United Nations Environmental Programme

Environmental impact of the internet and related digital services

Research Report

Leiden Model United Nations 2021

The power of the Internet

Forum:	United Nations Environmental Programme (UNEP)
Issue:	*Environmental impact of the internet and related digital services*
Student Officer:	*Evangelos Xylas*
Position:	*Deputy President*

Personal Introduction

Dear Delegates,

My name is Evangelos Xylas, I am sixteen years old, and I attend the IB Diploma year one at Platon School Greece. It is a tremendous honour of mine to be serving in this year's Leiden Model United Nations Conference for the first time as a Deputy President for the United Nations Environmental Programme (UNEP) Committee. My first close interaction with Model United Nations was when I was fifteen years old, and I've attended a few conferences since then.

This year's agenda of the United Nations Environmental Programme (UNEP) Committee gives delegates the opportunity to discuss significant issues that need to be addressed. Environmental Impact of the internet and related digital services, combating the environmental impact of armed conflict in Afghanistan, **and…** are the three topics you are called to debate and find solutions.

As the expert chair on the topic of the Environmental Impact of the internet and related digital services, it is my responsibility to introduce you to the issue, help you through your research, and enhance your grasp of the topic through this study guide. I recommend that you undertake comprehensive research rather than just relying on this study guide. If you have any kinds of questions regarding your research, do not hesitate to notify me via email at xylasv@gmail.com,

I am looking forward to meeting you all at this year's LEMUN conference.

Kind regards,

Evangelos Xylas.

Introduction to the topic

The digital technology business, IoT, ICT, bitcoin mining, and access to the internet are among the least environmentally friendly and least sustainable industries in the modern world. It requires the use of rare, critical raw materials and other dangerous substances that affect the environment. As time is running out and climate change is having an immediate impact on our daily lives, it is clear that the problem of environmental sustainability must be addressed. According to BBC analysts, "the carbon footprint of our devices, the internet, and the systems that support them accounts for around 3.7 percent of global greenhouse emissions." These emissions are anticipated to more than double by 2025." On the other hand, digital services and the internet may provide a plethora of environmental opportunities that can improve the environment and reduce pollution.

Definition of Key Terms

Critical Raw Materials (CRMs):[1]
Critical Raw Resources are those limited raw materials that are essential to the economy and development of European countries.

Information and Communications Technology (ICT):[2]
It covers electronic information storage, processing, transmission, conversion, duplication, and reception goods.

Internet of Things (IoT):[3]
The Internet of Things (IoT) is a network of physical items implanted with sensors, software, and other technologies to connect and exchange data with other devices and systems through the internet.

Data Centers (DCs):[4]
A data center is a physical facility where businesses store their essential applications and data. The design of a data center is built on a network of computing and storage resources that allow for the delivery of shared applications and data.

E-waste:[5]
E-waste is any discarded electrical or electronic equipment that is defined as unwanted, broken, or inoperable electronic devices.

Artificial Intelligence (AI):[6]
Artificial intelligence (AI) is the replication of human intellect in machines that are programmed to think and act like humans.

Connected and Automated Vehicles (CAVs):[7]
Self-driving cars steer, accelerate, and brake with minimal to no human intervention. Connected vehicles utilize technology to interact with one another, link with traffic lights, signs, and other roadside objects, or get data from the cloud.

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2 "Information and Communication Technology (ICT) | Resources | IATP." Idaho Assistive Technology Project, 18–06-16, idahoat.org/services/resources/ICT.

3 "Internet-of-Things." Oracle, 17–05-12, www.oracle.com/internet-of-things/what-is-iot.

4 "Cisco.Com Login Page." Data Centers, 19–06-21, www.cisco.com/c/login/index.html?referer=/c/en/us/solutions/data-center-virtualization/what-is-a-data-center.htm.

5 Clark, Jeremy. "What Is E-Waste? Definition and Why It's Important." Great Lakes Electronics, 12 Mar. 2020, www.ewaste1.com/what-is-e-waste.

6 "Alternative Investments." Investopedia, 18–04-18, www.investopedia.com/alternative-investments-4427781.

7 "Connected and Automated Vehicles - MnDOT." Department of Transportation, 2021, www.dot.state.mn.us/automated.

General Overview

Environmental opportunities in digital services

With the increased use of information and communication technologies (ICTs) in people's everyday lives, ICTs' potential for environmental sustainability has become increasingly significant.

