UNGP
STUDY GUIDE

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Letter from the Secretariat

Dear Delegates,

It is with great honor and enthusiasm that I welcome you to ITUMUN 2025, where innovation, diplomacy, and collaboration come together to shape a brighter future. As Secretary-General, it is my privilege to witness the incredible passion and dedication each of you brings to this conference.

For this year's ITUMUN, we challenge you to think beyond borders and redefine the possibilities of multilateral cooperation. As a university rooted in engineering and technical excellence, we have embraced our unique identity by curating committees and agendas that emphasize industrial development, technological advancement, and critical technical issues. Whether debating economic policies, grappling with emerging technologies, or navigating historical turning points, you will be tasked with crafting solutions that not only address the challenges at hand but also inspire progress.

Model United Nations is more than just an academic exercise—it is a platform for you to develop critical thinking, refine your communication skills, and foster a spirit of teamwork. This conference is your opportunity to step into the shoes of world leaders, embracing the responsibility and influence that comes with these roles.

On behalf of the entire ITUMUN team, I wish you the best of luck in your preparations and during the conference itself. We are here to support you every step of the way, ensuring that your ITUMUN experience is both impactful and unforgettable. I look forward to seeing the energy and ideas you bring, and the lasting connections you will forge throughout this journey.

Warm regards,

Roya Alhariri
Secretary-General
ITUMUN 2025

1. Letter from the Committee Board

Distinguished delegates, we would like to express our enthusiasm and excitement for being able to chair the UN Global Pulse committee (UNGP) in the upcoming Istanbul Technical University's Model United Nations Conference (ITUMUN). We welcome you all and hope that you'll have a remarkable Model United Nations experience.

We believe that Model United Nations (MUN) is a platform for self- progress and development. It will open the doors for you to learn about and discuss contemporary issues from around the globe. We highly advise you to embrace yourselves within this remarkable experience.

We have put together this Study Guide, which we hope you will take the time to read. The Committee will open the discussion for two Agenda items. The first item will be "Utilising AI's technology in predicting and responding to crises" and the second will be "Enhancing digital inclusion and its global accessibility".

With the spread of Artificial Intelligence and the shift of socio-economic issues globally, our globe is turning to a digital sphere where tech and digital inclusion became very demanded. As pioneers in the future society, we must develop a high understanding of digital integration.

Discussing such issues will get you introduced to a new genre of information, and a new platform of interest. In this committee you will have the opportunity to discuss what's happening in the virtual world and how we can integrate it to reality.

We are not expecting you to understand and consider every aspect of both agenda items, but merely to produce an overview of the most important questions that might arise and possible solutions to these situations. Don't hesitate in contacting us if any questions arise in your mind.

Good luck,

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3. Introduction to the committee: United Nations Global Pulse (UNGP)

United Nations Global Pulse (UNGP) is the United Nations Secretary-General's initiative on big data and artificial intelligence for development, humanitarian action, and peace. Their vision is a future in which big data, artificial intelligence, and emerging technologies are harnessed safely and responsibly for the public good. UN Global Pulse was established based on a recognition that digital data offers opportunities to gain a better understanding of changes in human well-being and to get real-time feedback on how well policy responses are working.

Since its establishment in 2009, Global Pulse has operated as a network of labs and partnerships, working together to enhance decision making through technology, policy and humanitarian action. Its aim is to improve crisis response and advance the United Nations Sustainable Development Goals (SDGs).The UNGP collaborates with governments, private sector entities, academia, and civil society to identify the best innovative ways to analyze and use data.

UNGP's mission is to leverage data-driven insights to support decision-making, improve crisis response, and advance the United Nations' Sustainable Development Goals (SDGs). By collaborating , Global Pulse identifies innovative ways to analyze real-time and non-traditional data sources, such as social media, mobile data, and satellite imagery, to uncover trends, patterns, and actionable insights.

Disaster response, public health, climate change, poverty alleviation, and economic development are the main areas of focus for the UNGP. where it uses technology and data to transform global development and growth. It stresses privacy, inclusivity, and transparency while its functioning in different sectors.

4. Introduction to Agenda item A:Utilising AI's technology in predicting and responding to crises.

4.1. Introduction

Artificial Intelligence (AI) is a transformative subfield of computer science focused on creating machines capable of performing tasks that typically require human intelligence. These tasks include learning, reasoning, problem-solving, perception, language understanding, and decision-making.
AI has evolved significantly since its inception, with groundbreaking advancements in machine learning, deep learning, and neural networks. The impact of AI is profound, influencing various industries, including healthcare, finance, transportation, and entertainment.
The greatest barrier to achieving many of the Sustainable Development Goals (SDGs) lies in fragile settings characterized by extreme poverty, weak institutions, and ongoing vulnerability to natural and human-made disasters. Given current trends, complex emergencies may become even more challenging over the next decade, however, artificial intelligence (AI) holds the potential to transform crisis response to both save and improve many lives. In order to realize that promise, crisis response policymakers will have to prioritize ongoing and new AI investments based on a sophisticated understanding of risk and return.
Machine learning applications have already begun to transform three key functions of crisis response policy and programming, which we expect to accelerate over the coming decade. First, machine learning is helping decision makers continuously assess the risks of new and ongoing crises, particularly in the domain of natural disasters where data is rich, scientific modeling of underlying causes is advanced, and events are frequent enough to support robust feedback loops. Second, humanitarian and governmental crisis responders are increasingly using machine learning to improve targeting, intervention selection, and service delivery. And third, machine learning is streamlining the mobilization and prepositioning of resources for first responders, with current applications ranging from anticipatory financing for disasters to optimizing the logistics behind delivering humanitarian aid.

