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FRIHUS 2000:  
Public Sector Case Study  
of a Norwegian IT  
Highway Project

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## **FRIHUS 2000: Public Sector Case Study of a Norwegian IT Highway Project**

### **1. Summary**

In June 1997, a feasibility study was completed for a projected information highway infrastructure—Frihus 2000—in the municipality of Fredrikstad in south-east Norway.<sup>1</sup> In this particular case, the information highway project, if realised as originally planned, is believed to contribute to *increased industrial activity* in an economically backward region as well as attaining a high degree of *user-friendliness*. Interestingly, to arrive at measures that would benefit increased industrial activity, the study group considered as vital to undertake a mapping of user needs by conducting surveys and by activating various special-interest sub-groups, whose opinions acted as guidelines.

Before describing the project in detail, some background information is required in order to understand why an information highway project of this kind was located in a *backward region* instead of a metropolitan area, where investment in electronic infrastructure might be perceived to yield a much better cost-benefit ratio. Also, in an expert-dominated field such as Information and Communication Technologies (ICT), it does not go without saying that predominantly *non-expert groups* are called upon to contribute most of the specifications upon which project recommendations are based.

### **2. Introduction: The Translation Terrain**

Technologies shape society and are shaped by society. Often, the activities involved are, implicitly or explicitly, regarded as being *synchronic*, as little emphasis is placed upon the events leading up to the “shaping” processes. Viewed from another angle, a project describing socio-technical processes can benefit greatly, methodologically speaking, from the introduction of a *diachronic* ordering of events. Obviously, all technological projects have a *prehistory* upon which they depend to a certain extent. Sometimes this dependence is a strong one, particularly if technology is developed outside the

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<sup>1</sup> “Frihus 2000—Elektronisk motorvei i Fredrikstad kommune”, report, 30.6.1997.

traditional laboratory, which has been the focal point of many socio-technical studies in the past.<sup>2</sup>

If a technology is shaped more by its *cultural* context than by innovators in a laboratory environment, it can be argued that shaping or *domestication* of technology is rooted more in its historical past than anything else. Most often, domestication is regarded as the process of transforming technology from being an alien element into being a familiar one, making technology part of a sociotechnical setting where it becomes a stabilising element.<sup>3</sup>

It should also be noted that Law and Bijker can be said to point to the intervention of *history* in the shaping of technological changes, particularly when they talk of patterns emerging in the formation of social groups and their relations. They call for an approach to socio-technical studies involving “predictive structural theory about the obduracy of certain socio-technical circumstances and the malleability of others”.<sup>4</sup> They associate the term “*obduracy*” with an emphasis on structural conditions, which in various other socio-technical contexts appear as “*technological frame*”, “*technological momentum*” or “*negotiation space*”.

Frequently, terms such as domestication or obduracy are relied upon to explain why structural features are important when trying to explain how technical and social aspects intertwine in a way that combine structure with action. Much in the same way, it can be argued that structure will manifest itself in many cases as a *historical setting* or “backdrop”, thus emphasising the diachronic character of the socio-technical process. To emphasize that we refer to a relevant historical setting and not domestication or obduracy in general, we will use the term *translation terrain*.

The Norwegian or translation terrain consists in large part of *regional* sentiments which have pervaded the country’s cultural and political past for centuries. Often, these “*grassroots versus elite*” sentiments have been termed *parochial*, meaning that they represent the attempts of the rural population to propagate local rule which focuses on elements of popular protest. These

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<sup>2</sup> In the social constructivist tradition, many of these studies are influenced by Bruno Latour and Steve Woolgar: *Laboratory Life: The Construction of Scientific Facts*, Los Angeles/Princeton: Sage/Princeton University Press, 1979/1986.

<sup>3</sup> Knut Holtan Sørensen: “Social Shaping on the Move? On the Policy Relevance of the Social Shaping of Technology Perspective”, STS working paper 9/97, Trondheim: Centre for Technology and Science, 2997.

<sup>4</sup> John Law and Wiebe E. Bijker: “Postscript: Technology, Stability, and Social Theory” in Wiebe E. Bijker and John Law (eds.): *Shaping Technology/Building Society. Studies in Sociotechnical Change*. Cambridge, MA: MIT Press, 1992, pp. 303.

elements stress *anti-bureaucratic*, *anti-centralist* and *anti-governmental* values. Parochial sentiments give rise to frequent expressions of conflict when decisions made by central government are implemented in a local context.

Development of the Norwegian political party system has been analysed in this “grassroots versus elite” perspective.<sup>5</sup> Also, Norwegian opposition to membership in the European Union, lately expressed through the “no” vote in the 1994 referendum, is widely regarded to reflect the perpetuation of the same kind of parochial sentiments.<sup>6</sup> Obviously, these sentiments are tolerated by the Norwegian welfare state, as they do not constitute a threat to political stability. Also, the government has sufficient wealth at its disposal to supply outlying districts with economic subsidies among the highest in Europe. In this way some degree of satisfaction is achieved in outlying districts, and many conflicts are reduced to symbolic expressions instead of becoming a show of power.<sup>7</sup>

As far as technology is concerned, domestication of imported artefacts in Norwegian society can be expected to show a *regional* bias, thus tying in with the general parochial sentiments evident in Norwegian society at large. We will not be surprised to find that projects involving information technology are likely to win favour if they can be said to support regional interests.

Many examples of early social experiments involving ICT applications support the hypothesis that parochial sentiments are at stake. In the period 1984-1986 a “*telematics centre*” experiment was conducted in the municipality of Jevnaker north of Oslo, in which the use of advanced telematics in rural areas was given priority. Later, the experiment was repeated in other municipalities, most of them located outside what is regarded as an acceptable commuting distance to a larger city or town. The idea behind the experiments was to strengthen local labour markets as well as test different organisational and economic aspects of a social invention called “*telecottage*”, i.e. a locally based ICT service centre.<sup>8</sup>

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<sup>5</sup> Stein Rokkan: “Geography, Religion, and Social Class. Crosscutting Cleavages in Norwegian Politics” in Seymour M. Lipset and Stein Rokkan: *Party Systems and Voter Alignments. Cross-National Perspectives*. New York: The Free Press, 1967, pp. 367-444.

