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| **Comments C-003-E**  **21 August 2019**  **English only** |
| **Comments submitted by Hong Kong Applied Science and Technology Research Institute**  ON the FIRST DRAFT outline of the Report of THE ITU SECRETARY-GENERAL for the Sixth World Telecommunication/Information and Communication Technology Policy Forum 2021 |

**1. Preamble**

**1.1 The Sixth World Telecommunication/Information and Communication Technology Policy Forum 2021 (WTPF-21)[[1]](#footnote-1)**

1.1.1 Originally established by the 1994 Plenipotentiary Conference of the International Telecommunication Union (ITU), the World Telecommunication/Information and Communication Technology Policy Forum (WTPF) has been successfully convened in 1996, 1998, 2001, 2009 and 2013. By [Resolution 2 (Rev. Dubai, 2018)](https://www.itu.int/en/council/Documents/basic-texts/RES-002-E.pdf), the 2018 Plenipotentiary Conference of the ITU has now resolved to hold the next WTPF in 2021.

1.1.2 The purpose of WTPF is to provide a venue for exchanging views and information and thereby creating a shared vision among policymakers worldwide on the issues arising from the emergence of new telecommunication/ICT services and technologies, and to consider any other policy issue in telecommunications/ICTs which would benefit from a global exchange of views, in addition to the adoption of opinions reflecting common viewpoints ([Resolution 2 (Rev. Dubai, 2018)](https://www.itu.int/en/council/Documents/basic-texts/RES-002-E.pdf)).

1.1.3 By [Decision 611](https://www.itu.int/md/S19-CL-C-0128/en), the 2019 Session of ITU Council decided that the theme for WTPF-21 will be “*Policies for mobilizing new and emerging telecommunications/ICTs for sustainable development”* and thatthe WTPF-21 would discuss how new and emerging digital technologies and trends are enablers of the global transition to the digital economy. Themes for consideration would include AI, IoT, 5G, Big Data, OTTs etc. and focus on opportunities, challenges and policies to foster sustainable development.

1.1.4 WTPF-21 shall not produce prescriptive regulatory outcomes; however, it shall prepare reports and adopt non-binding opinions by consensus for consideration by Member States, Sector Members, and relevant ITU meetings ([Resolution 2 (Rev. Dubai, 2018)](https://www.itu.int/en/council/Documents/basic-texts/RES-002-E.pdf)).

1.1.5 All information relating to WTPF-21 is posted on <https://www.itu.int/en/wtpf-21/Pages/default.aspx> .

**1.2 Preparatory process for the ITU Secretary-General’s Report**

1.2.1 Discussions at WTPF-21 shall be based solely on a single report by the ITU Secretary-General, and contributions from participants based on that report, prepared in accordance with a procedure adopted by the Council and based on the proposals of Member States and Sector Members, and on the views of Associates, Academia and stakeholders, and WTPF shall not consider drafts of any new Opinions that were not presented during the preparatory period foreseen for drawing up the Secretary-General’s report prior to the forum ([Resolution 2 (Rev. Dubai, 2018)](https://www.itu.int/en/council/Documents/basic-texts/RES-002-E.pdf)). This Report outlines a potential scope for discussions and presents some of the policy issues under consideration among different stakeholder groups on new and emerging digital technologies and trends.

1.2.2 In accordance with [Decision 611](https://www.itu.int/md/S19-CL-C-0128/en) of ITU Council 2019, the ITU Secretary-General will convene an Informal Experts Group (IEG), each of whom is active in preparing for WTPF-21. A circular letter ([CL-19/34](https://www.itu.int/md/S19-SG-CIR-0034/en)) has been sent to Member States, the State of Palestine, Sector Members, Associates, Academia, and Organizations which have the right to attend ITU conferences and meetings as observers on 18 July 2019 calling for nomination of experts to constitute the IEG.

1.2.3 The preparatory process will be guided by the timetable set out as Annex 2 in [Decision 611](https://www.itu.int/md/S19-CL-C-0128/en) and in Table 1 below.

