



DIGITAL RADIO-TELEVISION EMISSIONS FOR INFORMATION, EDUCATION AND ENTERTAINMENT

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ABSTRACT

The unprecedented success of social media combined with the availability of omnipotent multimedia capturing communication devices has promoted a fervid two way interaction between broadcasters and their perspective audiences. The social media success path to preeminence, however, has created disillusioned expectations for analogous results in the arena of digital broadcasting. Indeed, the compulsive nature of radio television emissions has not created to entrepreneurial consortia euphoria for an energetic trajectory, as mass media corporations realize that under some certain circumstances contemporary technology forcibly trends to deregulated models of supply and demand. New channels of communication and vigorous broadcasting protocols restructure the domain.

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INTRODUCTION

Extravagant advances in Mobile Communication Technologies, Internet portability and Wireless Connectivity have created an emerging international intelligence culture that has elicited the "sleeping" potential of the global substrate; thus far this was susceptible to a prolonged hypnotic trance (in neurocognitive terms) exercised by mass media conglomerates (Moridis et al., 2010). As the centennial of radiophony and television broadcast approaches, primarily the commotion of emissions for entertainment, information, and education becomes a cluster of activities orchestrated (and performed) by different media than those used for decades: already the radio has been subsidized and does not exist *per se* as an autonomous device, while the illustrious TV set has been fused into devices with screens of very high resolutions, sharp color reproduction and the ability to have two way interconnectivity, as receivers and transmitters of multimedia

content the same time; more amazingly, these devices currently range in size, in mainstream applications, from 5" to 50", with the small ones performing paradoxically, in neuroscientific terms, much better (Dix, 2016). It seems, indeed, the smaller the size of the apparatus, the more potential it demonstrates as an additional premium device which extends human activity to a 24/24 basis. These parameters are constituents of variable, huge in quantity displacements of media campaigns to Internet based emissions, as the receiver devices demonstrate an amazing potential for applying programming techniques to the most comprehensive level; thus they become distributed Artificial Intelligence (AI) hubs, serving as "prosthetics" to everyday activities performed under the most stringent circumstances (CBI Insights, 2016). Some characteristic examples are thus presented:

- Their users "watch the news" occurring "back at home" while riding camels in the desert, and of course post real-time selfies of themselves in global social media; in fact the "news" for a personal-centric agenda, highly esteemed by social media, is that the recipient films himself with a HD or 4k analysis and the same time

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distributes the footage to huge repositories for global media coverage. Virtually, he broadcasts himself.

- One may communicate with his own clique, more or less easily and affordably, under the harshest circumstances; while wandering in busy international airports, in congested vacation resorts and crowded, difficult to reach pilgrimage spots he may retain control over his group; he may change his travel plans “on the fly” in the most convenient and affordable way while overwhelmed and encircled by thousands having the same intentions.
- These versatile, new generation mechanisms of indefinite potential extensions, allow their users to be informed for the possibility to have rain in the desert with significant accuracy or to express interactively, *erga omnes*, a reaction to happenings that the normal structure of educational TV or the conventional news media cannot neither verify nor cover. Indeed, for instance, huge geographic regions seem to be in turmoil or warfare, without the mass media enterprises having the ability to verify the exactness, the magnitude or the criticalness of the events reported to the global public. As readers react to the news by commenting, following their intuitive social perception, by expressing an expert opinion, if they are professionals in the field, or by posting videos and relevant evidence, if they happen to be eyewitnesses of events, then reporting the news becomes a two way ambidexterity. It involves the interaction with the wide audience, aiming to create verifiable proceedings, rather than top-down reports delivered by anchormen or anchorwomen.