<sup>6</sup> Tor Bjørklund, “Public opinion in Norway, Sweden and Finland towards membership in the EU prior to the referenda in the autumn 1994”, Working Paper 2/1994, Oslo: Institute of Political Science, 1994; Thomas Chr. Wyller, “The Referendum as a Political Process. The Norwegian experience”, Working Paper 3/1994, Oslo: Institute of Political Science, 1994.

<sup>7</sup> For an archetypical example of conflicting bureaucratic and anti-bureaucratic sentiments still evident in modern Norway, although at a symbolic level, see the bizarre “EU Cow” incident described (in mixed quality English) as a tourist attraction at [http://www.franksgrafikk.no/val\\_sogn/valdres/vang/\\_sights/2975cu10.htm](http://www.franksgrafikk.no/val_sogn/valdres/vang/_sights/2975cu10.htm)

<sup>8</sup> Per Hetland: *Exploring Hybrid Communities: Communications On Trial*. IMK Report No. 29. Oslo: Department of Media and Communication, 1996, ch. 5-6. (Reprint of doctoral thesis at the University of Roskilde, 1994.)

The Norwegian telecom, Telenor, was the instigator of these social experiments, which were funded to a large extent by the government.

The commitment shown by *politicians* to ideas of sustaining regional growth by means of telematics projects has been reinforced as ICT technology becomes cheaper and more accessible to non-experts. The non-socialist government formed in the autumn of 1997 consisted of a party coalition which placed great emphasis on using ICT technology to this end. In the coalition government, the Liberal Party (Venstre) and the Agrarian Party (Senterpartiet) expressed strong *scepticism* towards the plans of the resigned Social Democratic government to convert the facilities at Fornebu Airport outside Oslo into a centrally located ICT business park when the airport ceases operation in 1998. In particular, the Liberal Party stated a desire for such skills to be relocated to regional “telecottage” projects.<sup>9</sup> Stressing these notions even more vigorously, the Agrarian Party looked upon government-led IT politics as a vital component in trying to preserve a *decentralised population structure* as well as to strengthen *industrial growth* in sparsely populated areas.<sup>10</sup> Also, the new non-socialist government was intent to find new ways of regulating the market and thus prevent a commercially motivated price hike likely to afflict unprofitable backward regions when the deregulation of telecom services takes effect in 1998.<sup>11</sup>

Elements of *user orientation* and *non-expert intervention* evident in the “telecottage” experiments might be explained both in the light of the increasing user-friendliness of computer hardware and software and by the existence of a strong non-expert approach having evolved in Norwegian society.<sup>12</sup> In academic work, the non-expert approach is evident in the pioneering socio-technical “Industrial Democracy Programme” of Einar Thorsrud,<sup>13</sup> which paved the way for various government regulations such the Working Environment Act of 1977, and also the “Labour Charter” concluded by employer and employee unions at

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<sup>9</sup> “TT 2000: Informasjonsrevolusjonen er over oss”, <http://www.venstre.no/valg97/it2000.html>

<sup>10</sup> “Verdiskaping og fordeling”, <http://www.senterpartiet.no/politikk/programmer/stprog97/kap2.html>

<sup>11</sup> Rune Wikstøl: “Slik blir den nye IT-politikken. Sentrumspartiernes ønsketekning”. *Dagens Telecom*, 16.9.1997, <http://www.telecom.no/?id=1280719>; Anne Enger Lahnstein: “Telenor forsterker sentraliseringen: Økte forskjeller på nok et område”. Agrarian Party press release 5.8.1997, <http://www.senterpartiet.no/politikk/pressemeldinger/970805ael.html>

<sup>12</sup> Knut Holtan Sørensen: “Action versus Analysis: Making Sense of Technology Studies in Norway” in Tarja Cronberg and Knut H. Sørensen (eds): *Similar Concerns, Different Styles? European Approaches to the Social Shaping of Technology*. Brussels: European Commission Directorate-General (DG) XII, 1995. (Also published as STS working paper 15/95, Trondheim: Centre for Technology and Society, 1995.)

<sup>13</sup> Fred Emery and Einar Thorsrud: *Democracy at Work: The Report of the Norwegian Industrial Democracy Program*. Leiden: Nijhoff, 1976.

about the same time and subsequently renewed at regular intervals.<sup>14</sup> In this way, domestication is effected through user intervention taking place in society in preference to the summoning of technical expertise in laboratories.<sup>15</sup>

Realisation of the Frihus 2000 project in Fredrikstad in the late 1990s can be *explained* on the background of previous *experiments* trying out new ICT designs in a regional context as well as by prevailing *political sentiments* linking technology to prospects of improving social conditions locally. Thus the small-scale, non-expert “telecottage” experiments as well as recurring political actions to strengthen sparsely populated regions will act as a *translation terrain* preparing the ground for technologically and socially ambitious projects such as Frihus 2000, in which a whole region would be lifted up by the introduction of an IT highway, often to the disadvantage to better-off regions and cities such as Oslo, Bergen and Trondheim.

In other words, the translation terrain associated with Frihus 2000 was fashioned by experiences originating from the technically convincing *social experiments* of the 1980s and the *socio-technical experiences* of projects in the 1960s and 1970s, which merged with a historically motivated and deeply rooted *parochial political and cultural movement* in an attempt to combat the effects of latter-day economic setbacks in backward regions.

### 3. The IT Highway Project

#### 3.1. Institutional Setting

Partly, the Frihus 2000 project is linked to a plan for the development of local IT-related industry and partly to the EU-funded *Interreg II* project supporting, among other things, regional development in the Swedish-Norwegian border area. Because the Frihus 2000 project is not of a cross-national nature, it does not rank as an Interreg II project and receives no EU funding. It is related to Interreg II projects in the field of ICT because it ties in with the focus that Interreg II has put on improving economic conditions in this border area.

