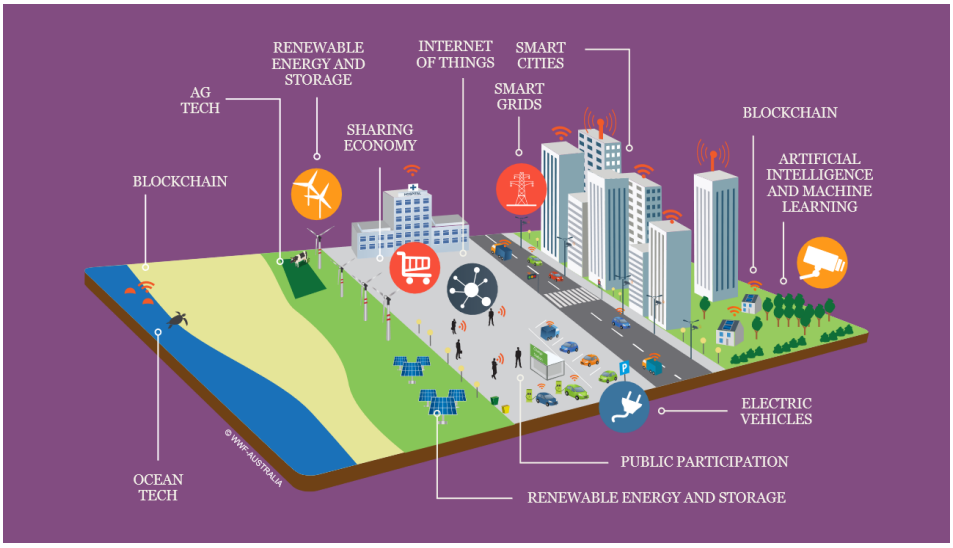

Figure 2[6]***:*** *Image depicting the smart and sustainable applications of technologies within a city.*

Information and Communications Technology (ICT)

ICTs can significantly contribute to the world's attempts to meet the SDGs, especially the goal number 9, "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" since ICTs enable countries and governments to be active in the digital world, achieving economic growth and easier collaboration with other member states. Furthermore, many Less Economically Developed Countries (LEDCs) have shown significant improvement in reaching the 9th SDG through the use of ICT, proving that

[6] WWF-Australia. "1DISCUSSIONPAPER2017Can technology save the planet?" Wildlife & Environmental Conservation Organisation - WWF - WWF-Australia, 2017, www.wwf.org.au/ArticleDocuments/360/pub-can-technology-save-the-planet-30may17.pdf.aspx?Embed=Y.

indeed it promotes sustainable development. Lastly, ICTs can produce solutions on a level, pace, quality, precision, and cost hitherto unimaginable. They are a means of delivering high-quality products and services in fields of many different sectors such as agriculture and the environment.

Figure 3[7]***:*** *Image depicting the ICT's contribution to the SDGs.*

The Sustainable Development Goals 7, 9, 11 and 17

Figure 1: *The SDGs 7, 9, 11, 17.*

All SDGs are heavily related to the topic of discussion since they all refer to sustainable development. Concurrently, goals 7 ("Ensure access to affordable, reliable, sustainable and modern energy for all"), 9 ("Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation"), 11 ("Make cities and human settlements inclusive, safe, resilient and sustainable") and 17 ("Strengthen the means of implementation and revitalize the global partnership for sustainable development") are immediately related due to their connection to technology and innovation.

[7] ITU. "ICTs to Achieve the United Nations Sustainable Development Goals." ITU News, 30 Oct. 2018, news.itu.int/icts-united-nations-sustainable-development-goals/.

Goal 7 refers to equal access to energy for all, which is a prerequisite for technology and which many people do not have. If access is ensured, then all nations can develop technologies and infrastructure and, ultimately, manage to become green and achieve sustainability. This is a vicious cycle seeing as with the new technologies, countries are going to be able to harness even greater amounts of energy which will most likely derive from renewable sources.

Goal 9 mentions sustainable infrastructure, industrialization and innovation, necessary elements of our journey towards sustainability. It basically stems from goal 7, since it describes what will happen if everyone has the ability to use energy and technology. Once again, it ensures that new technologies and innovations are going to be developed and used in a sustainable manner.

