There is a future for community radio in the digital era, too, although it is not obvious or guaranteed yet – and it seems that at least the near future will actually be analogue.

In this presentation I am not going to cover all the possibilities of digital media, instead I concentrate on digital broadcasting in Nordic countries.

There are big differences between Nordic countries especially in digital radio broadcasting - but what is common is that there are digital challenges ahead for all local and community radio broadcasters.
It is necessary to first take a short look at the different digital broadcasting systems available at the moment.

DAB is a European system, which has already been around for a while. It is currently in use in three Nordic countries - and in Norway and Sweden it has been tested even in local and community radio.

DAB+ is basically the same system, with more modern and efficient audio coding, which means that you can get more channels and better sound quality with same the bandwidth as earlier: old DAB receivers can not receive DAB+. This system has recently been proposed for Sweden.

DMB is multimedia version of DAB, developed in Korea – and it has also video coding, because it is designed for mobile television use. In Norway, there is a plan to launch a DMB service quite soon.

DRM is a system which has been originally designed to bring also AM band to the digital age – it has also been tested in Sweden – it has huge coverage areas.

And DRM+ is a new or should I say a forthcoming version of DRM which can be used on the FM band frequencies. It is very promising and versatile system also for small scale broadcasting.
Possible digital broadcasting systems for radio

- **DVB-T**  Digital Video Broadcasting [Terrestrial]
  - (digital TV)
- **DVB-H**  Digital Video Broadcasting [Handheld]
  - (mobile TV)

... 

- **IBOC** i.e. HD Radio
  - A proprietary system from the US
- **ISDB-T**
  - Developed in Japan, will be used also in Brazil

DVB-T is the system which we already know as digital television. It can be – and it is used for radio also for example in Finland and Sweden, but in larger scale DVB radio is not very economic, because it is a wideband system, not designed for radio use.

DVB-H is then a new version of DVB, introduced in 2004 for mobile television use. DVB-H is more spectrum-efficient than DVB-T, it offers more channels with the same bandwidth. However, you cannot receive DVB-H broadcasts with your regular digital TV – and if you happen to have a DVB-H mobile phone, you cannot watch normal TV with it. Here in Finland Nokia has been promoting DVB-H as the most rational digital system for also radio use.

IBOC – In Band On Channel - is mentioned here mainly as a curiosity, it is a hybrid system with very modest capacity, designed for the economic needs of the American radio industry. It is very unlikely that it would be taken into use here: every station using IBOC have to pay for the system.

ISDB stands for Integrated Systems Digital Broadcasting. It is a Japanese system, which allows you to broadcast all kinds of content in the same network-unlike the European systems, it is designed for television, mobile television and radio at the same time. But it is very unlikely it would be used in Europe, either.
Multiplex = a bundle of audio channels delivered over the same frequency channel

- DAB multiplex: 9 radio services
- DAB+ multiplex: 28 radio services
- DAB/DAB+ multiplex: 5 DAB services & 13 DAB+ services

Source: Prosch 2007, World DMB

The idea of multiplex might also be familiar to you already: digital TV - DVB is partly based on the research made for DAB and they do have some similarities in design, for example multiplexing.

- and basically it means that a single transmitter can deliver several services or channels at the same time on a single frequency.

Multiplexing means also that radio stations or channels do not have direct access to the spectrum using their own transmitters. There is always a multiplex operator – which, depending on broadcast legislation and regulations - has the power to set the price for the bandwidth in the multiplex and in some cases even to choose the stations which will be included.

These are serious issues for a small broadcasters. According to an estimate made in the UK, the delivery cost for community radio service could be 10 times higher on DAB network than on analog FM. And how you could get access to a multiplex in the first place, if the operator happens to be able to select its clients independently?

Another issue is that the coverage areas of these multiplexes are usually much larger than the coverage local or community stations on FM.