Industry mobilization for a clean and circular economy might serve as an excellent illustration of environmental opportunities in digital services. E-waste is a problem that has a negative impact on the environment, being particularly dangerous due to toxic chemicals that naturally leach from the metals when buried. Technology is continuously improving and evolving, leading to outdated devices that are frequently not recycled. A critical measure that needs to be deployed to increase device recycling is to offer a small financial incentive from the organization that would recycle its old electronic equipment to encourage others to recycle it.

Moreover, preserving and regulating ecosystems and biodiversity is another example of an environmental opportunity in digital services. In many ways, digital technology may contribute to reducing pressures on the natural environment and biodiversity. New technology and artificial intelligence (AI) can be used to detect biological incursions and track the movement of biological control agents. Alternatively, technology may be utilized to enable digitally supported and biodiversity-friendly business strategies.

Furthermore, technology can help to create a more equitable, healthy, and ecologically sustainable food system. Smart farming benefits from technology, such as IoT, AI, and automation technology, all contribute to greater productivity, easier monitoring, and optimization of farming operations. Additionally, it is now possible to identify food origins and ensure food safety due to advances in technology. Smart packaging and labelling, as well as monitoring and reporting, all help to make the food supply chain more environmentally friendly.

Another advantage of digital services is that they are less harmful to the environment since they reduce air pollution and material waste. During COVID-19 lockdowns air quality around the world improved as traffic reduced. This reduction in traffic was enabled by being able to work from home through digital means. Artificial intelligence and blockchain technology have the most potential to contribute to clean air. AI-based systems have a role in monitoring and preventing air pollution because they enable real-time pollution monitoring and detecting air-pollutant sources. AI-powered systems can also issue air quality alerts. Blockchain technology allows the safe, low-cost transfer of assets between parties without the involvement of third-party intermediaries.

Impact of digital services

Digital services and internet access, on the other hand, have a significant environmental impact that may be divided into two categories: direct impact and indirect impact.

Direct impacts.

The manufacture and use of ICT items have a wide range of environmental implications. To begin with, technological gadgets consume many resources. Both the manufacture and use of electronic gadgets necessitate the use of CRMs that are unreliable, resulting in resource depletion. Aside from that, the gadgets use electricity, generated mainly by CO2 emissions, resulting in air pollution. Furthermore, in order to manufacture a device, rare earth elements must be extracted, which requires a large quantity of water in both the mining and manufacturing processes. Along with water consumption, almost 90% of land usage is connected to raw material extraction. Additionally, ICT goods place significant pressures on natural ecosystems and animals.

Because of their high energy and resource consumption, data centers significantly negatively impact the environment. More specifically, the manufacturing process of servers has the greatest impact on abiotic resource depletion compared to networking devices and storage systems. As previously said, data centers require a lot of electricity to maintain a cool temperature, which increases CO2 emissions. Furthermore, the production process consumes unreliable materials such as gold and copper, confirming resource depletion as well as tailings disposal, leading to extensive land usage. Moreover, the world's data centers utilize approximately 292 million cubic metres of water every day. In addition, natural ecosystems and animals are exposed to severe stress as a result of data centers.

Some environmental effects of digital services, software, and the internet can be attributed to data transmission networks. To begin with, data transmission networks use energy, metal, and mineral raw materials, employ chemicals, and emit pollutants during manufacturing, leading to resource depletion. Besides, the land is required to accommodate data transmission network equipment such as mobile towers, masts, antennas, pipelines, tunnels, cable lines, base stations, and so on. Additionally, undersea cables and systems frequently have an impact on the sea's biodiversity.

Indirect impacts

One example of an indirect impact is product dematerialization and substitution. When physical commodities are converted into digital goods, dematerialization and substitution occur. The decrease of printed media as it is replaced by e-readers, tablets, and smartphones is an example of replacement. (e-books vs. printed books) On the one hand, wood from trees must be used in order to read printed media, while e-readers require electricity, increasing CO2 emissions. The same may be said for the debate over video streaming vs DVDs.

Another indirect impact of ICT goods is optimization and innovation. Applying ICT goods in applications can optimize processes by decreasing energy and resource consumption or boosting material efficiency, reducing the applications' environmental effect. The agricultural industry can benefit from the use of ICT technologies to minimize energy and water consumption. Moreover, autonomous driving and electromobility can benefit from the usage of ICT technology by lowering perceived transportation costs and therefore increasing travel demand. CAVs could increase vehicle primary energy use and GHG emissions by 3−20% due to increases in power consumption. Besides, wearable technology is a new phenomenon that incorporates electronics into regular activities, having potential risks both for human health as well as for ecosystems. Additionally, ICT implementation significantly improves supply chain process integration, resulting in enhanced corporate performance. Blockchain technologies have the following environmental consequences:

a) resource and water depletion,
b) biodiversity losses
c) increased CO2 emissions.

