

OUTCOME REPORT



**THE FUTURE
OF CABLE TV**

**25 TO 26
JANUARY 2018**

ITU HEADQUARTERS,
GENEVA, SWITZERLAND

**BEST PRACTICES AND
CASE STUDIES
IN EUROPE**

**CHALLENGES
AND OPPORTUNITIES**

**DYNAMICS PERTAINING TO A RESILIENT
HIGH SPEED BROADBAND INFRASTRUCTURE**
● the enabling environment ● the market trends ● the technology trends



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1. INTRODUCTION

The workshop **“The Future of Cable TV”** was held on the 25 and 26 of January 2018 in Geneva, Switzerland. It was jointly organised by the Development Bureau and Standardization Bureau of the International Telecommunication Union.

This workshop was conducted within the context of the European Regional Initiative approved by WTDC-17 on "Broadband Infrastructure, Broadcasting and Spectrum Management", whereby assistance is provided to countries in need on the assessment of dynamics, challenges and opportunities of diverse broadband technologies across Europe, including cable TV.

The event provided an opportunity to discuss cable TV related regional and international standardization issues and to share best practices and case studies on Cable TV roll-outs. The event was held back-to-back with the meeting of ITU-T Study Group 9 (Broadband cable and TV), which was scheduled from 22 to 30 January 2018.

Key topics covered by the workshop included:

1. Enabling Environment for Sustainable Growth and Deployment of Cable TV (workshop session 1);
2. Market Trends and Business Models (workshop session 2);
3. Evolving Technology: Innovation Driving Growth of Cable TV (workshop session 3);
4. Setting International Standards for Sustainable Growth of Cable TV (workshop session 4);
5. Way forward, summary of discussions (workshop session 5).

Over 26 interventions were made by eminent speakers from regulatory bodies, industry and ITU. Details of the agenda and speakers are available at <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2018/FCTV/Programme-and-Presentations.aspx>

The outcomes of the workshop will advance the implementation of the European Regional Initiative aiming at assisting countries in need of Cable TV related matters. The event also aimed at bridging the requirements and needs of the various countries within the standards community.

The main outcomes of the workshop are outlined in this report which is structured by presenting the results per workshop session. The report is concluded with a summary of all results, structured along a range of questions which are part of a background industry paper, available on the event web site: <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2018/FCTV/The-Future-of-Cable-TV.aspx>

2. PARTICIPATION

The workshop targeted all stakeholders involved in the development of the cable industry, in Europe and outside Europe. These stakeholders included ICT policy makers, National Regulatory Authorities (NRAs), broadcasting and cable industry representatives, cable companies, standardisation agencies and academia. Workshop speakers and participants came from Europe, the Americas, Middle East and Asia.

Over 70 participants from 30 countries took part in the workshop. Four national regulators from the European region were represented at the highest level. They included Marcin Cichy, President, Office of Electronic Communications (UKE), Poland; Jaromír Novák, Chairman of the Council of the Czech Telecommunication Office; Mihai Grindeanu, President, National Authority for Management

and Regulation in Communications of Romania (ANCOM), Romania; Cristina Lourenço, Deputy Director International Affairs, Autoridade Nacional de Comunicações (ANACOM), Portugal.



Figure 1: Group photo with speakers and participants of the workshop

3. DOCUMENTATION

The workshop was paperless. Relevant documentation, including the agenda, presentations recordings and a background industry paper were made available on the event web page: <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2018/FCTV/The-Future-of-Cable-TV.aspx>

Video recordings of the workshop as well as this outcome report will also be made available at the above named event web page.

4. OPENING ADDRESS AND SETTING THE CONTEXT

The workshop opening address was conducted by the two organising ITU bureaus, represented by:

1. Brahim Sanou, Director, Telecommunication Development Bureau, ITU;
2. Chaesub Lee Director, ITU Telecommunication Standardization Bureau, ITU.

“The convergence being witnessed in the ICT sector has opened new opportunities for Cable TV operators expanding their reach, improving content delivery as well as expanding the range of services available to subscribers”, said Brahim Sanou, Director of the ITU Telecommunication Development Bureau. “In building smart societies, policy makers, regulators, private sector and all stakeholders need to work together to bring out innovative applications and services that open the door to unprecedented knowledge, employment and financial opportunities for people everywhere.”

“ITU workshops encourage peer-learning and an exchange of best practices that encourages innovation to be shared globally,” said Chaesub Lee, Director of the ITU Telecommunication Standardization Bureau. *“This Cable TV workshop will help innovators to capitalize on advances in fields such as virtual reality and multi-platform, ultra-high definition TV, while also giving ITU standardization experts new insight.”*

The opening address was followed by a presentation by Kemal Huseinovic, Chief, Department of Infrastructure, Enabling Environment and E-Applications, BDT, ITU. He provided an overview of the background industry paper (see the workshop web page), to set the context for the workshop successive training/discussion sessions.

The presentation included the following sections, which correspond with the topics as included in the industry paper:

1. Cable TV context: outlining that cable TV is part of a converged service offering and that cable/video services can be delivered in various manners, including mobile platforms;
2. Technology trends: providing an overview of the most important technology developments around the broadband, local loop, video encoding and network management;
3. Service trends: outlining the key developments in terms of video-based services and the associated business models, including mobile video delivery;
4. Regulatory trends: outlining the key regulatory debates and issues, including net neutrality and the new European legislation (such as the new AVMSD);
5. Implications: including several key questions, addressing the key challenges of the cable industry.

