OUTCOME REPORT

ACKNOWLEDGMENT

This report has been produced by International Telecommunication Union (ITU). ITU would like to express their appreciation to all panel moderators and speakers, and to Dominique Lazanski, ITU consultant who put together this report.

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1 INTRODUCTION

The International Telecommunication Union (ITU) hosted a workshop for Europe and the CIS entitled **"ICT Infrastructure as a Basis for Digital Economy"** in collaboration with the State University of Telecommunications in Kiev, Ukraine on 14-16 May 2019.

The workshop provided an opportunity to discuss issues and exchange views on a number of current topics including 5G and spectrum policy, broadband connectivity, technical aspects of 5G, Internet of things (IoT), blockchain and cybersecurity.

Over 120 individuals representing 7 countries (Albania, Armenia, Azerbaijan, Belarus, Kyrgyz Republic, Ukraine and Uzbekistan) attended the workshop. Speakers and participants included government representatives of countries present, academia and industry. A representative from the European Commission also participated in the event.

2 DOCUMENTATION

The seminar was paperless. 27 presentations were delivered during the meeting. Relevant documentation, including the Agenda and the presentations are available on the workshop event page of the ITU website.

3 OPENING CEREMONY

The opening ceremony and opening remarks were given by:

- **Mr. Volodymyr Toluvko**, Rector, State University of Telecommunications, **Ukraine**
- **Mr. Jaroslaw Ponder,** Head of the ITU Office for Europe, **ITU**
- **Mr. Sergyi Starostenko**, Director, Department of Electronic Communication, State Service of Special Communications and Information Protection of **Ukraine**
- **Mr. Volodymyr Korsun**, Director General, Ukrainian State Centre of Radio Frequencies, **Ukraine**
- **Mr. Viktor Katok,** Chief Advisor on Science and Technology Policy, Ukrtelecom, Official Representative of the Communication Administration of Ukraine in SG15, **Ukraine**

Mr. Volodymyr Toluvko provided the opening remarks. He welcomed the ITU, speakers and participants of the meeting and wished for fruitful discussions on 5G and related technological and policy challenges.

Mr. Jaroslaw Ponder thanked the State University and Ukraine for hosting the workshop, underlined the importance of Regional Initiatives for Europe, in particular Broadband infrastructure, broadcasting and spectrum management that reflects the priorities in the region. He stressed on the continued collaboration on issues related to the digital economy, especially including 5G and future technologies related to 5G.

Mr. Sergyi Starostenko outlined the challenges in Ukraine pertaining to 5G policy and its underlying requirements. He highlighted that Ukraine follows and adopts ITU standards, especially ITU-T IMT-2020/5G standard, and is looking forward to its implementation and adoption.

Mr. Voldymyr Korsun discussed the challenges in Ukraine on frequencies and spectrum management including the lack of harmonization with European spectrum. He added that the Ukrainian State Centre of Radio Frequencies continues to closely follow ITU recommendations on the application of new technologies in the digital economy.

Mr. Viktor Katok discussed his representation and involvement in ITU-T Study Group 15 “Networks, Technologies and Infrastructures for Transport, Access and Home“. He mentioned the ongoing collaboration and discussion needed between Ukraine and ITU.

Dr. Chaesub Lee, Director of Telecommunication Standardisation Bureau at ITU, in a pre-recorded video, gave an overview of the work of the ITU-T and expressed the wish for further collaboration with Ukraine and stakeholders in the region.

4 SUMMARY OF DISCUSSIONS

Session 1: ICT Infrastructure as a basis for digital transformation

Moderator: Ms. Lyubov Berkman, Vice-rector of scientific and pedagogical work, State University of Telecommunications, **Ukraine**

Session 1 focused on the current and future digital economy in light of the upcoming global launch of 5G. The building blocks to enable growth of the digital economy and on what is essential to develop digital transformation, were discussed. Each presentation illustrated a different approach to digital transformation based on specific experiences.