**Table 1: Timetable for the elaboration of the ITU Secretary-General’s Report**

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| **1 August, 2019** | A First Draft outline of the report by the Secretary-General shall be posted online for comments |
| **21 August, 2019** | Deadline for receipt of comments on the First Draft  Deadline for nominations for a balanced group of experts to advise the Secretary-General on further elaboration of the report and of draft opinions associated with it |
| **1st IEG Meeting (September 2019 during the CWG cluster)** | First meeting of the group of experts to discuss the First Draft of the report by the Secretary-General and the comments received |
| **1 November, 2019** | The Second Draft of the report by the Secretary-General will be posted online, incorporating discussions from the 1st IEG meeting  This draft will also be made available online for open public consultations |
| **23 December, 2019** | Deadline for receipt of comments on the Second Draft, and for contribution on broad outlines for possible draft opinions  Deadline for inputs from the open public consultations |
| **2nd IEG Meeting (January/February 2020 during the CWG cluster)** | Second meeting of the group of experts to discuss the Second Draft of the report by the Secretary-General and the comments received, including from the open public consultation |
| **1 April, 2020** | The Third Draft of the report by the Secretary-General will be posted online, incorporating discussions from the 2nd IEG meeting and including outlines of draft Opinions  This draft will also be made available online for open public consultations |
| **June 15, 2020** | Deadline for receipt of comments on the Third Draft, and for contribution on possible draft Opinions  Deadline for inputs from the open public consultations |
| **3rd IEG Meeting (September 2020 during the CWG cluster)** | Third meeting of the group of experts to discuss the Third Draft of the report by the Secretary-General and the comments received, including from the open public consultation |
| **1 November, 2020** | The Fourth Draft of the report by the Secretary-General will be posted online, including the draft Opinions, and incorporating discussions from the 3rd IEG meeting |
| **23 December, 2020** | Deadline for receipt of comments on the Fourth Draft |
| **4th IEG Meeting (February 2021 during the CWG cluster)** | Fourth meeting of the group of experts to discuss the Fourth Draft of the report by the Secretary-General, including the draft Opinions, and the comments received |
| **15 March, 2021** | The final report of the Secretary-General to WTPF will be posted online, including the draft Opinions |
| **Mid-May, 2021 (back to back with WSIS Forum 2021)** | Sixth World Telecommunication/Information and Communication Technology Policy Forum |

**2. Themes for WTPF-21**

2.1 By [Decision 611](https://www.itu.int/md/S19-CL-C-0128/en), the 2019 ordinary session of Council decided that the theme for WTPF-21 is “Policies for mobilizing new and emerging telecommunications/ICTs for sustainable development” and that it would discuss how new and emerging digital technologies and trends are enablers of the global transition to the digital economy. Themes for consideration would include AI, IoT, 5G, Big Data, OTTs etc. In this regard, the WTPF-21 will focus on opportunities, challenges and policies to foster sustainable development.

2.2 New and emerging digital technologies have the potential to accelerate progress towards the achievement of the 2030 Agenda for Sustainable Development by facilitating enabling action by ICTs on each and every one of the 17 Sustainable Development Goals. In this regard, they are also expected to drive progress in alignment with the WSIS Action Lines. As the world stands on the cusp of the fourth industrial revolution, breakthroughs in telecommunications/ICTs are transforming the global digital economy addressing issues across diverse sectors such as health, education, employment, transportation, agriculture, nutrition, disability, youth, social inclusion, gender equality and poverty.

2.3 This transformative power comes with complex policy challenges in various areas including, inter alia, equality and equity (inclusion), trust, interoperability, transparency and accountability.

2.4 Concerns regarding the various implications of emerging technologies are not new, and the world has previously witnessed similar paradigm shifts across society, industry and economy that lead to new models of growth and innovation. There is a policy imperative to learn from these past experiences to better inform strategies to maximize the benefits promised by these technologies and foster innovation through balanced and considered policies.

2.5 Policy-making in this respect, therefore, is critical for facilitating country efforts, particularly in developing and least developed countries, to address a range of potentially common issues across these technologies that will help drive meaningful innovation for sustainable development. These issues include, *inter alia*, infrastructure needs, investment, regulatory environment, training and skills development, market environment, institutional cooperation, the role of development aid, etc.

2.6 In this regard, some of the broad questions that could be addressed while considering the opportunities and challenges of new and emerging digital technologies include:

2.6.1 Looking ahead, what are the new and emerging digital technologies and trends that ITU membership would consider the key enablers of the global transition to the digital economy? Given the inter-connections or -dependencies in the use and deployment of such technologies, what is the role that policymakers can play to foster an enabling environment that creates a holistic and agile ecosystem to enable sustainable use of new and emerging digital technologies?