5. SESSION 1: ENABLING ENVIRONMENT FOR SUSTAINABLE GROWTH AND DEPLOYMENT OF CABLE TV

The objective of this session was to identify the key enablers for successful and impactful cable TV roll out and the presentation of European case studies.

Session moderator: Jaroslaw Ponder, Head of ITU Office for Europe, ITU.

5.1 Key note presentation: Cable in Europe - Innovation driven and steady growth

The session was initiated by a key note presentation, titled *“Cable in Europe - Innovation driven and steady growth”* by Matthias Kurth, Executive Chairman, Cable Europe.

The full presentation is available on the event web site and the following observations were made:

- Convergence is a key trend whereby video service delivery over IP/mobile is integral part of any cable TV offering;
- Cable has a strong position in the broadband market and 49% of the cable connections provide over 30 Mbit/s download speed. Speeds over 30 Mbit/s are often labelled as Next Generation Access(NGA). Cable has the highest coverage of NGA in Europe, over any platform;
- Cable is still competitive with fibre deployment, as fibre takes a long time to deploy. Infrastructure competition is still important and cable has still a good position because of the investments made in the past;

- Recent changes of the FCC on neutrality promotes investments in infrastructure. It is noted that the US is leading over EU on the investment per household, factor of 3.1x was reported in 2015;
- Digital Single Market strategy of the EU can help to reach a gigabit society;
- Many regulatory controversial topics are currently being addressed by the cable industry (6 topics are covered in the presentation), including infrastructure competition/investments;
- Cable's competitive edge is that the cable industry can provide access, also for OTT players, as they lack an access network.

5.2 Presentation 2: Towards Gigabit society

The second presentation, titled *"Towards Gigabit society – how to ensure the increase of telecommunications networks efficiency"*, was presented by Marcin Cichy, President, Office of Electronic Communications (UKE), Poland

The full presentation is available on the event web site and the following observations were made:

- Market overview: cable has a strong position, also compared to FTTH;
- Local deployment is important in Poland and two initiatives are presented (5G deployment and Polish government initiated project);
- IoT market is important, for the Polish cable industry as well as for the Polish society at large;
- In Poland the regulator has addressed many disputes on access to passive network elements/local loop (> 350 disputes);
- The EU goals are mentioned: for industry 1 Gbit/s and for households 100 Mbit/s;
- Promotion of infrastructure investments is needed and supported by the Polish regulator by following the EU directives/regulations closely, including co-investment and infrastructure sharing. The regulatory topics include Bitstream Access, Local Loop unbundled but also access to passive infrastructure – ducts/masts, connections and in-house wiring;
- Key challenges list includes the use of infra – infra sharing, competition and cost based access.

5.3 Presentation 3: Limits of Cable TV

The third presentation, titled *"Limits of Cable TV: Trends, Challenges and Emerging Opportunities"*, was presented by Jaromír Novák, Chairman of the Council of the Czech Telecommunication Office.

The full presentation is available on the event web site and the following observations were made:

- Czech cable penetration is relatively low, Satellite and Terrestrial are the largest, but cable growth is fastest;
- Czech cable penetration is weak if the number of inhabitants is below 10k;
- In the big Czech cities cable is DOCSIS 3.0 based;
- Barriers for cable take-up in the Czech Republic include; administrative permissions, deployment costs, cost for acquiring a right of way, price sensitivity (i.e. a low willingness to pay for content) and the take up of Digital Terrestrial Television Broadcasting (DTTB);
- The Czech regulator is carrying out many projects on improving the quality of broadband internet access, including a range of broadband speed measurements.

5.4 Presentation 4: Romanian Cable TV Market

The fourth presentation, titled *"Romanian Cable TV Market"*, was presented by Sorin Mihai Grindeanu, President, National Authority for Management and Regulation in Communications of Romania (ANCOM), Romania.

The full presentation is available on the event web site and the following observations were made:

- The Romanian cable market is one of the most developed markets in EU, which was also addressed by the key note presentation (see Section 5.1)
- The retransmission market is relatively large in Romania, as compared to other European markets;
- The Romanian cable industry needs to reinvent itself to survive in the long run.

5.5 Presentation 5: Cable TV and the Portuguese Case Study

The fifth presentation, titled “*Cable TV and the Portuguese Case Study: Trends and Enablers*”, was presented by Cristina Lourenço, Deputy Director International Affairs, Autoridade Nacional de Comunicações.

The full presentation is available on the event web site and the following observations were made:

- Description of the cable market in Portugal: 80% of households are passed by cable (representing a 4th rank in the EU);
- 99.6% of the cabled connections are based on the DOCSIS 3.0 standard in Portugal;
- The Portuguese cable industry holds 33.2% of households and 36.1% of pay-tv subscriptions;
- Cable TV operators became mobile operators or converged service providers and consequently there is no ‘cable industry’ as such any longer;
- New TV viewing habits are dominated by OTT and non-linear viewing;
- Fibre to the home (FTTH) coverage is very high in Portugal;
- Key enablers for broadband growth in Portugal: regulatory and policy approach (free market entry, investment promotion, access to infra), infrastructure development, competition (promote co-investments), operators’ strategies (including to deploy ADSL and FTTH as to complete their cable infrastructure).