The Interreg Community Initiative is important to Frihus 2000 because it was designed to *counteract problems of long distances* affecting transport and

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<sup>14</sup> See “Wage Agreements and Basic Agreements”, <http://www.lo.no/english/loenn.html>

<sup>15</sup> A more thorough description of socio-technical projects and movements in Norway is given by Knut Holtan Sørensen: “Action versus Analysis: Making Sense of Technology Studies in Norway”, *op. cit.*

commuting, an underdeveloped infrastructure, low standards of education and a weak labour market especially for women and young people in the inner Scandinavia regions of Sweden and Norway. The Interreg programme aims to further joint efforts by the two neighbouring countries, and exploit opportunities for co-operation in promoting business and tourism and stemming the outward flow of population. One of the main lines of action pursued by the programme is to promote innovation in the field of vocational training and ICT training, and strengthening links between educational authorities and private industry.<sup>16</sup>

More concretely, Frihus 2000 is organised as part of Østfold Town Initiative (Østfold byoffensiv), a programme for initiating projects designed to help *restructure local industries*. The Østfold Town Initiative, which has a budget of NOK 80 million for the years 1996-1999, concentrate on funding projects for tailoring educational resources to suit the needs of the local workforce, find new ways of developing tourism, strengthen the industry profiles of the various towns, and redesign public service functions advantageous to the private sector, e.g. simplification of application procedures and elimination of the number of state or municipal offices to deal with.<sup>17</sup> As we shall see, the Frihus 2000 project did not tax the Town Initiative budget strongly, as it was initiated in a rather scaled-down manner.

In the case of Fredrikstad, Frihus 2000 was not the only project organised under the auspices of Østfold Town Initiative. There was also an Old Town revitalisation project (Festningsbyen Fredrikstad), a project to develop new festivals and conferences (Arrangementsbyen Fredrikstad), and a project to establish a centre of research and development (Forskningshavna). Of these projects, Frihus 2000 and the R&D centre seemed to gain most momentum as the feasibility studies progressed, the former because of the *socio-technical aspects* and the interest of an *external telecom actor*, the latter because an engineering college seemed ready to relocate from the neighbouring town of Sarpsborg.<sup>18</sup>

It is important that the Frihus 2000 project came about neither as the result of a strong technological environment in Fredrikstad, nor as the result of a strong technology drive among users in the local public and private sectors. The idea of investing in an IT highway was brought in from outside and was not based on local demands in the first place. When the Frihus 2000 project started, the

<sup>16</sup> "INTERREG II S/N A Borderless Co-operation", European Commission Directorate-General (DG) XVI ERDF programme No. 95.00.10.014, [http://europa.eu.int/en/comm/dg16/reg\\_prog/po/prog\\_541.htm](http://europa.eu.int/en/comm/dg16/reg_prog/po/prog_541.htm)

<sup>17</sup> "Østfold byoffensiv", [http://www.ostfold-f.kommune.no/offensiven/html/\\_stfold\\_byoffensiv.html](http://www.ostfold-f.kommune.no/offensiven/html/_stfold_byoffensiv.html)

<sup>18</sup> Gunnar Steen Iversen: "Ingeniørene ønsker FMV", *Fredriksstad Blad*, 26.4.1997, <http://www.fredriksstad-blad.no/1997/312/Nyheter/97042615/97042615.html>

municipality's most notable technological feat was a couple of hastily constructed Internet pages—a student project which was cancelled a few months later. The contents and shape of the web pages were, in the eyes of the local authority, too deficient to be of much use. Also, investing in maintenance and further development of the implemented solution did not appeal to anyone.<sup>19</sup>

Obviously, the aborted Internet project acted as an incentive to look for better technological solutions. Even so, the most prominent local factors in favour of investing in ITC solutions in Fredrikstad were arguments about finding ways to *counteract the economic backwater aspects* of the region.

### 3.2. Mapping of macro actors

Main actors at the macro and meso levels were Østfold Town Initiative (representing government funding), the municipality of Fredrikstad and Norwegian telecom, Telenor. Each of the three partners contributed towards covering one third of the costs of doing the Frihus 2000 feasibility study, which amounted to no more than 300,000 kroner (approximately US\$ 40,000). These were the direct costs accounted for and consisted mainly of expenses associated with meetings and travels. If sunk costs, mainly work-hours, were included the project budget was an estimated 1 million kroner, one half of which is thought to be contributed by Telenor.<sup>20</sup> As can be seen, a comparatively small amount of money was invested initially, obviously out of proportion with the ambitious goals and high costs that the term “IT highway” seems to imply in most cases.

Telenor emerged as the *key actor* of Frihus 2000. The municipality had been consulting Telenor on a number of occasions, and the case of the aborted Internet project was brought up. At Telenor, the distress of the municipality obviously evoked fond memories of previous *telecottage* projects, which did not meet with much success in the 1980s. Now things had changed with the rapid development of World Wide Web technology. Even part funding by Østfold Town Initiative and the municipality was in sight. As a low-risk, low-cost project, taking on the Frihus 2000 feasibility study was considered worth while for Telenor. There was little to loose if the project turned out to be a failure and much to be gained in case the ideas would catch on.

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<sup>19</sup> Interview with Director of Information Services, Knut Western, 13.6.1997.

<sup>20</sup> Unless otherwise stated, facts referred to about Frihus 2000 in the rest of the paper are taken from “Frihus 2000—Elektronisk motorvei i Fredrikstad kommune”, report, 30.6.1997 (preliminary version with no pagination).



Obviously, revitalising the telecottage concept in shape of an IT highway in Fredrikstad was looked upon by Telenor as an opportunity to generate business in a *niche* that could be their own. Telenor felt the need to find niches in order to avoid some of the negative economic effects expected when telecom services were *deregulated* at the beginning of 1998. By acting as a driving force in the Frihus 2000 project, Telenor would gain valuable insight into the possibilities of keeping control of the *access net*, i.e. those parts of the telephone lines extending from the exchange into each end user's home or workplace. Furthermore, if Frihus 2000 turned out to be a success, Telenor could be the first telecom to tailor the electronic networks to the needs of local communities. In this perspective Fredrikstad would serve as a *test case*, into which Telenor was prepared to invest a comparatively small amount of money. They expected the investment to repay many times over if the Frihus 2000 model was successful and could be applied to other local communities, of which there are 435 in Norway.<sup>21</sup>

The municipality of Fredrikstad, as the other major actor, wanted an IT-related project as part of the *restructuring* process that the municipality was undergoing. First, due to a merger of several neighbouring municipalities in 1974, Fredrikstad revamped its local administration. In keeping with the abolishment of the traditionally entrenched hierarchies and the introduction of a downsized, reform-oriented bureaucracy, reliance on modern technology was a tempting proposition. Second, the newly elected mayor supported these ideas vigorously. He had recently returned from Oslo, where he had worked as one of the prime minister's private secretaries and as such taken part in the group who drafted the government's IT visions for the future.<sup>22</sup> Consequently, he was intent that his local community should be among the *frontrunners* in adapting new technology to local needs.<sup>23</sup>

By the time Frihus 2000 was initiated, Fredrikstad had made some serious attempts to specify how new technology could be adapted to suit their needs. An *IT strategy* was outlined and a rudimentary *user requirement study* carried out in 1993. A small *feasibility study* on the introduction of Internet services was completed in 1996, which resulted in the abortive student project.<sup>24</sup> Soon it was realised that the emerging scenarios involved social and technical problems much too *complex* to be dealt with without calling on assistance from forces

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<sup>21</sup> Statement made by Erik D. Wilmar, Telenor, in conversation 14.8.1997.