Presentations and Discussions

"Innovative technologies as a basis of digital transformation"

Mr. Volodymyr Tolubko, Rector, State University of Telecommunications, **Ukraine**

Mr. Tolubko explained the digital transformation engendered by 5G, IoT, the tactile Internet, telemedicine and many more services. He noted that this is about merging humans with technology, for the benefit of individual development and for the welfare of society. Eight perspectives to be considered are cybersecurity, startups, education, human resource, infrastructure, marketing & communications, finance and media. In Ukraine, solutions to speed up the digital economy need to be implemented. The building of reliable fixed and mobile infrastructure as well as the mitigation of threats is essential. The following need to be addressed to facilitate digital transformation in Ukraine:

- Digital infrastructure development
- Implementing state support and cooperation
- Changing VAT and tax for a more efficient economy
- 5G technology development and deployment
- Digital literacy
- Protection of IP
- Enabling of smart services
- Ultra-broadband mobile networks
- New signals and codes for technology
- 5G radio frequencies using new and different bands
- Efficient 5G management

"ICT Infrastructure as a basis for Digital Transformation"
Mr. Ram Sewak Sharma, Chairman TRAI **India**

Mr. Sharma presented India's strategy on the digital economy and how enabling access and empowering citizens enhances the lives of Indian's citizens. He addressed the challenges India is facing in light of the ethnic and cultural diversity in the country. He discussed a digital India which tackles the three aspects namely physical infrastructure, software and citizen empowerment. Mr Sharma highlighted the development of JAM, a programme focusing on the most important aspects underpinning a digital India – financial inclusion, access to mobile services and digital identity.

"Connecting the last mile for digital transformation"
Ms. Aminata Amadou Garba, Technology Coordinator at the Telecommunications, Network & Spectrum Management Division (TND), BDT, **ITU**

In a pre-recorded interview, Ms. Garba briefly introduced the ITU's programme on connecting the last mile. Essentially this programme is looking for case studies and information on success stories ranging from the implementation of hybrid technologies, new business plans, policies and regulations and other multi-stakeholder approaches to last mile connectivity.

"Measuring digital transformation in Belarus. Methodology and indicators"
Mr. Yauheni Salauyou, Head of Department, OJSC "Giprosvjaz", Ministry of Communication and Informisation of the Republic of **Belarus**

Mr. Salauyou presented his work on digital transformation and measurement of the digital economy in Belarus. He remarked that each field has its own process and approach to deal with digital transformation which must be taken into account. Overall, the approach consists of organising the business process through an informisation and the supply chain. Thirteen economic areas of informisation were identified and measured by the application of Mr. Salauyou's methodology to achieve an outcome of rankings.

"Prospects for the development of satellite telecommunications as an integral part of ICT infrastructure"
Mr. Gennadiy Vlasenko, Head of Space Systems and Complexes and Satellite Telecommunications Department, State University of Telecommunications, **Ukraine**

Mr. Vlasenko discussed the need for broadband access through satellite and connectivity. He mentioned the issue of cost and addressed possible solutions to acquire cheaper equipment. He provided an overview of how rural coverage could be addressed through satellite in Ukraine especially with the rollout of 5G in 2020. The University signed agreements with Eutelsat and Data Group to further research and develop the potential use of satellites for connectivity.

Session Conclusion

A wide variety of issues were discussed in the context of challenges for Ukraine and some possible solutions by looking at India's digital programme, last mile connectivity projects and satellite access. There were questions from the audience about spectrum release in Ukraine and how to harmonise spectrum with Europe.

Session 2: Legislative, normative and regulatory environment required to enable implementation and development of 4G/5G networks and innovative services

Moderator: Mr. Hiroshi Ota, ITU-T SG15 Counsellor, **ITU**

Session 2 focused on what is needed to create a vibrant and dynamic environment for the deployment of 4G/5G and the provision of services resulting from that deployment. Presentations and discussion focused on specific technologies and spectrum bands as well as regulatory and standards concerns.