5.6 Discussion and questions

- Infrastructure is already deployed by the Government (in joined public private investment vehicle) in Qatar. Having infrastructure already deployment, content is more important in Qatar. There is a need to understand the content requirements first, before any further investment;
- Content is crucial (more so than infrastructure). For example, safeguarding the provisioning of Free-to-Air (FTA) content is important. We have must carry rules, as capacity is no longer constraint any more. Cable access fees are discussed and regulated in Germany;
- What is the future for cable in Poland? Why would cable operators invest in cable as they don’t get the revenues, this is a key problem. For achieving the 2020 EU goals, we need fibre/FTTH (i.e. HFC should become FTTH). Wholesale products should help cable companies to generate revenues (from their infrastructure investments). The business model should change of the cable operators. Passive infrastructure sharing is crucial;
- What is the future for cable in Romania? Romania has the highest level of infrastructure competition and highest speeds against a low price (fixed);
- In what way is information on broadband access critical? Especially for the weaker groups in society. Here is a task for the regulator to translate it to ‘normal’ language;
- Given the limited capacity on cable, what is the impact on the services and the available content? On the contrary, there is already too much content out there with a big choice. The challenge is how to find what you want. With digital there is no limit (as there was with analogue cable). The problem is really who pays for what in the value chain;
- Given the many copyright issues/disputes, should NRA ask TV operators to show their copyrights or leave it to ex-post intervention. Copyrights is a very complicated area and it is not the cable

operator but the television service providers/broadcasters that are responsible for having the proper copyrights in place. There are specialized bodies (collecting societies) and these should be regulated in that there are should not be too many.

6. SESSION 2: MARKET TRENDS AND BUSINESS MODELS

The objective of this session was to identify the emerging trends in the cable industry from a business perspective. Industry challenges and opportunities in both the developed and developing countries were addressed.

Session moderator: Bernd Riefler, Co-Founder & Chief Marketing Officer, Veed Analytics, Germany.

6.1 Presentation 1: The evolution of Chinese Smart TV

The first presentation, titled "*The evolution of Chinese Smart TV*", was presented by Shinzhu Long, CTO, Shenzhen Skyworth Digital Technology Corp, China

The full presentation is available on the event web site and the following observations were made:

- Coocaa is an Operating System (OS) for smart TV sets and STBs. It is a product of Skyworth which was solely a product/box manufacturer in the past. This OS was launched in 2013;
- Skyworth produces smart TVs and STBs. Skyworth's OS is used by over 25 million users
- Skyworth also provides Subscriber Management Systems (SMS), Customer Management Systems (CMS) and Operating Support Systems (OSS) for the broadcasting industry, as well as a so-called Big Data analyser for identifying customer trends and demands;
- By leveraging the 25 million user base, Skyworth holds a large amount of operational/viewing data;
- Skyworth's business model is based on sharing revenues with content/service providers. Skyworth also generates advertising revenues which include new media advertising, advertising when the smart devices are booting/starting-up and commercial advertising for online shopping. The largest part of their revenues comes from advertising during system booting time.

6.2 Presentation 2: Enable fluid living for people

The second presentation, titled "*Enable fluid living for people*", was remotely presented by Nicolas Fortineau, Director of Product Development, Liberty Global, Netherlands.

The full presentation is available on the event web site and the following observations were made:

- From a deep understanding of our consumer needs (based on research across multiple countries) we identified the following key trend: from fixed to flexible schedule and moments;
- Why or what drives this trend? Our customers are always online, also when they are on the go and on holidays. Binge watching is a new viewing habit, as well as checking what is going on (with the family), switching on devices remotely at home, gaming, tuning (music/smart speakers) and chatting;
- What services are customer asking for? Service reliability and security are key. They also want unlimited data, ultra-fast broadband. Mobility is first, across all customer touch points and during his/her journey. Comprehensive eco system which are boundless;
- How are we going to deliver these services? Fastest and reliable internet (1 Gbit/s), 100% coverage (wall to wall, we are not selling broadband but WiFi), smart WiFi = box and boosters, multi-screen user interface (very simple), service orchestration (based on customer profile/data,

including parental locking of services), smart-home (the business model/services are still debated, what is best/needed);

- What are the next services? Voice service activation, predictive (on the basis Artificial Intelligence) and tailored services (to the different user groups/individuals).

6.3 Presentation 3: Cable in Europe

The third presentation, titled “*Cable in Europe: Innovation-driven growth a hyper-competitive market*”, was presented by Maria Rua Aguiete, Executive Director, IHS Markit, UK.

The full presentation is available on the event web site and the following observations were made:

- Pay-TV is still growing in EU but not in US. Why? Because cable/pay-tv in US is very costly. In the US \$86 and \$23 in EU, and in Japan even \$7;
- Triple play seems to be answer for competing in the converged world. For example, Virgin Media in the UK offers a triple-play package for 48 pounds/month;
- For the cable industry pay-tv is the most important revenue generator. Although the subscriber base is declining, the ARPU (Average Revenue Per User) is going up (21% over the last years) and the net result is positive;
- Cable un-subscribers are going predominantly to satellite and IPTV;
- The Cable industry is kick-starting NGA broadband network deployments across EU (with DOCSIS 3.0);
- Of the cable revenues, 45% comes from (linear) TV services and 35% from internet services in Europe;
- The Cable/IPTV industry has been investing in original content, but content is very expensive See for example the top OTT players. Netflix, 7bn and Amazon, 6.7bn in the last year;
- Cable operators have invited OTT providers such as Netflix onboard, as to strengthen their offering. Cable operators see themselves more and more as content aggregators;
- The Cable industry should continue investing in infrastructure and focus on their core, which is offering high-ARPU service bundles.