4.2. Key Concepts

Crisis prediction: refers to the detection and forecasting of potential crises that may impact an organization or society.

Crisis response: refers to the actions and strategies implemented to manage and mitigate the effects of a crisis. Key elements of crisis response include swift decision-making, resource allocation, coordination, and communication

Data Sources for AI in Crises: they mainly include, social media platforms for sentiment and situational analysis, satellite imagery for environmental monitoring, internet of Things devices for real-time data collection, public health records and epidemiological data.

Natural Disasters: are disastrous events that are unavoidable and can cause huge-scale destruction. Natural disasters are often the result of various geological and environmental changes that cause disturbances to the normal functioning of all the natural systems around us.

Disaster Mitigation: actions taken to reduce the impact of disasters before they occur

Public Health Emergency: are situations that pose immediate and significant risks to public health and require swift intervention to prevent widespread harm

Intelligent network systems: telecommunications network architectures that enable the provision of advanced services to users.

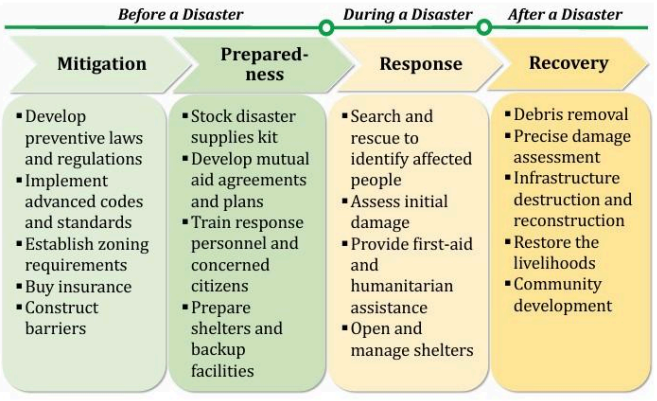
4.3. Applications of AI in Crisis Management

4.3.1. Natural Disasters

Natural hazards have caused catastrophic damage and significant socioeconomic loss, showing an increasing trend. Statistics for 2017 indicate economic losses from natural hazards in the United States exceed $300 billion; Hurricane Harvey alone has caused $125 billion in socioeconomic losses (Wilts 2018). These adverse impacts pose challenges to disaster response managers, who face increasingly tight resources and an exhausted workforce, and such challenges force local authorities to reevaluate their policies for disaster management.
The goals of disaster management are to implement operations and strategies to actively prepare, rapidly respond and rescue, efficiently allocate resources, quickly correct damage and recover to full functionality, ultimately protect the community and minimize the adverse impact. That is to say that disaster management should strengthen the disaster resilience of a community. The term disaster resilience refers to the ability of an entity to anticipate, resist, absorb, adapt to, and rapidly recover from an unexpected disturbance

4.3.1.1. Phases of disaster management and application areas

As shown in Figure 2, disaster management involves four phases: mitigation, preparedness, response, and recovery.



01. Phase 1: Mitigation

In the disaster mitigation phase, decision makers need to: Identify hazard and risks (Application Area 1), predict possible impact (Application Area 2), assess vulnerability (Application Area 3), develop mitigation strategies (Application Area 4)

AI Applications in disaster mitigating:-

a. Identify Hazards and Risks (Application Area 1):
Traditional methods including field monitoring and expert surveys are used however they are highly exposed to errors. Therefore, supervised and unsupervised AI models are used to enhance efficiency through analyzing large datasets.

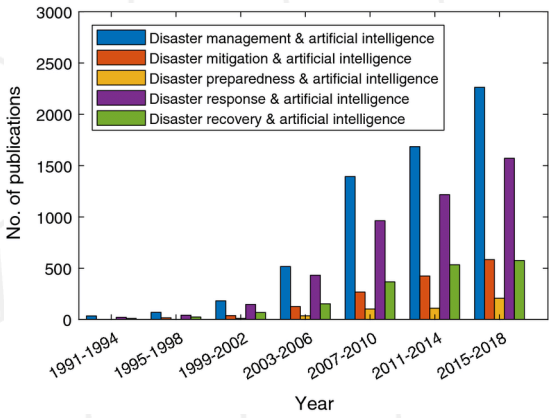
b. Predict Possible Impacts (Application Area 2):
Structural damage prediction using fragility curves, enhanced by AI, are used in predicting possible disaster impacts. Methods include LR, Neural Networks, and SVM. Infrastructure service disruptions predicted with models like RF, Decision Tree (DT), and Bayesian Additive Regression Tree (BART).

c. Assess Vulnerability (Application Area 3):
Vulnerability of structures and communities assessed using spatial regression models, RF, Neural Networks, and Deep Neural Networks.

d. Develop Mitigation Strategies (Application Area 4):
Based on impact and vulnerability analyses, AI supports decision-makers in creating resilient communities.

02. Phase 2: Preparedness

Disaster preparedness phase, include: early Warnings (Application Area 5), disaster detection (Application Area 6), emergency training system (Application Area 7), disaster evacuations (Application Area 8).



