

13 HØYKOM³⁹ - Support for broadband communication in the public sector in Norway (*English summary*)

13.1 Introduction

HØYKOM is a Norwegian program for inducing public sector institutions to acquire and use broadband connections and applications. Its budget allocation from the Department of Trade and Industry amounted to 8,5 M€ during the first period (1999 – 2001) and 21 M€ for the second (2002 – 2004), with an additional funding of 11 M€ from the Department of Education and Research for the second period, aimed at providing primary and secondary schools with high speed Internet connections. The Research Council of Norway has been overseeing the program on assignment from the two ministries. An external secretariat has been charged with operations and with serving the program board, which designs strategies and decides on the funding of projects.

These pages render essential findings of the evaluation report to which it is published as a summary. For more information about the evaluation exercise, please feel free to contact the authors. For more information about HØYKOM and its 400 plus projects, try <http://www.hoykom.no/>.

Public sector broadband usage has been considered to have an intrinsic value all along due to its expected positive impact on modernization of teaching, medicine, municipal and state services, and public access to political documents and processes. Particularly during the second program period, however, the projects were expected to be responding to the greater political objective of securing a nation-wide supply of reasonably priced broadband subscriber services to the public institutions themselves, and as an effect of that to the households, industry and commerce.

13.2 (How) can public sector demand stimulation contribute to broadband coverage and penetration?

As in many other countries, broadband availability is expressed in terms of DSL (and cable) coverage, which may give a good picture of the residential market but not of the institutional market, where multiple simultaneous users and true broadband applications (video conferencing, ASP hosting, IP telephony etc.) abound. Thus despite DSL coverage - not uptake - approaching the 70 per cent mark, broadband access for schools and town halls is a great problem in non-urban areas, where it is not even possible to fall back on DSL solutions. The average maximum bandwidth for each project rose from 40 Mbit/s before the project to 170 Mbit/s afterwards, reflecting that one in ten went for 1 Gbit/s installations; however, some projects around 1 Mbit/s were also funded.

³⁹ høy = high; kom = com; høykom = high speed communication, or broadband communication.

The program theory (or program logic) has been particularly demanding, inasmuch as the projects were expected to improve public sector performance while at the same time providing the impetus to commercial broadband providers to stretch their infrastructural networks a bit further and their prices a bit lower. The strategy of the program board for the first period was to locate the best candidates for exciting new, technology driven applications and co-fund their efforts to get these new ideas of the ground and into “production” in the institutions in question. Projects ranged from digital X-ray via the integration of digital map services for municipal regulation of land use, to the more mundane applications of a web site for dispatching municipal forms for completion and submission. On top of these projects, various support measures, mostly addressing the need for increased competence on broadband technologies, were implemented.

One thing was forbidden: HØYKOM could not directly fund broadband infrastructure (until HØYKOM-School came along at the end of 2002). This followed from the strong OECD recommendations to follow a market based strategy for infrastructure building in order “not to distort markets”. Broadband communication emerged at the same time as the deregulation of the telecom business. It was important for many reasons to let market forces decide the best pattern of renewing old infrastructure (telephone lines) and extending new technologies (wireless, satellite, fiber, etc.). One reason was to avoid unnecessary public expenditure, of course. This market based strategy follows from an assumption that the theoretical results from neo-classical equilibrium models could be applied without major adaptations to the special technological and commercial structures of the telecom sector.

The public servants in question were well versed in the OECD doctrine and had sought to validate it against independent sources. We remind the reader, however, that the neo-classical equilibrium model of economics does not in fact deal with real world competition; it only describes a hypothetical state of the economy *after* competition has resulted in a situation of equilibrium. The theory does not describe the dynamic forces that lead to this equilibrium, nor does it state that this is a stable equilibrium.

Hence the decision not to distort markets rests on assumptions that are in many ways contradicted by the ceaseless innovative activity that characterizes modern capitalism. This lack of correspondence between model and reality might lead to the misguided conclusions about the dangers of “distorting markets” in order to achieve political goals (such as bridging the digital divide). Instead of rigid rules for government behavior, concrete analyses of the markets are required, and government sponsored building of infrastructure may be appropriate in some cases.