The advances in IT technology are not the only benefactor for this shift: the quality, the quantity and the cost-effectiveness of mobile computing mould a culture of autonomy, distancing the viewer from his television set or radio, while, the same time, harnessing interactivity and creativity having as epicenter his portable device. Inevitably, radiofrequency emissions are gradually replaced by video streaming from Netflix™, Hulu™ or Youtube™, [...], portals. Communications under the harshest conditions may be serviced with overgenerous tools like Skype™, Viber™, Messenger™, WhatsUp™ and similar, that at virtually no cost provide services that were unthinkable some years ago even to executive officers. Even further, they are brand names globally attested and easily recognizable by their formal user specifications, their latent qualities, their learnability and communication potential. Looking for something rightfully requisite, audiences and consumers in general are provided with great expectations: indisputably they still use their TV sets or radiophony devices, e.g. while they are commuting, but the focal point of their Human Computer Interaction (HCI) with audiovisual streams takes place at a higher level, with devices readily capable of storing, retrieving and sending information (Dix, 2016). It's not out of the ordinary, after all, that virtually instructive TV emissions are enthusiastically transformed to mashups of learning objects, massively building up vast repositories of communal knowledge.

DIGITAL BROADCASTING, PROGRAMMING AND INSTRUCTION

When it comes to “broadcasting” one’s self, there is a practical antinomy that preoccupies all the involved parties, i.e. the

mass media conglomerates, the regulating authorities, and the general public: the tools offered for little or at no cost are provided as services by nearly exclusively USA based companies; on the other hand, the users of these services, in an overpowering manner, reside not in the USA. As a matter of fact, most of them are not even American. Therefore, the technological hegemony of one country demurs the regulatory action of national authorities that have for a century exercised strict control over the distribution of Radio Frequencies (RF), have fervently supervised, if not censored, the emitted content, and meticulously subsidized or sanctioned the economic policy of broadcasting companies. Plausibly, researchers are embezzled if there is ground for consensus. In brief, audiovisual broadcasts, as far as the global community is concerned, have a perpetual structure of adequately recorded forms for images, video, music, slides or text files that are handled interactively in huge repositories, with the potential for world wide access and distribution. Already most of this information is manipulated, both in its input and output mode, by mobile devices (Ally, 2009). However, it is crucial, albeit the other factors mentioned thus far, to monitor who manages commercially this sphere of influence. Indeed, very fast computer networks, available in the course of a plethora of devices, stipulate through variable interconnectivity schemes every resident of this planet. This is commissioned with Web 1.0 tools like e-mails, with collaborative educational content mega structures like Wikis (Web 2.0 tools), with massive, easily reached Web 3.0 tools, like educational portals offering formal or informal learning, communication with government agencies - not only for taxation or similar matters, industry portals for the dissemination of goods, and lately Web 4.0 tools for advanced mobile communication and learning (Sharples, 2013). It is not therefore a paradox that authoritarian regimes imply restrictions on the use of such services and tools. It is exactly this approach of Web 4.0 infrastructures, along with 4G and the forthcoming 5G networks that endorses the terminal devices, i.e. the mobile computers and the portable paraphernalia, to very advanced, as they are communally perceived by both makers and users, highly adaptive devices (Ferry, 2009). Their evolution, in terms of hardware and software, from cellular phones to handheld computers, and recently to sophisticated, two way multimedia outlets has increased the portability of an increasingly mobile and, yet, polarized society. Their ability to be everywhere, anytime, potent to record dazzling activities, provides footages recording irreducible levels of motion, feeding constantly input channels, professionally alleged to social media and mass media; the same time they serve as omnipotent, AI enhanced reproducing gateways for entertainment, information and education (AI Khan *et al.*, 2015).

The National model

Radio-television counts some 100 years as an initiated activity around two pillars: it commenced action driven by the commercial model, in the USA, but soon, in Europe, where the notion of the ethnic state prevailed, it was launched as an enterprise based on the country’s inalienable assets. Therefore, emphasis was given over the common national and cultural tradition, as it was expressed in a variety of different official languages through this continent. This comes in steep contradiction with the American model that has flourished over a mosaic of diverse experiences between languages, ethnicities, communities and classes. The usage of digital broadcasts through receivers of digital television or