At this point I would like to quote Lawrence Lessig and remind you that “system architecture is politics by other means”
Digital radio broadcasting in Nordic countries 2008

- Finland:
  - DAB launch 1998
  - 40% coverage and 12 YLE channels by 2004
  - **DAB network shutdown 09/2005 -> 0 % coverage**
    - Some services (3 YLE + 2 private) on DVB-T since 2001
    - Mobile TV network using DVB-H (Digital Video Broadcasting-Handheld) launched 12/2006 (currently 1 radio channel)

- Sweden:
  - DAB launch 1997
  - 85 % coverage and 6 SR channels by 2001
  - **Partial DAB network shutdown 12/2001 -> 35 % coverage**
    - SR radio services on DVB-T since 2008
    - Swedish Radio and TV Authority has proposed DAB+ in 2008


Let’s look at the current situation in Nordic countries.

Finland started DAB broadcasts 10 years ago—and it was the first country in the world to shut down its DAB digital radio network in 2005.
– But actually the situation in Sweden does not differ that much from us.

The biggest differences are that the Swedes have not pulled the plug out completely, although practically nobody is listening to DAB.

In addition, there has been a lot of discussion about the future of radio and digital broadcasting in Sweden as well as evaluation of all the available options—so now they have a plan how to proceed.
Digital radio broadcasting in Nordic countries 2008

- Norway:
  - DAB launch 1995
  - 80% coverage with national and regional MUX,
  - 20 NRK and 2 commercial channels
  - 191,000 DAB receivers sold by 12/2007 (~12 % of the population)
    - Analogue radio switch-off will be decided when 50% has DAB receivers (~2010?)
  - NRK, TV 2 and MTG are expected to launch mobile TV using DMB (Digital Multimedia Broadcasting) in 2008.

- Denmark:
  - DAB launch 2002.
  - 90% coverage with nationwide MUX
  - 14 DR and 3 commercial DAB channels.
  - More than 1 million DAB receivers sold by 06/2008. (~20% of the population)


Norway and especially Denmark are very different cases when compared to Finland and Sweden in digital radio broadcasting.

First of all, both rely still on the old version of DAB. Norway would be especially eager to shut down FM broadcasting – it is the only country in the world which has already decided how the switchover process of radio will proceed - and Denmark is actually one of the few countries, which have been relatively successful in introducing digital radio

My colleague Per Jauert and I have been studying the differences between DAB in Denmark and in Finland.

There were quite many reasons for the failure in Finland: the timing was unfortunate, the emphasis was clearly more on digital television, the regulatory approach as well political means were different - and in addition: unlike in Finland, there was no attempt in Denmark to involve local and community stations in DAB, which was rolled out as a nation-wide service only.
As you see, there has been lot of development in this field, several new standards have been created besides DAB, even DAB itself has been updated and even neighbouring countries may have taken very different approaches towards digitalization of radio.

About two and half years ago, a group of European researchers conducted altogether 43 expert interviews about the future of radio in five countries. The idea was to find out how the experts see the future and in what technologies they believe in.

I am not going to go in to all details here, because the results have been published in the Journal of Radio and Audio Media. So you can look them up there, if you are interested.
How people will receive radio content in 2015?

- Most respondents believed in some kind of digital terrestrial radio in their home countries
- Most respondents believed that FM radio will still remain significant both in Europe and Canada
- Internet-based radio and audio services will grow, but satellite radio was rejected in Europe
- No consensus about the dominant European way of delivering radio in 2015: on the contrary, most believed that there will be distinct national solutions

Why the future of radio then will be like that ->

- The existing market penetration of FM radio means that it will be around for a while
- DAB is an expensive and uneconomic system for commercial and community stations
- DAB coverage patterns do not match with the needs of commercial and community stations
- In Europe, DRM is the favorite secondary system – also to supplement or even replace DAB

Anyway, we asked everybody the same basic question: how do you think people will receive radio content in 2015? Most of the respondents believed in some sort of digital terrestrial radio broadcasting in their home countries. But - with few exceptions- most respondents also believed that analogue FM would remain significant until 2015.

In addition, they did not agree on any single dominant digital audio delivery platform. On the contrary, most of them thought that there would be distinct national solutions and multiple co-existing digital systems for radio delivery, while DAB was seen as important primarily in countries with already existing networks.

