

Impact of Digital Radio-Television Development on Spatial Development of Slovenia

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Through the digitalisation of telecommunication (TK) systems the radio broadcasting network is also becoming a part of a unified - global telecommunication infrastructure. The new systems are related to new services and to specific technical characteristics of digital networks. The latter shall stem in the users needs of applications and services. The digital broadcasting system will make it possible to transmit not only the traditional radio-television but also multimedia contents, while the introduction of inter-activity will provide the access to the Internet. Consequently it follows from the above that a co-ordinated, economic and efficient construction and utilisation of public telecommunication systems shall be ensured (RTV, railways, electric power management, etc.), naturally considering potential spatial impacts.

1 Introduction

The digitalisation of broadcasting systems represents an important turning point not only in the development of what broadcasting has to offer, but also in the sense of a technological association with alternative telecommunication systems. In the area of production the digital radio-television will encounter major modifications, as in addition to classical audio-visual subjects others - so-called multimedia oriented services - will appear, which will also include PAD (Programme Associated Data). On the other hand the broadcasting radio-television systems are also becoming interesting for the distribution of different telecommunication services.

The last decade gave rise to several proposals of the telecommunication infrastructure development strategy. Thus in the HONET project, produced in the environment of the then ISKRA, it is possible to trace the networks which are supposed to form the future information telecommunication infrastructure. These are the following networks:

- Telekom
- Railways
- Electric Power Management of Slovenia
- RTV microwave links
- Cable television
- Special systems (fire service, emergency, taxi...)
- Ministry of Internal Affairs
- MORS (Ministry of Defence)
- Satellites
- GPS

In September 1992 the ruling government requested the co-ordination of HONET project with the "Public Administration" project, yet to no avail. As a result the Ministry of Traffic and Communications formed a committee to further the development of telecommunications project, named MITIS. The project dealt with 10 networks (then PTT, Railway, Electric Power Management, RTV, academic sphere, banks, tourism, state administration, and industry). Unfortunately MITIS was neither comprehensively dealt with nor adopted. It was commented on by the Chamber of Commerce of Slovenia and by the General Association of Electric Industry, and they proposed the establishment of a National Telecommunication Council, which was regrettably not appointed. In its documents MITIS also identified the third generation of telecommunication services, dealing with digital systems which will serve as a basis for the new telecommunications infrastructure.

Today it is only sensible to talk about the development of digital systems. In the above-mentioned studies on the telecommunications networks development there are quite a few so-called backbone networks. Here I have in mind the network of the Telecom, Slovene Railways Management, Slovene Electric Power Management, and microwave links of RTV Slovenia. Other networks provide communication to the final user (Telekom, Cable TV, RTV secondary network). Backbone networks have a common feature - they were built for the needs of the above-mentioned large companies. In the case of the Railways Management network we are dealing with

private telephone networks, a wide area network (WAN) and transfer of technical information (signals related to the status in railway traffic), with Electric Power Management - ELES we are mostly dealing with the development of the technical information system and a few other applications, while with RTVS links we are dealing with the primary distribution of RTV programmes and feeding the secondary network, which transmits the signal to the final user. With the development of technology all the above-mentioned networks were digitised. While in the case of Railway Management and Electric Power Management the utilisation of optical fibres, with RTVS the introduction of digital microwave links prevailed. All three may be attributed the following features:

1. Through digitalisation the networks became usable practically for the entire range of telecommunication services.
2. Through the introduction of optical fibres the capacity of the said networks enormously increased and - in spite of the increased needs to transfer information as a result of introduction of new applications - it offers a sufficient amount of free transfer capacities. A similar statement also applies to the introduction of digital link systems of RTVS, only that there are less free capacities (while it requires a rather high quality of digital audio-visual signals at the primary distribution level)