Blockchain/Distributed Ledger technology, Quantum computing, neuro technologies, energy technologies

- Facilitate people and technology interaction- Understand how new technologies connect with one another and its influence, whether they reflect or amplify human values as we make decisions on investment, design, adoption, reinvention.

For example, DLT/blockchain technologies can reduce transaction cost of coordinating diverse parties. It is driving force behind massive flow of value in digital products and services, and can create secure digital identities that can make new markets accessible to anyone

- Encourage system thinking, not pieces of technologies

- Empowering people with technologies, not people driven by technologies. Encourage approaches which put human value ahead of technology efficiencies

- Promote human-centered design – design is part of the technology/system development from the very beginning, instead of after thoughts

- Unearth the true or dominant value in the technology itself, and keep discussion/debate/watch on the technologies as they are developed

- capture the “windows of opportunity” to shape the future and direction of emerging technologies

2.6.2 As key decision makers, how does ITU membership envision the role of new and emerging digital technologies in accelerating sustainable development, keeping in mind the current and future needs of both developing and developed countries as well as all segments of the population? What are the trends in developing the whole-of-government, multi-stakeholder collaborative policy approaches that are forward-looking, flexible and evidence-based that can contribute to this goal?

Technologies alone will not provide meaningful opportunities for all, as their developers usually follow the business ROI. It is vitally important that key decision makers engage all stakeholders so that societal values and inclusive solutions are considered from the start.

Multi-stakeholder approach means collaboration of leaders across business, government, civil society, and academia, including the engagement of younger generations.

Technology alone is not enough to bring whole society up to equal benefits. For example, mobile telecom revolution and new infrastructure (in Africa) has not fostered innovation. It mainly benefits the consumers but not the technology producers. Hence a new industry has not been established. It needs a complementary evolution in other areas as well, for example, innovation, entrepreneurship, other infrastructure, and industrialization policies.

When new technologies and automation diminishes the role for low-cost unskilled labor, how can an agrarian or low-industrialized economy be transformed into knowledge-driven economy that is able to acquire, deploy, and develop new technologies? It depends on whether or not it is possible to close the gap in education and R&D. It takes time. We may use advanced technologies like AI to help this process. For example, leverage AI to make sense of big data, find patterns and unearth insights across education and scientific disciplines.

On the other hand, there is value to be gained to bring up tech development in developing countries. Up until now, the developed countries or western values and economies have been dominating the technology development. Along with it comes the bias in the tech development as well. If technologies are to empower people, not to determine an under-developed region, then we have to design and encourage more diversified technology development to unearth more value for human and society.

The future for a sustainable development lies not in the hands of experts, but also every citizen. For example, with a mobile phone, everyone can be a monitor point for environment. For more sustainable path, we may use digital tech (3G/DLT) for mobile carbon trading (each person is allocated an equal quota), water allocations and deforestation (satellite imaging, drones), ocean/ship mgmt. and protection (satellite, sensors, data processing), network of nano-satellites/fleets of drone ships to track the health of the oceans.

Gender divide is an issue that tech may increase or decrease it. Now only 30% women in scientific research, even smaller in STEM, less than 25%. Its downside is obvious, leaving millions of good ideas and input out of the conversation, and holding back much-needed knowledge production. It is important for right policies to help unleashing women’s potential.

Emerging technologies can transform the way we perceive gender, age, and the body itself. People can maximize their output given the right environment and opportunities. 2.6.3 What are the key opportunities and challenges facing the development and deployment of such new and emerging digital technologies?

a) continually expanding bandwidth… improving compression technology

b) dense long-term storage (use DNA to store info, 100K times flash mem)

c) always-on computing … fragile … power outage … familiar with primitive/fallback systems

d) ubiquitous computing has social impacts (less human interaction, declining empathy among young people)

e) environmental externalities … data centers 2% electricity use … sustainability and energy efficiency of computing methods and hardware; e.g. “cloud computing” energy/security/privacy … where to store data … for real-time insight and decision making, mesh computing / distributed computing more agile solution without incurring scalability costs

f) equality of access: development of affordable technologies, e.g. NVideo $99 GPU with advanced deep learning engine; … all environ (intermittent power, temperature shift, or radiation) e.g. Raspberry Pi sold 12m devices since 2012

g) reduce first movers dominance (for fair access), fair taxation, competition policy, consumer rights … super-platforms can wield outsized power over their value chains … access huge amounts of data allows price discrimination among consumers, putting disadvantaged competitors out of business

h) trust in institutions and in technology is under threat. As computer indistinguishable in daily lives, securing system and protecting privacy vital to restoring trust among citizens, governments and corporations.

