Annual Report

2024

United Nations Internet Governance Forum

Dynamic Coalition

on

Data Drive Health Technologies

DCDDHT

2024 IGF DC DDHT Annual Report

Mission Statement

Mission Statement of the United Nations Internet Governance Forum (IGF) Recognized Dynamic Coalition on Data Driven Health Technologies (DC DDHT):

> The Dynamic Coalition on Data Driven Health Technologies facilitates a multi-stakeholder dialogue on the topic of the internet and e-Health, m-Health (mobile), internet of medical things and e-wellness technologies, so as to seek common ground on values, principles, ethics, norms, culture, standards, best practices and so forth.
>
> Knowledge sharing and open communication between multi-stakeholders, with collaboration, assists innovation and delivery of quality eHealth Care products and services. Technology tools and devices, access by the internet, data sharing and use on the Internet, Medical Internet of Things and Wellness Internet, enable, the mandates of the United Nations Sustainable Development Goals (SDG), and in particular, Goal Number Three. SDG Goal #3 seeks to ensure Health and Well-Being for all, at every stage of life.
>
> The Dynamic Coalition takes a global citizen centered approach on all matters.

Acknowledgements

The United Nations Internet Governance Forum IGF Secretariat. has provided us with invaluable support throughout the year. We also wish to thank Jutta Croll and Markus Kummer for their support. We want to note Robert Guerra for his continued contribution to the support of the DC infrastructure.

We thank our invited guest speakers for their invaluable contribution to the discussions we have had over the course of the year. Bringing the international community together means very late hours for some of our speakers, who have so helpfully accommodated this issue of time zones.

We encourage our session participants to continue to deepen and enhance our public discussions with their insights by joining the coalition. We thank members of other IGF Dynamic Coalitions for collaborating with us at our events

We wish to thank our new coalition members for joining us, and all our members for enriching our Dynamic Coalition's body of knowledge. We look forward to continuing interesting discussions with all, in the future.

The Dynamic Coalition members were supported by their families, friends, employers and professors, in their valuable work and we express our warmest thank you to all of them.

2023 IGF DC DDHT Annual Report is Reported By:

Ms. Amali De Silva – Mitchell, Founder & Coordinator, Dynamic Coalition on Data Driven Health Technologies. March 1, 2024.

Disclaimer

The views and opinions within this report are those of the writers and may not reflect the views and opinions of the United Nations Internet Governance Forum Secretariat, nor conform to IGF definitions, practices, norms, values and so forth.

1. Executive Summary

In 2024 we delved into the areas of cybersecurity, twining technologies, AR, VR.

These are all technologies that have developed post principles and foundations set up at WSIS in 2003 and 2005.The information society was at the core of the work 20 years ago, however, now we look to the future with emerging technologies driving the internet, that had not been conceived in full at that time. There is now a shift in the foundational paradigms. We are now dealing with the Informed Society, Intelligent Society. AI Society, who are an advanced and sophisticated user group where we even include robots with their own identities. However, costs, skills and infrastructure limit the global uptake of the new, leading to yet again, a digital technology divide. We will continue to deal with lags and legacy systems that can create unexpected disruptions to the new paradigms.

We first did a check-in event with the affiliated members of the DC, to assess the status of ehealth post covid, lessons learnt and opportunities. We found that telemedicine was now a household phrase and commonly expected as an ehealth service. We have come a long way since the year 2020 and the Covid pandemic. This work led to us into collaborating with DC3 at IGF 2024 on highlighting cybersecurity issues for the community networks CN ehealth services user. CN can be located in urban areas where the cost of connectivity and new devices are high for marginalized groups, or in remote locations where no broadband or satellite connectivity exists. We asked for support of small and medium size enterprises servicing the local community for ehealth, such as an independent doctor or pharmacy. These groups may be pressed to use digital supply chain ordering services or connect to a national ehealth funding model. that are way more sophisticated than the local CNs.

We introduced a new topic of twining technologies at ITU and Eurodig that has tremendous potential for use in Healthcare, clothing and other sectors. The topic of Virtual Reality, Augmented Reality, Avatars and Twins, brings up interesting issues for discussion. A prototype can be set up to run simulations and then specifically designed for the user. This requires modeling to highs standards. These technologies have great potential in the field of medical education, patient specific medical services, research and so forth.

Some issues these technologies bring up additional privacy and security issues. There is a need for a re-evaluation of the concepts of privacy, security, personal and community information amongst other concepts for understanding the emerging risks. Data validity and quality are key, as personal profiles are being set up. Data sharing amongst these technologies, interoperability, storage, retrieval and data disposal or anonymity are still areas to be discussed, at a minimum. These technologies can be more complex than simple AI as it works in real time with pre-existing and new data inputs. Hence, it is critical to evaluate the inputs and outputs for regulated compliance.

As the year developed it became a reality that the whole world will be connected with Satellite internet by one service provider or another. This lessens the burden of costly infrastructure, but the cost of connection at the rural areas remains. Going back decades, pioneering groups volunteered to bundle their community applications to support each other. This should be the rigor going forward as local groups can easily repair and develop application systems. Volunteer technology services as that exists for the development of IT commons / Open Source will be required. Skills training is now more accessible to all online, so there is a definite opportunity. Open source means that even AI capabilities can be in available to local groups. Our work within the DC continues as a place for great conversations, community sharing and working to excel as the user experience for ehealth.