After outlining their views on the future of radio, each respondent was asked to tell why they thought so and explain their arguments. Based on our earlier studies on DAB we were not very surprised when DAB transmission was widely considered among the respondents as expensive, uneconomic and unsuitable especially for small commercial and community stations.

Similar results about the problems with DAB have been found in other European studies, too, for example in Spain –and these issues have been mentioned also in the report on the State of Community Media in the EU.

Unfortunately, these problems for small-scale broadcasting with DAB are basically the same with other DAB-related standards DAB + and DMB because they have the same basic design, which matches better with large-scale broadcasting. In order to understand why, we have to go back in time, all the way into late 1970s and early 1980s.
This over-simplified timeline is here to illustrate the fact that the original basic design of DAB actually reflects the socio-political and economic structures of European radio broadcasting in the early 1980s. At the time when DAB was created, in many European countries private and local radio broadcasting was either non-existent or about to be introduced, and radio in general was still largely dominated by national public radio broadcasters.

However, over the next few years the structures, competitive settings and power relations of radio broadcasting in Europe changed in a fundamental way - but all this was more or less neglected in the development of the DAB system. The European broadcasting environment in the mid-1990s did not match any more with the idea, according to which the system had been designed.

It should also be noted that the development of CD standard as well as Radio Data System were some of the early inspirations for developing digital radio, but the EU-supported project for DAB was not started until as a part of the counterattack of the European electronics industry against the Japanese.
When DAB was introduced, it was certainly the best and most appropriate digital radio system, because no other system was available at that time. DVB-T was also approved as a standard in 1995, and the future of digital broadcasting in Finland looked at that time very clear indeed, as you can see.

Jouni Mykkänen estimated in his report for the Finnish Ministry of Communications that that the listening of analogue FM would start decreasing in less than ten years after the introduction of DAB, when its penetration would be over 50 percent.

Now it is worth to notice that even in the UK, where DAB has been relatively successful during the last 13 years, DAB radio listening alone is still only about 11 percent of all radio listening and all digital platforms together account less than 20 percent of all radio listening—so it seems to be a long way to go.
DAB and local radio in Finland

- The mismatch was quite obvious from the beginning

"either the Finnish commercial local radio stations must be turned into regional stations with significantly larger coverage areas, or they need another, alternative frequency allocation" (Mykkänen 1995, 24).

Despite his optimism, Mykkänen had also noticed that the DAB frequency allotment areas confirmed in the Wiesbaden plan did not match at all with the Finnish local radio coverage areas.

Because DAB is based on multiplexes with single frequency networks, several stations have to share the same transmitters and the same coverage areas – and in Finland, the smallest coverage areas available were not local, but regional.
Now it seems that actually both the ideas Mykkänen originally proposed to fix this problem have become true.

Currently only 13 local radio stations in Finland have one transmitter site – and the rest 34 stations have in practice more or less regional coverage areas with multiple transmitter sites.

We also got additional L-band frequencies for so called “local” allocations - but frankly speaking, I do not believe that it would sensible to build any kind of L-band DAB in Finland for a handful of local and community stations.

It is also an open question, will there ever be any kind of DAB or digital radio network in Finland at all.
ESF Workshop, WG for policy
"The Budapest declaration" (05/2008)

- Current digital radio broadcast delivery technologies remain unable to deliver the capabilities of traditional analogue FM broadcast.

- The capability of the digital systems may improve, but it will take many years to before they become widely used.

-> FM broadcast transmission capability will remain a significant requirement for community broadcasters in the short to medium term (at least 15 years).

In light of the above, the following policy objectives should be pursued:

1) optimize and maintain the availability of FM spectrum for broadcast use by community radio projects, as well as for public services and small scale commercial operators which face similar difficulties with using digital transmission systems to fulfill all of their broadcasting requirements;

2) ensure continued FM RDS receiver capability for all citizens by defining this as part of a base-line standard for all future European radio receivers, designed to provide digital reception capability within the single market. …

There was a great workshop in Budapest last May about digitalization of community media in which I had a privilege to participate.