Presentations and Discussions

"Standardization of physical telecom infrastructure in ITU"
Mr. Viktor Katok, Chief Advisor on Science and Technology Policy, Ukrtelecom, **Ukraine**

Mr.Viktor Katok commented that the future of wireless connectivity depends on the future of wired. He mentioned the main drivers to internet access, namely the 5G, IoT and big data, and discussed that while mobile access and connectivity is growing rapidly, fixed line broadband is growing at a slower pace. Speeds were slower, on average, in the CIS region than in the other ITU regions. Moreover, he highlighted the increase in connectivity speed and type las well as its impact on digital inclusion. In Europe, the number of FTTH and FTTB increased 15.7 % since 2017 to almost 60 million connections. Mr. Katok introduced the ITU-T G series recommendations for home networking and specifically the G.65x series for fibre characteristics. He also discussed the ITU-T L series for optical fibre cable structures and installation. Finally, he informed all on on-going draft works and new potential recommendations in ITU-T study groups on optical fibre.

"Implementation of 5G in Europe: Opportunities and Challenges"
Mr. Jaroslaw Ponder, Head, ITU Office for Europe, **ITU**

Mr. Jaroslaw Ponder introduced ITU and briefly discussed "connecting the last mile's" challenges, following up on the earlier ITU presentation in Session 1. Mr. Ponder then presented the work of ITU-R and ITU-T in the development of 5G, known as IMT-2020. He discussed the identification of 5G 'pioneer' bands in Europe as 700 MHz, 3.6 GHz and 26 GHz and noted the European spectrum auctions that have and are taking place. He also introduced the ongoing negotiations for the World Radio Conference later this year. 5G usage case studies, in areas like IoT and AI, were presented as were the trials and testbed plans in Europe. Work on electromagnetic field (EMF) measurement and safety was also mentioned as well as the work ITU-T Study Group 5 on "Environment and circular economy" in relation to the rollout of 5G. Finally, the work of the Development sector in IMT-2020/5G development and capacity building was presented along with the report "Setting the scene for 5G: Opportunities and Challenges" published in September 2018.

"Normative and regulatory aspects of the 4G / 5G networks implementation in Ukraine"
Mr. Igor Yereshchenko, Chief Expert on Spectrum Strategy, Kyivstar, **Ukraine**

Mr. Igor Yereshchenko addressed the challenges faced in implementing 4G and 5G networks in Ukraine. He discussed the need for an overarching policy and plan as well as a national broadband plan for Ukraine. Furthermore, he addressed the priority to harmonise spectrum with Europe and release certain bands for 3G and 4G that have yet to be used. Specifically, the need to work on the better use and efficiency of 700, 800-850 and 900-950 MHz is imperative in order to rationalize connectivity in Ukraine and with Europe. He noted that legislation was out of date and needed to be updated for this to happen.

He added that best practices for mobile connectivity and frequency management such as lower the overall tax burden for companies and allowing for infrastructure and spectrum sharing are needed but should be accompanied by a change in legislation. Other best practices, which are noted by the GSMA, include equal rights for all operators to infrastructure, taking a technology approach to spectrum allocation and connectivity, international harmonization and effective distribution. Mr. Volodymyr Toluvko challenged Mr. Yereshchenko as to why operators didn't engage in better spectrum management and a discussion about roles of the operator and roles of the government took place.

"Some regulatory aspects of infrastructure development of information and communication technologies for the development of the digital economy"
Mr. Ivan Hohotva, Director, Department of Communication, National Commission for the State Regulation of Communications and Informatization, **Ukraine**

Mr. Ivan Hohotva addressed similar challenges to the previous presentation on regulatory issues to developing the digital economy in Ukraine. First, he focused on the lack of agreement and infrastructure sharing among operators in Ukraine and how that created a challenging situation for competition. Alongside previous speakers, he mentioned the importance of 700, 800-850 and 900-950 MHz. There was a discussion on the 2017 legislation to regulate the telecommunications market in Ukraine and allow for easier access to infrastructure. Different ministries, specifically the Ministry of Energy and Infrastructure, have different responsibilities with regards to mobile access and releasing spectrum. However, Mr Hohotva mentioned that operators are reluctant to share infrastructure and take each other to court to solve differences. Some changes to the regulatory environment were recommended.