2. Background to UN Internet Governance Forum, Dynamic Coalitions

Internet Governance was one of the most controversial issues discussed at the United Nations World Summit on the Information Society WSIS, held in two phases, in Geneva, 2003, and in Tunis, 2005. Cognizant of the fact that any Internet Governance approach should be inclusive and responsive, the WSIS requested the Secretary General of the United Nations to convene a new forum for multi-stakeholder policy dialogue.

The Internet Governance Forum (IGF) as a platform for discussions brings various stakeholder groups to the table as equals to exchange information and share good practices. While the IGF may not have decision-making mandates, it informs and inspires those who do. It facilitates a common understanding of how to maximize Internet opportunities and address risks and challenges. (*Sourced IGF Website January 2022*)

IGF Mandate Paragraph 72 of the Tunis Agenda: 72: We ask the UN Secretary-General, in an open and inclusive process, to convene, by the second quarter of 2006, a meeting of the new forum for multi-stakeholder policy dialogue called the Internet Governance Forum (IGF). The mandate of the Forum is to: • Discuss public policy issues related to key elements of Internet governance in order to foster the sustainability, robustness, security, stability and development of the Internet; • Facilitate discourse between bodies dealing with different cross-cutting international public policies regarding the Internet and discuss issues that do not fall within the scope of any existing body; • Interface with appropriate inter-governmental organizations and other institutions on matters under their purview; • Facilitate the exchange of information and best practices, and in this regard make full use of the expertise of the academic, scientific and technical communities; • Advise all stakeholders in proposing ways and means to accelerate the availability and affordability of the Internet in the developing world; • Strengthen and enhance the engagement of stakeholders in existing and/or future Internet governance mechanisms, particularly those

from developing countries; • Identify emerging issues, bring them to the attention of the relevant bodies and the general public, and, where appropriate, make recommendations; • Contribute to capacity building for Internet governance in developing countries, drawing fully on local sources of knowledge and expertise; • Promote and assess, on an ongoing basis, the embodiment of WSIS principles in Internet governance processes; • Discuss, inter alia, issues relating to critical Internet resources; • Help to find solutions to the issues arising from the use and misuse of the Internet, of particular concern to everyday users; • Publish its proceeding *(Sourced IGF Website January 2022)*

Role of the Multistakeholder Advisory Group (MAG)

The Secretary-General of the United Nations established the Advisory Group (now referred to as the Multistakeholder Advisory Group - MAG). The purpose of MAG is to advise the Secretary-General on the program and schedule of the Internet Governance Forum meetings. The MAG is comprised of 55 Members from governments, the private sector and civil society, including representatives from the academic and technical communities. In addition, representatives of former IGF host countries, as well as representatives of intergovernmental organizations, are invited to attend and contribute to the meetings and work of the MAG. The MAG holds face-to-face meetings, preceded by open consultations, up to three times a year.

The idea of establishing a Dynamic Coalitions Coordination Group (DCCG) emerged at the 10th IGF in João Pessoa, Brazil, during the first-ever main session dedicated to Dynamic Coalitions (DCs). The idea found broad support among members of the different coalitions, many of whom were exchanging views and good and best practices for the first time. The main task of the proposed Group would be, on one hand, to develop a framework for all DC with some common principles and recommended rules of procedure, and on the other hand, to act as a convener of coalitions in order to further the open and constructive discussions that took place in Brazil. The Group would work on obtaining organizational support in those areas where the Dynamic Coalitions may require support, look at areas of overlap and duplication and aim to create synergies among DCs. It was suggested that it also serve as a liaison to both the IGF Secretariat and the MAG. *(Sourced IGF Website January 2022)*

3. The Dynamic Coalition on Data Driven Health Technologies, Within the UN IGF Framework

The Dynamic Coalition on Data Drive Health Technologies, DC DDHT, is a recognized member of the Dynamic Coalitions of the Internet Governance Forum IGF and as such, is a member of DCCG. DDHT also seeks to work collaboratively with the working groups of the United Nations International Telecommunications Union, the World Summit on Information Society activities, as well as with other international, regional and national

initiatives such as EuroDIG, Internet Society, ICANN and others. Members of the Dynamic Coalition also hold positions within these other entities.

The founding mandate of the DC DDHT has been as follows: The DC will discuss the issues and make recommendations to improve data quality and access to data, for building or remediating technologies and services to the global public, in keeping with the United Nations Sustainable Development Goal # 3: Ensure healthy lives and promote well-being for all at all ages. This will involve supporting technologies for the eradication of diseases; easing blindness or hearing; enhancing nutrition; supporting new developments for surgery; tele-medicine; public health education; public health management and so forth.

DC activities will include providing guidance and interpretations, risk management, advocacy and making recommendations for data standards, best practices and providing input in to other related and associated policies and legislation. DC Scope: Global, all health, associated industries, services, fields (such privacy, safety etc.) in the private, non-profit and public sectors. There are no exclusions of associated or cross-cutting policy or methodologies, and it strives to be fully inclusive and diverse in approach to all matters, ensuring a multi-stakeholder approach.

4. Intersessional Work

Joint DC paper on Robotics and the Medical Internet of Things

We continue to work on the content of this paper in 2024. This paper brings together inputs from the DC DDHT sessions and members from a variety of venues.