We analyzed the current digital radio systems - and we ended up with the same conclusion as some of the respondents in that DRACE- study: no existing digital broadcasting system could directly substitute for FM. In other words, none of the currently available digital systems alone has a significant relative advantage over FM.

On the final day of the workshop the working group on policy drafted a paper about the common policy goals – and as you can see, the first two objectives are

- to keep the FM spectrum available for community radio and

- ensure FM RDS receiver capability as a part of new radio receivers
The Swedish radio industry – including also the National Organisation of Community Radio think that DAB+ is the most appropriate technology for digitalisation.

However, "the FM network should not be abandoned too early but be used instead for parallel broadcasts and more local and community radio broadcasts, for example."

At least two different official reports published last summer have shared our opinions:

The final report of the Swedish Radio and TV Authority about the future of radio …

- DAB should become the primary platform for all national, regional and large local services
- FM is still the most effective and cheapest way of delivering community radio and smaller local services
- The Government should set a criteria and timetable for digital switchover (so that it could be completed in 2020)

... and the interim report by the Digital Radio Working Group in the UK.
In general, there is no similar external pressure for digitalization of analog radio and abandoning FM, because the mobile phone business has been much more interested in frequencies vacated by the shutdown of analog television than FM band frequencies.

Perhaps the most obvious reason for longevity of FM is the sheer number of existing analog receivers—also as integrated units in all sorts of devices.
World DMB & EBU digital radio receiver profiles (09/2008)

World DMB and EBU introduced their new digital radio receiver profiles in September 2008 - and they also gave recommendation that analog FM RDS should be included into all new digital DAB-type digital receivers.

At the same time, so called L-band reception was made mandatory which means that in the future, owners of new digital radio sets will be able to listen also stations on possible L-band multiplexes.

Finally, it should be also noted that there is no DRM support of any kind in these new pan-European digital radio receiver profiles.

Source: Anthony Sethill, CEO Frontier Silicon, EBU Digital Radio Conference, Caligari, Italy, September 19th, 2008
DRM+ is a promising candidate...

A. DRM+ for Broadcasters

- **DRM+ supports small and medium broadcasters**
  - Small coverage areas with simple single station
  - Power efficient system
  - No complex multiplex structure, e.g. single service per frequency possible

- **DRM+ supports huge broadcasters**
  - Huge coverage areas with SFNs (single frequency networks)
  - Heterogeneous networks with service following to DRM, DAB, FM and AM
  - Up to 4 Services in one multiplex (audio and/or data)

So although the recent tests with DRM+ have been quite promising and the system is especially designed to meet the needs of small broadcasters …
... but still under development!

Summary – DRM+ in Brief

• DRM+ is being developed by a worldwide consortium and will be standardised under ITU and ETSI rules in 2009.
  → DRM+ will be an open, freely available international standard.

• DRM+ offers a considerable choice of data services, including digital traffic information, and extended signaling features like Traffic/News/Whether Announcements, AFS, and Warning/Alert notifications.

• DRM+ offers the certitude to regional and local broadcasters to take part in the digitalisation of radio.

• DRM+ is suitable for the digitalisation of the FM frequency band.

• DRM+ as an additional resource to the DAB/DAB++/DMB/DRM family broadcast standards, and eases the development of a migration strategy particularly for local and regional layers.

Source: http://www.drm.org/fileadmin/media/downloads/drmplus_presentation_v1.5_.pdf

... it seems that we have to wait for some time. But DRM+ is in any case the best candidate for a reasonable digital radio broadcasting system for small-scale and community broadcasting we have at the moment.

But besides suitable technology, digitalization of community radio requires also money, political support and sometimes also changes in communications policy for recognition and frequency spectrum access.
MOTION FOR A EUROPEAN PARLIAMENT RESOLUTION on Community Media in Europe (2008/2011(INI))

The European Parliament,

K. whereas the Internet has propelled the sector into a new age with new possibilities and challenges, and whereas transition costs from analogue to digital transmission put a considerable burden on community media,

19. Asks Member States to make television and radio frequency spectrum available, both analogue and digital, bearing in mind that the service provided by community media is not to be assessed in terms of opportunity cost or justification of the cost of spectrum allocation but rather in the social value it represents;

EXPLANATORY STATEMENT

5. The needs of the sector

Cultural diversity and media pluralism can be used by national authorities to assess the necessity for operators to include specific broadcasting services in their networks. In the digital environment it is also important to ensure that tools such as electronic programme guides include the CM available in their listings. Therefore the EU and Member States’ regulatory authorities should take up these notions to justify allocation of radio frequencies to CM and their inclusion in the digital environment, including following the digital switchover.