6.4 Presentation 4: Broader horizons

The fourth presentation, titled “*Broader horizons: Cable’s position in a multi-play market*”, was remotely presented by Guy Bisson, Research Director, Ampere Analysis, UK.

The full presentation is available on the event web site and the following observations were made:

- Cable Penetration has dropped but ARPU has gone up over the years due to multi-play offerings;
- Company consolidation is key for having the scale to carry-out infrastructure investments. The best position is to be in the quadrant of high consolidation (cable share of pay tv) and strong pay-tv position (market share of the largest cable operator);
- Broadband is a key revenue generator for the cable industry;
- Speed is only an issue when you don’t have it. If there is plenty on offer then price becomes very important;
- Mobile take-up is increasing rapidly in fixed markets where the infra is poor and that is reflected in the way people are watching video/television; using smartphone rather than PC/TV;
- Broadcasters are regaining ‘lost’ audience reach through OTT offerings. For example, BBC viewers consume/watch 56% of the BBC content through the I-player;
- On demand viewing is extending the prime-time hours, the engagement with TV is getting longer and hence OTT can become complementary;

- Linear viewing is going down and consequently also the ad revenues (see the chart of Sweden).

6.5 Presentation 5: 4K/8K/VR applications

The fifth presentation, titled “*4K/8K/VR applications: a step forward to enhance cable television business*”, was presented by Tatsuo Shibata, Director, Japan Cable Laboratories, Japan.

The full presentation is available on the event web site and the following observations were made:

- 4k/8k shipments are reaching a critical mass now. DTH in Japan starts carrying 4k/8k in December 2018. These services will also feed HFC and FTTH networks. 4k shipments is now (end 2017) 40% of the total TV shipments in Japan;
- VR may be a killer application with the mass production of Head Mount Displays;
- For (cable/satellite) 4k services consumers need to purchase a new STB (with an H.265 encoder), so this may be an opportunity for cable companies;
- For VR most of the needed standards still need to be developed/agreed;
- The Tokyo 2020 Olympics would be a good opportunity to promote 4/8k and VR.

6.6 Discussion and questions

- How does Liberty Global see competition? Liberty Global wants to avoid becoming a dumb pipe and sees the Google as the big competitor. Through holding the pipe into the home, we believe we have a strong position in the smart-home market;
- Who is going to standardise/regulate the voice service activation? Liberty Global doesn't know, but NRAs must catch up as the developments are going fast;
- Linear TV is still strong and stable. Is linear TV to stay? Yes, it is here to stay. The largest countries in EU show this. It may change in the future, perhaps more tailored (based on viewing statistics);
- What is critical in China for cable companies to compete? In China it may be different from Europe. In China there is no consolidation under the cable operators (this is due to the regulations). In each province there are more than 10 operators. Newcomers (OTT players) will compete with the cable operators. OTT will have perhaps over 1b subscribers soon. So, cable should be able to consolidate otherwise they cannot compete with OTT;
- Netflix is not really a content aggregator but a content studio. Amazon seems to be more an aggregator, they have channels and have sports content/rights. Amazon is a clear competitor for cable operators. Cable should invest in viewers statistics analytics (like Netflix does);
- Why do the American cable operators do not realise that they are pricing their pay-tv services too highly? They are changing but too slowly. Don't forget that Netflix is a single service and cable is a subscription so the ARPU is much higher;
- What are the IP bandwidth requirements for 4k/8k? Using the current IP networks, 4k/8k is not easy to deliver (at least they say in Japan). 1 Gbit/s local loop (GPON) is not enough because of other services. 10 Gbit/s is a figure that comes closer to what is needed. Stable video is good on RF but on IP it is more difficult to deliver;
- Content is (still) king and exclusive content is important. But how big is the risk of investing in content (see for example the investments in sports in the past)? Partnerships can be an answer to reduce the risk;
- Who is investing money in content in China? OTT providers. There are three big OTT players and they are investing billions. Cable companies don't have money to spend on content;

- When will we stop delivering video over broadcast networks? IP delivery will become the main stream but broadcasting networks will co-exist with IP, for the next 5 to 10 years and perhaps even 20 years.

7. SESSION 3: EVOLVING TECHNOLOGY: INNOVATION DRIVING GROWTH OF CABLE TV

The objective of this session was to present the latest technological innovation for the content delivery on integrated broadband cable networks, including new types of smart terminals able to provide integrated services, including advanced user interfaces.

Session moderator: Istvan Bozsoki, Head, Telecommunication Networks and Spectrum Management Division, BDT, ITU.

7.1 Presentation 1: What media content forms will cable networks need to carry?

The first presentation, titled "*What media content forms will cable networks need to carry?*", was presented by David Wood, Consultant Technology and Innovation, EBU.

The full presentation is available on the event web site and the following observations were made:

- A wide range of video content and formats are evolving including video formats and systems, audio formats and systems, virtual reality, augmented reality, voice activation and 3DTV;
- Picture resolution will go beyond 4k/8k, up to 128k. This trend seems to be inevitable as bigger numbers always appeal to the public;
- It is Important for the developers of cable networks to consider the evolution of content technology;
- Public expectations rise as the public educates itself to its viewing context;
- Most important is to develop systems that can adapt to evolving content forms.
- The most critical evolution is probably image quality and personalisation.