Additional themes that emerged in 2024 were:

1. Augmented Reality,
2. Virtual Reality
3. Twinning

2024 Book: Health Matters, Technologies Driving Change in Healthcare, A Community of Thought. Part 3.

The book's chapters were written by members of the Dynamic Coalition over the course of 2023. The complete chapters are available for download, at no charge, from the United Nations Internet Governance Forum, Dynamic Coalition on Data Driven Health Technologies webpage at: [Dynamic Coalition on Data Driven Health Technologies (DC-DDHT) | Internet Governance Forum (intgovforum.org)]

In 2024, the new written contributions for the DC book were as follows:

- Dr Houda Chihi, Overview About Cybersecurity in Healthcare
- Yao Amevi A. Sossou, Innovating for health equity through sustainable and inclusive eHealth systems powered by data-driven technologies

Please refer to Appendix 2 to access the full content of these articles.

5. Collaboration with the International Telecommunications Union ITU

The DC continues to participate actively with the public working groups of the ITU. DC DDHT also hosted a session at World Summit on the Information Society WSIS 2024. The report of this session is noted below:

WSIS 2024 Session 285 :AR VR and the Metaverse, An opportunity to enhance ehealth Technologies

Presented by: Internet Governance Forum, Dynamic Coalition on Data Driven Health Technologies

May 30 th, 2024 : 1600 hours. Session Link: itu.int/net4/wsis/forum/2024/en/Agenda/Session/285

Moderators: Dr Amado Espinosa (Mexico), Dr Joao Rochas Gomes(Portugal), Amali De Silva – Mitchell (UK /Sri Lanka)

Presenters: Carol McDonald (IEEE - US), Rodrigo Silva Roja (Chile), Yao Amevi A. Sossou (Benin), Dr J Erbguth (University of Geneva)

Rapporteur: Amali De Silva-Mitchell

Key issues discussed:

1) There is an incredible and tremendous opportunity to leverage this technology for the healthcare industry and other industrial applications. It is no longer just for recreational use.
2) The internet is not a requirement for the use of these technologies, they can be used stand alone. Hence, it can be used in remote locations and integrated into telecommunications networks, with a phased in approach. It would require 5G.
3) These technologies fully immerse the user in a scenario and activate multiple human senses. There can be health side effects with overuse.
4) The use of these technologies can provide standardized, quality, and repeatable training for healthcare staff. Student anxiety could be reduced and the most effective use of hands on training may be achieved. Simulations increase the knowledge base of students. The use of technology can reduce training costs and speed up training, which may also be conducted in remote locations, making education more accessible to all.
5) Public education, alternative medicines education, and education for patients at home, and for caregivers, can also be provided through these AR, VR Mixed Reality educational products. Some education is already in existence.
6) The privacy issues for this data must br considered. It uses personal data as training data. It also creates huge amounts of data when treating patients. This data can then be used for training systems, statistics, surveillance and research. This should however not be done without proper consent.

7) There are also additional complexities for standard privacy issues with this data in real time, with modification and retention. It uses real, cloned, twinned and AI developed data input profiled values, to create a spectrum of real and artificial outcomes and retained values. Profile making can aggregate personal data to create a group data set or twin or clone for example. Who then owns the identity and jurisdiction? There could be issues for intellectual property as well.
8) Technologies developed for other industries, e.g. the textile industry and electronic games industry, can be repurposed for use by the healthcare sector, reducing development costs and opening up to multistakeholder investment opportunities.
9) Africa has a young population that can be trained in and for the development of these technologies. Other countries that are textile producers should train their staff with IT skills to use these technologies.
10) Technology can be used innovatively to remediate for waste and e-waste issues, so as to assist with the management of impacts to global climate change and hazards management.
11) Healthcare workers can benefit from customized protective clothing and footwear. Other industrial workers at risk can also benefit from these design initiatives. This will also assist with the development of medical robots.
12) Prosthetics and other customized medical supports for patients can be developed with these technologies, as well as assist with remote surgery, heath care discovery, modeling and simulations for preventative care.

Tangible Outcomes

Tremendous opportunity for training healthcare staff and for all industries for skills development. Health care training can be standardized, developed centrally at lower overall cost, to be made readily available. Perhaps the use of these technologies will reduce anxiety for students, with the opportunity to repeat training exercises and increase practice, leading to enhanced skill and knowledge. This technology will not replace real practice but will bring a better prepared student to the real practices, enhancing the overall quality of the training and providing the opportunity to train more students faster and at a lower cost. This is a great opportunity for Public Private Partnerships investment between government and the healthcare industry.

Customization is a key feature of these technologies, that can be used with success across industries for many innovative applications.

Action Plan

Encourage ongoing and enhanced, global multi-stakeholder discussions regarding this technology space, including conversations on opportunities, risks, unseen issues and complexities, social benefits, economic benefits, remediation for climate change issues, values, norms, weaknesses etc.

A differentiation must be made between this fully immersive technology and general AI and mainstream robotics.

Records management vis a vis patient health care records, will have an additional level of complexity imposed upon it, by these technologies, and hence a full, analysis of each situation is required to limit risks, for instance privacy. The development of an ITU guidance and issues paper document for this space would be beneficial for developers and users. Continued development of ISO and other standards and best practices recommended.