Goal 11 would be closely related to smart technologies which create smart, sustainable cities. If cities are made sustainable using technology, the world will be one step closer to achieving the SDGs and reaching a state of total sustainability, preparing the planet for future generations. In addition, people will have unlocked more potential and gained experience and knowledge from the use of sustainable technology, qualities which will definitely help in the fight for sustainable development.

To conclude, goal 17, the last goal, is one of the most vital goals out of the 17. It refers to partnerships and relations among member states and reinforcement of the implementation methods. First of all, cooperation is a major ally in this journey. Ensuring all nations have resilient, unbreakable ties and "healthy" relationships, is the only way to achieve *any* goal. Nonetheless, using the appropriate, strong means will guarantee the accomplishment of *any* goal in the most suitable, eco-friendly, quick and cost-efficient way possible. Hence, goal 17 should really encourage the international community to strive as hard as possible to meet the SDGs.

Renewable energy sources

One of the gravest environmental challenges the world is currently facing is climate change, which is partially due to fossil fuels emitted during the generation of energy. Fossil fuels and other, non-renewable energy sources have a severe impact on the planet and hinder humanity's attempts to be sustainable. To address that, people can use technology and exploit renewable energy sources to produce the energy required to cover the world's needs.

Renewable energy derives from many sources, the most common ones being solar (from the sun), wind (from the wind), hydro or hydroelectric (from water), tidal (from oceans

and tides), geothermal (from the Earth's heat) and biomass (from biofuels). To harness those sources and generate energy, people need to use technological innovations such as photovoltaics, turbines, dams, water wheels and power plants. This is a great example of the contribution of technology to sustainable development since, using the above types of technology to produce renewable energy will definitely enrich the planet's resources and nature, leading us closer to accomplishing our goal for sustainable development (seeing as it is also related to SDG 7).

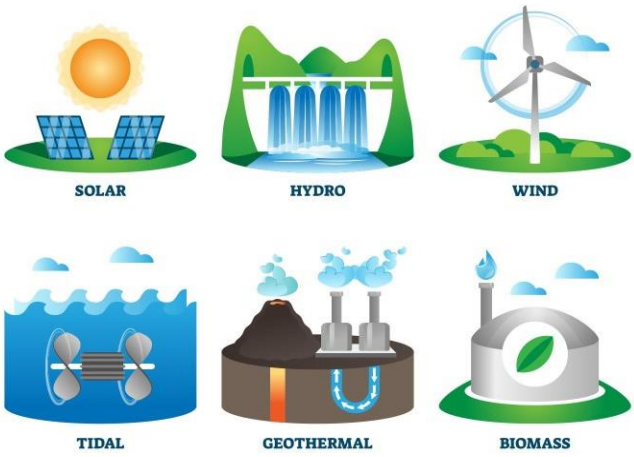

Figure 5[8]***:*** *Image depicting the six most common renewable energy sources.*

MAJOR COUNTRIES AND ORGANISATIONS INVOLVED

Finland

Finland has managed to reach the top of the overall performance board on the accomplishment of the SDGs, scoring 85,9 out of 100. In addition, Finland stands out due to its exceptional design, production and utilization of technology, since its industry relies, for the greatest part, on sustainable, efficient, low-emission technologies. It could share its sustainable methods and design process as well as the way it exploits renewable energy sources with the global community, in order to use it as a basis for future technologies and constructions.

[8] "Types of Renewable Energy Sources." Inspire Clean Energy, 20 Nov. 2020, www.inspirecleanenergy.com/blog/clean-energy-101/types-of-renewable-energy-sources.

Sweden

First and foremost, Sweden is ranking second at the SDG compliance ranking board with a score of 85,61% achievement of the goals. People and authority figures in Sweden have organized many projects and missions to accomplish the SDGs and up to now, they have been, to some extent, successful. Sweden has established the Digital Demo Stockholm initiative aiming to transform Stockholm into the smartest city in the world. It is important to note one of the projects which took place in Stockholm, as part of the aforementioned initiative, namely, the "Water Monitoring Networks", in collaboration with Ericsson, a networking and telecommunications company. Members of Ericsson along with city officials and specialists created a quality monitoring system for the waters of Stockholm which checks for pollution, locates pollution sources, and collects data to predict future water quality changes.

