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Broadcasting in 2030: Crystal Gazing

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ABSTRACT

Broadcasting has informed, educated and entertained the world population during last 120 years of its inception. There has been lot of technical evolution during this period namely coming of digital and compression technologies, emergence of satellite, internet and fiber optics adding to the earlier terrestrial mode of transmission and providing simplex to duplex mode and interactivity. This has also led to any person becoming a broadcaster using her/his smart phone and the social media like YouTube, Instagram, Facebook etc. apart from tens of thousands of DTH channel operators. In this scenario, the content called king, has suffered most, losing its appeal, integrity, reliability and ethics. Authors feel that by 2030, this will lead to the closure of most of the Public Broadcasting services, News Channel and unethical content broadcasters on social media. Only A few bigger global delivery companies will possess the skill and finances to harness the potential of interactive and enhanced TV (ITV and ETV) which shall permit the users to view or skip a program or commercial.

Keywords: Personalized information: Walled Garden; Interactive TV; Metaverse; Enhanced TV with return data path; Data visualization and exploration tool; Operational Intelligence.

*"There are decades where nothing happens; and there are weeks where decades happen."***— *Vladimir Ilyich Lenin***

INTRODUCTION

Italian physicist Guglielmo Marconi with his assistant, George Kemp, transmitted the Morse code for the letter "S" from Poldhu, in England, on December 12, 1901, and received transatlantic radio signal at the coast of the United States of America successfully. The first "television" system broadcast was accomplished by Philo Farnsworth on September 7th, 1927. These two starts penetrated every home around the world during the last century. Undoubtedly, they have a profound effect on the lives of people providing, news, information and entertainment. The explosion of the broadcast stations, Government's intervention in managing public service broadcasting (PSB), the way the broadcast organizations are run and operated, invent of compression and digital based new technology, manufacturer's role in thrusting the new transmission systems such as DAB, DRM, DVB, etc. without backing by affordable receivers in the market, was bound to be catastrophic, especially for PSBs. It led to proving the prediction in 2003, "about the death of public broadcasting, emergence of many

key players such as network provider, program houses, subscription management agencies etc. by 2020" [1] to be true. In this paper, authors examine the state of Broadcasting in 2030, crystal gazing the emerging technologies, the present status of content delivery and also suggest some novel technology-based ideas for broadcasting to be made ethical, encompassing integrity and reliability to survive in 2030.

THE CONTENT CHARACTERISTICS

Content is any form of source material such as news, movies, images, games that appear on the screen and is consumed by user. Content plays the most important role in driving or killing the broadcast channel. The channel success depends on viewer's acceptance of content and format. The key characteristics of the good and acceptable content are:

INTEGRITY, CREDIBILITY AND RELIABILITY

Media is a communication system that lets us experience the world and be a part of it. The viewer must be sure that the news and related information being broadcast is true. Unbiased news may be defined as a factual presentation of the incidence, without any twist toward a political influence or to benefit the owners of the news channel. The merging of media companies in multi-billion-dollar deals has resulted ownership of media outlets into an ever-decreasing number of conglomerates. Unbiased news appears to be rare since money seems to control over journalistic integrity and it is naive of anyone to believe that the broadcast Moguls don't control the news content and the mode of its reporting.

> *"In dictatorships the media is controlled by the State. In democracies the media is controlled by wealthy individuals with political affiliations. Objective media and journalists simply do not exist in the mainstream."* ***— Robert Black***

Concise, Clear, New, and without Replication

The presentation of news story needs to be such that the meaning is unmistakable, and succinct. Viewers have no time and interest for watching elaborate reiterations. The language should be specific, emphatic and concise to save the reader from incomprehension and boredom. It must be relevant without abstractions. One line information need not be repeated for quarter-hour, showing the clip again and again, elongating the length by inserting unnecessary music or annoying long commercials.

Ethical

During late 1950s, Television was a major cultural socializing agent. During 1960s and 1970s, content was considered to be the ruler of the mind of society. Till the advent of mobile, TV was unchallenged controller of the social psyche. Even today with the enormous penetration of social media, TV has invaded majority of homes creating new threat of cultural evasion, programming the minds and guiding people behavior. The logic (human mind and will) known as fourth domain is being severely affected by unethical content.