Themes for WSIS 2025

1) Should privacy best practices and legislation for AR, VR, Metaverse, and Mixed reality spaces be developed new, or should existing practices be enhanced ?
2) Should a special focus be developed for the Ethics governing this space?
3) What public education should be rolled out for users and who should provide it?
4) Collaboration for multi-stakeholders / Public Private Partnerships for investing in this space, understanding that the internet is not a pre-requisite for these technologies.
5) How can emerging technologies support waste and e-waste management, and the climate?

6. Collaboration with EuroDiG in 2024

DC DDHT organized a pre-event at the EuroDig 2024 conference by virtual and online participation.

AR, VR, Metaverse for Urban and Rural settings – Pre 05 2024

Organization members:

- Amali De Silva- Mitchell
- Dr Jorn Erbguth
- Frederic Cohen
- Dr Joao Rochas Gomes
- Rodrigo Silva Rojas
- Yao Amevi Amessinou Sossou
- Guest: Dr Oliver Crepin Lebland

Virtual Reality, Augmented Reality with Mixed Reality or Metaverse spaces have crept into internet supported devices for a longtime. They are found within cars, mobile phones, gaming devices, advertising, education and training, health and wellness applications, to name a few applications of these technologies within our citizen lives. The opportunities for this technology with 5G and now 6G are tremendous, improving economic productivity, facilitating speed to intended results, providing access for nontechnical users, plus much, much more. There are significant opportunities with the use of these technologies, to make UN SDG 3 Health and Wellness for All, a reality. For example, supporting the elderly / seniors wellness or mental health.

However, are we moving into use case spaces that are not supported by robust guidance and best practice? The EU has set up a coalition to support discussion and explore these issues. AI which is embedded within these technologies, is only now, gaining regulatory guidance. Do these technologies with their wider specrum of additional use cases, require further guidance for safe and optimal use? Issues could be related to health and wellness and other aspects of social, technical and economic safety.

We discussed the opportunities, impacts and issues of AR, VR and Mixed Reality together. We explored the issues that need to be guided by best practice, for full beneficial application of these technologies.

The session recording can be found here:

AR, VR, Metaverse for Urban and Rural settings – Pre 05 2024 - EuroDIG Wiki

7. Intersessional Event with the Public – Covid in Retropect

DDHT hosted an online virtual event with guests Jeff May (UK) and Jenny Sicat- Crabb (US/ Philippines). Dr Joaa Gomes, Yao Soussou and Amali De Silva-Mitchell hosted the session. It was a very interesting discussion, on the learnings from the Covid pandemic, now a few years on and way forward from a public view point. The recording can be found on the IGF website page of DDHT at:

> What did we learn from e-health care during the Covid pandemic and how can we leverage these lessons, for the betterment of e-health and wellness devices and services on the internet?

8. Intersessional Event with DC Libraries

DDHT also hosted an event with the IGF DC dedicated to libraries. This event introduced the new IFAL International Federation of Library Associations and Institutions policy on healthcare information within libraries. Peter Murgatroy (New Zealand) was our guest, and provided us with an excellent presentation. Amali De Silva -Mitchell, Yao Soussu, Dr Joao Gomes and Dr Amado Espinosa hosted the event. The recording can be found on the IGF website at the DDHT webpage.

> Ehealth reaching the last mile with the public and private library systems (Passcode: s6!g8p8w)

9. DC Session at IGF Riyadh Meetings 2024, Public Engagement Event

DDHT co-hosted a session with DC3 Community Connectivity
IGF 2024 DC3-DCDDHT Cybersecurity in Community Networks and digital health technologies: Securing the Commons

Harnessing innovation and balancing risks in digital space

Key Takeaways:

1) Stakeholders agreed upon the existence of multiple cybersecurity risks in community networks. 2) Participants stressed the need for a multistakeholder approach to tackle cybersecurity challenges in community networks. 3) Need for cybersecurity support for digital health end users (who can be patients or small entities such as doctor practices, pharmacies, testers etc.

Calls to Action
DC3 call to action: - Participants called for strong cybersecurity policies to be adopted by community networks. - Participants called for increased cybersecurity capacity building efforts in community networks. DCDDHT call to action: - Investment in infrastructure at all levels. - Opportunity to bundle services together to reduce costs.

Session Report
Osama Manzar pointed out that the Internet operates globally, but community networks serve hyper-local needs, particularly for those underserved by traditional telecom providers. Cyber safety, security, and data protection should not rely solely on top-down approaches but also on grassroots, socially driven, and behavior-based capacity building, which is often overlooked in planning. Communities are addressing this through initiatives such as empowering women to manage local information flow responsibly, creating hyper-local information trustees to act as fact-checkers, and engaging in role-play activities like street plays and oral content in local languages to promote cybersafety awareness.

According to Renata Santoyo, Anatel has become more actively involved in supporting community networks, teaching underserved communities how to build their own networks and navigate regulatory frameworks. Public consultations have been established to gather input from CSO. Proposed initiatives include leveraging the USF for community network projects, addressing potential conflicts between spectrum allocation and community network applications. Cybersecurity regulations have been updated to include community networks, with requirements for telecom providers to report incidents to the national data protection authority. To enhance accessibility, a simplified guide was developed, covering data protection, account management, and secure usage practices.