The networks may also be designed from bottom to top, i.e. in view of future telecommunication services. In such case it is sensible to contemplate the above-mentioned networks, with the access to the final user: Telekom (fixed and mobile networks), cable TV network, RTV (earth and satellite) network. In the research project of the Urban Planning Institute of the Republic of Slovenia, entitled Telecommunications System and Its Impact on Spatial Development (A. Gulic, S. Praper) one can detect the following statement: *“The designs of network operators shall stem from the users needs of applications and services, as the latter are the end product, the commodity which the users are willing to pay for. As with any product the quality and price are important here. Once the progress of technology conditioned the development of telecommunications systems and services, while nowadays technology is at hand. It will only be used if the user applications are clearly defined and the investments are economically based.”*

The services and applications shall therefore serve as a basis of contemplation of new telecommunication systems. In the following we can divide the treated networks into:

- Physical (wire line and optical)
- Wireless

The Telekom network and cable TV network belong to the first category. Either the Telekom network or the cable TV network are no longer limited to the traditional telephone and television services. The digitalisation of these networks made also possible the transmitting of

wideband services through the Telekom system, among which television is the most characteristic representative, as well as the Internet services. Similar conditions prevail with cable distribution systems (200.000 connections in the Republic of Slovenia), which are becoming universal and two-way (interactive) through digitalisation.

In the wireless networks system the most important are the system of digital broadcasting and the system of third generation mobile telephony (UMTS - Universal Mobile Telecommunications Systems). The transmission systems of digital broadcasting can be divided into satellite DVB¹-S, S-DAB² and terrestrial DVB-T and T-DAB. From the point of view of coverage the satellite systems are representatives of global telecommunications systems, while the earth systems may be divided into national and local - regional. The latter are closely related to the space. With data transmission through wireless systems we can not talk about routes - moreover - the density of the number of telecommunications connections does not depend on the telecommunications infrastructure, while it heavily depends on the quality of the wireless signal in space. The designing of wireless communications systems is therefore to a large extent **related to spatial planning** of the areas of coverage, considering potential spatial impacts.

Let us confine ourselves to the representatives of earth digital networks T-DAB, DVB-T and UMTS only. Through the development of digitalisation of broadcasting networks a tendency has arisen towards the transmission of additional services. One can trace the first essays of the type in the respective hybrid analogue-digital RDS (Radio Data System) system, in which the system capacity was too small (about 1 Kbit/s) for any major application. In the subsequent DAB system, which is digital and incompatible with the existing FM/RDS systems, it is possible to transmit much more data (2Mbit/s). With the arrival of the DAB system it became obvious that the traditional role of radio-television companies had changed. As we are dealing with systems which enable transmission of any telecommunication service, it has become clear that new rules of the game will have to be applied on this market. The need for a new regulation also originates in the fact that the future space in digital multiplexes will be shared by several mutually different radio-television programmes.

2 Digital Radio

Here we are talking about the issue of a balanced offer of various programme types (formats) of radio programmes within a single DAB multiplex, about the area of coverage with a digital radio signal, which will henceforth be equal for all multiplex members, and not last about the ratio of the bits intended for radio programmes and other bits for the so-called NON PAD

¹ DVB=Digital Video Broadcasting

² DAB=Digital Audio Broadcasting

(services not related to radio programmes). From the above one can draw a clear statement that a new deal has been established in the field of digital radio broadcasting, i.e. the distribution of roles to the so-called content providers, multiplex providers, and network operators.

We can say that the DAB systems development in Europe is coming to a crisis, as the initial interest of the providers of additional telecommunications services has substantially dropped along with the occurrence of digital television. In this way the tension and rivalry among radio companies and prospective new media subjects has decreased, and on the other hand has caused a slow-down implementation of digital radio networks. This is problematic, as the condition of establishment of a new digital network, considering the utilisation of new technology and related new services and users needs of those, has not been fulfilled. It has turned out that the users do not see additional value in a little better quality of radio sound and in improved conditions of reception in moving vehicles, while there is practically no new programme contents. With the problem of an insufficient available radio frequency space, which does not suffice for the distribution of all existing radio programmes, along with additional new programmes, and fresh telecommunications services, the story of the introduction of DAB systems gets in a blind alley. It is a well-known case that in Sweden they use DAB technology for the transmission of video pages in trains of Swedish railways.