In response to the market situation, many local municipalities (whether they have HØYKOM project funding or not) have used their semi-privatized local electricity companies to build access networks for public and private customers alike. These companies have cabling skills, a complete local customer base, and a sound financial position. This has provided a quick solution for local authorities. In the hospital sector, the decision to go for digital X-ray has driven bandwidth to new heights. Hospitals are owned by central government and they are driven by their own needs to this massive investment which has a payback time of four years and also lays the foundation for a broader uptake of ICT solutions, but only within the sector itself. This is not

the result of a demand stimulus through HØYKOM but of a strategic decision as in a private company.

Interesting secondary effects emerge. Because many decisions (not just the choice of technology) are involved, the new and burgeoning local actors on the supply side tend to accidentally reduce compatibility with each other, thus having to rely on the national transport network of the incumbents for traffic between themselves, essentially creating digital islands. This is particularly true for real-time interactive applications. Furthermore, the networks of the hospitals have implemented their security and safety measures in one way whereas local authorities choose other models. This essentially excludes local doctors from belonging to both the state health net and the municipal health sector net at the same time. Together, these emerging problems draw a picture of fragmented market decisions being less than optimal for building a sound and durable national broadband infrastructure. A more coordinated initiative to agree on more standards and perhaps even to plan or at least coordinate the new infrastructure seems in order. There may, however, be less incitement to rush than in the ICT heyday when HØYKOM was conceived. This should ease the total burden on public expenditure.

With HØYKOM-School allowing school owners to use subsidies for infrastructure, an important correction for broadband market failure was achieved for a sector without control over their own infrastructure providers. Over just a few months, 363 schools were provided the opportunity to scale up from an ISDN connection in most cases to higher speed connections, enabling not just faster Internet connection but in many cases also interactive collaboration with pupils and teachers in other schools. This is roughly one tenth of all Norwegian primary and secondary schools, and the subsidy destined for infrastructure required to achieve this averaged about € 16.000, a figure that most certainly will be insufficient the further into the periphery the program will reach. Schools have an interesting geographical location (i.e., where people live) and could serve as nodes for new access networks in the local community, provided they have sharable and scalable solutions. There is usually little incitement, however, for school owners with tight budgets, to give others a free ride.

In brief, HØYKOM has found projects to support where their contribution was crucial in providing new broadband access. However, this is more by fortuity than by virtue of program design. Far stronger measures of accumulation, mostly regionally based, are required to induce significantly different supplier behavior.

13.3 Are the broadband connections useful?

The hope of producing a series of “killer applications” has waned and HØYKOM has in fact rather been following a strategy of funding “a thousand flowers” with broadband champions and enthusiasts as gardeners. Schools, health and social services, and municipal authorities have catered for about nine out of ten projects. 70 per cent of the projects have held new or improved services toward clients (pupils, patients, businesses, or general public) to be a very important project goal. Many projects have involved multiple institutions and the projects have led to significant improvements of inter-organizational collaboration in nearly half the cases. Quality of services has im-

proved significantly in half the cases and efficiency in every one out of four. These are important aspects of the modernization of the public sector.

About 500 private enterprises have participated but mostly in minor roles. The program has not had strong incentives for involving private businesses strongly in the projects but there are some important exceptions. The program logic is simply not directed towards achieving this. Impact on competitiveness of local business is considered small but positive.

Half the funding has gone to institutions in the periphery and this is important in terms of the original thought behind the program to accommodate their need to improve their ICT competence and the need for broadband communication to compensate for distance to central areas. The danger of a digital divide is still there.

The additionality of the subsidy for these projects is high in terms of getting them off the ground. The government funding releases local funds and gives legitimacy to the projects. Without the funding, broadband uptake in the participating institutions would have come much more slowly and with a much more passive attitude to exploring new areas of use.

Still, the mixture of having to attend to getting the infrastructure in place at the same time as the applications and the changing patterns of work and of inter-organizational collaboration presents a fair amount of complexity and heterogeneity that needs to be dealt with. It would be better to secure the presence of a stable connection before too much work, experimental or routine, become dependent on it.