7.2 Presentation 2: Innovative, multi-platform TV viewing experiences

The second presentation, titled "*Innovative, multi-platform TV viewing experiences*", was presented by Marcelo F. Moreno, Federal University of Juiz de Fora (UFJF), Brazil.

The full presentation is available on the event web site and the following observations were made:

- Cable TV operators have a good market position as they hold detailed information about their users, they know the content industry and they usually provide the customer equipment;
- Cable operators should offer a seamless viewing experience, which include recommending linear and non-linear content to viewers/customers. The delivery method is in this secondary and switching should be transparent to the viewer;
- Cable operators should also offer the appropriate 'companion devices' based on technologies such as augmented reality, virtual reality and device synchronisation;
- UHD TV is an area that cable operators should further explore and enhance with 360 degrees video and free viewing point capabilities;
- Enhancing the viewer/user interface can be done by combining of inputs of different kinds, for example pointing to a product on the video and saying; "buy that!";

- Cable TV terminal devices can be connected to sensors and actuators, for example in e-health applications (i.e. IoT applications).

7.3 Presentation 3: Cable TV transformation

The third presentation, titled “*Cable TV transformation: why innovation in user experience matters?*”, was presented by Simon Trudelle, Senior Director Product Marketing, NAGRA - Kudelski Group.

The full presentation is available on the event web site and the following observations were made:

- The Kudelski Group has a large user base and has carried out extensive research (i.e. pay TVIF innovation forum) on how to innovate TV services, which is not easy consider the wide and rich contemporary cable TV offering;
- Service innovation has never been more critical given the rise of OTT services;
- Although there are many trends impacting the pay-TV industry, executives highlight three major challenges; (a) the proliferation of OTT services, (b) changing consumer behaviour and demand, and (c) content piracy, fuelled by illicit streaming devices;
- Looking ahead, the most commercially attractive opportunities relate to strengthening and differentiating core pay-TV and online TV offers;
- What is that cable operators need to do more? The following can be considered by cable operators; (a) smart IP-fication; (b) offering a compelling User Experience on All Screens; (c) offering a pre-integrated pay-TV entertainment solution; (d) free flowing personal route to content, and (e) feature rich - Modular services - Always evolved;
- A well designed and functioning Content Management System (CMS) is at heart of providing all these innovative new features and services.

7.4 Presentation 4: Mobile TV as part of a converged offering

The fourth presentation, titled “*Mobile TV as part of a converged offering*” was presented by Peter Walop, ITU Expert.

The full presentation is available on the event web site and the following observations were made:

- From a technical perspective mobile TV can be offered two different platforms; hybrid systems (such T-DMB in South Korea and in the past DVB-H in Europe) and integrated systems (such as LTE eMBMS);
- For the user there is no difference in the offered functionality between the two approaches, although it is noted that the (experienced) picture quality on T-DMB is lower than on LTE eMBMS (in South Korea);
- Hybrid systems are far more completed to deploy as a tailored mediation platform must be build, synchronising the broadcast and mobile platform;
- From a consumer perspective, offering mobile linear TV services is no longer limited by technology (like was the case with the launch of DVB-H in 2002/3 in Europe);
- Currently there seem to be no technical limitations any longer, whilst consumer patterns/viewing patterns have significantly changed (in a relatively short time frame);
- Mobile TV should be considered complementary to VOD, although the key questions remains whether there is an inherent demand for linear TV services on mobile devices. At best event-based linear TV can be offered on mobiles.

7.5 Discussion and questions

- Why didn't the Netherlands manage to set-up a nationwide fibre network (like now in Qatar)? The political climate was not right at that moment in time. The trend was that national assets were privatised and government investments in infrastructure were minimised;
- In what way can relaxing net neutrality rules help cable companies invest in infrastructure? By relaxing net neutrality rules, network operators can better manage their network traffic and it would also open-up ways to prioritise their services over third party services;
- Why would investors invest in cable infrastructure? Investing in cable infrastructure seem to be investing in broadband infrastructure and not so much investing in television services. We should really consider the profitability of providing broadband or television services. We don't have a clear understanding of this (yet).

8. SESSION 4: SETTING INTERNATIONAL STANDARDS FOR SUSTAINABLE GROWTH OF CABLE TV

The objective of this session was to identify standardisation gaps in the field of cable TV roll outs and to brainstorm on standardization needs from the cable industry perspective.

Session moderator: David Wood, Consultant, Technology and Innovation, EBU

8.1 Key Note Presentation: ITU-T Study Group 9 and the future of Cable TV

The session was initiated by a key note presentation, titled "*ITU-T Study Group 9 and the future of Cable TV*" by Satoshi Miyaji, Chairman, ITU-T Study Group 9, KDDI, Japan.