For the time being in Slovenia the situation in the field of DAB network is at the designing stage. The analysis of the existing analogue network shows a rather unbalanced radio offer. This applies as much to the variety of programmes, as to the density of regional radio networks, which are difficult to spatially identify from the standpoint of statistic regions. An impression remains that the existing FM radio broadcasting networks create their own regional image, which is more or less the result of individual local conditions and ambitions of local radio stations.

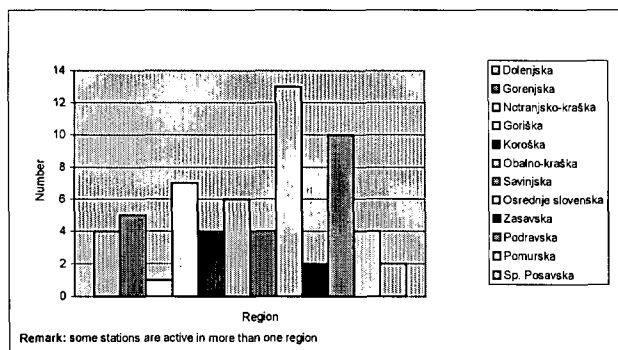


Chart: Spatial distribution of local FM-radio stations.

In designing T-DAB networks we encounter some issues which relate to the problems of programmes, contents and coverage areas. A programme strategy should

provide the answer to the question of what the offer of radio programmes will be like; whether in the new system there will be made up of all the currently operating radio stations, with the same programme which is on the FM network, or some capacity will also be dedicated to the new - multimedia radio programmes, which will provide fresh contents, enriched with added PAD (Programme Associated Data).

On the other hand it is suitable to ask what will be the relation between radio and other telecommunications services in DAB system. As an example let me quote English recommendations, which dedicate only 64 Kbit/s to the other telecommunications services.

Not of least importance is the spatial view of new networks. Considering that the same coverage area will henceforward be shared by at least 6 radio stations, which may currently have different areas of coverage by FM radio signal, it will be necessary to establish spatial strategy of T-DAB networks. This may either relate to the system of statistical regions or may create its own spatial pattern.

Slovenia has already made a few steps in the direction of T-DAB network development. A set of rules has been under preparation which is to solve the newly incurred conditions in the digital radio broadcasting market, and frequency blocks for the transmission of T-DAB signals have been co-ordinated. The spatial distribution and capacity of frequency allotments for T-DAB itself is not optimal, as it does not meet the current density of existing radio stations or spatial characteristics of the current distribution, nor any other potential strategy of spatial development of Slovenia.

The problem is even larger as a new mobile telephony system of the third generation - UMTS is on the horizon, which will enable rather high speeds of data transmission (384 Kbit/s in a moving vehicle and 2 Mbit/s when stationary). This system competes for the same frequency ranges as T-DAB (1.5 GHz), while in addition to telephone services it is also capable of providing other services.

3 Digital Television

As already mentioned DVB-T system offers even larger capacities. As applicable to all digital systems, DVB-T is also much more than television. In a single TV channel (8 MHz wide) it will be possible to transmit the following contents:

- 4 to 5 standard (4:3 format) television programmes or
- 2 to 3 improved (16:9 format) television programmes or
- 1 high definition television programme or
- combination of television, telecommunication, and data services

Naturally all the above contents are multiplexed in a single DVB-T channel. The real future of digital television is most probably in the so-called Multimedia Home Platform, which represents a giant leap in the development of telecommunication markets: from the present closed into the open - horizontal markets. MHP is the new, inter-active standard, which connects different services to the convergence of radio-broadcast, telecommunication and computer networks. MHP provides the universal Application Programming Interface, open and accessible in set top boxes, integrated digital TV sets, as well as in multimedia personal computers (MPC). MHP will enable the transmission of standard TV programmes, enhanced definition television programmes (EDTV), inter-active television and Internet contents, including the possibility of access to the world wide web, e-mail, e-commerce and the other Internet applications through the uniform API. The uniform standard will equalize the minor and major providers of services, lower equipment production costs (larger quantities and less varied articles) and consequently the prices, and therefore increase the selection of services and applications. In the beginning of 2000 the MHP standard was adopted by DVB, while the start of regular production of integrated digital TV sets has been scheduled for 2001.