2.6.4 How can the benefits of new and emerging digital technologies be made more accessible to all? Along with the challenge of connecting the unconnected through infrastructure, what can be done to ensure that everyone, particularly women and girls, has affordable access to new technologies; that people have the skills to leverage an environment where they can learn, share, and engage; that there is presence and use of balanced incentives for continued innovation; and that an environment of trust and inclusion is fostered? How can better international cooperation contribute to these efforts?

Promote value based governance, not technology driven follow up or drags in policy makings. Build value into tech development processes to reflect society’s values rather than solely those of their creators.

Proactively consider ethics, values, and social ramifications thru development stages, which can impact how tech integrate and support the collective human well-being.

Emerging technologies are usually developed by specialized communities with narrow interests, sometimes in areas where the values have not established yet. How to add “ethics” as a feature into technologies? It is not an easy task. It is as complex as adopting new methodologies, cultivating organizational culture, changing market mentality of the economics that is driving the development. In other words, the whole business model may need to be thought over again.

Digital technologies can be employed in multiple ways. All of their risks and impacts need to be assessed carefully. Need to engage socially responsible processes from the very start with a broader view of the potential impacts on the society.

2.6.5 How can the global community continue building local and inclusive innovation ecosystems that enable the use and building of trust in new and emerging digital technologies?

Realize the collective impacts that digital technologies on humanity and on our lives. They mediat our interactions, facilitate our economies, impact our bodies/environs, and process info that we depend upon day in and day out. We need to have the trust like pilots trust the instrument in the navigation of dark nights.

There is a tradeoff in technology development. Tech pursuit requires freedom to push boundaries, but it also requires to contextualize new capabilities with reflection on purpose and meaning. Both curiosity, ambition, and collective responsibility are important.

Need to develop code of ethics, culture of org or profession/sector. Always aware what is at stake in research, analysis, and application of technologies so that self-reflection and restraint can be exerted.

Seek opportunities at every important junction points where true values can become effective tools for shaping technologies and their development process. For example, decisions which are difficult for humans often involve intangible or invaluable features of life. When faced by machines, these unmeasured or un-measurable criteria will have to be reduced to code. An evolving consensus will have to be built and adaptive in the context of real-life situations. Such discussion and debate is an on-going effort, reflecting all the important considerations and value proposition throughout the process.

2.6.6 What are the ways in which stakeholders can work together to drive progress towards ensuring interoperability of technological solutions based on these emerging technologies to facilitate, among other things, greater access for all?

Technology solutions are built upon the value proposition that the target system will provide. A value focused approach can smooth out the interoperability challenges if the value is commonly agreed upon and carried out during the development process.

2.7 *Note: These overarching questions will be considered in conjunction with more detailed and specific analysis of the topics set out in* [*Decision 611*](https://www.itu.int/md/S19-CL-C-0128/en)*. Such analysis in each of these sections could potentially be broadly divided into three parts – opportunities, challenges, and policies to foster sustainable development.*

**2.8 Sub-Themes for Discussion**

[Decision 611](https://www.itu.int/md/S19-CL-C-0128/en) lists various sub-themes for consideration as indicated below.

**2.8.1 Artificial Intelligence (AI)**

2.8.1.1 AI solutions and technologies have the potential to transform areas as diverse and critical as education, healthcare, finance, mobility, agriculture and energy.

However, they also bring with them several implications of risks to aspects such as security, trust and inclusion, as well as issues of transparency and accountability – in AI algorithms, tools, and the data they depend on.

2.8.1.2 Some examples of AI-related policy questions that could be considered include:

a. What are the key policy imperatives driving decision makers to explore and harness the potential of AI-based solutions and technologies to enable the global transition to digital economy?

b. How do AI technologies support or challenge the development of telecommunications/ICTs? Conversely, how can telecommunications/ICTs enhance and disseminate inclusively the positive externalities of AI?

c. How can AI help the developing countries to better benefit from the use of advanced data-driven technologies?

d. What are the challenges facing the deployment and use of AI technologies? How can issues such as trust, transparency, accountability, bias and representativeness be best addressed?

e. How can stakeholders foster innovation while also ensuring that the future of AI is synonymous with a safe, inclusive and sustainable future for all?