Mr. Volodymyr Toluvko asked about the ongoing issue of having two regulators controlling frequencies and at the same time having to harmonise with Europe. The issue that he raised was that the policies of the two regulatory bodies often don't align so how can this issue be addressed while trying to align the overall Ukrainian spectrum policy with the European Union? It is a challenging issue without many answers currently.

"Standardization of Broadband Access and IMT-2020/5G transport support in ITU-T SG15"
Mr. Hiroshi Ota, ITU-T SG15 Advisor, **ITU**

Mr. Hiroshi Ota presented the work of ITU-T Study Group 15 which mandates is broadband access and 5G transport, optical technologies and optical access network or PON (passive optical network). He introduced the structure and the more specific topic areas under discussion for standardisation.

Session Conclusion

Technical and regulatory issues to 5G was the focus of this second session. Challenges to building fixed line and mobile networks, including 4G and 5G in Ukraine, were discussed. The identification and discussion of a number of issues took place in this session. Finally, standardization of telecommunications networks and EMF were mentioned and the overall conclusion was that more communication in the Ukraine as well as more alignment and capacity building with Europe, the ITU and other international organisations is needed.

Session 3: Spectrum requirements and case studies on 5G pilot projects

Moderator: Mr. Anatoliy Tychynskyi, Adviser to the Director General on Radio Frequency Assignments, Ukrainian State Centre of Radio Frequencies**, Ukraine**

Session 3 further discussed technical and spectrum issues including spectrum band auction, harmonization, fixed and mobile broadband rollout and related technologies. Specific case studies were discussed and ITU provided an update on the WRC-19 preparations.

Presentations and Discussions

"Technical aspects of harmonization of the radio frequency resource usage of Ukraine on the way of introduction of modern and advanced communication technologies"
Mr. Volodymyr Korsun, Director General, Ukrainian State Centre of Radio Frequencies**, Ukraine**

Mr. Volodymyr discussed the challenges for the harmonization of spectrum in Ukraine and within Europe region. This might require a period of transition where inherited spectrum and new spectrum might need to be shared. However, there might be technical constraints on the equipment. Ukraine has had some success in recent years including harmonization of 1800, 2100 and 2600 MHz bands and the introduction of technology neutral principles in the operators of the Ukrainian market. But an important next step is to harmonize the use of the first and second digital dividend frequencies in Ukraine and this means ongoing participation in European coordination meetings include CEPT ECC.

"Outcomes of the 3rd Annual Spectrum Management Conference for CIS and Central and Eastern Europe"
Mr. Farid Nakhli, Programme Officer, ITU Regional Office for CIS

Mr. Nakhli presented the standardization work of IMT-2020 at ITU and the use cases for IMT-2020/5G. Preparations for the WRC-2019 was discussed and the different approaches to the conference for the CIS region were mentioned. Case studies from the UK, Lithuania, Kyrgyzstan, Romania, GSMA, ESOA, and GSA were discussed.

Conference participants noted the following:

- A complex approach used to discuss issues with involvement of a wide range of stakeholders.
- A high level of scientific and technical level and practical value of presentations and discussions.
- Spectrum provision is one of key aspects of ICT infrastructure for digital economy and contributes to the implementation of the UN Sustainable Development Goals.
- When implementing new technologies and systems, the protection of existing systems needs to be considered.
- To implement radio technologies that enable development of 5G/IMT-2020, IoT/M2M and ITS, taking into account the need to harmonize spectrum and ensure cross-border coordination is important.
- Harmonious development of new radio technologies is only possible when there is balance of interests between ensuring required quality of digital services provided to citizens and economic efficiency.
- The need to continue to develop methods and criteria of integral assessment of efficiency of spectrum usage is important.
- It is reasonable and practically valuable to organize conferences and other events dedicated to usage of spectrum and satellite orbits by radiocommunication systems regionally and globally.
- The CIS conference was relevant and timely, and its outcomes can be used by expert in their professional activities, including preparation to WRC and other ITU forums.