<sup>22</sup> *Den norske IT-veien: Bit for bit*. Oslo: Ministry of Transport and Communications, 1996. Also available at <http://odin.dep.no/html/fovalt/offpub/utredninger/it/it-veien/>

<sup>23</sup> Statement made by Mayor Svein Roald Hansen at press conference 14.8.1997.

<sup>24</sup> "Rapport om Internett-prosjektet i Fredrikstad kommune", Fredrikstad Local Authority Information Services and EDP Department, 23.5.1996.

*outside* the local administration's own ranks. At the time there was no doubt that Telenor was best equipped to undertake a comprehensive feasibility study. As it were, Telenor had made themselves indispensable as part of the national translation terrain, not least through their widely-publicised "telecottage" experiments. No other bodies had shown themselves equally capable of finding ways of adapting new technologies to local needs.

Probably, the municipality of Fredrikstad in co-operation with Telenor would not have started the feasibility study without the participation of Østfold Town Initiative, who, as the third major actor, provided some support and funding. Østfold Town Initiative also contributed towards giving the project a *new dimension*. The perspective was no longer set on a narrowly defined Internet project, but to contribute to a major restructuring of society and bring about *important changes* along the lines adopted for Interreg II projects. Notably, focus would be on improving the *efficiency* of industry by reforming and simplifying their dealings with local and central authorities, as well as making Fredrikstad more attractive to industries considering *relocation*. There was a notion that implementation of a *modern telecommunications network* would be a required step to take. Apparently, nobody questioned the magic power of ICT or the competence of Telenor in this respect. The translation terrain formed by Telenor's "telecottage" experiments was interpreted as being *conducive* to the realisation of scenarios now looming large in Fredrikstad.

### 3.3. Mapping of Micro Actors

The macro and meso actors defined the project and set the condition for the participation of the micro actors. In a way the macro actors controlled the way micro actors should participate and how they should be represented. Micro actors were allowed a voice in two ways. First, their perspectives on the use of network services were expressed through a couple of *surveys*. Second, *five sub-committees* or *user groups* were formed in which representatives of relevant groups of micro actors were invited to make their views known.

The use of surveys and the setting up of sub-committees were in keeping with the avant-garde trends as defined by the translation terrain. In the tradition of the industrial democracy movement, *user orientation* is a well-known principle. Unfortunately, in many ICT projects these principles are not adhered to. To be true, there exists a widespread model of user participation, which the principles of industrial democracy specify, even if they are not adhered to in practice. This lack of attention to user participation is born out frequently by the lament of knowledgeable entrepreneurs. Recently, the managing director of a successful business software package company likened the lack of user influence in

Norway with dictatorship imposed by data experts. He said: "In no other field can a minority rule uncontested the way the IT department of a business firm does."<sup>25</sup> Research has shown that the current practice of computer systems design *sidesteps* most of the principles of user participation. What happens in many cases is that the design of systems is *professionalised*, and that this professionalisation is explained by reference to a set of *detrimental descriptions* of the user.<sup>26</sup>

As can be seen, user participation is not self-evident in practice. This is why the Frihus 2000 is a *notable exception* in relying to a large extent on user input instead of leaving the requirement specifications to data experts. No doubt it can be said that the macro actors were *consciously* seeking solutions that would prevent, as far as could be done, the bad results most likely to occur when relying excessively on expert advice. In particular, the lack of success of previous telecommunications projects such as the telecottage experiments were brought to bear on this choice of strategy. In the event, the macro actors fell back on the well-known principles of user participation, although little adhered to during the past decades. This is the most likely explanation why micro actors in the shape of *non-experts* were brought into the project.

As part of its reorganisation plans, the municipality of Fredrikstad had conducted a rudimentary user requirement study in 1993, which hardly extended beyond a simple mapping of some user groups later relied on in the Frihus 2000 project. The background for this approach is found among the goals for the merged communities. In keeping with the radical non-hierarchical principles being implemented, a desire was expressed to *disseminate information* among public bodies more efficiently as well as to improve communication with the world at large. To this end the local authority had in mind to address several user groups. The plans took a new turn when the Internet suddenly became a real proposition. In August 1995 the potential of this new information channel was presented in a memorandum. The local authority acted swiftly. In October 1995 the first Internet project was started. The aim was to become sufficiently familiar with the new technology so as to set up an Internet service for use by civil servants, politicians and citizens.<sup>27</sup>

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<sup>25</sup> Trude Blåsmo: "Data-gründer tar selvkritikk: -Datadiktatur i norske bedrifter" [Interview with Managing Director Une Amundsen, SuperOffice], *Adresseavisen*, 10.3.1998, <http://193.215.75.206/adresseavisen/nyhet/1998/mal/artikkel.awml?artikkelref=19980310B14145>

<sup>26</sup> Morten Hatling and Knut Holtan Sørensen, "Social Construction of User Participation", in *Informasjonsteknologi: Rapport fra forskerseminar i regi av programmet Informasjonsteknologi og samfunn*, Oslo: Norwegian Research Council, 1997. Also available at <http://www.sol.no/forskningsradet/program/itogsamf/rapporter/seminarrapport/hatling.html>

<sup>27</sup> "Rapport om Internett-prosjektet i Fredrikstad kommune", Fredrikstad Local Authority Information Services and EDP Department, 23.5.1996, p. 2.

The first Internet project revealed that issues were *more complex* than could be foreseen. After half a year's work, the project, mainly carried out by students, ended up with presenting a workable although quite *simple Internet service*. However, it was soon decided to close down this service, as it did not meet the *high expectations* concerning restructuring that existed at the outset. Like most simply constructed Internet services, the Fredrikstad WWW pages were made up mostly of press releases, a telephone book, a presentation of the local authority organisation structure and various bits and pieces of otherwise paperbased material, which made the solution look quite pedestrian.<sup>28</sup>

Micro actors taking part in this first attempt at constructing Internet services were representatives of various sections of the *local authority*. When the assistance of Østfold Town Initiative and Telenor was enlisted in 1976, the perspectives were *broadened* and the base of participating actors expanded. From now on, the representatives of the local authority were given less prominence, and various *user groups* were called upon once again. No doubt Telenor played a major role in this decision, relying on experiences from previous telecottage experiments, but the decision was also in line with ideas of increased citizen participation launched when the merger of local communities took place in Fredrikstad.