AI Applications in disaster prediction

a. Early Warnings and Alerts (Application Area 5)
AI analyzes data from IoT sensors, social media, and accelerometers to help provide early warnings. Toretter can be provided as a sufficient example of media-based data analysis, since it uses semantic analysis of tweets to estimate earthquake locations faster than official announcements.

b. Real-Time Disaster Prediction and Detection (Application Area 6)
AI methods including: SVMs, neural networks, and regression models can predict disaster trajectories and impacts. It is used for Predicting hurricanes, floods, earthquakes, and fires.

c. Emergency Training Systems (Application Area 7)
Unfortunately, AI applications in this area are currently limited. However , Potential exists for virtual training environments and simulations powered by AI to prepare responders and communities.

d. Disaster Evacuations (Application Area 8)
AI aids in planning and developing evacuation strategies.Key Contributions of AI in evacuations include: Contra-flow lane management during hurricanes, Estimating crowd dynamics and identifying optimal evacuation routes, Development of evacuation support systems using reinforcement learning, neural networks, and optimization algorithms, and Smartphone accelerometer-based earthquake warnings.

03. Phase 3: Disaster response

Disaster response includes the following areas: studying disaster impacts (Application Areas 9 and 10), address urgent needs (Application Areas 11 and 12)

AI Applications in disaster response

a. Situational Awareness and Decision-Making:
AI methods, particularly supervised and deep learning models, are applied to assess disaster impacts (Application Areas 9 and 10). In addition to user-friendly disaster information systems facilitate coordination and address urgent needs (Application Areas 11 and 12).

b. Mapping and Damage Assessment:
AI generates event maps and damage assessments using data from satellites, drones, robots, and social media. Using computer vision and classification algorithms help analyzing pre- and post-event imagery to prioritize the disaster response and management.

c. public reliant Information:
Platforms like the Humanitarian OpenStreetMap Team call for global volunteer efforts to create rapid devastation maps, aiding response efforts.

d. Social media platforms:
The base of social media data is geo-location and timestamps, which helps in the support needed for disaster relief plans. AI techniques such as sentiment analysis and reinforcement learning analyze these data making them a huge resource of aid.

e. Use of robotics in Disaster Response:
Robots are involved in search and rescue operations, firefighting, and damage recovery, which are enabled through machine learning to gain and adapt skills.

f. Telecommunications and Emergency Services:
AI, including machine listening, analyzes the surge in communication after disasters and automatically identifies urgent needs to be disseminated to whoever may help.

04. Phase 4: Recovery

This phase focuses on rebuilding the infrastructure and services. (application area 13)

a. Damage Assessment and Prioritization

Data is collected from drones, satellites, and ground-level imagery to analyse the extension of damage. Computer vision and machine learning models prioritised the most affected areas to receive backup.

b. Resource Allocation and Optimization

AI models help in optimizing the resource distribution process. Resources including: materials, labor, and funding are distributed to meet the efficient recovery process. Reinforcement learning helps in simulating and allocating resources effectively.

c. Infrastructure Reconstruction

AI assists in designing resilient infrastructure by analysing previous disaster data and common patterns. This helps in generating a reconstruction plan for the damaged infatuation.

d. Economic Recovery

AI analyses the market needs and trends which helps in identifying the affected economic areas. This paves the way to match displaced individuals with job opportunities that match their skills and demands

4.3.2. Public Health Crises

In the first two decades of the twenty-first century, two big deadly epidemics posed a global public health challenge. Infectious disease known as serious acute respiratory syndrome (SARS) cases first appeared in 2002, and a novel coronavirus (SARS-CoV-2) was reported as the etiologic agent in coronavirus disease 2019 (COVID-19), with the start of a new outbreak at the end of 2019. SARS spread to five continents, prompting the World Health Organization (WHO) to declare the outbreak was caused by a novel pathogen, a member of the coronavirus family that had never been seen before in human history.

The fields of medicine, research and development, and public health are all being transformed by artificial intelligence (AI). AI has taken over some routine tasks in the last decade, and its effect on repetitive tasks has already begun.

4.3.2.1. AI application in public health

a. Crisis Recovery in Public Health

Usage of intelligent network systems such as (WeLink, Tencent Conference), to enable the continuity of online workplaces, education, reducing social and economic paralysis. AI is also used to analyse crisis related data, and provide safe crisis management techniques, minimising cross-infection risks. Which helps in collecting crisis data, identifying causes, and predicting severity, enabling effectiveness in response.

b. Predicting Public Health Emergencies

AI monitors social media, news, and government reports to detect potential outbreaks earlier than traditional methods. This enables it to create Early Warning Systems and integrate data from diverse sources, reducing delays and errors that might occur in data collection or analysis. AI provides alerts for infectious diseases by analyzing multilingual news, disease reports, and official statements.

4.3.3. Humanitarian Crises

AI has the potential to support humanitarian actors as they implement a paradigm shift from reactive to anticipatory approaches to humanitarian action. This shift entails acting as soon as a crisis may be foreseen and proactively mitigating the adverse impact on vulnerable people. In this regard, AI technologies may further expand the toolkit of humanitarian missions in their three main dimensions: preparedness, response and recovery.