Republic of China

China has made rapid advances in many sectors, including technology and it is considered a giant when it comes to its information technology (IT) industry. Recently, in collaboration with Greenpeace, China released a clean energy scorecard for its technology industry -the first one to ever be drafted-, evaluating the attempts of major Chinese tech companies to transform into ones which rely solely on renewable energy. China, as one of the world's biggest powers, could influence countries around the world to do the same, and see how close they are to becoming exclusively reliable on renewable energy, while it could also take the first step in many other actions and initiatives.

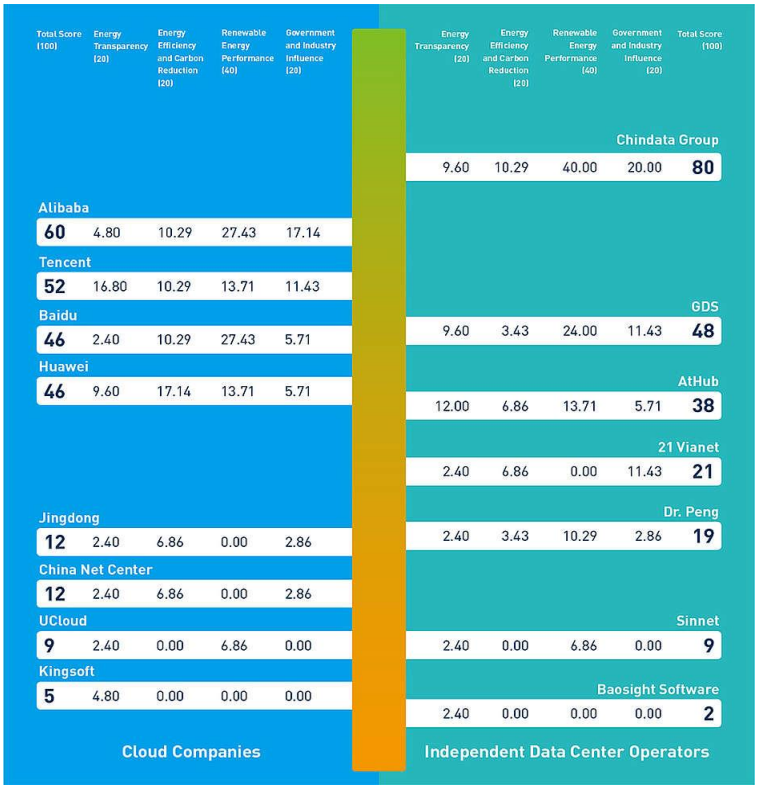

Figure 6[9]: Image depicting China's tech giants' clean energy scoreboard.

[9] Greenpeace East Asia. "Greenpeace Releases First-ever Clean Energy Scorecard for China's Tech Industry." Greenpeace East Asia, 8 Jan. 2020, www.greenpeace.org/eastasia/press/2846/greenpeace-releases-first-ever-clean-energy-scorecard-for-chinas-tech-industry/.

Uganda

Uganda, since the adoption of the 2030 Agenda, has had a remarkable course in realizing the SDGs. Due to its well-planned initiatives and efforts, Uganda has made considerable progress in implementing the goals and it has gained recognition from the UN. The government is committed and has been extremely supportive towards all groups and minorities, addressing all issues which beset the country and its citizens. It has held many initiatives related to all SDGs, including goals 7, 9, 11 and 17 which concern the topic at hand, such as appointing a Cabinet Focal Point Minister in charge of SDGs. The economy in Uganda has made a tremendous comeback. Additionally, Ugandans are living longer than ever before, with an average life expectancy of 63.7 years. In the education sector, remarkable progress has been made, as seen by increased literacy and enrollment at all levels. Other African countries could take Uganda's initiatives, achievements and efforts as an example and encouragement to strive to achieve sustainable development.