radiophony enhances the national model, since all these media alongside the RF spectrum are perceived as useful, valuable things owned by the state (Ala-Fossi, 2008). Simultaneously, policy makers and regulators demonstrate quick reflexes in taking advantage of the strong influence that mass media broadcasts exercise on community, and therefore seek closer interference with its legacies, its commitments and, inevitably, its debts (Czepek *et al.*, 2009). In the technical domain, the shift from analogue transmissions to digital communication methods, increases the effectiveness, reduces costs for telecasters and transmission arrangements and enhances productivity, permitting better use of range and the capacity to cover more administrations; as a result, the objective of computerized broadcasting foreshadows, as essential and appealing, both controlling authorities and governments (O'Neil, 2009). State controlled radio-television has its pros and cons. While it serves the nation's interests and spreads information for the purpose of promoting widely accepted moral values and ethics, it may attain a biased or misleading nature that unilaterally promotes a political cause. Therefore, its strong hold, its ability to expand the didactic activities of the Department of Education may be obscured by its perseverance with ideas or strategies rather than matters of principle. Instead of promoting activities that convey instruction, knowledge or skill it may be involved in situations that are influenced by obscure points of view.

The American model

The American broadcasting companies realized beforehand the potential to be funded by sponsorships and commercials. As USA was developing a multicultural societal model, there was no need for advocacy of political independence. American broadcasting companies were scattered in many local radio and television transmission stations, using frequencies available in specific regions' band. The transmitted content had for the most part an entertaining character, because in the absence of sustainable state support, the major fiscal resources, the advertisers, wanted to produce a pleasant feeling to the audiences. This light atmosphere would allow commercials to appear in a more regular way into the transmitted programs. The broadcasting enterprises in America had not any need to support fervent state antagonisms, hostilities, or political disassociations between countries. Enjoying internal free trade, freedom of movement for commodities and people, and increased cooperation between its states, producers were seeking to gain attention through amusing programs and then to produce advertisements and commercials for the audiences. Viewers and listeners travelling between Europe and the USA could easily sense the different orientation of the radio-television shows. American broadcasts were mainly commercial whereas their European counterparts had a more direct and strict orientation for news and instruction. The differences were not just about technical issues (the American analog broadcasting system was not compatible with the European ones in most cases). The content of the European radio-television programs was regulated by the principles of social public services whereas in the American peers the nature of the emitted curriculum was basically entertainment (Papathanasopoulos, 1993). This specific process was a priori different with the one their European counterparts adhered to: they were ensuring that the government and the regulating authorities would have the major share of "cultural and political control over broadcast content" (Tworek, 2015). On the contrary, the American broadcasting system was directed

(in a way) according to the preferences of the public. The more noteworthy the effectiveness of transmission - reducing costs for telecasters and transmission arrangements, the more remarkable recurrence productivity occurs - permitting better use of range and the capacity to cover more administrations; as a result, the objective of computerized broadcasting portends major shifts, as essential and appealing, in the agenda of controlling authorities and governments (O'Neil, 2009).

The global model

Although European firms were in dominant position as far as the doings of cellular telephony were concerned, the advent of mobile communications the smartphone style, proved to be a triumph for the American software and network industry, while the hardware part blossoms with unprecedented success in Asian countries. Therefore, the advent of Digital Broadcasting is characterized by the following features:

- Internet streams serve as alternatives to global (and local) broadcasts. Viewers are not obliged any more to use cumbersome equipment for receiving satellite radio-television channels (Hoeg and Lauterbach, 2005). Nearly all such worldwide emitting channels are readily available via wired or wireless Internet connections, USB modems and cellular telephony communications, WiFi hotspots, [...], with in fact global range, at even further reduced prices.
- The merger of radio-television broadcasts with web-based repositories has created virtual channels, streamlining from huge in size and potential portals to several millions of simultaneous viewers (Gandy, 2003). These gateways have a considerable in size memory, which well extends human intelligibility to unprecedented levels. For instance, the average audiophile some decade ago could not boast of having more than 10k of vinyl LPs, CDs or cassettes with music; the average radio station had stored in its racks some 100k of these; few could assert of possessing 1M, and finding a specific song in such storage containers was more or less a time consuming adventure. On the other hand, within the Web at least 1G of songs are readily available, within minutes, for free, to all the residents of his planet, provided they can take advantage of a moderate Internet connection.
- Obviously, listeners and viewers seeking to navigate in an ocean of mass media clips, trailers and footages, not to mention live shows and emissions, can make good use of the AI tools and search engines offered by colossal Internet based companies. These enterprises have managed to sustain repositories that have saved from oblivion the collective social memory of humanity, i.e. they have digital copies of mass media broadcasts from nearly all countries as far back in time as one's memory can go.