> *"All of us who professionally use the mass media are the shapers of society. We can vulgarize that society. We can brutalize it. Or we can help lift it onto a higher level."* — ***William Bernbach, American advertising creative Director***

Entertaining

The entertainment genre rules the TV. Entertainment adaptations are immensely popular on TV channels. In countries like France, Spain, Sweden and Israel, compared to original content

shows, the TV channels featured more adaptations of shows like *The Voice*, *Strictly Come Dancing*, *Got Talent and Survivor*, *Married at First Sight*, within the entertainment category and *Who Wants To Be a Millionaire*? within the game category. The Indian television channels have also produced many popular serials using adaptations of worldwide popular brands, like *Dancing with the Stars*, *Big Brother*, *The Weakest Link*, *Who Wants To Be a Millionaire*, *The X Factor*, and so on. Thus, TV channels are ready to provide good entertainment but they get masked by long commercials.

Personalized information (Walled Garden)

Walled Garden provides a controlled environment where merchant sites and advertisements are accessible to viewers, as per his choice in contrast to the present system during which long commercials are forced on the viewers, creating total repulsion and his changing the channel [2]. Individualized TV allows viewers to switch the program to match their individual desires. Viewers can change point of view at will, call up instant replays, guide the plots in drama, interact with the TV host.

Lazy interactivity

A concept that permits people to click on remote to view the commercial or stop it or switch to a product's website, making viewing a purely spontaneous activity.

VARIED CONTENT FOR DIFFERENT SEGMENTS OF AUDIENCE, EXPANDABILITY

The same content could also be presented in several formats to suit different age, ethnic, gender, group. Demographic, Behavioral, Geographic and Psychographic segmentations are done at the present only with a view to focus on the commercial for maximizing the revenue from advertisements. The time is ripe now to innovate and produce expandable content with a choice for selection of the format by the viewer.

Feedback to know the acceptability

The broadcaster must know who have changed the channel when a specific program or advertisement came on the screen. A "return data path," may be a way for the broadcaster to *understand* what you're watching and when you are skipping the channel on start of a program or long commercials. It offers the opportunity for targeted advertising, every marketer's dream. The return data path can also be used for alternative audio tracks and interactivity.

Present Technological Scenario

Terrestrial Broadcasting

The emergence of compression and digital technologies have completely transformed the mode of content production, transmission and its consumption. The digital technology has changed the way the scenes are captured, edited (from linear to non-linear), processed and stored in archives. The retrieval from archives also uses Robotics and Artificial Intelligence (AI). The compression technology has made possible the delivery of tens of thousands of channels using DTH platforms over a wide geographical terrain. The availability of satellite, fiber and Internet has made the analogue terrestrial transmission system transmitting single channel, a technology of bygone era. The advent of Digital Audio Broadcast (DAB) [3] as a potential substitute for FM broadcast, various DVB [4] channels (satellite, cable, terrestrial), Digital Radio Mondiale (DRM) [5] designed to work over the AM/ FM/ Shortwave bands used for analogue

radio; WorldSpace [6], a satellite audio delivery system; could not give a new life to the traditional terrestrial broadcasting, mainly due to the consortiums concentrating on selling the transmission system without giving attention to the availability of affordable receivers. The technology that has survived is FM analogue transmission due to its high quality, availability of receivers even built-in mobile phones.

Broadcasting in the cyberspace

Cyberspace opened new possibilities for administering broadcast services in 1990s. Several radio and TV stations started live broadcasts combining hypertext technology with packet audio and video. Initially this presented tough challenges to software architects, network operators and content providers especially due to limited internet bandwidth in those days. The problem was overcome using compression, buffering and UDP (User Datagram Protocol), a connectionless lightweight transport-layer protocol scarifying "retry" mechanism of Transmission Control Protocol and Internet Protocol (TCP/IP) [7, 8]. Several trials for Audio/Video delivery via net, storage and delivery of Video-on-Demand (VOD)/ Music Archives, Virtual Radio, Interactive 3D TV were conducted to direct the destiny of Broadcasting in future [9]. The result is visible today with Internet playing a key role in broadcasting. With the coming of Web 3.0 [10] and Elon Musk's Starlink satellite internet upload speed of 13.89 Mbps closer to matching the speed of the fixed broadband (17.18 Mbps), many of the desired services in form of ITV and personalised TV shall become a reality.