International Institute for Sustainable Development (IISD)

The IISD is a critically acclaimed, award-winning independent research institute, located in Canada, which runs both missions and projects all around the globe with the ambition to transform the planet into a place where people and the environment can flourish, mainly through sustainability. The IISD argues that in order to achieve sustainable development, people need to act inventively and use modern, innovative technologies in alternative ways. The institute mainly focuses on and meticulously explores the contribution of financial technologies to sustainability, especially in the freshwater sector. Through its website, it provides readers with information on how technologies can be exploited by businesses to reach sustainable development and on how useful they can be for the achievement of such goals. It also runs many related initiatives in partnership with the UNEP.

Greenpeace

Greenpeace is an international non-governmental environmental organization which was established in 1971. Its goal is the creation of a peaceful, healthy world where relations between humans and nature can thrive, primarily through non-violent action. The organization has organized many seminars and published articles and research on green technologies and on how people can use them to achieve sustainability. In addition, it has helped many organizations and countries become green and sustainable through thorough

analysis and research, utilizing technology and is planning to aid many more in the upcoming future.

TIMELINE OF EVENTS

Date	Description of Event
October 1987	The Brundtland report is published by the UN, coining the term "Sustainable Development".
1990	The International Institute for Sustainable Development is established.
3rd-14th June 1992	The United Nations Conference on Environment and Development 1992 or "Earth summit 1992" happens in Rio De Janeiro, Brazil.
26th August – 4th September 2002	The World Summit on Sustainable Development 2002 or "Earth Summit 2002" occurs in South Africa.
20th-22nd June 2012	The United Nations Conference on Sustainable Development 2012 or "Earth Summit 2012" takes place in Rio de Janeiro, Brazil.
3rd April 2014	The European space Agency launched its first Sentinel, initiating the Copernicus program.
13th-16th July 2015	The third international conference is held in Ethiopia, where the Addis Ababa Action Agenda is adopted which establishes the Technology Facilitation Mechanism.
25th-27th September 2015	The United Nations Sustainable Development Summit takes place, where the 2030 Agenda is adopted by all UN member states.
1st January 2016	The Sustainable Development Goals take effect.
22nd December 2017	Resolution A/RES/72/242 is adopted by the UN General Assembly.
5th-6th June 2018	The Third Multi-Stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals takes place.
15th October 2018	The UN Department of Economic and Social Affairs publishes the World Economic and Social Survey (WESS).
January 2019	The World Environment Situation Room is established by UNEP.

UN INVOLVEMENT: RELEVANT RESOLUTIONS, TREATIES AND EVENTS

- The Sustainable Development Goals (SDGs)

The SDGs are 17 goals set by the United Nations and adopted by all its members in 2015 during the UN Sustainable Development Summit. Part of the 2030 Agenda for Sustainable Development, they are an urgent demand on all countries, developed and developing, to join forces in a global partnership to end poverty, preserve the environment, and improve the lives and opportunities of everyone, everywhere. In the case of the topic of "The contribution of technology to sustainable development", all SDGs apply since they both refer to Sustainable Development. However, a few of them have a tighter correlation with the topic, which handles the contribution of technology, namely goals 7 ("Ensure access to affordable, reliable, sustainable and modern energy for all"), 9 ("Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation"), 11 ("Make cities and human settlements inclusive, safe, resilient and sustainable") and 17 ("Strengthen the means of implementation and revitalize the global partnership for sustainable development")[10].

Figure 7: *The 17 Sustainable Development Goals.*[11]

- UN General Assembly (GA) Resolution A/RES/72/242, 22 December 2017[12] and the Secretary General's Report[13]

[10] "THE 17 GOALS." Sustainable Development, sdgs.un.org/goals.
[11] "What Are the SDGs?" SDG Talks, www.sdgtalkspodcast.com/p/SDGs/.
[12] United Nations GA. "A/RES/72/242 - E - A/RES/72/242 -Desktop." ESubscription to United Nations Documents, 18 Jan. 2018, undocs.org/en/A/RES/72/242.
[13] UN ECOSOC. "impact of rapid technological change on sustainable development." 4 Mar. 2019, unctad.org/system/files/official-document/ecn162019d2_en.pdf.