1. Trust issues become paramount – machines need to learn from observation and decipher human values,…,mediating layer through which human interpret the world, like a pilot trusts the instruments in inclement weather…AI/robotics will migrate into positions of power, responsibility, and accountability… requires extensive governance
2. Value alignment problem – AI objectives need to align with human’s… the solution AI finds is “provably beneficial system”…unknown or uncertain objective is better than partial or erroneous objective ..learning human value from human behavior is difficult
3. Research challenges, common sense problem or replicating situational awareness without large data training…
4. Automation could undermine industrialization in developing countries by undercutting their labor cost advantage
5. Security vulnerability, AI applications can be tricked, hacked, or confused… ensure that decisions made by machines are programmed in a secure manner, resistant to being subverted or exploited through cyber-attacks.
6. AI/ML decisions opaque… concerns of delegating authority to them… justification and trust are deeply linked….AI needs to explain its reasoning…algorithms show bias after examining data sets that reflect human bias (misspecification or unrepresentative training data)… unpacking their processes is technically possible, but AI will likely modify its approach for the next decision. This means it is difficult to verify results. Limits the ability for humans to learn from machines as they make independent decisions.
7. AI resource are open source … w/o transparency it is hard to isolate problems and make critical adjustments. How to ensure such technologies are not used by “bad” guys?
8. Organize data for AI system
9. Ethical standards and normative expectations of AI
10. AI and robotics governance, foresight challenge for policy makers…. Space for innovative governance procedures and potential creation of new types of committee, agencies, advisory groups with authority to be defined.
11. Conflict resolution: no framework or best practices exist for resolving conflicts associated with AI applications and systems…e,g, AI research not regulated, but products may be.
12. Impact of AI depends on how we adopt them. Decision making processes for boards and managers in determining where and when to use them become important
13. AI, robots and humans work better when they work together

**2.8.2 Internet of Things (IoT)**

2.8.2.1 The IoT and connected sensors are driving improvements to national growth and human wellbeing in a range of areas such as healthcare, water, agriculture, natural resource management, resiliency to climate change and energy.

However, while IoT is increasingly responsible for connectivity-based service models in the aforementioned diverse areas of application, capturing its full potential will require an understanding of where real value can be created and a successful effort to address a set of systems issues, including interoperability.

2.8.2.2 Some examples of policy questions that could be considered to provide a better understanding of efforts needed to successfully deploy IoT include:

a. What are the key challenges and opportunities facing policymakers for ensuring that IoT applications create real value? What is the role that policymakers can play in developing an ecosystem at the national and international level that best supports the cross-sectoral nature of such applications?

b. How can stakeholders ensure that technologies continue to evolve, providing lower costs and more robust analytics, to support use of these applications? How can the critical issues of interoperability and trust be addressed?

c. What steps can be taken to ensure that the benefits arising from the use and application of IoT systems are more equitably accessible, across countries and populations?

1. Lack of standards, lack of interoperability, like WWW consortium to set standards and protocols;
2. security concerns, hacking risks for companies and users, e.g. cyberattacks hacked cameras and monitors sending traffic to cripple websites; requires management of multiple risks, including stopping use of insecure devices to attack 3rd parties, preventing improper control of IoT devices, securing private/public services, data privacy and cross-border data communication, balance btw protecting consumers and enabling companies for policy-makers across jurisdictions; procedures and protocols for sharing and storing data

- e.g. use technology to find balance. “edge computing” is a compromise

1. risks associated with users and public when they become too dependent on connectivity and power conditions, e.g. loss of important skills or become fragile – more complex tightly coupled systems are more exposed to normal accidents
2. legacy equipments e.g. no connectivity or embedded sensors
3. technology immaturity (e.g. large scale analytics)
4. business model challenge, uncertain ROI: how firms manage new business models created around data analytics and services attached to connected assets; data multiuse, it can render value to multiple parties in a variety of contexts … who owns the data, who profits from its use, how it can be valued properly
5. environ or social benefits from IoT, e.g. reduction of waste or energy usage; optimal benefits for society not equal business benefits, how we value the utilization of infra and m-to-m communications in areas where productivity isn’t the most important outcome
6. collaborative opportunities across businesses, e.g. mobile data for insurance premiums… disassembling the value that is created and apportioned to each party, … fair outcome
7. availability of knowledge … will not exploit others… fair practice
8. IoT will create volatility just like internet did in media, entertainment, and travel industries. Policy makers and businesses need strategies to manage the fallout. Best practices or early industry transitions … requires collaboration from industry and government.
9. Lack of skilled workers e.g. data scientists
10. societal concerns (economic dislocation), reduce demand for routine, manual work, - empowering integrated digital-human workforce with value delivered through augmentation rather than replacement; each of these technologies alone may reduce, but together may enable