The building of competence has been of vital importance and the learning in the projects has been massive. The organization of the competence support function has yet to find a stable solution. In the early phases, the secretariat provided guidance. With the increased application workload, this was no longer possible. A network of consultants has been set up and disbanded. A national center for broadband applications has been set up with two regional nodes. Annual meetings have brought project managers together for exchange of experiences. We contend that a regional organization of competence on infrastructural questions will be quite necessary for effective aggregation of demand. In addition, there may be a need for stronger central guidelines lest all the local initiatives become loosely connected broadband regions. A competence support function for applications should follow other, perhaps sectoral lines.

13.4 Emerging challenges

Network technology easily requires major changes in organization to become effectively used. When one starts poking in an organization, one starts to learn how it functions. This calls for a much stronger focus on organizational and inter-organizational change. More recently, HØYKOM has started to see the advantage of not pushing broadband as a solution but rather of seeing how broadband can be used to address imminent questions in development of the public sector. Broadband has had a surprisingly high priority as a strategic means of development in the institutions with project funding. This has also no doubt led to better results than a straight technology push.

A number of challenges have also emerged that cannot easily be solved within the confine of individual projects. This includes issues such as broadband availability (of course), availability and compatibility of equipment, solutions for safety and reliability of solutions, standard PKI solutions, legal obstacles to co-operation between municipal authorities, intellectual property rights when pupils publish their cut-and-paste project to the world rather than to the classroom, costing and pricing of joint and shared services, interfaces between legacy systems of co-operating partners, questions of governance and control in co-operative networks and distributed work organizations, problems of integrating different sectoral solutions at the local level, questions of distribution of legal responsibility for services rendered jointly by independent institutions, and others.

While projects cannot wait for these issues to be resolved, it is nevertheless important to have a structure for channeling such arising matters into forums where they can be addressed properly and by the proper authority.

13.5 Conclusions and recommendations

HØYKOM has helped launch or upgrade broadband activities in a large number of public institutions in many sectors and at all levels of administration. Projects have led to new and improved services to the public as well as more efficient internal administration and cross-boundary staff. Median bandwidth rose from 512 bit/s to 8 Mbit/s in conjunction with the projects, and one in ten had 1 Gbit/s installations, essentially making ADSL coverage a moot point.

The idea of a broadband competence support structure has not yet found a good solution. We suggest the following four important organizing principles: Semi-autonomous user forums where professionals also take part; sector-wise or subject-wise organization at the levels of application and usage; regional organization for infrastructural problems; and high quality government pamphlets for standards and coordination problems.

It has been difficult to handle the dual goal statement (public sector modernization and improving broadband availability) because they are at times contradictory. To have to use a broadband connection in order to be able to acquire it is quite a feat. In practice, this question has boiled down to whether to fund good projects in the periphery or very good projects where they already have access to broadband.

National government owns the hospitals and it has therefore been possible to use digital X-ray as a lever to increase bandwidth and hence open a national information superhighway on which also other health data can travel. HØYKOM has been important but not indispensable in this project. In other sectors with a more distributed power structure there is less of an opportunity to achieve strategic action of this kind. We have found HØYKOM to be well situated to act as a driving force in the municipal sector and idem for HØYKOM-School. However, sectoral demand aggregation requires a stronger purchasing power than can be achieved in typical HØYKOM application-oriented projects. A regional aggregation is required for that, perhaps modeled on the British Broadband Aggregation Project (Appendix V3.4). Also in terms of development, the hospitals have a strategic advantage because of their sheer strength.

We further recommend that HØYKOM be continued, aimed towards development in schools and municipal authorities, and that the infrastructure question be separated out and given much more attention.

The interdepartmental group working with HØYKOM for coordination purposes should discuss and properly channel questions deriving from the work of the HØYKOM secretariat and projects, such as the awareness of the problem of islands of broadband, and of the incompatibilities between sector-specific networks designs. Also, concrete market analyses rather than general principle of competition should guide the work. Finally, framework conditions should be stabilized as quickly as possible.