Explosion of Smart mobile phones

According to Statista, the number of smartphone users in 2021 around the globe is 6.378 billion, making 80.63% of the world's population owning a smart phone [11]. The emergence of affordable mobile phones has not only created a new class of content consumers (4.48 billion as on 2021) [12] on their mobile phone; just watch the people at airports, in trains and public places, but also made every and anyone to create *technically* good quality content. The availability of social sites with high number of active users in billions and revenue in billion USD as in 2021, such as YouTube (2.291, 19.8), Facebook (2.74, 86.0), WhatsApp (2.0, 5.0), LinkedIn (0.305, 8.05), Instagram (1.221, 6.8) Weixin/WeChat (1.213) [13] have created huge revenue for everyone, its companies, through selling advertising and average revenue per user (ARPU), content providers and channel partners, proving President Franklin Roosevelt wrong who declared Television as "an interesting curiosity of little commercial value" in his 1938 New York World's Fair address.

Emerging Technology for Broadcasting in 2030

What will the broadcasting be in 2030, just after nine years from now? There has been tremendous development in technology and trends shall continue. The technology predicted to be used for broadcasting to survive in 2030 is shown in Figure 1.

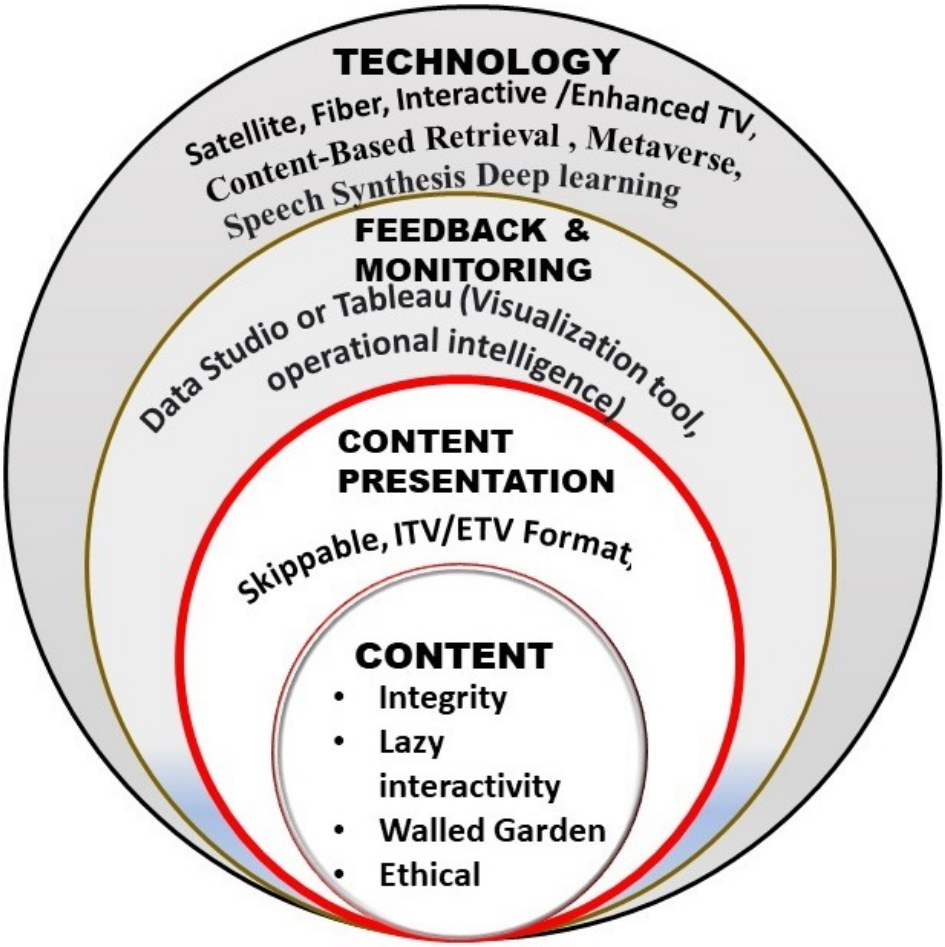

Figure 1. Technology predicted to be used for broadcasting in 2030

INTERACTIVE TV

Broadcasters can enrich their viewer's experience by providing interactive content that integrates Web content with their traditional TV program [14]. This will mean.

- Integrating Web content such as data, supporting text, images, graphics with the TV scene.
- Imagine, during a match, viewers have choice to submit a question to Google, and acquire the Google search results.
- Another way to get viewers interested is to provide a small window on the lower side of the screen that may exclusively show the commercials with main program continuing on the screen. The user may have option to stop the commercial or click on it to access the merchant's website for instant shopping.
- While continuing to enjoy the regular program, viewers may access related Website getting quick access to local information or more in-depth data.