Overall, contemporary viewers or listeners prefer to use series of videos, recordings and hypertexts that provide rich alternatives, as contrasted with monolithic, passive and in many cases biased sequences of information (Norman, 2002). Using advanced AI gear, at both ends of their communication channel, consumers rather turn themselves to users than to passive viewers. Interaction, usability, effectiveness, efficiency and similar notions from the HCI scientific domain become everyday concerns for nearly all human beings (Neville and

Salmon, 2012). For example, what smartphone one possesses is not a matter of affordance or even social well-being (Jones *et al.*, 2013); it rather be a matter of survival, since it becomes the gateway to the Information Society. Nostalgic stances towards simple cellular telephony devices do not relieve the user, since the more multimedia capable the end gear is, the more expressive, i.e. using multiple media channels, the communication becomes. Consequently, information, entertainment and education are not received as prime time broadcasts but as prime event repercussions (Politis *et al.*, 2017). Viewers are navigating with the appropriate site that hosts the vital pieces of information rather than tuning with specific TV stations, gambling with the probability of occurrence. Even further, social media enhance this metamorphosis of viewers to users (Yardley *et al.*, 2016). The change in emphasis, as much as viewing is concerned, does not have to do merely with the capacity of the audience to see or hear something from a specific device within a certain region. By changing the visual appearance or the particular way under which audiovisual works are exhibited, continuously new perspectives for sales emerge, and therefore the economic scenery of radio-television broadcasts is altered. The emerging agenda for new technological potential means also that online streaming will be attracting more and more financial resources (Politis *et al.*, 2017).

SURVEY: DETECTING NEW TRENDS AND GENERAL DIRECTIONS

A survey was conducted to decipher how much, thus far, the general audience have turned themselves from passive viewers to interactive users. An assessment was conducted in the Aristotle University of Thessaloniki in January 2018, on a sample of 61 Greek students, aged 20 to 27. The group of people questioned had one hour to complete the e-questionnaire at the Department of Informatics premises.

The questionnaire consisted of three main parts

The first part posed a series of queries aiming to decipher how the sphere of digital radio-television broadcasts has created new tendencies in the way people get informed, entertained or educated. The results are presented in Table 1. The age of the subjects and their educational status of course is not characteristic, in societal terms, of a global viewing audience. In Greece for instance, and generally speaking in Europe, where aging societies have build up, viewers adopt more conservative aspects towards television, radiophony and the combination with portable or mobile devices (Cochrane and Roger, 2010).

Table 1. Orientation towards new services for the radio-television landscape

No.	Query	Responses [out of 61]	Average [hh:mm]	Range [hh:mm]
1	Time consumed daily for listening to music	59	2:47	0 - 10
2	Time spent daily for updates on breaking news (using all media - in a continuous session or periodically)	59	1:24	0 - 3:30
3	TV emissions viewed daily (either via RF broadcasts or online)	59	1:23	0 - 3:30
4	Entertainment – task committed using		[%]	[%]
	TV emissions (either via RF broadcasts or online).	57	9.54	0-20
	PCs or Laptops	57	54.86	10 - 100
	Mobile/Portable Devices	57	34.28	0 - 70
5	Getting informed out of breaking news: task committed using			
	TV emissions (either via RF broadcasts or online).	57	9.89	0 - 40
	PCs / Laptops	57	52.65	5 - 100
	Mobile/Portable Devices	57	37.26	0 - 90
6	Developing Social Relations using			
	TV emissions (either via RF broadcasts or online).	57	1.58	0 - 50
	PCs or Laptops	57	40.56	0 - 100
	Mobile/Portable Devices	57	55.84	0-90