Preparedness

AI technologies can support humanitarian preparedness as AI systems can be used to analyze vast amounts of data, thus providing essential insights about potential risks to affected populations. These insights can inform humanitarians about such risks before a crisis or humanitarian disaster unfolds. In this regard, predictive analytics, which builds on data-driven machine learning and statistical models, can be used to calculate and forecast impending natural disasters, displacement and refugee movements, famines, and global health emergencies. To date, such systems have performed best for early warnings and short-term predictions. Yet, their potential is significant, as AI systems performing predictive analytics can be instrumental for preparedness. For example, the Forecast-based Financing programme deployed by the International Federation of Red Cross and Red Crescent Societies (IFRC) enables the swift allocation of humanitarian resources for early action implementation. This programme uses a variety of data sources, such as meteorological data and market analysis, to determine when and where humanitarian resources should be allocated. Another example is UNHCR's Project Jetson, which uses predictive analytics to forecast forced displacement contributing to the escalation of violence and conflict in Somalia. Project Jetson builds on various data sources, including climate data (such as river levels and rain patterns), market prices, remittance data, and data collected by the institution to train its machine learning algorithm. In another context, the World Food Programme has developed a model that uses predictive analytics to forecast food insecurity in conflict zones, where traditional data collection is challenging.

Response

AI systems can be used in ways that may support humanitarian response during conflicts and crises. For instance, recent advances in deep learning, natural language processing and image processing allow for faster and more precise classification of social media messages during crisis and conflict situations. This can assist humanitarian actors in responding to emergencies. In particular, these advanced AI technologies can help identify areas that would benefit from streamlined delivery of assistance to those in need. For example, the Emergency Situation Awareness platform monitors content on Twitter in Australia and New Zealand to provide its users with information about the impact and scope of natural disasters such as earthquakes, bushfires and floods as they unfold. Similarly, Artificial Intelligence for Disaster Response, an open platform that uses AI to filter and classify social media content, offers insights into the evolution of disasters. Platforms such as these can triage and classify content, such as relevant images posted on social media showing damages to infrastructure and the extent of harm to affected populations, which can be useful for disaster response and management. Another example is the Rapid Mapping Service, a project jointly developed by the United Nations (UN) Institute for Training and Research, the UN Operational Satellite Applications Programme, and UN Global Pulse. This project applies AI to satellite imagery in order to rapidly map flooded areas and assess damage caused by conflict or natural disasters such as earth.

Recovery

AI may be effectively used in the context of recovery, as the complexities of contemporary crises often lead to protracted conflict situations.48 Information technology can be an additional asset for facilitating engagement between humanitarians and affected communities in such contexts. AI technologies may support humanitarian action in protracted situations. For example, the Trace the Face tool developed by the International Committee of the Red Cross (ICRC) was designed to help refugees and migrants find missing family members. This tool uses facial recognition technologies to automate searching and matching, thus streamlining the process. Another example can be found in the AI-powered chatbots that may provide a way for affected community members to access humanitarian organizations and obtain relevant information. These chatbots are currently providing advisory services to migrants and refugees. Similarly, humanitarian organizations may use messaging chatbots to connect with affected populations.

4.3.4. Cybersecurity Threats:

Artificial intelligence (AI) technology has become a key force in addressing cybersecurity challenges by virtue of its advantages in data analysis, pattern recognition and automated processing. By applying technologies such as machine learning and deep learning, cybersecurity threat detection systems are able to more accurately identify anomalous behavior, detect unknown threats, and adapt to new attack patterns in real time. This not only improves the accuracy of threat detection, but also greatly reduces the false alarm rate.

Approaches to Artificial Intelligence Technology in Threat detection

Machine Learning in Threat Detection

Supervised learning is one of the most common approaches in machine learning that relies on labeled datasets to train models to identify known threat types in new data. In cybersecurity, supervised learning is widely used in scenarios such as malware detection, spam filtering, and intrusion detection. With a large amount of labeled normal and anomalous data, the model is able to learn and recognize the characteristics of malicious behaviors, thus effectively distinguishing between normal traffic and threat activities in real-time detection. The advantages of this approach are its high accuracy and interpretability, but its effectiveness depends on the quality and quantity of labeled data.

Deep Learning in Threat Detection.

Deep learning is able to automatically extract and learn features of complex data through the architecture of multi-layer neural networks, giving it a significant advantage in cybersecurity threat detection. Convolutional Neural Networks (CNNs) are commonly used to process image and traffic data, and can effectively detect features such as malicious code or anomalous network traffic. Recurrent Neural Networks (RNN) and its improved version, Long Short-Term Memory Networks (LSTM), on the other hand, are good at processing time-series data and are suitable for application scenarios such as analyzing network behavior logs and detecting persistent threats. Through deep learning of large-scale data, these neural network models are able to identify threats that are difficult to detect by traditional methods, improving detection accuracy and response speed.

Integrated Learning and Multimodal Approaches

Integrated learning improves the overall detection accuracy and robustness by combining the prediction results of multiple models. In cybersecurity threat detection, integrated learning can synthesize the advantages of different algorithms, such as integrating multiple models such as decision trees, random forests, gradient boosting trees, etc., in order to improve the detection of complex threats. The integrated learning approach can effectively reduce the false alarm rate of a single model and enhance the adaptability to various threats through the complementarity of different models. For example, in malware detection, integrated learning can synthesize multiple feature extraction methods and classifiers to improve the accuracy and generalization ability of detection.

4.4. Benefits of Using AI in Crisis Management

Speed and Efficiency:
AI systems can analyze vast amounts of data in real-time, providing decision-makers with actionable insights. This capability allows organizations to respond swiftly to emerging crises, ensuring that the right actions are taken promptly.

Improved Communication
AI-driven chatbots and automated messaging systems can facilitate communication during crises. These tools ensure that stakeholders receive timely updates, reducing misinformation and enhancing coordination among teams.