The design of digital TV network DVB-T is similar to that described with digital radio T-DAB. Important here is the spatial aspect and the decision on the contents of the digital multiplex which - in relation to the digital radio network - are much larger. There are more promising possibilities of introducing new telecommunication services and applications, while it is also necessary to design the transition of the existing analogue TV programmes into the digital network. It is also possible to conceive the DVB-T system for the mobile reception of signals, which reflects in certain decrease of capacity of DVB-T multiplex.

4 Conclusions

It seems that - in spite of the increasing awareness of the convergence of the telecommunications market and the model of global information infrastructure (GII) - digital broadcasting still does not enjoy enough attention. In the planning documents of the Ministry of Environment and Space it is possible to trace the development charts of the Telekom network, ELES (Electric Power Management) network, and Railways network, while the broadcasting network is missing, although - from the point of view of the prospective telecommunication services and applications - it represents an equal part of the so-called Slovene Information Infrastructure. In the long-term plan of the Republic of Slovenia for the period from 1986-2000, amended in 1999, there are only the concepts of the analogue TV network for the minority programmes, TV networks (programmes 1 and 2 of TVSLO), and FM of radio network (programmes 1,2 and 3 of RA SLO) from 1984. The conditions in the field of broadcasting

have drastically changed in the last decade. The offer of programmes has broadened in the form of commercial radio and television stations, while the broadcasting networks are becoming a section of the Slovene telecommunication infrastructure through digitalisation. The telecommunications system undoubtedly influences the spatial development, while we can claim even more firmly that the telecommunications system - particularly the wireless part - is conditioned by space. In the studies on the telecommunications system and their impact on spatial development (6) it is possible to encounter emerging and important mode of access to the Internet and the world wide web - i.e. through TV sets. It is obviously more and more clear that the digital television and radio network will become increasingly important pillars of the future information infrastructure. URST (Administration of the Republic of Slovenia for Telecommunications) has outlined a plan of introduction of DVB-T in Slovenia by designing: a national SFN (Single Frequency Network) of DVB-T to cover at least 95% of population, three national networks, built on a combination of MFN (Multi Frequency Network) and SFN (Single Frequency Network), two MFN or SFN networks for regional programmes, and a few local transmitters. This principal orientation shall be followed by the principal strategy of the introduction of digital radio broadcasting in Slovenia. In its evaluations the Broadcasting Council, authorised for the treatment of principles of distribution of broadcasting frequency spectrum states that the law does not stipulate which body is competent for the preparation and the adoption of the principles of frequency channel assignment. As a result the Council has appointed a special expert project team, and - based on the proposal of this team, in co-operation with RTV organisations - has adopted the "Principles of the allotment of radio broadcasting frequency spectrum and assignment of radio broadcasting channels". In addition to the "local non-commercial programmes", defined by law, the Council also introduced regional (non)commercial programmes. But, considering the fact that the legislation does not identify the areas or regions, the Council took the number of population, covered by a signal as a criterion for regional programmes (10% of population of the Republic of Slovenia). This criterion can also be encountered in the draft Media Act, in the section dealing with local RTV programmes. In addition to the local programmes regional RTV programmes are also mentioned there, intended for the population of an area (region, town), with more than 10% and no more than 50% of the population of the Republic of Slovenia.

The lack of a transparent development strategy of the digital radio and television, not only in the sense of space but also in the sense of programme and services is probably a result of the fact that the development of radio and television has come to a turning point, as on one hand the role of RTV organisations is changing as a consequence of the new distribution on the digital radio broadcasting market (providers of contents, multiplexes and networks), and on the other hand due to the

indisputable fact that the national RTV has got competitive commercial RTV organisations, with which it will have to share the space in digital multiplexes in the future. Hereby one shall not neglect the fact that along with the above an interest also arises in the distribution of additional - non broadcasting services and applications.

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