The principal aim of this specific GA Resolution, titled "Impact of rapid technological change on the achievement of the Sustainable Development Goals", is to convince the Technology Facilitation Mechanism to take under maximum consideration the effect of rapid technological changes on the achievement of the Sustainable Development Goals and include it in its following multi-stakeholder forums.

- Third Multi-stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals, New York, USA, 5-6 June 2018 [14]

This forum belongs to the Technology Facilitation Mechanism, launched through paragraph 70 of the 2030 Sustainable Development agenda. In the specific multi-stakeholder forum, the third one to take place, the thematic area "Impact of rapid technological change on the achievement of the Sustainable Development Goals" was included, as an outcome of the UN General Assembly's requests (Resolution A/RES/72/242).

- The 3 Earth Summits

The three Earth Summits happened over the course of 30 years: one in 1992 (The United Nations Conference on Environment and Development), one in 2001 (The World Summit on Sustainable Development) and the last one, in 2012(The United Nations Conference on Sustainable Development). The most vital out of the three, and most relevant, is the Earth Summit 2012 or The United Nations Conference on Sustainable Development 2012 or Rio+20. In this conference, the UN decided to propose the SGDs and one of its themes was related to green economy for sustainable development.

- Addis Ababa Action Agenda, paragraph 123[15]

The Addis Ababa Action Agenda (AAAA) was agreed upon during the third international conference on 13-16 of July 2015. It offers a comprehensive collection of policy actions by Member States, including a set of over 100 concrete measures to finance sustainable development, restructure the global economy, and achieve the SDGs. Paragraph 123 of the Agenda establishes the Technology Facilitation Mechanism (TFM) with the aim to support the sustainable development goals.

[14]STI. "1Multi-stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals." Home.:. Sustainable Development Knowledge Platform, 5 June 2018, sustainabledevelopment.un.org/content/documents/19125Session_notes_STI_Forum_2018_29.5.2018.pdf.

[15] "Addis Ababa Action Agenda.:. Sustainable Development Knowledge Platform." sustainabledevelopment.un.org/frameworks/addisababaactionagenda.

- World Economic and Social Survey 2018 (WESS 2018), "Frontier technologies for sustainable development"[16]

This is a survey written by the United Nations Department of Economic and Social Affairs (UNDESA). It consists of five chapters which evaluate the impact and contribution of frontier technologies on all sectors of sustainable development as well as how said technologies can accelerate the attempts for the realization of the 2030 Agenda on Sustainable Development.

PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

- Europe's Copernicus program

Europe's Copernicus program, previously known as Global Monitoring for Environment and Security program (GMES), is an initiative launched by the European Space Agency (ESA) in partnership with the European Commission (EC), on behalf of the European Union (EU). This program is a distinctive example on how we can exploit technology to achieve sustainable development in view of the fact that ESA has built and sent into orbit a number of satellites, the Sentinels, which monitor changes on the Earth and its atmosphere, such as sea level rise, the weather, the temperatures and the atmospheric composition, among others. All the data, analysis and information collected from the satellites is made available to the public who can later query them and reach outcomes relating to the environment and future phenomena which might occur around the world as well as ways to address them. Such problems include but are certainly not limited to climate change, civil insecurity, floods, draughts, forest fire and faulty management of the environment.

- Citizen's engagement through social media

The recent years, social media have become exceptionally popular among users of all ages, and so have environmental campaigns through them. People perceive social media as a means through which they can disseminate their ideas and organize campaigns to help the environment and reach sustainability. As a result, there are countless hashtags and campaigns which contribute towards the goal for sustainable development and seek to raise awareness to the public, all of them applying technology. By way of illustration, the hashtag *#nptech* on Twitter, allows users to learn information about the use of technology by several non-profit

[16] UNDESA. "World Economic and Social Survey 2018: Frontier technologies for sustainable development." Welcome to the United Nations, 2018, www.un.org/development/desa/dpad/wp-content/uploads/sites/45/publication/WESS2018_full_web.pdf.

organizations, including environmental ones and comprehend how those can contribute to the attempts for sustainable development. Another example would be the litterati campaign, which assists in the efforts to free the world of litter by encouraging participants to take a picture of litter before collecting it and throwing it away, and then posting said picture on the respective app. Moreover, this contributes to research since data accumulated from the pictures and app can uncover a lot about the world of litter.