Leandro Navarro spoke about decentralized identifiers which enable individuals to manage multiple identities, allowing organizations to verify specific information about them. To empower community networks and similar groups, efforts are underway to develop open-source software enabling these communities to provide such services independently, including a wallet to store data structures and credentials.

Talant Sultanov highlighted the success of community networks in Kyrgyzstan, connecting people to the Internet for the first time. Recognizing the trust users place in the Internet and their role in enabling access, the initiative felt a responsibility to equip users with the necessary skills and knowledge to navigate the digital space safely. This led to the parallel launch of the *Technology for Society* project: Key initiatives include help desks providing advice on cybersecurity issues, cyber hygiene training where traditional storytellers convey cybersecurity concepts in simple terms, making them accessible to rural communities.

Amali da Silva-Mitchell pointed out that when dealing with health data, it is important to have secure communications.

Dr Jorn Erbguth highlighted that privacy is a major concern in health technologies, and when data is used for commercial purposes, it should be based on informed consent.

Houda Chichi gave a presentation on the paradox of digitalization: while healthcare services improve, many threats arise. Emerging tech is being increasingly deployed in health: AI/ML, blockchain, cloud, IoT - hence it is important to build the capacity of health experts.

Highlights from Q&A and discussion:
- Microsoft reports that over 90% of cyber incidents happen because of phishing. Through education and capacity building the individual becomes the strong link (instead of the weak link), especially in community networks.
- It is important for regulators to have sensitivity and not impose the same regulation for enormous telecom operators and small ISPs.

Reported by DC3

Please refer to Appendix 1 for the detailed report for this session by DDHT member Dr Joao Gomes. A recording of this exciting session is also available at the Internet Governance Forum.

Main DC of DCs joint Session

This year Dr Joao Gomes played an active role supporting Jutta Croll organize and present the Main joint DC event, on behalf of DDHT for all DCs. Members Yao Soussou and June Parris were also invited to speak during the session.

10. Issues recommended for further discussion as an outcome of the 2024 DDHT sessions

These topic areas would benefit from further discussions for policy making.

1. Should privacy best practices and legislation for AR, VR, Metaverse, and Mixed reality spaces be developed new, or should existing practices be enhanced ?
2. Should a special focus be developed for the Ethics governing AR,VR, Metaverse and Mixed Reality space ?
3. What social issues should be considered for Avatars and Twins ?
4. What public education should be rolled out for users and who should provide it?
5. Collaboration for multi-stakeholder / Public Private Partnerships for investing in this space, understanding, that the internet is not a pre-requisite for these technologies.
6. How can emerging technologies support waste and e-waste management, and the climate?
7. What is the impact of real time data collection in the public and for the public?
8. What lessons learnt from telemedicine during the Covid pandemic should be resolved and how ?
9. Affordability for all, as well as access for all must continue to be enhanced

11.Vision for 2025 Work and Beyond

We expect to be driven by the interests of our membership. We commenced a mentorship program that has successfully integrated new members into our work. We also initiated a NEXT GEN subgroup of members who are encouraged to investigate issues that are of significant to the under 35 age group. The leads for this team are Dr Joao Rochas Gomes, Yao Amevi A. Soussou and Herman Ramon all past regional or country youth leaders.

12. Administrative Matters Update

Our DC membership is growing with a diverse membership of multi-stakeholder participants from around the world. The depth and breadth of conversation has been very informative, refreshing, collaborative and educational.

As always, the DC is open to and welcomes membership from the global public, through participation on the DC email list. We continue to run an active email list as the primary

mode of communication with members. We also host a monthly virtual call open to DC members only.

Stakeholder members have volunteered to attend Main DC sessions on behalf of DDHT as the timings for these meetings are not condusive to members in North America.

New Logo for DCDDHT

This logo was designed for the Dynamic Coalition by Yao Amevi A. Soussou

Appendix 1 Report by Dr Joao Gomes

Reporting on the DC-DDHT Session: Cybersecurity in Community Networks and Digital Health Technologies

Session Reference:

- Title: DC-3 & DC-DDHT: Cybersecurity in Community Networks and Digital Health Technologies: Securing the Commons
- Link: https://igf2024.sched.com/event/1sWnQ/dc-3-dc-ddht-cybersecurity-in-community-networks-and-digital-health-technologies-securing-the-commons

Context and Participants:
This dedicated session brought together experts and practitioners to examine cybersecurity's integral role in community networks and digital health infrastructures. Key participants included:

- Moderators: Luca Belli (onsite), Amali de Silva-Mitchell and Jörn Erbguth (online)
- Rapporteur: Senka Hadzic
- Speakers:
- Renata Santoyo (ANATEL, Brazil) – Government perspective on regulation and public policy.
- Leandro Navarro (guifi.net, Spain) – Insights from a large, community-driven network.
- Talant Sultanov (Global Digital Inclusion Partnership, GDIP) – Perspectives on global inclusion strategies.
- Osama Manzar (Digital Empowerment Foundation, India) – Highlighting community empowerment and digital literacy.
- Josephine Miliza (APC, Kenya) – African regional perspective on community connectivity and resilience.
- Dr Houda Chihi (Telecom Tunisia, DC-DDHT) – Private sector insights into network security and infrastructure resilience.
- Herman Ramos (DC-DDHT) – Emphasizing digital health challenges and solutions.