Resource Optimization
By utilizing predictive analytics, AI can forecast potential crisis scenarios and recommend optimal resource allocation. This ensures that organizations are prepared and can deploy resources effectively when a crisis occurs.

4.5. Challenges and Ethical Considerations

Bias and Fairness

One of the most urgent ethical issues in AI is bias. AI systems are trained on data that may reflect historical biases and prejudices, leading to biased outcomes.

Privacy and Surveillance

AI's ability to collect and analyze vast amounts of data raises significant privacy concerns. AI-powered surveillance systems can track individuals' movements and behaviors, potentially leading to an invasion of privacy. The ethical challenge lies in balancing the benefits of AI-driven security and surveillance with the right to privacy.

Transparency and Explainability

AI algorithms often operate as "black boxes," making understanding how they arrive at specific decisions difficult. This lack of transparency can lead to ethical issues, especially in critical healthcare and criminal justice applications. Ensuring AI transparency involves developing explainable AI models.

Accountability and Responsibility

Determining accountability in AI systems can be challenging, mainly when AI makes autonomous decisions. If an AI system causes harm, it is crucial to establish who is responsible—the developers, the users, or the AI itself.

Employment and Economic Impact

AI's automation capabilities can disrupt job markets, leading to job displacement and economic inequality. While AI can create new job opportunities, it may also render specific skills obsolete.

Security and Safety

AI systems can be vulnerable to cyberattacks and malicious use, posing significant security risks. Adversarial attacks, where malicious actors manipulate AI inputs to cause incorrect outputs, highlight the need for robust security measures.

Societal and Cultural Impact

AI has the potential to influence societal norms and cultural values, raising concerns about its impact on human relationships and social structures. For instance, AI-driven social media algorithms can shape public opinion and behavior, sometimes leading to polarization and misinformation.

4.6. Questions to be answered

How can AI optimize resource allocation in times of crisis?

In what ways can member states work collectively to promote ethical AI usage across varying platforms?

What new technologies or developments in AI have the potential to improve crisis management even more?

How might AI be applied in global efforts to realize the Sustainable Development Goals (SDGs), with specific emphasis on fragile settings?

How to ensure transparency and explainability of the AI models to build trust in the crisis management system?

In what ways can AI enhance early warning and crises detecting systems?

5. Introduction to Agenda item B: Enhancing digital inclusion and its global accessibility

5.1. Introduction

Connecting online has become an essential tool for everyday functions such as working, accessing information, staying in touch with friends and family, increasing productivity, self-actualization, and other forms of self-empowerment, as well as for receiving basic services. Being connected is a means to providing enhanced personal and societal well-being and digital livelihoods. Online connectivity enables the right and the ability to access basic human services such as health care, economic and personal development opportunities, skills development, and education for all. It also acts as a catalyst for individuals to exercise their right to freedom of opinion and expression, facilitating the realization of a range of other human rights

Digital inclusion is defined as “equitable, meaningful, and safe access to use, lead, and design of digital technologies, services, and associated opportunities for everyone, everywhere”. Digital inclusion is enabled by human rights-based, intersectional, and whole-of-society policies and multi-stakeholder approaches and actions, that take into account the various barriers individuals face when accessing and experiencing digital technologies. Human rights are to be promoted, protected, respected, and enjoyed online as they are offline, and the specific needs of individuals need to be taken into consideration in the digital world so as not to leave anyone behind. Digital inclusion should aim to dismantle existing structural social inequalities and enhance well-being for all

Bridging the digital divide is not insurmountable; it is a challenge that, with concerted effort, can be overcome. The developing world possesses immense potential and creativity, and by nurturing digital inclusion, we can unlock new avenues of growth and prosperity. The journey toward digital inclusion is not merely about technology – it is about ensuring that no one is left behind in the digital era. By prioritizing affordability, accessibility, and digital literacy, we can pave the way for a more equitable, interconnected, and empowered world.

For everyone who wants to be connected, we should guarantee the availability and accessibility of the Internet, digital devices, services, platforms, and relevant content; affordable access to them and to critical digital and other skills, education, and tools; and equitable participation in safe, discrimination-free online spaces, with the opportunity to create content and consider and involve different groups in the design, development, testing, and assessments of digital devices, services, platforms, and policies.

5.2. Key Terms

Digital inclusion: is the access and use of Information and Communication Technologies (ICTs)—like the internet and its infrastructure, hardware, software and digital literacy training—by all people, regardless of age, gender, ethnicity, nationality, mobility, physical and cognitive abilities, cultural and socio-economic backgrounds.

Digital Divide: is the gap between demographics and regions that have access to modern information and communications technology (ICT) and those with no or restricted access. This technology can include the telephone, television, PCs and internet connectivity.

Digital literacy: having the skills to effectively use technology, and the knowledge and skills to do so safely and responsibly

Digital Public Goods (DPGs): The DPGs are a response to a need for global digital cooperation to unlock a more equitable world. They consist of open-source software, open data, open artificial intelligence models, open standards, and open content as a way to achieve the Sustainable Development Goals (SDGs).

Digital Public Infrastructure (DPI): is an open-source identity platform that can be used to access a wide variety of government and private services by building applications and products on a set of application programming interfaces (APIs) like India Stack.

Sustainable Development Goals (SDGs): also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity.