The full presentation is available on the event web site and the following observations were made:

- Cable television is still growing and dominant as 35% share in 2021 (forecast). Digital terrestrial TV (DTT) is rapidly growing toward 2021 mainly in developing country;
- Cable television is still growing in all the regions except for North America. Asia and Middle East and Africa are leading the growth;
- OTT like Netflix is a threat to cable TV operators in general, particularly in Americas and West Europe. Netflix is a giant OTT, but its growth (26 M for 5 yrs) is smaller than cable TV growth (33 M for 5 yrs);
- Cable television broadband access is still growing. Cable modem can provide gigabit per second broadband Internet by DOCSIS 3.0 and 3.1;
- ITU-T SG9 has been conducting the development of global standards on cable television technology more than twenty (20) years as a de jure standardization development organization (SDO);
- SG9 Key Missions for the period 2017 – 2020 are to include; (a) bridging the Standardization Gap (BSG), considering requirements from various regions and the implementation and deployment guidelines (Q4/9); (b) evolution of cable TV networks, including ultrahigh-speed cable modems, robust and flexible security and high-efficiency transport technology and (c) Innovative services, including advanced definition video experiences (4K/8K/HDR etc.), high realistic experiences (VR/AR etc.) and integrated broadcast and broadband services.

8.2 Presentation 2: Cable industry – a frontrunner of innovative content delivery

The second presentation, titled "*Cable industry – a frontrunner of innovative content delivery*", was presented by Paulo Valente, Chairman, ETSI TC CABLE, Cable Europe.

The full presentation is available on the event web site and the following observations were made:

- A shift in the cable operator's business model is needed: from a Network Centric model to a Customer Centric Model;
- ETSI Technical Commission for Cable has four Working Groups focussing on the following aspects; (a) Architecture, Interfaces, Protocols, (b) HFC Distribution, Installation, Operational Best Practices, (c) Engineering, Efficiency and Sustainability, and (d) Network, Fault, Monitoring and Performance Management and Test & Measurement Best Practices;
- Cable operators are building robust networks to deal with the business shift, which includes the deployment of DOCSIS 3.1 + FDX, Fixed Mobile Convergence, SDN/NFV and moving from HFC to Distributed Access Architectures.

8.3 Presentation 3: Standardization and ICT accessibility in ITU

The third presentation, titled "Standardization and ICT accessibility in ITU", was presented by Simao Campos, Counsellor, ITU-T Study Group 16, TSB, ITU.

The full presentation is available on the event web site and the following observations were made:

- Accessibility and disability is an important item to consider for cable operators given that worldwide some 1 billion people are disabled (=15%) and ICTs are a powerful equalizer of abilities, empowering persons with disabilities to fulfil their potential, dreams and ambitions;
- Standardization is an important part and various ITU-T Study Groups are addressing accessibility, such as SG1, SG5, SG6, SG16 and SG20;
- There is Inter-Sector Rapporteur Group on Audiovisual Media Accessibility (IRG-AVA) and two other specialised groups; (a) Joint Coordination Activity on Accessibility and Human Factors (JCA-AHF) and (b) Dynamic Coalition on Accessibility and Disability (DCAD);
- In conclusion: (a) International standards are necessary for affordable, inclusive, accessible services and systems, (b) useful specifications are being produced, and (c) some standardization opportunities are left around systems and end-user devices.

8.4 Presentation 4: DVB challenges in a changing media environment

The fourth presentation, titled "DVB challenges in a changing media environment", was presented by Peter Mac Avock, Chairman DVB Project.

The full presentation is available on the event web site and the following observations were made:

- Media consumption is growing; people are spending more and more time on (all) media (10% growth over the period 2010-2018);
- The impact of OTT on linear TV & Radio has been limited, and is much much slower than anticipated; the shift to online TV & video is happening slowly;
- Strengthen broadcasting and specify the transition to seamless hybrid broadcast broadband services and delivery is key in the survival of broadcasters (in the long run);
- Cable operators are re-conditioning the same content multiple times (i.e. the 'format zoo pain point'). A common Format that could be used across all client devices would save operational costs. Note that all the format conversation usually degrades the content quality and thus user experience;
- In conclusion some advice; (a) If you're a cable operator – deploy DVBC2 now, selling it as an UHD upgrade, and (b) If you're a broadcaster – work to finalise the DVB's IP Multicast solution.

8.5 Discussion and questions

- For all speakers, what is the key message that you would like to share with us?
- Collaboration between content providers and distributors is key for cable companies;
- Accessibility and access services will bring many opportunities for cable operators and they should consider these aspects when deploying their services;
- Cable has a long history and will continue to grow over the year to come;
- The transition to IP is happening now, so jump on the bandwagon.

9. SESSION 5: WAY FORWARD AND A SUMMARY OF THE DISCUSSIONS

The final session was to wrap-up and summarise the key findings of the workshop. This was done by addressing the thirteen questions as included in the industry paper (see event web site) and asking feedback from the workshop presenters and participants. The thirteen questions are grouped together around the workshop sessions and the responses are presented in the order of the sessions.

Session moderator: Stefano Polidori, Advisor, ITU-T Study Group 9, TSB, ITU

9.1 Session 1: Enabling Environment for Sustainable Growth and Deployment of Cable TV

Question 1: *What would be the key technological and service developments that Cable TV network operators should embrace as to improve their competitive stance in the converged market place? Especially considering the rise of OTT and mobile service offerings from market players outside the traditional industries of telecommunications and broadcasting.*

Responses:

- A common denominator in the discussions was the need for consolidation in the cable market which is characterised by fragmentation. This consolidation is needed to create company scale for carrying out the large investments in broadband capacity. It was also acknowledged that one of the main factors driving demand for broadband capacity was the deployment of UHDTV (4k/8k) services;
- Another identified factor for cable companies to improve their competitive stance was to collaborate or incorporate VOD or OTT providers, as to leverage their position as content aggregator. In this way, cable companies should move away from their traditional 'network centric' model to more 'customer centric' models;
- One of the key questions in the workshop was whether there is a sustainable and profitable future for the cable industry. Several presenters argued that the cable industry is still growing and the market data seems to support this argument (perhaps excepting the US market). It was however argued that in terms of subscribers this growth is evident, but that in terms of ARPU the business model is changing from video-based to broadband-based services. If the latter is the case, it should be concluded that investments in cable companies is more and more investing in broadband providers. In turn this will need new wholesale models for earning back the relatively large broadband investments;
- Cable companies providing local content was also identified as an important differentiator, especially in countries where national and cultural content is highly valued;
- The US cable market was discussed in length, especially the down-turn figures and what explained these figures. The high cable prices were identified as one of the key factors. Although

it was acknowledged that could not be the single factor explaining the down-turn in this industry.