Key Discussion Points:

- Securing the Commons:
  The session stressed that cybersecurity is not merely a technical issue but a

communal imperative. As participants noted, community networks serve as shared public goods - “the commons” - essential for delivering telehealth, remote diagnostics, and health education. Ensuring that these networks remain stable, resilient, and secure allows them to function as trustworthy platforms for health innovation. As Houda Chihi emphasized, the increasing reliance on digital solutions like remote healthcare services, telemedicine, and the Internet of Medical Things (IoMT) necessitates robust security practices to safeguard patient data, prevent cyber-attacks, and ensure continuity of healthcare operations.

- Resilience and Capacity Building:
  Speakers highlighted that building local capacity through training programs, community engagement, and resource sharing is crucial for sustainable security. Improving cybersecurity in community networks directly benefits telehealth endeavors, ensuring continuous service delivery, even amidst potential threats or connectivity disruptions. This aligns with Houda’s perspective on the importance of cybersecurity skills development across healthcare teams and communities to address the ever-evolving landscape of cyber risks. Recommendations included adopting a Zero Trust approach, continuous education for medical staff, and proactive cybersecurity tools like AI-driven threat detection systems.

- Future-Oriented Security Strategies:
  Looking ahead, speakers highlighted that community networks may evolve to incorporate mobile-first or satellite-based backbones. As infrastructure shifts, so too must our security strategies. The session recognized that today’s CN-centric models will need to adapt to changing technologies, ensuring a future-ready approach that anticipates emerging cyber risks.

- Interoperability, Trust, and Policy Alignment:
  Governments and regulators play a significant role in creating enabling environments. Aligning policies, fostering interoperability, and encouraging open standards build a secure ecosystem where digital health services can thrive. This synergy between policy, technology, and community engagement ensures that cybersecurity becomes ingrained in the DNA of digital health infrastructure.

Conclusions and Path Forward:
The DC-3 and DC-DDHT session confirmed that cybersecurity and digital health are deeply interconnected. To protect health data, ensure service continuity, and sustain public trust, we must secure the digital commons. Going forward, the group will:

- Develop guidelines and best practices that bridge the gap between community networks, emerging technologies, and digital health systems.

- Conduct further research, informed by participant feedback, on how to scale security models as connectivity solutions evolve (e.g., mobile-first, satellite links).

- Foster stronger collaboration among stakeholders - technologists, community leaders, policymakers, and health professionals - to embed cybersecurity at every layer of the digital health value chain.

These findings will inform the DC-DDHT's 2025 agenda, shaping policies, capacity-building initiatives, and frameworks that ensure resilient, secure, and community-centered digital health networks worldwide.

Appendix 2

Overview About Cybersecurity in Healthcare

Dr Houda CHIHI InnovCOM SupCOM Houda.chihi@supcom.tn

Abstract :

The huge progress of technology is making our life much easier together with advanced services but at the same time it is joint with threats especially that we are facing the governance of data. Hence data protection is mandatory to enable digital safety exploitation. Therefore, following the great increase of online & remote medical tasks Patient safety is at risk. There is a paradox with technological progress and patient safety.

Cybersecurity in Healthcare Best practices

Cybersecurity is a requirement to benefit digitalization and redirect it for a value creator. It is about selecting the safest technology solution. Lack of cybersecurity practices and awareness leads to complex problems related to financial operations, especially with the rise of ransomware as a service. In addition, lack of security and data protection at industries is harmful for reputation especially with the Variability of cybercrimes sources. Healthcare organization protection is mandatory in the digital age as it is related to human life.

Data security Cyberattacks could impact on real time healthcare operations by disrupting them. In addition, patients' data is the focus of cybercriminals. For this cybersecurity ensuring in healthcare companies is a must have which is based on a specific KPIs such as availability, confidentiality and integrity. Proactive detection is a key for patient protection and ehealth improvement. In other side, healthcare sector is at risk with the emergence Remote medical actions based on IoT devices. The exploitation of Internet of Things technology corresponding to Internet of Medical Things (IoMT) requiring data storage in the Cloud which is the focus of attacks.

The top trends of cyberattacks issues are related to overall supply chain attacks , DDOS threats , phishing, ransomware, DNS. Cyberattacks increase with the rise of generative artificial intelligence leading to misinformation.

Specific practices are required to benefit from innovation without making others' life at threat. It starts by cybersecurity culture development requiring training and rising awareness of health staff about the importance of data protection in all healthcare centers. Next, it is about reviewing the connectivity tools which helps to review the cybersecurity strategy such that endpoints protection is a requirement.

Digital healthcare operations users should follow a zero trust for any healthcare operation and application. Following the revolution of artificial intelligence, we need to review the adaptability of legacy cybersecurity tools. Restrict the access to digital health operations from devices equipped with specific security tools. Other important tasks of cybersecurity should be followed such as Firewall continuous configuration together with Virtual Private Network (VPN) exploitation, continuous update of passwords and adopt multi factor authentication for any access, check any link before clicking in it, awareness and capacity building is a key to ensure patients' safety, regular update of healthcare software tools, track and control of healthcare staff activities, test any digital application before deployment, continuous backup and restauration of patients' data, collaboration between different players is required about regulations and policies statement, required collaboration with IT staff, collaboration with international healthcare companies to be informed & updated about cybersecurity incidents, threat hunting and threat intelligence application for Proactive threat detection in which data collection is improved with the integration of artificial intelligence and machine learning. New trends of cybersecurity methods enabling value creation for digital companies in general and healthcare industries in particular which is related to the exploitation of blockchain for encryption, Artificial Intelligence (AI) and Machine Learning (ML) for data collection and proactive threat detection. IT infrastructure segmentation Get inspiration from regulations stated by US organizations such as health insurance portability and accountability act (HIPAA)