Intersectionality: refers to the simultaneous experience of categorical and hierarchical classifications including but not limited to race, class, gender, sexuality, and nationality

5.3. Background

During the last few years, the world has reduced the digital divide quite a lot, but we still have 2.6 billion people around the world without internet access. Therefore approaching key barriers can be limited to the following areas:

Infrastructure

Whereas this infrastructure is readily available in some parts of the world, other regions struggle to connect. The digital divides are emphasized between regions and between and within countries. While limited availability in more connected countries remains a concern, those persons who cannot afford to subscribe to private services can often benefit from ubiquitous Wi-Fi hotspots, due to a greater proliferation of basic infrastructure. However, generally, persons in less connected countries do not enjoy the same privilege of public services, as infrastructure is relatively sparse – especially as the Internet's backbone is fiber optic submarine cables, leaving many landlocked countries and remote areas struggling to acquire the additional support necessary to make use of such cables. In addition to rural populations and indigenous peoples, disaster-prone areas, landlocked states, and island states are disproportionately likely to be unconnected, with these populations also having less access to enabling infrastructures like electricity or roads.

During the COVID-19 pandemic, being connected has proven to be not a luxury, but a lifeline. As the pandemic relocated everyday functions such as education, work, and health services online, often within one's home, it became even clearer that it may not be enough to rely on public Wi-Fi networks to connect online and that meaningful and regular connectivity may require access from homes and

private networks in an inclusive way. This may require re-thinking aggregation strategies for public access possibilities such as Wi-Fi traditionally in schools, libraries, markets, and community centers with alternative access strategies at local and community level.

Accessibility

Online access takes into account the different elements of connectivity, such as access to digital equipment, regularity, and intensity of access, required skills, cultural aspects, and the lack of relevant content in local and relevant languages, in local script instead of spelling in Latin script. For example, the most commonly used language on the Internet is the English language, greatly privileged access for those who speak English and enabling their participation in digital life and the digital economy. In addition, cultural and social norms are one of the most significant, yet largely ignored, barriers preventing access to digital technologies, such as mobile phones and Internet.

Digital inclusion thus also encompasses the ability of users to use technologies efficiently for their own and others' benefit. Digital technological and literacy skills are therefore an important element of digital inclusion to secure a shared prosperous digital future for everyone. However, to navigate in the ever-digitizing world, more than just basic digital skills are needed. The 21st Century skills include 1) learning and innovation skills: critical thinking and problem-solving, communications and collaboration, creativity, and innovation; 2) digital literacy skills: information literacy, media literacy, ICT literacy; and 3) career and life skills: flexibility and adaptability, initiative and self-direction, social and cross-cultural interaction, productivity, and accountability. In addition to learning 21st Century skills, upskilling is also crucial to ensure that people understand the opportunities the digital world offers and are able to take advantage of those opportunities.

Affordability

Affordability is a crucial obstacle for connecting online. First, devices needed for connecting online need to be affordable. This can mean hand-held devices such as smartphones or a computer. Ensuring Internet-enabled devices at an affordable price point to enable digital inclusion may entail measures to encourage mass production as well as addressing issues related to undue sector specific taxation. Having a device to connect is not solely enough to access online. In addition to the affordability of devices, the cost of data also needs to be affordable compared to disposable income. If connecting online is to be inclusive and equitable, the cost of connecting should also take into account the level of income of users in, particularly those who are underserved or groups that face barriers to inclusion/connectivity. This should also take into account, for instance, the different amounts of data that may be required to operate online for different functions, since limited data can pose another barrier for meaningful connectivity.

5.4. Relevance to Sustainable Development Goals (SDGs)

Rapid shifts in digital technologies are changing the context for pursuing the Sustainable Development Goals (SDGs). In the best cases, these technologies have contributed to massive improvements in access to public services and economic opportunities for millions of people. In the worst cases, they have opened the door to new forms of government surveillance, exacerbated inequalities, and encouraged social divisions. Many private firms also have enormous influence in

shaping the interface between digital technology and societal well-being. Against this backdrop, a growing movement is emphasizing the need for digital public goods and digital public infrastructure.

Nearly seven years after their adoption in September 2015, the Sustainable Development Goals (SDGs) are approaching the midway point to an overarching 2030 deadline. All 193 U.N. member states launched the economic, social, and environmental objectives of the SDGs under a headline ambition of "transforming our world." But in many ways, the world has already transformed itself, independent of the goals, and often not for the better. Rapid technological changes, divisive politics, and a global pandemic have all altered the context for the pursuit of global sustainable development. Some SDG trend lines have jumped forward, some have stagnated, and many have continued in the wrong direction.

At one level, digital technology is formally included within multiple SDG targets including:

- SDG 1: No Poverty

New digital technologies have contributed to rapid and massive improvements in access to public services, the provision of social protection, and new economic opportunities for millions of people. For example, India's Aadhaar system now provides digital identification for more than a billion people, quickly enabling a dramatic expansion in access to government programs in the world's second most populous country.

- SDG 4: Quality Education

Digital technology facilitates access to online learning programs, allowing individuals in the remote areas to be included. E-learning programs benefit in skill development and capacity building for individuals.

- SDG 5: Gender Equality

Digital inclusion empowers women and girls by granting them access to educational programs, employment, and entrepreneurial opportunities. Digital enhancement helps in identifying gender-based issues and inequalities.

- SDG 9: Infrastructure and Innovation

Target SDG 9.1 is to “Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.” Target 9.c is to “Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.” Target 9.a is to “Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States.”

- SDG 16: Peace, Justice, and Strong Institutions.