**2.8.3 5G**

2.8.3.1 5G has the potential to act as the connecting tissue of tomorrow’s digital economy, linking everything from smartphones to wireless sensors and industrial robots to self-driving cars.

It could play a key role in supporting governments and policymakers in transforming cities into smart cities - allowing citizens and communities to realize and participate in the socio-economic benefits delivered by an advanced, data-intensive, digital economy.

Harnessing the potential of 5G’s capabilities will require addressing several challenges relating to its deployment including, inter alia, costs and infrastructure.

2.8.3.2 In this respect, some essential questions include:

a. What are some of the key uses/application for 5G technologies that can drive global development? What are the main challenges relating to deployment of such technologies?

- AI/ML/Big Data can be more powerful with broader applications and solid business cases

- AR/VR can be applied for remote immersive applications like training/education/remote operation/medical operations etc

- low latency applications like auto driving and always-on apps

- virtual games and infotainment industry

- new digital assets from crypto space and DeFi (decentralized finance)

- Equally important B2C/C2C applications (in addition to B2B applications) as many P2P and decentralized networking formed to complement the cellular networks

- New business models will emerge as partners/businesses collaborate with operators in deploying base stations for providing 5G services, thanks to technologies like Blockchain which can incentivize various parties with reliable record and consensus contribution

Challenges:

- large deployment cost needs solid business return to justify – existing telecom service economy and fee structure short of expectation

- new collaboration business models to support flexible partnership and innovative collaborations

- technical challenges in other related technology areas, for example, enhanced user interface to take advantage of 5G capabilities, data privacy and protection, security issues, big data processing, battery life of terminals etc.

- ROI consideration when there are uncertainties in standards and the imminent future standards e.g. 6G and beyond

- 5G technology alone cannot make much return, it depends on a host of other related emerging technologies

b. What is the role that policymakers can play to ensure that policies and strategies supporting 5G implementation provide benefit and access to all?

- Adopt new license models, instead of the old wavelength auction model, other collective bidding or more innovative or inclusive models can be devised to encourage community, businesses, personal contribution/involvement and support benefits for larger society

- More operators may get the licenses since 5G is micro-cell based with more concentration. Careful analysis is needed to balance the business viability versus competition and fair services for consumers

- With big data and other technologies (IoT, cloud/edge computing), it is possible to devise system and performance benchmark (e.g. reguTech) to closely monitor the utilization of the resources. This is useful for pricing the public resources.

- Policy makers can leverage some revenues (for example via tax) to support or promote the educations in 5G and other related technologies (e.g. AI, big data, IoT etc). 5G education shall not be conducted by operators alone, neither the existing educational program can address it sufficiently.

c. What are the steps that all stakeholders can take to foster an innovation ecosystem and new business partnership models to maximize the benefits for all while minimizing associated costs, financial and otherwise?

- Start from the value-focused design and overall system approach (rather than technology alone)

- Encourage all stakeholders’ involvement with clear incentives and targets

- Innovative partnership models

- innovative business models enabled by new de-centralized architecture such as blokchain/DLT

- Clear boundary of data ownership and proper usage

- Cost effective or incentive based monitoring system

- backup plan when new techs/solns/things fall apart

- Use joint effort by technology, human, group, and society, to come up innovative solutions

**2.8.4 Big Data**

2.8.4.1 Big Data has the potential to create significant value for the world economy and consumers everywhere - enhancing the productivity and competitiveness of the private and public sector globally.

However, policymakers may need to address several challenges if they are to capture its full potential.

2.8.4.2 In this respect, some of the key questions to be considered include:

a. What tools, technologies and techniques can stakeholders apply to fully harness the potential of Big Data?