How it works?

An ITV link appears as an 'I" icon on the screen signaling the viewers about the availability of interactive content. Viewers can click this icon and access the menu showing the availability of data, relevant Web site or access to search engine. Authors recommend availability of an additional small window on the screen providing PiP (Picture in Picture) where the

commercials could be played with viewers having option to watch it or stop it. The pictorial depiction has been made in Figure 2.

Figure 2. Interactive TV with icon and PiP for user controlled hot commercials

What shall change?

ITV shall use the foundation of today's television- similar content but expandable, same commercial but with hyperlink to switch to its web site, built in interactivity button providing a menu option, same fiber or satellite distribution but with total control of viewer to skip the boring commercial or quench his thirst of inquisitiveness by seeking more information. It will empower all; the viewers, the broadcaster and the advertisers.

ENHANCED TV

Enhanced TV (ETV) uses return channels to provide option to select icons on the screen to get additional information, visit Web sites and order products and play games [15]. ETV also allows embedding of commercial into main program itself. By providing an "e" symbol, viewer can click and access the Web site of the product. For example, a person wishing to purchase a coat as the actor on the screen is wearing, if the coat is enhanced, he can click on it, access the Web site and procure online (Figure 3). This type of TV commercial (T-commerce) has huge potential for a revenue stream.

Figure 3. Enhanced TV with T-commerce

Content-Based Video Retrieval (CBVR)

Content-Based Video Retrieval (CBVR) is a technology that allows retrieving of similar video from a database on the idea of searches on frame, scene (set of contiguous frames), shot (set of contiguous shots having a standard semantics) or story level (complete video object) [16]. Video segmentation is based on detection of transition between shots [17]. This technology offers multi-layered content where news or feature films are often of varied lengths allowing flexibility for viewers to settle on what proportion of time he wants to devote on a specific program of his interest. Every video in the database can be segmented into several shots. Computing feature vectors for key frames, and storing them in a database, may enable the user to query the database to retrieve videos with similarity higher than a predefined threshold. The same program of various lengths may also be produced and stored in the database with option to viewer to choose.

Speech Synthesis and Deep learning

Advanced deep learning technologies are available which synthesize speech that sounds like a human voice. It is capable of providing dozens of lifelike voices for a wide variety of languages. Text-to-speech (TTS) synthesis technology has been used in broadcasting in many fields, such as virtual anchors, voice news broadcasts, and automated story reading. Voice conversion converts non-semantic information in speech (transforms acoustic features so that it appears as if the speech is spoken by another person) while retaining semantic (linguistic) information. This may be helpful in changing speaker identity and emotion in the speech. This technology can be used for applications, such as pronunciation assistance [18] and speech enhancement [19-21], etc. This will completely transform the way the programs are presented by anchors today.

Metaverse

Metaverse, coined in 1992 in a sci-fiction novel by Neal Stephenson, refers to digital spaces that appear more lifelike due to the use of virtual reality (VR) or augmented reality (AR). It brings up images of a new world in which animated avatars of our physical selves virtually perform activities such as, making presentation in the offices thousands of miles away, shopping, gaming and traveling. Facebook is already working on it. Microsoft has been awarded a $20 billion contract by the U.S. military for its MR Tech that enables people located in different parts of the world to join 3-D holographic experiences on varied devices, such as smartphones, tablets and PCs, VR headsets and HoloLens 2.

Data Studio or Tableau

An interactive data visualization and exploration tool provides business and operational intelligence by time-series analytics of big data gathered by application monitoring. Data is presented in a graphical or pictorial format that provides visual presentation of analysis to decision makers. In absence of data visualization, methods used to show effectiveness of program or commercials are not transparent and audiences are sold as mere data commodities to advertisers. Current technology with connected TVs or broadcasts on social media makes it possible to track the viewing behavior. Datafication of the information gathered from viewing pattern such as when the audiences' flick from channel to channel, or automatic capture of the number of audiences growing or sinking after a few episodes, can be stored in a database. This digital trail left by viewers and sentiment analysis/opinion mining can be represented in a visual form to broadcasters, content creators, advertisers for business model evolution [22]

Gazing into the crystal Ball

Broadcasting has reached again at a crossroad in its evolution where it has to choose a path for its survival. The convergence of broadcasting, Information and communication technologies (ICTs), and broadband Internet has diminished the boundaries between traditional analog broadcast and offering of content on Internet by social media. The seminal question as to what form of broadcasting shall survive in future and the structural changes needed for it, is still open. Deloitte has predicted that "by 2030 a handful of global digital platform companies will control every aspect of media from production to customer with national broadcasters all but extinct in dystopian scenario" [23].