"Bridging Digital Infra Gap in India-"Last Mile-as-Managed Service"
Mr. Satya N. Gupta, Chairman - India & BIMSTEC ASIA

Mr. Satya Gupta discussed funding and technology options for rural broadband access with a focus on how the Indian government looked at options in rural India. Mr. Gupta discussed the idea of a managed hotspot service provider (MHSP) and showed how that was deployed in an example from Bluetown. Lessons learned and recommendations included providing tax breaks, government funding for deficit budgets, access to rights of way, infrastructure sharing, technology neutral approaches, providing the ability to have local content and local education and also allowing for local entrepreneurship to participate in the MHSP project.

"5G in Albania and AKEP strategy on the issue"
Mr. Denion Meidani, Director of Frequency Monitoring, Quality Assurance, and Inspection, AKEP**, Albania**

Mr. Denion Meidani discussed Albania's approach to 5G. Key to approach is using suitable models for authorizing 5G frequency bands, spectrum sharing for scarce frequency resource and fair competition. AKEP wants to ensure consumer protection and economic development through spectrum use and 5G rollout. This includes the allocation of the 700 and 800 MHz bands as well an update to the National Broadband Plan to include 5G. Future plans for 5G include work on the transition period to 5G, review of resource allocation for 700 and 800 MHz and to work closely with the Albanian CIRT on prevention and mitigation of security issues.

"Normative and technical aspects of measuring coverage of the population by public digital terrestrial wireless networks"
Mr. Vadym Blagodarnyi, Deputy Director of the Scientific and Methodological Department, Ukrainian State Centre of Radio Frequencies**, Ukraine**

Mr. Vadym Blagodarnyi made a technical presentation on how Ukraine measures coverage through both predictive and physical means. He illustrated how the country uses mobile monitoring systems as well as segmentation to determine coverage. Indicators are determined and based on where people live as well as speed and physical geographical location. Determining the coverage will help enable better efficiency of 5G in the future.

"Organizational and technical aspects of enabling environment creation for 5G deployment in the developing countries"
Mr. Vladislav Kumish, A.S. Popov ONAT, **Ukraine**

Mr. Vladislav Kumish presented his work on "broadbandcalculation.online" tool. The tool enables selecting the most promising (from economic and technical point of view) solutions for building broadband access networks in human settlements. He outlined the data and methodology that goes into the website including engineering specifications, tariffs, information providers and consumers.

Session Conclusion

This session focused on technical, regulatory and physical challenges to 5G both in Ukraine and in other countries. Regulation, market, investment and coverage are all challenges faced in rolling out 5G. Ukraine's challenges in addressing European spectrum harmonization will take some effort as will updating legislation and addressing rural coverage. During this sessions, several proposition to address those issues where presented.

Session 4: Application technologies of the near future: Internet of Things, machine learning, intelligent transport networks, robotics, blockchain

Session 4 looked at new and emerging technologies which will be enabled by the launch of 5G. Discussions on radio networks and identifiers for future networks also took place.

Presentations and Discussions

Moderator: Mr. Jaroslaw Ponder, Head of the ITU Office for Europe, **ITU**

"Blockchain: EU strategy and key objectives"
Mr. Massimiliano Dragoni, Senior Policy Officer, Digital Innovation and Blockchain, Digital Single Market Directorate, DG CONNECT, European Commission

Mr. Massimilliano Dragoni presented the European Union's strategy and objectives for Blockchain. He introduced the European Blockchain Partnership, a collection of 29 countries working together on European Blockchain Services Infrastructure. Three deliverables were agreed: use-cases for cross border digital public sector services, functionalities and architecture and a governance model. Mr. Dragoni then discussed the EU Blockchain and Observatory Forum which is both an online and offline community of workshops and trainings. Finally, he presented the International Association of Trusted Blockchain Applications, a European multi-stakeholder group that promotes interoperability, transparent governance, legal certainty and trust on blockchain worldwide. The first Blockchain Congress will take place in November 2019. Finally, Mr. Dragoni mentioned future work and timeline and how all stakeholders can get involved.