From now on, five sub-committees constituted the *major actors* at the micro level. Four external user groups and one internal local administration group were selected as higher-level actors to represent target groups for future local utilisation of ICT technology. These user groups or sub-committees represented *industry, local administration, government, citizens* and *ICT experts*. A sixth sub-committee representing the police force did not materialise due to the uncooperative attitudes of the local chief of police. The key actors expressed regret that this potentially important actor did not want to be enrolled in the project.<sup>29</sup>

The five user groups set about providing *user requirements* for a future IT highway. Although representatives of the macro actors, particularly Telenor, took part in group meetings and provided guidance, it must have been quite *unclear* to the non-expert micro actors, at least at the start, what the Frihus 2000 project was all about. Consequently, not all user groups responded with equal enthusiasm, and their reports, when compared, appear to be quite *inconsistent*, even as summarised in the final feasibility study report. Even so, the user groups provided a detailed picture of their basic requirements in quite a

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<sup>28</sup> Interview with Director of Information Services, Knut Western, 13.6.1997.

<sup>29</sup> Interview with Director of EDP Services, Gunnar Mathisen, 13.6.1997.

different and certainly more *coherent* way than most feasibility studies relying exclusively on the assistance of experts.

### 3.4. State of the Project

The feasibility study report relied to a large extent on reports compiled by the five user groups. In the feasibility study report, attempts were made to structure the requirements, although it is difficult to see how *specific recommendations* have been arrived at. No doubt this is caused by the *diverse manners* in which the groups mapped their requirements.

The *citizen group* based its work on three surveys in order to map citizen needs realistically. First, a *questionnaire survey* was carried out, using a representative selection of the town's population over 15 years of age. Second, certain key persons were selected for *in-depth interviews*. These two surveys were undertaken by a professional opinion research firm. Third, the group set about investigating in a more *informal* way the requirements specifically expressed by users of the municipality's provisional web pages.

In its report the citizen group emphasized that more than 80 per cent of those asked indicated that *newspapers* were the main source of information about the community. 47 per cent of the population wanted thing to stay this way, but 32 per cent were in favour of a specially produced *community newsletter*. The report concluded that the newsletter may be put on the *Internet* instead of being printed. Already, 22 per cent of the population had access to an Internet connection.

Of the wide range of potential needs touched upon in the surveys, the reports singled out the requirements of people *likely to relocate* to Fredrikstad and commuters likely to become *telecommuters*. The former group would be interested in finding out if the town has a full range of attractive community services (jobs, housing, kindergarten, etc.) as expected by the typical Norwegian family. The citizen group speculated that the latter group could be lured into spending more time as telecommuters in Fredrikstad if office facilities were readily available. 22 per cent of the commuters said that they would consider spending a couple of days a week in their home town if offered suitably equipped amenities.

The *local administration* group attempted to chart which electronically registered data would be of sufficient interest to user groups outside public administration. They tried to find reasons that warranted *extended availability* of such data, either for internal use within local administration or for general

use. The group ended up with a *long list of categories*, ranging from advanced library services to maps, brochures, environment issues, forms, tourist information, press releases etc. Increased availability of such public data is believed to counteract some of the negative effects experienced when local administration activities are scattered around town, as retrieval of data will be possible at a number of access points. Some data will even be made freely available on the web, such as *statistics* about Fredrikstad, which was one of the most tangible offers of the abortive Internet project in 1996.

The *government* group took as its point of departure that social security, tax and employment services authorities, for which government is responsible, had already established their own Internet services with an intended *two-way communication* with users in mind. The group stressed the importance of this strategy at the *local level* in order to improve the accessibility of services to citizens at large. The group recommended that a local *Call Centre* or Customer Contact Point is established jointly for all public administration bodies in order to deal with all kinds of enquiries addressed to municipal and governmental organisations. Also, all bodies should be hooked up to the same data network in order to facilitate the operation of the Call Centre and integrate the databases in question.

The *industry* group was concerned with the problems of *small firms* in getting established in a competitive environment. The group maintained that such problems could be eased if electronic solutions based on standardised equipment and a suitable variety of technical components were implemented. The group is the only one to explicitly state that an "*information highway*" is a highly desirable solution. By enabling the construction of various co-ordinating activities on the "information highway", Fredrikstad-based industries might even attain a leading edge vis-à-vis industries in other communities. The group called for pilot projects that could show the potential of the "information highway" as soon as possible.

The *IT experts* group had no qualms in recommending a physical *IP/ATM-based network* in Fredrikstad, based, they said, on their review of the requirements detailed by the other user groups. The IP (Internet Protocol) net would serve as a link to the Internet at large, whereas the broad-band ATM (Asynchronous Transfer Mode) component would enable the establishment of high-quality services by privately operated local area networks (LAN and WAN) and also serve as the backbone of the somewhat slower IP net. Even if the cheapest solution is using existing telephone lines, the group recommended that *optical fibre cables* are placed in the ground, preferably along two alternative routes between every major access point in the net. To save costs, which could easily be excessive, the group proposed that local interests should co-operate with

major national network owners, such as telecom companies (of which Telenor is clearly the biggest), cable TV firms and electricity suppliers, in establishing the physical network.

Once the physical network is established, a *maintenance centre* for the up-keep of the network as well as a *Call Centre* for its operation are required. The maintenance centre may be “outsourced” to one of the telecoms if it cannot be organised as a local firm, at least initially in order to give the IT highway a flying start. As far as the Call Centre is concerned, the report suggested a local solution offering a “first-line answering service” (meaning doing away with the need for users to find the right organisation to contact) with optional functions added such as marketing, sales and information retrieval.

*Summarising* the contents of such diverse user group reports and finding a conclusion is no small undertaking. The feasibility study report *circumvented* these vexing problems by jumping to conclusions without discussing whether the various user group reports seemed to require different strategies, and how these strategies could be forged into an *overall strategy*. Instead, it appears that the specification of the most technically oriented user groups were adopted without much discussion. This means that the *Call Centre* recommended by the government group, the *information highway* recommended by the industry group and the *physical network* recommended by the IT experts were singled out as the most pertinent user requirements.