Forecasting the future is always difficult. Many predictions made in the past, by experts with impeccable credentials, have proved to be dramatically wrong. In 1876, the President of Western Union, William Orton, dismissed phones as a "toy" and wrote,

> *"The idea is idiotic on the face of it. Furthermore, why would any person want to use this ungainly and impractical device when he can send a messenger to the telegraph office and have a clear written message sent to any large city in the United States?" The eminent scientist Lord Kelvin predicted in 1895 that "Heavier-than-air-flying machines are impossible" and in 1897 compounded this error by further predicting that "Radio has no future". In 1932, Albert Einstein said, "There is not the slightest indication that nuclear energy will ever be obtainable. It would mean that the atom would have to be shattered at will". In 1961, T.A.M. Craven, FCC predicted, "There is practically no chance communications space satellites will be used to provide better telephone, telegraph, television or radio service inside the United States."*

In case of broadcasting the prediction is much more difficult on two counts viz its changing role in the society and ever-increasing user's expectations and rapid technological developments as discussed above. However, a keenly watched transformation of the sector, provides an input for a few predictions for the year 2030. The authors gaze the crystal ball and predict that:

- "Legacy" free-to-air Public Service Broadcasting will extinct from the scene. The main reasons shall be technological obsolescence; lack of encouragement to personnel for innovation, research & development; absence of motivation; lack of finances, freedom & creativity; unproductive employees.
- Technology-driven convergence processes will facilitate business model innovation. The organizations with strong technology background, shall be able to reconfigure and reinvent to create value in this new domain. Most of the private channels lack the zeal for innovation and continue broadcasting programs to please their political bosses or earn quick revenue. Majority of the viewers feel what Montale expresses below.

  > *"Mass communication, radio, and especially television, have attempted, not without success, to annihilate every possibility of solitude and reflection"* ***- Eugenio Montale***

Therefore, many private commercial channels will vanish from the scene, especially due to their poor quality of content and higher dependence on commercials and paid news:

- Interestingly the traditional broadcast companies are being confronted with new competitors from outside the television industry, mainly by Amazon, Samsung, Apple, Google, Facebook (now renamed Meta), You Tube and Netflix. These companies started as completely different industries, like consumer electronics, or e-commerce, targeting

different customer and user pools. These global digital platform companies with strong R & D and motivated teams shall be able to make use of emerging technologies like CBVR, Data visualization software, Metaverse, Artificial intelligence to totally transform the way the content is created and disseminated. They will be able to provide services like Two-Way Broadband using satellite/fiber, Interactive TV (ITV) with scenes enhancements, providing flexibility to choose advertisements and also to get to website or more data as they like. Only few of them adopting these technologies and business models used within the converged media "ecosystem" or "environment", will survive.

- New broadcasting ecosystems throw great challenge to developers, content providers and marketing team. Content needs to be based on human behavior, innovative, compelling and appealing to the target segment. The era of multi minutes of advertisements shall be over. Either viewer shall have choice for skipping advertisement or there may be hot commercials (ETV) embedded in program.

"Where content is king, content creation is the jewel in the crown."-Charles Allen, executive chairman of Granada Media, in Management Today (December 2020)

CONCLUSION

Broadcasting in 2030 is poised to be technology driven, user friendly and exciting with interactivity being the key feature. It will need to encompass emerging technologies to provide immense enhancement in the content for offering multiple choice to viewers to watch what it wants and to skip the unwanted boring commercials or noisy and repetitive content. This will need determination, perseverance and resources to adopt to the new and emerging technologies and ensure delivery of multi layered ethical and reliable content. In this brave new fast-changing world, being torn apart and reassembled, piece by interactive piece, broadcasters have two options: to hold on to the past, or accept the challenge. A few can place their heads in the sand and hope for the best. There is another option. Broadcasters can embrace the future, and accept the challenge of learning what it takes to survive and prosper by new rules. The rewards, for those broadcasters who take this challenge, are there for the taking. Very few digital companies may do it. They will be future media moguls. Public Sector broadcasters, commercial channels, and content providers not adhering to this new brave world shall become extinct.

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