"Technologies to support new/future services and applications"
Mr. Hiroshi Ota, ITU-T SG15 Advisor, **ITU**

Mr. Hiroshi Ota discussed the ITU's work in future technologies which support services and applications. These technologies are AI including AI for Health, machine learning for 5G, IoT, distributed ledger technologies, intelligence transport systems and quantum key distribution. Mr. Ota presented ITU's activities in the AI for Good summit, the Focus Group on AI for Health, ITU-T Study Group 20 on IoT standardisation and its work programme, ITU-T Study Group 17 on Security including DLT, ITS and QKD as well as other activities and work in study groups.

Functionality and identity management in 5G/LTE and IoT networks"
Mr. Yuriy Kargapolov, CEO, Ukrainian Network Information Centre, **Ukraine**

Mr. Yuri Kargapolov discussed potential ways to facilitate identity management in future networks. The issue is that with the development and deployment of next generation networks, more and more devices will be connected. The current technical structure of the Internet, namely the TCP/IP protocol, is not going to be able to handle a proliferation of new devices connecting at such a rapid pace. His proposal is to place identity management in the core of the Internet with ENUM and the domain name system (DNS). This would allow an easier access and authentication for identity management in 5G and for IoT. Mr. Kargapolov discussed the technical functionality and application of his concept and demonstrated how it might work in his presentation.

"Self-optimizing radiosystem of 2-5G networks"
Mr. Andriy Derkach, Regulatory Expert, Lifecell, **Ukraine**

Mr. Andriy Derkach presented Lifecell's work on self-configuring and self-fixing networks which are able to be managed and optimised on their own using algorithms and analytics. Further technical details can be found in the presentation slide deck.

"AI technologies in digital future"
Mr. Mykyta Klymenko, Institute of AI problems, **Ukraine**

Mr. Mykyta Klymenko discussed current research, technical definitions and development as well as future applications for AI. Current research includes robotics, machine learning and creativity, thought processes, knowledge representation and applications and natural language processing. He went on to show how data became key to AI and current machine learning applications. Mr. Klymenko also presented his institute's work on object detection and tracking and emotion recognition. In the future, the neuronet, social data processing and perception-based machine learning are possible applications of AI.

Session Conclusion

This session looked at new and future technologies. Standards, security and 5G are going to underpin and allow the development and growth of applications and new services. The key to solving Ukraine's challenges highlighted were future innovation, collaboration and cooperation.

Session 5: Cybersecurity challenges

Session 5 looked at cybersecurity challenges in the areas of IoT and other system technologies. Policies and programmes were discussed as were best practices and approaches from government.

Presentations and Discussions

Moderator: Mr. Victor Vyshnivskyi, Head of Department, State University of Telecommunications**, Ukraine**

"Improving the security of consumer smart products: the UK's Secure by Design Programme"
Ms. Dominique Lazanski, Consultant, Department for Digital Culture, Media and Sport, **UK**

Ms. Dominique Lazanski presented the UK's Secure by Design Programme and, in particular, the recently launched Consumer IoT Security Code of Practice. She discussed how this code is part of the wider UK's Cyber Strategy. Highlighted the top three guidelines which are no default passwords, implement a vulnerability disclosure policy and keep software updated. She also noted the current UK consultation on IoT regulation and the ETSI specification based on the Code of Practice.

"Concept of cyber defense organizational and technical model"
Mr. Mykola Khudyntsev, Deputy Head, State Centre for Cyber protection and Counteraction to Cybercrime, **Ukraine**

Mr. Mykola Khudyntsev presented cyber protection in Ukraine from an organisation and technical point of view. He introduced the regulatory legislation and the next steps for regulatory aspects which include new normative and technical documents for next generation networks. He also provided an overview of current infrastructure projects. Those are the National Communication Network, the State System for protected access to the Internet, unified data centres, protected mobile communication and cybersecurity of critical information infrastructure. Mr. Khudyntsev described the organisational model of Ukrainian cybersecurity including national security operation centres, computer emergency response teams, event management and sources of data. He also described the Ukrainian challenges as well as international and national cooperation that the government is engaging in.

