Overcoming the rural digital divide

This break-out group discusses the Digital Divide. Wikipedia defines our key concept by saying that it "refers to the gap between those who benefit from the Digital Age and those who don't. People without access to the Internet and other information and communication technologies are put at a disadvantage, as they are unable ... to obtain digital information, to shop online, participate democratically, or learn and offer skills."

Perhaps we should think the other way round? Scientific discovery and technological innovation should be seen as enabling processes. In our case they provide means of achieving better life quality for the rural population and improved conditions for companies operating on the countryside.

Let me introduce the environment that this break-out group intervention refers to. Kuhmo is a municipality in Mid-Eastern Finland. I come from Iivantiira village, a community of around 60 households, some 25 kilometers from the Russian border. Outsiders say that Iivantiira belongs to 'perukka', the hinterland. For us it doesn't. It is the center of *our* world.

Villagers of Iivantiira are searching for the most effective approaches to overcoming the digital divide; ways of building the future of our community. The world is currently undergoing an industrial revolution, which leads us towards something which has been called the *Information Society*. The information society can be understood as a new mode of living and of production, where the crucial tools of production depend on information technology.

Villagers in Iivantiira believe that it is essential to take control of that process. To understand what is really going on, we also needed to take part in the debate. An early minister of traffic and communication was of the opinion that Finland's strategy towards information society should be market-driven. A Canadian colleague pointed out that this wasn't a very good idea since you cannot expect market-driven initiatives in areas where there isn't any market. In this way we realized quickly that we should ourselves actually construct the information society infrastructure.

The best way to bridge the digital gap is to construct your own networks. To begin with, such a task may seem to be enormous. The learning process can be mastered if it is approached incrementally. Huge tasks can be handled effectively, by proceeding bit by bit. The spoon needs to be converted into a shovel; and the shovel into an earthwork machine.

While other actors in our Kainuu region thought that mobile networks are the best solution for scarcely populated rural areas of our region, we started a small pilot of four households in Hietalahti neighborhood. We were told that fiber networks are much too expensive and too complicated. Local hands-on experience showed quickly that reality worked the other way round.

There was no use telling the administrators that the WiMAX signal will not cross hills and mountains, not to mention penetrating growing pine and spruce forests. They had to learn this the hard way. WiMAX subscriber installations proved to be twice as expensive as those of our fiber networks. In the final analysis fiber networks actually proved to be the sustainable solution.

Iivantiira village knew from experiments in music net conferencing pedagogy (which is a very demanding setting) that an optical fiber network is the only way to produce a high-speed and

symmetrically functioning two-way transmission which is needed to arrive at a sustainable service platform for the information society.

After a few years the WiMAX networks were already outdated. Improving the mobile network would have required the old network to be replaced by a new one. In a fiber network, capacity updates involve exchanging media converters only. That is much less costly.

We were also told that constructing and maintaining fiber networks can be too complicated for rural actors. But it is not. Building village networks isn't rocket science. Perhaps 80% of the undertaking consists of earthwork. In our area we own a rich resource base of local skills, tools and machines. That proved to be a vital asset in trying out cost effective ways of construction.

So leaders and village members needed to get confident about their own resources and skills. That is the best way how local potential can be unleashed.

The information society also produces new methods to overcome technical complexity. Peer expert networks is a generous new resource of the new social formation. The project leader took part in a Swedish minority expert group operating in a MiniBB discussion forum.

The forum worked in a similar way as the collaborative Wikipedia author community, programmers in a number of open-source software projects and IoT developers in the The Things Network. Questions were being asked and quickly responded. Technical knowledge was shared in the same spirit as in 'talkoo', a collaborative work method in Finnish rural communities.

With funding from EU the Finnish Rural Development Program opened up the road for village network construction. With a new regional director there was suddenly an opportunity for bottom-up oriented participatory action. Six villages in North-Western Kuhmo established a cooperative which built 160 km of core networks for 200 households in the area. Every household constructed their share of the network by collaboration. Disabled and elderly inhabitants were helped by their neighbors.

Being courageous enough to construct our own network gave us the opportunity to learn lessons that can only be learnt in the rural areas where the knowledge is needed. Carefully written reports was a way to hand over the experience to other, similarly minded rural inhabitants.

In the appendix below I'll list some of the experience that we gained. Let me conclude by stating only one key element of that knowledge. This is the most important advise gathered:

To take full advantage of the collaborative effort you need to own the village network and to remain in control of it. Don't hand it over to a tele company, which may sound tempting. The telecoms would love to administer and make themselves indispensable. But at the same time they will be able to spell the rules of the game. That may turn expensive when the needs of the local community grow.

Some of these learnings may sound trivial and they are easy to see during ongoing work. Still, it is crucial to start by systematically learning the basics and then to take the step over threshold. - Good luck.

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Elements of the experience gained while constructing village networks in North-Western Kuhmo, Finland

Creating motivation and joint understanding of the effort is fundamental to success. A network should never be pushed to a party which doesn't actively want to have one. Work bottom-up, not top-down.

The village network should be a non-profit effort. Perhaps it doesn't matter which company structure is being applied, but the cooperative has some advantages as a working concept. In a cooperative it is easy to understand that the collaboratively produced advantages are going to be shared among participating members. Such knowledge provides a good motive for joining the effort.

The village community should be responsible for their own network. Firm commitment is assured when the village takes economical responsibility. In this way the constructed network becomes property of the village and an building block in the village development plan.

The villages made good use of their superior knowledge of local conditions. That is a cost-saving knowledge that the big and distant telecom seldom has. Careful local preparation and planning pays back during the project, as it speeds up construction and documentation.

We paid careful attention on inventory of local resources. We found that most often time there will be a earthwork company around, an earthwork machine, tractors. Villagers actually constructed some home-made cable carriages.

The bottom-up approach calls for action in even smaller units than the village. Here the 'neighborhood' proved to be an important concept. That is a community of the nearest 10 - 15 households. The members of the neighborhood know one another and interaction is intuitive. Helping neighbors is a natural way of solving problems and gathering strength.

The households which take part in the collaborative construction effort also want to become subscribing customers. In this way network penetration raises from 15 or 25% of telecoms, to more than 70% in an effort run by the village cooperative.

Viability of network investments depend on the number of participating households per cable kilometer. Naturally, we wanted to experience 100% penetration. This level may be reached in the future, when administrators properly understand that constructing the missing 30% will later cost sometimes up to five times more, compared to the extra effort in an ongoing, financially supported project.

The regional medical director told us: 'Don't focus on needs of the elderly person in the small red house at the end of the village road'. He understood that it is primarily the service provider who needs the subscriber line of the patient. Nurses should be doing their jobs instead of spending their time at the steering wheel of a car, driving from one client to another.

It was important to take advantage of our country's excellent and free open net resources. Open-source cartographic tools like QGIS provided excellent base information when combined with open access data from the national statistical bureau.

The project avoided unnecessary costs by making cable placement agreements with all parties concerned whenever possible. You can save close to 2000 euro per village road, household junction or bus stop, wherever you are able to plough the cable in privately owned earth rather than using expensive pipes or metal structures.

A GPS navigator proved to be cost-saving way of locating all special structures of the village networks: End points, junction closures, road crossings, sections where they deviated from depth recommendations. Although most of these construction details were pinpointed by ball markers, this documentation practice was a way to avoid unnecessary search work when the network was later maintained and extended.