Table 2. Music: new styles of interaction with multimedia content

No.	Quantity of music listened or accessed on a daily basis	Participation in activity [%]	Hours of daily interaction (Average) [hh:mm]
1	I don't listen to music all	6.56	
2	Usually from mobile phone (in radio mode)	26.23	1:56
3	Usually from mobile phone (streamlining Youtube™, etc.)	4.92	2
4	Usually from mobile phone (playing Mp3 style files)	8.2	2:48
5	Usually from Youtube™ or similar (using a multitude of devices)	39.34	1:58
6	Usually from PC, at home (Youtube™)	13.11	2:34
7	Usually from PC, at home (Spotify™)	21.31	1:28
8	While driving, through radio	19.67	2:09
9	While working with PC	6.56	3:15
10	From my PC	13.11	2:26
11	I listen to music	4.92	4
12	Through TV (Web radio)	1.64	
13	Live streaming	1.64	7
14	Through e-radio	8.20	4:12
15	Radio	11.48	2:39
16	During transportation by bus	4.91	2:20
17	Through usb in car	1.64	
18	I listen when I go out to bars or clubs	1.64	
19	While watching TV	1.64	5
20	Through vinyls and CDs	1.64	1

However, for the emerging world, either developing or underdeveloped, although lagging behind as far as affordances are concerned, there is a significant population boom. As a result, the viewing audiences are shifted towards the younger percentiles of the demographics charts. In addition to that, the working force along non-adult spectators and listeners, embraces over enthusiastically mobile devices for a variety of reasons (Hein, Shewmaker and Nguyen, 2017).

- The second part of the survey attempted to decipher this fusion of radiophony and televised emissions within the digital frame of broadcasting. Indeed, while some subjects do not demonstrate any interest in listening to music *per se*, the majority of them was considerably engaged with it in various modes. The use of radio as an autonomous device has deteriorated rapidly; as a matter of fact, apart from its distinctive use in automobiles, stores or working places, listening to radio emissions, either for entertaining purposes or for learning vital pieces of information has been exploited by the use of other trendy devices and gadgets, that have a multirole usage. In Table 2, the listening habits of a new generation are presented.
- The third part of the survey tried to detect qualitative characteristics in the use of digital broadcasting. These were cropped out of the corpus of the free-text style comments that accompanied this survey. Indeed, a new tendency was revealed, the use of social media as news outlets. The subjects pointed out that broadcasters rely increasingly on material that is cropped out of social media as far as breaking news are concerned. Omnipotent portable devices may record *in situ* noteworthy events, revealing a potential that promotes affirmative sociability and communal activity at its utmost (Kapp, 2012).

However, the potential to broadcast one's self should not be conceived as ability to substitute or develop a belligerent attitude towards the professional digital broadcasting services for the fear of uncontrolled deregulation (Politis, 2015). For example, there is plenty of informative material in various forms hanging around within the Web, intending to inform or educate; however, it is far from offering certified education (Osmond *et al.*, 2009).

Conclusion

The classic model of RF broadcasts used in Europe and the Americas for a century has deficiencies in providing full coverage to a polarized world. Inequalities within the financial, linguistic, cultural and religious background of the people living in fragmented regions provide insurmountable barriers in RF broadcasting terms. Analog radio-television seems to be deficient in cases of disconnected regional coverage, due to physical, technical or jurisdictional discrepancies. Digital broadcasting may bridge the gap, under certain circumstances, between different cabals and ethnicities in overcoming their differences (Kraft *et al.*, 2008). On the other hand, uncontrolled streamlines of audiovisual content favor gigantic international distributors and threaten the existence of local radio-television service providers. The hypotheses of this survey and its extrapolations for modern societies were cross examined in the oasis of Deir Hajla, Israel. It is a predominantly Arab speaking region of the Jericho district, near the border with Jordan, a few km away from the northern

bank of the Dead Sea. The advent of digital communications, combined with the extensive use of affordable mobile devices, has provided the inhabitants and the millions of its tourists with new means for conveying multimedia content on demand. It is amazing that under such harsh living conditions, the public of this region enjoys educational, informative or recreational content access at a very little cost.

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