"Protection of personal data in modern cyberspace"
Mr. Vasyl Polishchuk, Head of the Support Team for the Implementation of Information Security Systems, Avtor, **Ukraine**

Mr. Vasyl Polishchuk presented how his company is developing and deploying secure access to devices and networks including a secure token and a secure crypto card. More technical details are available in his presentation.

"Modern information technologies as an effective tool to protect goods and documents from fraud"
Mr. Maksym Trembovetskyi, Doctor of technical sciences, State University of Telecommunications, **Ukraine**

Mr. Maksym Trembovetskyi presented strategies for modern information technologies to be used as a deterrent for fake goods and products. His work focuses on the use of QR codes and bar codes for tracking and storage of information on goods and secure access to the information stored about products.

"Activities of the ITU Telecommunication Development Bureau on cybersecurity"
Mr. Farid Nakhli, Programme Officer, ITU Regional Office for CIS, **ITU**

Mr. Farid Nakhli gave an overview of ITU's activities in cybersecurity, specifically in the ITU-D and ITU-T. He presented the areas of focus for the ITU's Development sector which are Cybersecurity Services Catalogue, Engagement and Awareness, National Cybersecurity Assistance, Computer Incident Response Team (CIRT) Programme, Human and Institutional Capacity Development and Information Sharing. Mr. Nakhli briefly introduced the Global Cybersecurity Index which is to be published soon and more details on the ITU-D sector programmes and cyberdrills.

"Can one unit make the world safer"
Mr. Vitalii Voropai, Technical Customer Service Specialist, IBM, **Ukraine**

Mr. Vitalii Voropai presented the work he and his company, IBM, undertakes. He identified the most urgent issues of many of IBM's clients with outdated tools, skills, advanced attacks, cloud security, data privacy and regulatory compliance. He demonstrated how with the growth of IoT there is a need for connected security across connected devices and networks. Mr. Voropai introduced threat intelligence products, which include a platform, consulting and event management. He closed his presentation with several examples.

Session Conclusion

Session 5, the final session, focused on cybersecurity. It had the most engagement from the audience which clearly indicated that cybersecurity is an ongoing concern. Each presentation demonstrated approaches to different aspects of cybersecurity. Questions from the audience included how 5G networks and services will be secured. Clearly, further discussion on this topic needs to take place with all stakeholders.

5 CONCLUSION

Round table: Digital economy development in Europe and CIS

Moderator: Mr. Farid Nakhli, Programme Officer, ITU Regional Office for CIS, ITU

Mr. Farid Nakhli led a closing discussion on the digital economy in Europe and the CIS region, with a special emphasis on the challenges in Ukraine. There was a general discussion about convergence between offline and online life to create a digital life. Mr. Nakhli highlighted the general agreement that education, skills and jobs are essential in Ukraine to ensure growth, innovation and use of the growing digital economy in the region. In Ukraine, the digital economy is growing and so are digital government services. There is an urgent need to prepare citizens and citizens of the future.

Wrap-up and conclusions

All stakeholders were thanked for their contributions to the regional conference. Next steps and the way forward were presented in conclusion slides. The following is a list of those conclusions:

- 5G is essential for innovation and is considered the future for bridging the digital divide.
- Exchange of best practices and case studies on 5G would be beneficial to all countries and the digital economy.
- Mobile technologies especially digital identity and digital financial services empower citizens.
- Since connecting the remaining 50% who are unconnected is the top priority, the last mile becomes the 'first mile'.
- 5G enables the application of new and emerging technologies including AI, blockchain and IoT.
- Ongoing skills development and training are imperative for citizens of the digital economy.
- Enhanced collaboration and cooperation of all relevant stakeholders, in particular standardization bodies, in order to create an enabling environment.
- Relevant policies and regulation, enhanced by multi-stakeholder input, is essential to an enabling environment.
- Without trust, safety and security, the growth of the digital economy is at risk.
- Investment in cybersecurity is essential.
- Cybersecurity requires partnership will all relevant and interested stakeholders.

Collaboration between the ITU and Ukraine would continue and be ongoing and there would be a focus on capacity building, as needed. It was agreed that the workshop would take place again next year in 2020.