Besides hinting at a multitude of enticing *scenarios* the feasibility study report concluded by recommending a couple of *projects* which can serve as pilots with a view towards giving tangible results almost immediately. As stated in the report, pilots have to be useful, realistic and clearly visible to everyone. The pilots suggested include:

- a. “*Telecottage*” in the shape of a telecommuters’ office block, created for commuters who would otherwise work in Oslo. Basic requirements are broad-band network access and teleconferencing facilities.
- b. *Internet café* as a gathering-place for people without an Internet connection at home. This is basically as a free service supplemented by instruction.
- c. *Teleconferencing facilities* tailored to the needs posed by supplementary education schemes and seminars. These facilities are primarily aimed at serving higher education, research institutions and the private sector.

- d. *Deployment of workstations* (“electronic information kiosks”) designed for general use at places such as the library, the railway station, post offices and public buildings.
- e. “*Virtual chamber of commerce*”, i.e. the linking up of existing networks in the private sector as a start of more complex networks in the future.
- f. *Cable network experiments* in some residential districts for the testing of ADSL and cable modem technologies.
- g. “*Build-Your-Own-Business*” advisory service for budding businessmen.
- h. *Information technology user support centre*, which could lead to the expansion of an existing Microsoft Windows support centre.

For some time after the report had been presented, everybody seemed to be quite *vague* about the priorities that sooner or later had to be assigned to the suggested pilots. Conversations with the macro actors showed that they were in favour, although somewhat reluctantly, of the telecottage concept, but nobody seemed willing to make statements as to when and how the next move would take place. The clearest commitment seemed to be on the part of Telenor, who stated that they would like to take part if the project was carried on.<sup>30</sup>

Apparently, very little happened during the last months of 1997, at least locally. At Christmas, the commercial firm which operated the server used on a temporary basis by the Fredrikstad local authority suddenly went out of business—to everybody’s surprise, including that of the local authority, who was deprived of all internet and e-mail connections for a couple of weeks. More than anything else, this incident proved the *vulnerability* and *inadequacy* of the local authority in dealing with complex technological solutions involved in establishing the projected IT highway. Also, it stressed the dependence on a major *telecom* such as Telenor in finding workable solutions.

On the part of Telenor, further involvement in Frihus 2000 was based more on establishing a *new telecottage experiment* than trying to satisfy the multitude of user requirements found in the feasibility study report. Defining Frihus 2000 as a telecottage project at the time when the conclusion was written foreshadowed their next move, which would be to present Fredrikstad with a telecottage solution as a project of limited duration. Needless to say, this solution required some additional problems to be solved. The feasibility study report gave no clues as to the *partners* involved in the realisation of Frihus 2000 in shape of a

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<sup>30</sup> Statement made by Erik D. Wilmar, Telenor, in conversation 14.8.1997.



telecottage. Also, because of the competitive world full of high-risk projects in which telecoms find themselves at present, the project needed *approval* at the highest level within Telenor.

In the end, approval of the Telenor management was obtained, and an appropriate partner in a suitable venue was found locally. In February 1998 it was announced that the *Fredrikstad telecottage* would open on March 20 in the building of Næringsakademiet, the local branch of a national arranger of IT training courses, particularly courses under the Microsoft Authorised Academic Training Program and similar schemes.<sup>31</sup> It was also announced that Policy Management Systems Norden, a firm offering ICT solution to banks and insurance companies, would rent *office space* for ten workers, thus relieving some of their employees of the chore of commuting to Oslo.<sup>32</sup> Furthermore, there would be five more offices available to other firms. The offices are equipped with *broad-band communication lines* and *teleconferencing facilities* so as to make for efficient teleworking.

The telecottage project was in need of a *new feasibility study* in order to evaluate its potential. Costs were estimated at a low NOK 225.000, again to be split equally between Telenor, the municipality of Fredrikstad and Østfold Town Initiative, who is representing the government. A municipality spokesman said when questioned about the costs by a local newspaper: "In relation to the results that I expect to see [...] the project costs are peanuts."<sup>33</sup> The new feasibility study report is expected in the early fall of 1998, while the telecottage experiment is planned to last until the end of 1999. There is no indication of what will happen to the other possibilities and the various user requirements outlined in the first feasibility study report.

#### 4. Social Shaping Aspects

As the Frihus 2000 project developed, the translation terrain as defined in section 2 played a major part, although not always as expected. Frihus 2000 started out as a project with *user orientation* in the best Norwegian industrial democracy tradition and ended (at least for the time being) as a *telecottage*

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<sup>31</sup> The presentation in Norwegian of Næringsakademiet is found at <http://www.na.no/>  
For presentation of the local branch at Fredrikstad, see <http://www.na.of.no/>

<sup>32</sup> The presentation of PMS Norden is found at <http://www.pmsn.no/pmsn/>  
The firm is a subsidiary of Policy Management Systems Corporation (PMSC), a global provider of solutions for the insurance and financial services industries, see <http://www.pmsc.com/>

<sup>33</sup> Statement by the municipality's Director of Industry Planning, Johan Martin Riiser in Geir Ola Eggen: "Ny utredning til 625.000", *Fredriksstad Blad*, 26.2.1998,  
<http://www.fredriksstad-blad.no/1998/589/Nyheter/98022610/98022610.html>

*project* defined more or less by telecom experts in the global tradition of systems engineering. Both traditions have existed in Norway for some time, and, as explained in section 3.3., the principles of user participation are often *sidestepped* in practice. In particular this is so if data experts succeed in having their scenarios adopted. By choosing the telecottage approach in a relatively small and economically backward area and using input from major user groups, the Frihus 2000 project apparently went a long way towards reinforcing what looks like a specifically *Norwegian approach* to ICT applications. However, this statement conceals the fact that some of the major actors had quite *differing attitudes* at the outset, and that influences from one of the actors helped shape the project in a particular direction.