Question 2: *In what way can NRA's, international bodies like ITU and other stakeholders (e.g. EBU, CEPT, ETSI) help in addressing the challenges of the Cable TV industry? For example, in terms of regulations, licensing or standard setting.*

Responses:

- It was shared that NRAs should give room for consolidation and co-investment in the industry. As such there is a need to reverse previous policies whereby competition was encouraged by promoting new market entrants. Also, the promotion of infrastructure sharing is needed. All these measures are needed as the required infrastructure investments are often too large to be carried by a single (smaller) company;
- The following standardization gaps were identified; (a) open platform for TV program delivery, (b) a common Set-top-box (STB) for the three different platforms (i.e. Cable, Terrestrial and Satellite), (c) guidelines for (service and network) implementation, (d) IBB compatibility and (e) access services;
- It was also argued that for better service integration on the STB/PVR (as to deliver the wide range of services) the technology was not the real bottle neck (and consequently technical standards), but rather Intellectual Property Rights (IPR). IPR is a complex matter and its practical application is not keeping up with the rapid technological developments and the many different services on offer (by cable companies and others);
- Finally, standards for IP multicast was identified as an area for more standardisation work.

9.2 Session 2: Market Trends and Business Models

Question 3: *OTT delivered services are perceived by consumers to be on-par with HFC/IPTV delivered services or is there still a unique selling point to be derived from HFC/IPTV-based service delivery?*

Responses:

- It was argued that for most services there is no unique selling point any longer in having a HFC/IPTV network as OTT SPs are buying capacity like in the telecom business and can agree with the network operator (or cable operator) a competitive set of service levels. The argument that cable companies should focus on their content aggregation role also supports this argument. Perhaps for the delivery of UHDTV (4k/8k) there may still be a competitive edge for cable companies to own and run their HFC/IPTV network as they as they can directly manage traffic. This in turn, is dependent on net neutrality regulations (which vary per country and is recently relaxed in the US);
- It was remarked that for countries with a relatively poor fixed infrastructure, there is still a competitive edge for cable companies to own and run their HFC/IPTV network. Hence the above argument (see first bullet) may only be valid for markets like the US and Europe (i.e. markets with several broadband platforms);
- It was also remarked that in countries like Qatar, where the Government is investing in dark fibre in conjunction with private partners (i.e. Public Private Partnerships – PPP), ICT infrastructure is considered a shared public good and that competition should be on services and content.

Question 4: *Are integrated service offerings across multiple platforms critical in surviving in the long-run? Will linear TV remain a key element of this service offering, based on which also VOD services can be developed?*

Responses:

- It was widely acknowledged that linear TV services should be part of a converged offering with truly integrated (i.e. seamless switching between services for the end-user) and whereby the mobile platform is key (and as argued by some, mobile is even the first platform);
- What the position is of linear TV is, varies between countries. For example, in El Salvador linear TV is still 'king' and media services are not as advanced as in Europe. Further it was argued that when customers do not have the understanding or knowledge of these more advanced media services, demand for these services is absent;
- It was generally argued that the role of linear TV would change over time, although slowly. Linear TV would be more for event-based content and services. This event-based content is not automatically a domain for cable companies to control, as (the larger) OTT providers are start buying sport rights and producing event-based content.

Question 5: *Non-linear watching is dominant under young people. Can it be expected that they will carry their video consumption pattern into adulthood, or at that time, they would like to be entertained by professionally produced linear TV content? Or in other words, is linear TV dead or will it continue to exist? And if so, for what share of all video watching?*

Responses:

- The view that current viewing patterns (i.e. VOD and binge watching), predominantly present and measured under younger audiences, would change over time was supported by the workshop participants and presenters. Because these younger audiences will grow older and older people prefer to be entertained (rather than searching for content). The strength of linear TV is its simplicity and the viewer is not spending ½ hour or more on selecting a video;
- At a more demographic and social level it was argued that the older you get the more you want to be entertained. When you are young you are still searching and you are trying to find out who you are. It is widely observed that in many countries populations are getting older and hence the market for linear TV services is predicted to grow or at least to remain stable;
- Hence, it was widely acknowledged that linear TV is here to stay, but that viewers would more and more view these services on mobile device rather than on the stationary TV set in the living room.