Digital technology can empower hundreds of millions of people, ensuring transparency and rapid access to government services. However, they might open the door to new forms of government surveillance, empowered autocrats with repressive digital tools, exacerbated many forms of pre-existing inequality, and encouraged social divisions through the spread of misinformation. The latter has, for example, hindered responses to the COVID-19 pandemic—which has in turn adversely affected most SDG trajectories.

Due to increasing demand, in 2020 alone, the United Nations Development Programme (UNDP) supported the implementation of more than 500 digital solutions around the world. In Ukraine, amidst the ongoing war, the government is harnessing digital technology to ensure continuity of public service delivery for its people. Besides improving efficiency, digitalization helps to reduce costs and ensure that the most vulnerable people in society also benefit.

5.5. Promoting Digital Inclusion for SDGs

As nations strive towards these global goals, attention now coalesces on digital public goods (DPGs): open-source, interoperable digital solutions that can be effectively leveraged to build the much-needed Digital Public Infrastructure (DPI) to ensure society-wide benefits. Built inclusively with a human-centred approach, digital public infrastructure can supercharge delivery of these goals to benefit everyone, everywhere.

Digital public infrastructure is described as a set of shared digital systems that should be secure and interoperable, and can be built on open standards and specifications to deliver and provide equitable access to public and/or private services at societal scale and are governed by applicable legal frameworks and enabling rules to drive development, inclusion, innovation, trust, and competition and respect human rights and fundamental freedoms. As infrastructure, they cut through the siloed approach of designing and implementing digital solutions with interoperable, society-scale programmes that shift innovation and competition to activities that take place atop it.

Functionality of the Digital Public Infrastructure:

Inclusivity: Eliminate or reduce economic, technical, or social barriers to enable inclusion, empowerment of end-users, last-mile access, and avoid erroneous algorithmic bias.

Security and Privacy: Adopt an approach that embeds key privacy enhancing technologies and security features.

Collaboration: Encourage the participation of community actors at different stages of planning, designing, building, and operating to facilitate and promote a culture of openness and collaboration.

Governance for Public Benefit, Trust and Transparency: Maximise public benefit, trust and transparency while respecting applicable legal frameworks. This means that laws, regulations, policies and capabilities should seek to ensure that these systems are safe, secure, trusted and transparently governed, and also promote competition and inclusion, and adhere to principles of data protection and privacy.

Sustainability: Ensure sustainability through adequate financing and technological support and enhancements to facilitate uninterrupted operations and seamless user focused service delivery.

Human rights: Adopt an approach that respects human rights at every stage of the planning, designing, building, and operating. Intellectual Property Protection: Provide adequate and effective protection and enforcement of intellectual property rights for the rights-holders of technologies and other materials used based on existing legal frameworks.

Sustainable Development: Seek to develop and deploy these systems that contribute to the implementation of the 2030 Agenda for Sustainable Development and achievement of Sustainable Development Goals.

Strategies for promoting digital inclusion might suggest:

- **Creating pathways for women to participate in the design and implementation of DPI:** Civil society groups can play a lead role in collaborating with women's collectives to build capacities for social audits using a digital and/or data justice lens. Women should be part of ongoing public consultations (rather than one-off) that make deliberate attempts to include the participation of those whose rights are often denied or invisible
- **Embedding DPI approaches across digital health initiatives:** Policy, investments and other efforts focused on DPI and DPGs should include health as a critical sector, and should highlight the linkages between DPI for health and DPI for other sectors, such as financial services, or sectors included in WHO's 'One Health' initiative (e.g. environment, agriculture and veterinary)
- **Driving public and private sector actions to invest in DPI for agriculture:** Given agriculture's intricate complexities and intersection with every other sector, such as finance, supply chain, manufacturing, water and chemicals, DPI for agriculture can break down data silos and create shared technology infrastructure together to translate the vision into reality to end hunger worldwide
- **Embedding DPI in government public service delivery programmes:** Governments can embed DPI design into social protection programmes and other public services, such as payment to smallholder farmers, etc. DPI offers seamless data sharing across departments,

enables cooperation in government among departments, and delivers integrated services for people. Often, governments are leading users for DPI for targeted public service delivery.

- **Leveraging education for broader outcomes**: By integrating upskilling and learning as critical components of public rails, policymakers unleash gains across a spectrum. Holistic education powered by DPI supports the verification of educational attainment for economic and other credentials, promotes civic engagement, fosters entrepreneurship and economic growth and improves education outcomes.
- **Embedding DPI approaches in education strategies and policies:** Enabling, future-proof policies and frameworks in place can set out how countries break down data silos and create shared technology infrastructure
- **Encouraging responsible business practices:** Governments may consider supporting sustainable and responsible business practices, through mandates on corporate social responsibility (CSR), environmental audits in ecologically fragile environments and ethical supply chain sourcing and management. All of these can be bolstered via DPI to improve traceability and create public rails for innovation
- **Facilitating data exchanges with clear governance and safeguards**: Increased transparency must ensure industry adheres to regulations and prevent government malpractice. Governments must protect businesses against the risks of misuse of sensitive business and personal data.

5.6. Previous Efforts

Today, this work has already begun. Below are four initiatives from around the world that highlight the power of digital cooperation embedded with inclusivity and resilience.