From the beginning, the municipality's user orientation, stemming from an administrative merger and the establishment of a new administrative structure, spilled over into the ICT field when the Frihus 2000 project was started. When Telenor entered the project at a later stage, an *expert-oriented attitude* crept in. At first this attitude did not matter much, because the user groups were allowed to conclude their reports as planned. The expert-oriented attitude appeared in full when the conclusions were drawn. As we have seen, the telecottage concept attained pride of place at this stage. At the next stage, the telecottage showed up in an implementation for a two-year test period, and the other possibilities were *put on hold*, seemingly indefinitely, even if an optimistic spokesman of the municipality expected to have several part projects realised by the year 2000.<sup>34</sup> Also, the expert-oriented attitude meant that all user groups were *disbanded*.

Telenor had taken over and shaped the project according to their own ideals. The municipality lost out because they proved much to *fallible* when it came to handling complex technical problems for which user-oriented solutions were to be found. In the invisible battle between user orientation and expert domination the experts emerged *victorious*, yet again. Apparently, nobody seemed to mind. Probably, some visionaries in the municipality of Fredrikstad may feel a bit cheated, although they probably still believe that political sentiments and future government support may generate further projects directed at using ICT technology towards satisfying user requirements in a broader perspective. Reportedly, initiatives are underway to find solutions to the local authority's *internal ICT problems* and the introduction of IT-based *administrative reforms*.<sup>35</sup>

To be true, the technical components relied on as well as the applications to be realised within the scope of the telecottage project are far from being

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<sup>34</sup> Statement made by Director of EDP Services, Gunnar Mathisen, at press conference 14.8.1997.

<sup>35</sup> Statement made by Mathisen in telephone conversation 4.3.1998.

Norwegian inventions. Optical fibre IP/ATM networks constitute the *standard approach* everywhere when implementing broadband nets for high-quality on-demand applications such as the transmission of video in real time. Also, the organisation, relying on a scaled-down Call Centre model, has been tested elsewhere. The feasibility study report cites experiences in Brunswick, Canada, and in Salford, United Kingdom, as the main sources of inspiration.

Before embarking on the feasibility study representatives of the municipality of Fredrikstad and Telenor paid a visit to *New Brunswick* to study their fibre-optical network, which will eventually cover the whole province. A *Call Centre* had been established, which grew rapidly to be the second biggest in North America with the creation of some 3,300 jobs by such companies as Xerox, Royal Bank, Canada Trust and Northern Telecom.<sup>36</sup> Politicians supported the initiative vigorously. The New Brunswick Economic Development and Tourism Minister, Camille Thériault, said: "This is an excellent example of how rural regions can use the information highway to take an active role in their own economic development."<sup>37</sup> Also, the Minister emphasized that in an increasingly global economy, building and using the information highway is critical to creating jobs and growth for Canadians.<sup>38</sup> Another dignitary added that one of the great benefits of the information highway is that it allows small companies in rural areas to provide services just as effectively as those located in larger centres.<sup>39</sup>

In *Salford*, at the heart of the Greater Manchester conurbation, *Gemesis 2000* is designed as a collaborative project between University of Salford, Cable and Wireless Communications (formerly Nynex CableComms), City Pride and the Manchester TEC. *Gemesis* aims to develop *user-driven applications* that will assist in the regeneration of the North West of the United Kingdom. This will be achieved primarily through pilot projects in the fields of education, training and research, business development, community services, health care, and community safety.<sup>40</sup>

While the New Brunswick case served as an *inspiration*, not least from a political point of view, there was doubt that the Canadian initiative has a scope that is practically *unattainable* in Norway, at least for the time being. New

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<sup>36</sup> "Information highway minister addresses Montreal Chamber of Commerce", Communications New Brunswick Information, 1.5.1995, <http://www.gov.nb.ca/cnb/news/edt/00001.htm>

<sup>37</sup> "Six municipalities go on line with Internet", Communications New Brunswick Information, 1.4.1996, <http://www.gov.nb.ca/cnb/news/edt/6e0370et.htm>

<sup>38</sup> "Thériault attends info highway ministers' conference", Communications New Brunswick Information, 1.10.1996, <http://www.gov.nb.ca/cnb/news/edt/6e1488et.htm>

<sup>39</sup> "Six municipalities ...", *op.cit.*

<sup>40</sup> See the *Gemesis 2000* web site <http://www.salford.ac.uk/gemesis/>

Brunswick is the size of half of Norway and effects of the information highway are accordingly impressive. In Norway, no information highway project of a comparable size is planned. The *centralisation* aspects of the Canadian project are likely make it unsuitable in a Norwegian context, although other social shaping aspects are looked upon as being exemplary.

As stated in the Frihus 2000 feasibility study report, the Salford case is more in line with what is *realistic* as a solution in the town of Fredrikstad. While the long-term vision of Gemisis 2000 sees the potential of the chosen projects in national and international terms, the initial test bed site would focus on a *restricted area*. The primary site for development of the applications projects is Salford, while linkages into other areas of Greater Manchester are incorporated as a major feature of the plan. This strategy has much in common with the scope that Frihus 2000 will have in Fredrikstad, even if Frihus 2000 will focus on slightly *different fields* of development. For reasons of security and privacy, there will be no health care and community safety projects in Frihus 2000.

Initially, Frihus 2000 was based almost exclusively on political sentiments and user participation. Gemini 2000 is quite different due to the incorporation of 30 *doctoral researchers* who constitute what is termed “the birth of a new think tank for the North West [of United Kingdom], an intellectual and research resource that will provide a unique service to the region as it engages with the future.”<sup>41</sup> The Gemisis newsletter raises high expectation in this respect:

*“A think tank that will be able to ask the large questions, but one that is also firmly grounded in the very specific needs of the private and public sector. A think tank which will become a living symbol of the truism that the most valuable commodity in the coming century will be information. Those who have it, use it, apply it will thrive. Those that do not will wither. The fundamental purpose of the Gemisis project, through all its activities, is to help ensure that the Manchester metro area, home of the first industrial revolution will also nurture the post-industrial revolution. If it does not, it probably doesn’t have much of a future.”*<sup>42</sup>

Undoubtedly, the main actors of Frihus 2000 think otherwise, as no university expertise is involved in their project. They have placed more faith in Telenor, who, as we have seen, was a major sponsor of the feasibility study and who also states bluntly in the final report that they intend to take part in the proposed

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<sup>41</sup> “Gemisis Business, Communication & the 21st Century: New Ideas For A New Age”, *Gemini News*, Vol. 5, 1997 (August), [http://www.salford.ac.uk/gemisis/newsletter/archive\\_aug/](http://www.salford.ac.uk/gemisis/newsletter/archive_aug/)

<sup>42</sup> *Ibid.*

pilot projects. In this way the Norwegian project has opened up for a *technology push* and a commitment to a particular *telecom partner* that is less strongly felt in the British project. Gemini 2000 has awarded the tender for supply and installation of its core ATM equipment to the consortium of Newbridge Networks and ICL, in spite of the fact that Cable and Wireless Communications is their main partner. Frihus 2000 has not yet issued a tender, so it remains to be seen to what extent Telenor will remain the preferred telecom partner. As far as *academic connections* are concerned, they are unlikely to receive much attention in the Frihus 2000 project. This is not surprising, as the Norwegian translation terrain excludes university participation in telecom projects.