Innovating for health equity through sustainable and inclusive eHealth systems powered by data-driven technologies

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Introduction

Healthcare is changing in ways we couldn't have imagined a decade ago. Data-driven health technologies (DDHTs) are revolutionizing how we approach healthcare, offering tools to tackle long-standing issues like unequal access, overburdened systems, and environmental sustainability. Yet, with these advancements come tough questions: How do we ensure these technologies reach everyone? Can we balance innovation with ethics and privacy? How do we make it all sustainable? As someone deeply involved with the Dynamic Coalition on Data-Driven Health Technologies (DC-DDHT), I've seen how global conversations, research, and collaboration can drive real change. This article draws on those experiences to explore how we can use technology to build a future where healthcare is accessible, inclusive, and responsible. From empowering communities with better eHealth access to making sure our tech doesn't harm the planet; the goal is simple: health systems that work for everyone.

Empowering communities through eHealth access

Healthcare inequity is deeply rooted in the absence of connectivity and resources in underserved regions. Technologies like satellite internet have emerged as lifelines, as highlighted by the European University Institute (2024). Satellite hubs enable local providers to deliver telemedicine, real-time diagnostics, and digital health education in areas with limited infrastructure. For instance, the potential of these technologies is being realized in developing regions where satellite networks bridge the last mile to connect rural clinics to global healthcare expertise (Kulesza, 2024). Libraries, often overlooked in discussions about healthcare, hold immense promise in addressing these gaps. In New Zealand, public libraries have become gateways for community health, offering resources approved by medical institutions to improve health literacy (Times Colonist, 2024). Canadian libraries lend tools such as thermal cameras to identify energy inefficiencies in homes— an innovative model that could easily be adapted to include lending AR/VR health diagnostic devices or educational resources. Reflecting on these advancements, I see libraries as critical in democratizing healthcare access. However, their role must extend

beyond offering tools; they should become hubs for public-private partnerships, where governments and tech innovators co-invest in infrastructure and training. Community-led models, particularly in African countries, could empower local libraries to deliver culturally sensitive health education alongside digital services. Ethics and security in robotics integration Who is responsible if something goes wrong? The developer, the healthcare provider, or the machine itself? Privacy concerns are also critical, especially as robots handle sensitive patient data. On the technical side, interoperability and cybersecurity are essential. Robots must integrate seamlessly into existing healthcare systems and protect data from breaches. Autonomous robots must be designed to align with strict ethical standards, ensuring transparent decision-making and equitable access across diverse populations (Stahl & Coeckelbergh, 2016). Cost-effective and energy-efficient designs are equally important, particularly in resource-constrained settings. These considerations align with the ITU's emphasis on green health IT, which calls for innovations that minimize environmental impact while maximizing health benefits (Jain & Doriya, 2022). Robotics is revolutionizing healthcare, offering groundbreaking applications in surgery, diagnostics, and patient care. Yet, as João Rocha Gomes noted, this innovation comes with ethical and security challenges, particularly around patient autonomy and data privacy (Gomes, 2023). For instance, robotics-powered surgeries raise questions about liability in cases of errors. Houda Chihi's work on cybersecurity emphasizes the vulnerabilities that arise with interconnected medical devices. The proliferation of the Internet of Medical Things (IoMT) necessitates robust encryption and real time threat detection systems (Chihi, 2024). From ransomware attacks targeting hospital systems to breaches in personal health data, these risks cannot be ignored. The adoption of zero-trust cybersecurity frameworks, blockchain, and AI-based solutions offers promising directions, yet global standards are still in their infancy. Personally, I believe the success of robotics and IoMT depends on striking a balance between innovation and regulation. While we cannot stop technological growth, we must ensure that patients' rights and safety remain at the forefront. Governments, developers, and healthcare providers need to collaborate on robust policies that address these concerns while ensuring equitable access to robotics technologies. Libraries as catalysts for eHealth transformation Libraries have always been repositories of knowledge, but their evolution into hubs for health equity is both timely and necessary. The metaverse offers an unprecedented opportunity to revolutionize education and healthcare by creating immersive, interactive spaces where people can learn and access services remotely, regardless of their location" (Metaverse in 2040, 2022, p. 12). In underserved regions, libraries can use metaverse technologies in some way where community members access digital tools, health information, and workshops. The concept of "gadget libraries," as proposed by Amali De Silva-Mitchell1 , exemplifies this potential by envisioning libraries as centers lending diagnostic devices, AR/VR tools, and other healthcare innovations. Augmented and virtual reality tools are becoming essential for public access to advanced technologies, positioning libraries as vital hubs for community-based healthcare and education" (Metaverse in 2040, 2022, p. 15) Existing models in Canada and New Zealand