Question 6: *OTT service providers seeking partnerships with Cable TV network operators illustrates the strength of linear TV or OTT providers merely seeking market access, by accessing the eco-system/STB of the Cable TV network operator?*

Responses:

- It was argued by some that OTT providers (like Netflix and Amazon) are going to be dominant in the market as content is expensive and requires (global) scale. However, the argument of an inherent need for local content would contradict such an outcome. As argued before, this need for local content forms an advantage for cable companies, especially when they would leverage their role as content aggregator;
- A common threat was identified for cable operators becoming merely a 'dumb pipe'. Which would support the argument that OTT providers are just seeking market access (when working together with cable companies). Again, it was argued that this could be prevented if cable companies would focus on their role of content aggregator.
- It was added that having the role of content aggregator would require superior client contact points and interfaces, whereby content and service selection is very easy and intuitive.

9.3 Session 3: Evolving Technology: Innovation Driving Growth of Cable TV

Question 7: Do Cable TV network operators need to replace their existing coaxial-based local loop with fibre given the forecasted demand for more broadband capacity, and especially considering the uptake of UHD TV?

Responses:

- Some presenters argued the need for distributed access architectures and a coexistence of coax and fibre. Others would argue that demand is endless and even a self-fulfilling prophecy and consequently fibre in the local loop is needed. There seems to be no consensus on what a minimum required (download) speed would be; some argue a minimum of 1 Gbit/s whereas others would argue higher speeds (which was exemplified by the long-term goal of introducing DOCSIS 3.1);
- In addition, it was argued that broadband needs are dependent on the local situation and that the small providers may not need very high broadband speeds. Also, the business model would drive the need for broadband. For example, in some countries the business model is still very much geared around offering linear TV services. This mixed picture results in the deployment of various technologies, some deploy fibre (x PON), others DOCSIS and some only DVB-C.

Question 8: Is the deployment of future network concepts necessary for provisioning of competitive multi-screen/play offerings and may this entail outsourcing of network assets to third parties (with system integration skills)?

Responses:

- It was argued that system integration is key for the deployment of truly converged services, delivered over multiple platform (including the mobile platform). Consequently, system integration work should be outsourced and cable companies should focus on their content aggregation role;
- It was noted that some cable companies outsource their network operations to third parties (like in Switzerland). However, for doing so, further standardisation work is needed.

Question 9: DOCSIS 3.1 and DVB-C2 provide both efficient solutions for the transmission of high quality video. Is there a need for both or should they be integrated in all-IP based networks?

Responses:

- It was noted that Cable Europe is promoting the deployment of DOCSIS 3.1, whereas the DVB project is recommending the deployment of DVB-C2;
- Furthermore, it was noted that there are no commercial DVB-C2 deployments to date. Also, DOCSIS 3.1 based deployments are still very expensive and consequently it is still difficult to have a profitable business case. In this light, the recent DOCSIS 3.1 deployment in Denmark would be an interesting test case to follow.

9.4 Session 4: Setting International Standards for Sustainable Growth of Cable TV

Question 10: Should NRAs be closely monitoring (potentially) unfair practices of locking-in customers in TV ecosystems, and if so, should they be proactive in protecting consumers against these practices? Or alternatively, is the promotion of global standards sufficient?

Responses:

- It was observed that the locking-in of customers in TV ecosystems does not seem to be a regulatory issue, rather than a standardisation issue (see Section 9.1 on IBB);

- In addition, it was remarked that the cable industry needs more regulatory room for co-investment, consolidation and network sharing. As to facilitate the required network investments for broadband capacity (see also Section 9.1).

Question 11: *Are the different net-neutrality regimes and dispute resolutions hampering service innovation and network investments? Can it be expected that the forecasted future growth in IP-based video delivery, result in new net neutrality disputes?*

Responses:

- Although net neutrality issues were not specifically addressed in the workshop presentations, it was acknowledged that the regulatory stance in these issues could affect the investment climate. With more relaxed net neutrality regulations, the willingness for investors to invest in broadband capacity could increase (see also Section 9.1);
- Also, the ability to offer zero-rating services by cable companies (or mobile companies), was considered an effect weapon in competing with OTT providers.

Question 12: *Are the current proposals for the AVMSD revision sufficient in helping the audiovisual industry to compete better in the converged market place? Are key elements missing or should rules be changed or removed in the AVMSD revision?*

Responses:

- It was argued that the revision of the AVMSD is still not resulting in a level-playing field between providers offering linear TV services and providers of VOD-based services;
- In addition, it was argued that these European revisions take too long so that these Directives are lacking behind the current market developments. Europe should implement these revisions quicker as they are not helping industry (as they are outdated) and moreover as it is not understood by the market why these revisions take so long.

Question 13: *Is a different direction or approach needed of standardisation bodies in setting standards in the areas of IBB and network operations (including DOCSIS and DVB-C2)? Are critical standards missing or being developed too slowly?*

Responses:

- Rather arguing for more or missing standards, it was argued that we have too many standards and standardisation bodies. Consolidation or a closer collaboration between standardisation bodies is needed.

9.5 Conclusion

All stakeholders were thanked for their contributions to the workshop and were invited to participate in upcoming activities related to this key topic. The outcomes of the workshop will be featured in a comprehensive industry paper to be released by ITU in the first half of 2018. The paper will advance implementation of the European Regional Initiative aiming at assisting countries in need of Cable TV related matters, and bridge the requirements and needs of the various countries with the standards community. It will also contribute to the workflow of several ITU study groups including:

- ITU-T Study Group 9: Broadband Cable and TV
- ITU-D Study Group 1: Enabling environment for the development of telecommunications and ICTs
- ITU-D Study Group 2: ICT Services and Applications for the Promotion of Sustainable Development
- ITU-R Study Group 6: Broadcasting Service