In this respect it should be noted that transition costs from analogue to digital transmission put a considerable burden on CM activities.

If we then look at the report on Community Media in Europe, which was adopted by the European Parliament on September, from the perspective of digitalization of community broadcasting, there are three chapters of special importance:

First of all, the report says (actually this is mentioned two separate times) that the transition costs from analogue to digital transmission will be a considerable burden on community media,

it also asks that the Member states should make both analogue and digital television and radio frequency spectrum available for community media

and finally it suggests that community media should be included in the new digital broadcasting environment in the name of cultural diversity and media pluralism

- These are great policy goals for EU members: but what about the world outside EU?
Australia supports community stations to start DAB+ in capital cities

- The Australian government gives 5 million € (10.1 AUD) for the community broadcasters in capital cities for starting up on DAB+ during 2007-2010
- First year funding has been spent on preparations to launch community radio in 6 cities on DAB+ at 1.1.2009
- About 40 wide-coverage community radio stations in the capital cities will get funding
- Money can be spent on infrastructure or capital and ongoing costs for participation in commercial radio multiplexes

- Community radio in the rural areas still needs other solutions for digitalization!

http://www.cbaa.org.au

Australia is making a big leap next year- they are launching digital radio on DAB+ as the first country in the world – and probably they are also first to support financially the digital transition of their community radio stations

5 million euros for digital community broadcasting is a nice sum of money.

This strategy may work in metropolitan areas, but in all rural areas there are probably not enough stations to even fill a single multiplex…
But when there is some innovativeness and enough digital capacity available, even a nationwide digital multiplex can be utilized for community media.

I think this Frikanalen in Norwegian national DVB-T network is a very interesting approach. However, this could not have happened in Finland ...
... there is no way Finnish community media could get it’s own nationwide digital television channel, because the only multiplex operator has already reserved all the available channel capacity in all four nationwide DVB-T multiplexes for large commercial clients.

This means also that there is some sort of shortage on DVB-bandwidth in Finland at the moment, which of course means that the prices tend to go up.
The ownership of DAB/DVB infrastructure in Nordic countries

- In other Nordic countries the digital broadcasting infrastructure is owned (and multiplexes are operated) by the state or state-controlled companies.

- In Finland, the owner of infrastructure and the only DVB-T and DVB-H multiplex operator is Digita
  - 100% owned by a French listed company TDF
  - 61 m€ profits with 126 m€ turnover in 2007

Source: http://www.yle.fi/uutiset/24h/id/77953.html

Source: http://www.tdf.fr/shareholders.html

The case of Finland is different, partly because the owner of our digital broadcasting infrastructure and the only multiplex operator – which in practice has a monopoly - is running its operations just in order to make money – without any national social goals or cultural policy objectives. And as you can see, it is also very successful in its efforts.
Shutting down DVB-H would free one more multiplex for DVB-T

- Only three (DVB-T or FM) simulcast channels left on DVB-H!

However, we actually have in Finland one more DVB multiplex – which has been reserved for mobile TV.

Now it seems that DVB-H has failed. Both commercial TV-channels like Nelonen as well as telecom operators like Elisa say that they are no longer interested in DVB-H, and it is not very likely that this would become any kind of business in Finland ever.

For a consumer, there is no sense to invest in DVB-H device with only 3 simulcast channels, if a handheld DVB-T device will give you access all the free TV channels.

DVB-H network could be closed down, so that the frequencies could be re-used for a DVB-T multiplex – and after that there should be some digital bandwidth available for Finnish community media, too.
Thank you!

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http://www.drace.org