- World Environment Situation Room

The World Environment Situation Room (WESR) is a platform developed by the UNEP which aims to facilitate the journey towards achieving the Agenda 2030 for Sustainable Development, focusing on the environmental aspect of sustainable development. It permits users to access, examine and share near-real time data and statistics regarding the situation of the environment in each area of the world. It includes an air visual which provides information about the air, the air quality, the fires, the wind, and the population of every place around the globe. UNEP is planning to incorporate more aspects into the platform, which will enhance the users' experience and raise awareness of challenges the world is facing.

POSSIBLE SOLUTIONS

At this point it is essential to note that the topic of discussion, namely "The contribution of technology to sustainable development", does not pose an issue in order for it to require solutions. Nonetheless, ways through which technology can actually support humanity's attempts for sustainability as well as on how to promote said ways, have to be discovered.

Raising awareness and promotion

A very important step would be raising awareness to the public since not many are cognizant of how technology can impact sustainable development in a progressive way. That could be done through a plethora of ways depending on factors such as the age group and the country. Furthermore, the majority of people are inexperienced when it comes to using modern technologies. Hence, they cannot apply their minimal knowledge of technology in the job market, which, due to the development of technology, requires this kind of expertise, leaving them unemployed. Therefore, education of the public is crucial in this case.

Another thing people and governments are not aware of are examples and methods through which technology can constructively affect sustainable development. Thus, means

such as, but not limited to, the SDGs, financial technologies, electric vehicles, public electric transport, recycling, LED lights exploitation of renewable energy sources, carbon capture and storage which are examples on how technology can contribute to sustainable development, must be promoted. Additionally, it would be necessary to promote the manufacturing and production of all those technologies and offer guidelines on how they can be developed and used, since, as previously mentioned, most people have minimal experience and do not comprehend how said technologies can actually help. That way, the global community can mitigate chances of any errors which might arise or find ways to avoid them.

Funding

One of the great barriers the world is facing, pertaining to exploiting technology for sustainability, are financial issues, especially in less economically developed countries. Due to financial limitations, such countries do not have the ability to acquire, manufacture and utilize technologies for the sake of the environment, since the whole process is exceedingly expensive. Consequently, a solution would be funding and financial support, or alternatively, research to discover more cost-effective ways.

Another serious hindrance is the fact that millions of people around the world, especially those residing in Less Economically Developed Countries (LEDCs), unfortunately, do not have access to electricity, a prerequisite for the type of technology needed for sustainable development. Providing those people with the means and infrastructure required to produce and conserve electricity would be necessary in this case.

Research

However, financial challenges and lack of electricity would not be the only impediments. Each country has its own frameworks, regulations and norms as well as quotas, tariffs and subsidies which impact the import, export, manufacturing and management of technologies and each one of them requires a distinct approach. As a result, an examination and evaluation of the aforementioned characteristics of each country would be vitally important in order to detect the most appropriate response for each one of them.

Furthermore, many of the technologies which might be used might have a harmful effect on the environment and instead of assisting people, deteriorate the situation. Thus, it is crucial to conduct a life-cycle analysis (LCA), a method for assessing a product's impact on

the environment over the course of its life cycle, for all the technologies which will be exploited.

Lastly, an extremely crucial solution would be to research. To begin with, this research should include an examination of what in fact works and what does not, based on previous attempts and experiences and how exactly it works. Moreover, it should contain an evaluation on which design is the most suitable for each technology and country, since, as seen before, design is an aspect which significantly affects efficiency and the environment. Additionally, encouraging countries, especially ones doing a great job in sustainable development, to share data, statistics and information on how they managed to achieve what they have achieved could also be included in the research as a reference and basis for future innovations and as a way to observe which approaches work better. To conclude, a way to incorporate the public into this would be citizen science, through which not only awareness could be spread but also, people could learn all about the new innovations. Undoubtedly, all this research could also assist in minimizing the negative consequences which might derive from the exploitation of technology as a means for sustainable development.

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