Systemic impacts

The Impact of Digital Transformation on Environmental Sustainability.

Nowadays, as the globe faces a slew of unprecedented problems, technology has the potential to play a critical role in constructing a more sustainable future. In terms of sustainability, technology may have a highly positive influence on the environment. Green technology, such as solar panels and wind turbines, can, for example, help in the replacement of practices and procedures that harm or deplete natural resources with more sustainable and efficient ones. Furthermore, technology contributes to waste reduction by recycling inefficient gadgets and replacing them with new ones. The ability of digital technology to manage environmental data can also make it easier to control environmental conditions.

The importance of access to internet

The impact of the internet is not just environmental. Studies find that many people in low- and middle-income countries, including the underemployed, women, rural residents and others who are often marginalized, derive great benefits in such areas as education, employment and health when they use computers and the Internet. The Internet has been remarkably successful in developing greater opportunities for communication access - and economic growth and social development - for the first users. The majority of the next users will be mainly from developing countries and will connect to the Internet principally via wireless networks. But there are substantial discrepancies in access to ICTs between developed and developing countries and also within countries, depending on factors such as gender, rural coverage, skills and educational skills. For many developing countries, increasing access to the internet is thus a main goal to promote economic growth, inclusivity and education, and many developed countries continue to push for improved internet access.

Environmental Policies in the Digital Age

Regulation of Big Data and the data economy could have significant consequences for how governments regulate or control environmentally problematic applications or business models. More in-depth research is necessary to evaluate existing concepts and generate new ideas. Cities should be assisted in redesigning their digitalization strategy in order to achieve ambitious environmental goals such as energy efficiency, sustainable transportation, and sustainable consumption.

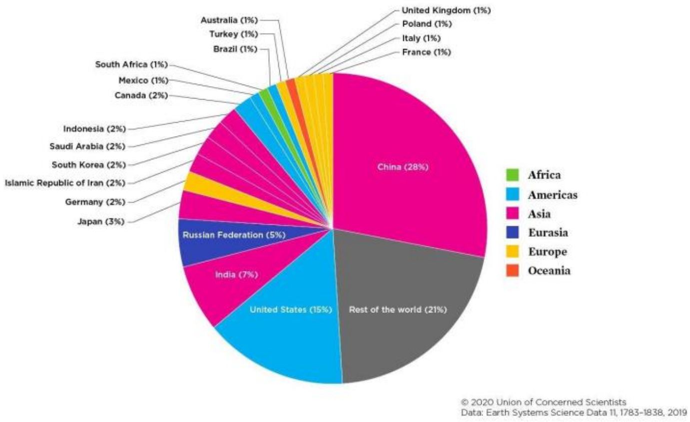
Major Parties Involved

China
China is the world's greatest user of primary energy, using 145.46 exajoules in 2020. Furthermore, China is responsible for 28% of global greenhouse gas emissions. Additionally, China ranks #1 among the countries with the most internet users. Around 989 million people, 70.4% of the Chinese population, have internet access.

India
India is responsible for 2.65GT CO2 emissions and is the second-most populous country for internet users. In addition, India is responsible for 7% of the world's green greenhouse gas emissions.

US
The United States is also one of the world's most significant users of primary energy. The United States is responsible for 15% of the world's CO2 greenhouse gas emissions. About 90.8% of the population in the US uses the internet.

Europe
Finland and Sweden are at the very top of the European Union's power consumption statistics. More than 91% of Europeans use the internet.



Timeline of Events

1870	The second industrial revolution. Electricity, natural gas, and oil were invented. Communication methods such as the telegraph and telephone were also introduced.
1947-1969	The first working transistor
1969	Start of the third industrial revolution. Electronics, telecommunications, and computers were invented.
1983	The invention of the internet. Rise of home computers.
1989-2005	With the invention of the World Wide Web, The internet is becoming more popular.
2000	About 65% of all households in the United States owned a personal computer
2005	By the end of the decade, about one billion people had access to the Internet, and about three billion people had cell phones.
2009	The bitcoin network was established

Possible Solutions

- Developing methods and guidance
- Closing data gaps
- Relating technologies, resource demand, and environmental impact
- Broadening the scope of the impact categories of environmental assessment

studies
- Integrating systemic effects into ICT-enabled solutions
- Exploring ‘big points’ of sustainable ICT consumption and options for educating consumers
- Policies for making digitalization and the data economy more sustainable

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