- The Sierra Leone Directorate of Science, Technology & Innovation's (DSTI) DPG OpenG2P created during the Ebola response is today offered as a re-imagined government-to-people social cash transfer architecture to crisis countries such as Sri Lanka, Afghanistan, and Ukraine. DSTI engages the private sector and university communities to build the technology that makes digital public goods like OpenG2P possible.
- GovStack supports governments in embedding the capacity to identify, deploy and sustain DPGs for DPI. The apparatus of its support so far encompasses open-source tools, a sandbox for testing, and communities of practices. GovStack envisages that through these efforts it can contribute to building DPI that can deliver faster, safer and more inclusive services. It cooperates with Ukraine, Kenya, Rwanda, Egypt and the EU co-financed with Horn of Africa countries.
- E-Estonia's backbone, X-Road, included in the digital public goods registry, is an open-source solution that provides secure data exchange between organizations. "X-Road can contribute to the attainment of the SDGs by helping to close the digital divide and enhancing connectivity, in addition to boosting the transition towards cleaner energy systems, and supporting industry, innovation and infrastructure," according to Nele Leosk, Digital Ambassador, Government of Estonia.
- The United Nations Development Programme (UNDP), in collaboration with Singapore's Infocomm Media Development Authority (IMDA), launched an important global initiative on digital inclusion at ATxSummit, an exclusive by-invitation only platform bringing together more than 4,000 guests from 85 countries across tech and government. ATxSummit is part of

Asia Tech x Singapore, Asia's flagship tech platform that unites over 25,000 global and industry decision makers to forge an inclusive digital future.

United Nations Agencies concerned with digital inclusion and its global accessibility

- International Telecommunication Union (ITU)
- UNESCO (United Nations Educational, Scientific and Cultural Organization)
- UNICEF (United Nations Children's Fund)
- UN Development Programme (UNDP)
- UN Global Pulse

Many of these initiatives are built collaboratively with UNDP and countries themselves, so they can build their digital infrastructure in ways that can support robust economies, more resilient communities and empowered citizens.

5.7. Challenges and Issues

Digital Divide

Limited access to technology: Many individuals, especially those in marginalized communities or rural areas, lack access to reliable internet connections and have limited ownership of smartphones or computers.

Technological literacy: Even if individuals have access to technology, they may lack the necessary skills and knowledge to navigate the digital landscape effectively.

Affordability: Cost barriers can hinder access to technology, as devices and internet packages may be too expensive for some individuals or families to afford.

Accessibility And Usability Barriers

Lack of infrastructure: Insufficient or non-existent internet connectivity and limited access to technological resources can prevent individuals from accessing digital information and services.

Geographical limitations: People in remote or rural areas may face difficulties in accessing the internet due to a lack of network coverage or limited availability of physical infrastructure.

Cognitive And Literacy Barriers

Digital skills gap: Many individuals lack the necessary digital skills and knowledge to navigate technology effectively. This includes tasks such as using search engines, understanding online security, or utilizing online tools and applications.

Limited literacy levels: Difficulty in reading, understanding, or comprehending digital content can be a major obstacle, particularly for individuals with low literacy skills or non-native speakers of the language used online.

Social And Economic Factors

Digital inclusion presents challenges in terms of social and economic factors that hinder access and adoption of technology. These obstacles include affordability, accessibility, and digital skills gaps, which must be addressed to ensure equal opportunities for all.

Online Privacy

Data breaches and identity theft**:** Malicious actors are constantly seeking to exploit vulnerabilities and gain unauthorized access to sensitive information. This puts individuals at risk of having their personal data exposed, leading to identity theft and potential financial loss.

Lack of control over personal information: Users often provide personal information while accessing online services or platforms. However, they may not have full control over how this information is used, shared, or stored by service providers.

Invasive surveillance and tracking: Online activities can be closely monitored and tracked, violating individuals' privacy and creating a sense of constant surveillance. This is particularly concerning for marginalized groups already facing discrimination or social stigmatization.

Phishing and online scams**:** Cybercriminals use fraudulent methods, such as phishing emails or fake websites, to deceive users and extract sensitive information. This can result in financial loss, identity theft, or exposure to other online threats.

Exposure of personal information through social media: Many individuals share personal content on social media platforms without fully considering the potential risks. This can lead to unintended consequences, such as reputational damage or targeted advertising.

5.8. Additional reading

- Digital public infrastructure | United Nations Development Programme
- Sustainable Development Goals | United Nations Development Programm
- The National Digital Inclusion Alliance (NDIA) & Roland Berger. (n.d.). Bridging the Digital Gap: The state of digital inclusion in the MENA region. In *www.pwc.com/me* [Report].https://mcit.gov.eg/Upcont/Documents/Reports%20and%20Documents_26122022000_Bridging_Digital_Gap_State_of_Digital_Inclusion_in_MENA_Region_26122022.pdf

5.9. Questions to be answered

How might governments and international organizations collaborate in extending digital infrastructure to very remote and underserved areas?

How can frontier technologies, such as satellite internet or community networks, be leveraged to overcome topological barriers to connectivity?

How might DPFs be designed to directly contribute towards the SDGs-poverty reduction, quality education, and gender equality?

How might governments and civil society collaborate to ensure that digital technologies serve reductions in violence, increases in justice, and strong institutions (SDG 16)?

In what ways can public education systems integrate 21st-century skills into curricula and better prepare future generations for a digital world?

How can digital service providers balance profitability with affordability in order to enhance access to their services?

How might community-based approaches be mobilized to enhance digital literacy and nurture local ownership of digital initiatives?

How can infrastructure development for resilient connectivity be prioritized for disaster-prone regions and landlocked countries?

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