showcase the feasibility of this approach. For example, New Zealand's libraries provide digital health resources approved by government agencies, while Canadian libraries support environmental sustainability by lending Climate Action Kits (Times Colonist, 2024). These initiatives can be expanded to include preventive healthcare tools, from blood pressure monitors to educational AR simulations. Reflecting on these examples, I see libraries as bridges between technology and communities. However, their success depends on localized strategies. In Africa, for instance, involving community elders and leveraging indigenous knowledge could enhance the effectiveness of library-led health programs. Libraries must also partner with NGOs and healthcare institutions to offer integrated services that go beyond technology access. Health and environmental sustainability The link between healthcare and environmental sustainability is becoming increasingly evident. From energy-intensive hospital operations to the growing reliance on electronic devices, the environmental footprint of healthcare is significant. Initiatives like zero-waste programs in Egypt, where textile recycling supports sustainable practices, demonstrate how healthcare systems can contribute to environmental goals (WUF12, 2024). Similarly, refillable container programs in the Philippines offer scalable solutions for reducing plastic waste in healthcare settings. Green health IT is an area that I believe needs greater attention. As IoMT devices and robotics become commonplace, integrating renewable energy sources and adopting circular economy principles will be essential. The ITU's emphasis on green technologies provides a blueprint, but more actionable steps are needed at the local level. Additionally, By reducing the need for physical travel and enabling virtual healthcare services, metaverse technologies can significantly lower the environmental impact of health systems" (Metaverse in 2040, 2022, p. 20). The integration of mixed reality in healthcare has the potential to enhance sustainability by enabling remote diagnostics, virtual consultations, and immersive medical training, all while conserving resources" (Metaverse in 2040, 2022, p. 18) Reflecting on these developments, I see a dual responsibility for healthcare innovators: meeting the rising demand for services while minimizing environmental harm. This requires a shift in mindset, viewing sustainability not as a secondary goal but as a core design principle for all healthcare technologies. 1 This is from a summary of insights gathered from various discussions, webinars, and email exchanges led by Amali De Silva-Mitchell, the coordinator of the Dynamic Coalition on Data-Driven Health Technologies (DC-DDHT). Strengthening the foundation for eHealth equity Building equitable eHealth systems requires collaboration across sectors, governments, private enterprises, and civil society. DC-DDHT's focus on interoperability and bundled government supported services highlights practical solutions for addressing barriers to adoption (DC-DDHT, 2023). For example, small and medium-sized healthcare enterprises like pharmacies and clinics often lack the resources to implement secure eHealth platforms. Government subsidies and standardized software solutions can make these technologies more accessible. From my perspective, one of the biggest challenges lies in ensuring cultural relevance. A one-size-fits-all approach will not work for global healthcare systems. Instead, localized frameworks must guide the design

and implementation of eHealth platforms. This is where we must keep playing a critical role, fostering dialogue among diverse stakeholders and promoting context-specific solutions. Conclusion Technology is giving us the tools to reimagine healthcare, but it's up to us to use them wisely. Data-driven health technologies have the power to close the gaps in access, improve care quality, and address environmental challenges. However, they also come with responsibilities—to safeguard privacy, respect ethical boundaries, and design solutions that truly serve diverse communities. Working with the DC-DDHT has shown me that the future of healthcare isn't just about adopting the latest tools; it's about making thoughtful choices. Whether it's creating eHealth hubs in libraries, developing greener technologies, or ensuring that robotics enhance care without overshadowing the human element, collaboration and careful planning are key. The journey ahead is complex, but the potential to create a healthier, more equitable world is within reach. We must stay focused on inclusion, sustainability, and innovation. This way we can ensure that the healthcare systems of tomorrow truly work for everyone, everywhere. References 1. DC-DDHT (2023). Annual Report 2023. United Nations Internet Governance Forum. 2. Chihi, H. (2024). Overview About Cybersecurity in Healthcare. DC-DDHT Book Series. 3. European University Institute (2024). Two sides of the same coin? Future of the internet and sustainable development. Accessed from: https://hdl.handle.net/1814/77411 4. Jain, S. & Doriya, R. (2022). Security framework to healthcare robots for secure sharing of healthcare data from cloud. International Journal of Information Technology, 14(5), pp. 2429- 2439. Accessed from: https://link.springer.com/article/10.1007/s41870-022-00997-8 5. Kulesza, J. (2024). The Declaration for the Future of the Internet and its role in achieving SDGs. Retrieved from: https://hdl.handle.net/1814/77411 6. European University Institute (2024). Two sides of the same coin? Future of the Internet and Sustainable Development. Accessed from: https://hdl.handle.net/1814/77411 7. Times Colonist (2024). Libraries loaning thermal cameras to pinpoint heat-loss problem spots. Accessed from: https://www.timescolonist.com/local-news/libraries-loaning-thermal-cameras-topinpoint-heat-loss-problem-spots-9880796 8. WUF12 (2024). Twelfth Session of the World Urban Forum: Daily Reports. UN-Habitat. 9. Gomes, J. R. (2023). The Role of Technology in Reinventing Medical Practice. DC-DDHT Book Series. 10. De Silva-Mitchell, A. (2024). ESG and Branding: The Value for Healthcare Technologies on the Internet. DC-DDHT Book Series. 11. Rainie, L., Anderson, J. and Albright, J. (2022). The metaverse in 2040: Experts predict the future of virtual spaces and their societal impact. Pew Research Center. 12. Stahl, B.C. & Coeckelbergh, M. (2016). Ethics of healthcare robotics: Towards responsible research and innovation. Robotics and Autonomous Systems, 86, pp. 152-16