- rich data + smart analytics = contextual data reflecting events in wider environment, which can harness the real potentials of the big data

- machine or device data tells how it performs, where to extend the value. User data can tell the impact of the usage – how/when/why users take actions – which reshape our knowledge so that we can provide better/more proper solutions, and prioritize how we make decisions based on big data.

- innovative business model coupled with technologies can generate most impact. For example, with big data, we can know the specifics of machines, so that we can have new business models in terms of rental of machines instead of purchase. If we know the specifics of the users, we can provide tailor-made solution or services to customers without incurring extra system/platform costs.

- Innovative business models also include new peer-to-peer based business opportunities and new channels for delivering value

b. What are the key safeguards that policymakers could consider to ensure that the use and application of Big Data benefits all?

- data privacy and protection

- fair usage of data

- fair usage of computational model/algorithms and computational resources

- business model matching that of the usage of the technologies

- flexible framework and structure to solve potential disputes when things go sour

- consumer choice with clear understanding of the situation and potential benefits/downsides the system provide. Hence consumer education, preferably through a trusted or impartial 3rd party become helpful

c. How can Big Data challenges be addressed? How can data be made available to all in a responsible manner? What can be done to ensure that Big Data applications also respond to those not generating data on their needs, i.e. typically those left furthest behind?

- Holistic systematic approach and design

- user centric design with all stakeholders in mind from the very beginning

- human value in consideration and right framework

- establish multi-party data exchange and inter-operable protocols such that data privacy and protection can be implemented – equally important is the flexibility of the data access and monetization such that big data innovation is enabled rather than deterred by layers of processes and protection functions- there is a trade off involved here, which again can be measured by quantifiable measures (even if such measure may be fluid or changeable at the initial stage)

- there is a need for decentralization of value creation and exchange, such that 1) data quality is as important as data volume; 2) data generation and transferring incurs cost, which need to be weighed against its benefit; 3) fair usage of resources means data, storage, bandwidth, computation, energy, attention, and a host of other human and natural factors

**2.8.5 OTTs**

2.8.5.1 The emergence of OTTs has been driving growth, connecting people, and advancing innovation in the global economy. These services are reshaping and expanding the entire communications ecosystem, while also providing social and economic benefits to consumers worldwide and the global economy.

At the same time, the economic impact on the traditional model of the telecommunications industry and on telecom operators is being increasingly analyzed, including inter alia, the competitive environment, the level of regulatory exposure, the level of substitutability between OTTs and traditional telecom services and the interconnection between OTTs and public networks.

2.8.5.2 In this regard, some examples of OTT-related policy questions that could be considered include:

a. What are some of the key policy opportunities and challenges associated with OTT services?

- 5G and other emerging technologies bring new opportunities for services/applications, as well as new collaboration and business models. OTT may extend to include other partners/communities/businesses which might provide last mile access coverage, helping cover the cost of BS deployment, as well as more versatile and flexible applications/services. The challenges come from the license issues, accountability, fair usage, competition, and justifiable business arrangement/profit sharing etc.

b. How can OTT players and other stakeholders offering application services contribute in those aspects related to the security, safety and trust of the consumer?

- Transparency of the usage of consumer data, including access, function, historical data etc.

- Open access for other smaller application/service providers

- Freedom for consumers to choose various channels or service providers

- Public education for critical issues related to security, privacy, and safety

- Encourage open API for applications so that full eco-system may be developed openly

c. What approaches might be considered regarding OTTs to help the creation of an environment in which all stakeholders are able to prosper and thrive?

- Value driven approach incorporating all stakeholders at the very beginning

- Promote open API and flexible system architecture such that de-centralized or federated architecture and business model can be supported

- Allow technical flexibility in future-proof system design

- Human-centered design over technology-driven design

d. How can OTT players and telecom operators best cooperate at local and international level? Are there model partnership agreements that could be developed?

- Blockchain is a suitable solution here when multiple parties with different interests and locations are involved.

**3 Conclusion**

This draft is intended as a preliminary outline for the Secretary-General’s Report to WTPF-21, serving as a reference for experts as they develop draft Opinions on themes indicated in [Decision 611](https://www.itu.int/md/S19-CL-C-0128/en). This report will be further elaborated in subsequent drafts taking into consideration the written inputs received from experts as well as discussions during physical meetings of the IEG.

1. Note: The title of WTPF-21 is specified in ITU Council 2019 [Decision 611](https://www.itu.int/md/S19-CL-C-0128/en). [↑](#footnote-ref-1)