At the present stage, Frihus 2000 seems to be shaped more by *global* influences than by local user needs. In spite of this fact, the project is a long way from resembling the IT highway of New Brunswick, which served as a model. To be true, Frihus 2000 in its present shape is more reminiscent of *previous telecottage experiments*, which were of a predominantly technical nature. In this respect Frihus 2000 is based on experiences which are part of the Norwegian translation terrain, although based on technology which is imported without undergoing major modifications when it is adapted locally.

In the case of Frihus 2000, the development from user orientation to *expert dominance* was a major social shaping process and produced results which, at least at its present stage, did not fully realise expectations that existed initially. Neither did the resulting telecottage project encompass or accommodate the *multitude of options* detailed by the various user groups, which, along with the municipality, emerged as the losing actors in the initial rounds of social shaping. In this respect, Frihus 2000 adds variety to the translation terrain that was outlined in section 2.

## 5. Social Learning Aspects

By way of conclusion, I will consider what lessons can be learned from the way that ICT technology is *domesticated* or has acquired a local dimension through the Frihus 2000 project. I will also consider what is *missing* for the project to realise its full potential. To discuss the learning aspects I will draw on major features of *similar* projects elsewhere which seem to vouch for success.

Most features of Frihus 2000 in shape of a telecottage are technical and have been invented elsewhere. These features have been *imported* more or less without alteration to serve in a Norwegian context. All technical components will be installed in a “plug-and-play” fashion with no development work on cables, routers, protocols or communications software taking place in Norway.

The feasibility study report foresees a standard configuration based on the use of Bay routers running Optivity Enterprise software under HP Openview, Sunnet Manager, IBM Netview or Tivoli.

Furthermore, most of the ideas to be implemented using these technical components are imported as well. The idea of a *partnership* between the public and private sectors was adopted mainly from New Brunswick. The economic *regeneration* aspects are blueprints of those found in New Brunswick and Salford.

What stands out in the Norwegian case is first of all an all-out *user orientation* paired with a strong *telecom partnership* in keeping with the local telecottage tradition. Usually, telecoms play no major part unless admitted as the result of a tender. In New Brunswick, the project was a governmental responsibility. In Salford, the *university* played a prominent part. In both cases, commercial interests were kept at bay during the initial stages of planning.

This is not to say that in Fredrikstad, specific *commercial interests*, notably those of Telenor, will dominate. Due to strong user participation, which had more impact on the final report than can be observed in New Brunswick and Salford, the interests of Telenor were underplayed. This characteristic makes itself felt more in the feasibility study report than in the subsequent telecottage implementation. Probably, it can remain strong influence if other parts of Frihus 2000 are realised, particularly if the requirements of the citizen, local administration, and government groups receive more attention.

Another truly Norwegian aspect is the *non-metropolitan* and *decentralised* approach. Even if easing economic deprivation is part of the motivation in New Brunswick as well as in Salford, none of these projects came close to the scaled-down character of the Norwegian project. New Brunswick has implemented the new technology in a very large area (73,440 sq. km) with more than 200 communities connected by 1998.<sup>43</sup> Salford is part of the Manchester conurbation, which is the country's second largest city, representing over 60 per cent of the United Kingdom population. By contrast, the town of Fredrikstad has an area of only 290 sq. km and a population just in excess of 64,000.

Considering the cost and the reorientation required in the public sector as well as in the private sector when new technology is implemented, it is surprising that a community of the size of Fredrikstad pretends that it will install an IT highway more or less according to plans designed for vastly larger areas.

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<sup>43</sup> "New Brunswick on the World Wide Web", report by the Interdepartmental WWW Committee, 28.8.1997, <http://www.gov.nb.ca/edt/infohigh/wwwrpt/>

Contrary to what is believed in Fredrikstad, there is a real risk that the model chosen will need a *larger area* to enjoy any degree of success. Failure or success is yet to be confirmed, but it might be that the Norwegian belief in information technology as being “the most decentralised technology in the world”, according to views held by the present Minister of Trade and Industry,<sup>44</sup> just does not hold true.

Apart from these technical and geographical considerations, other factors influencing the success of Frihus 2000 is the *scope* selected for the project. In some other Norwegian towns, such as the neighbouring town of Halden, ICT development is rooted in an *action plan* such as a community development report or a municipal industry development plan.<sup>45</sup> In Fredrikstad, the reduction of *commuting* seems to be the overall goal, at least for the time being. This narrowing of focus is inexplicable since an IT highway, when implemented, must serve a variety of goals so as to be cost effective. Usually, a telematics project of this kind has to satisfy a widely defined set of “*urban demands*”, such as economic regeneration and development to sustain, increased and improved employment opportunities, social needs and the improvement of quality of life, education and training, requirements of the elderly and disabled, healthcare, libraries, environment, and transport, to cite but a few commonly specified areas.<sup>46</sup>

To the defence of Fredrikstad it can be argued that a *piecemeal* or “bottom-up” strategy such as the one chosen is a well-known procedure in systems engineering. In particular, this strategy is used to implement the “juiciest” parts, yielding the most *spectacular* results, first. What comes later is not always detailed at the start.<sup>47</sup> The adverse effects of this strategy is that the community runs the risk of developing only a few *disjointed* projects, and that there will never be a *concerted* effort to bring about the huge investments and large-scale restructuring of society that lie at the core of an open network such as the IT highway. In this respect the development strategy in Fredrikstad differs from widely accepted guidelines laying the foundations of the Global Information Society as outlined by the G-7 Information Society Conference in 1995,<sup>48</sup> the

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<sup>44</sup> “Sponheim skeptisk til Fornebu” [quoting a statement made to *Dagsavisen Arbeiderbladet*, 18.10.1997], *Telecom*, 20.10.1997, <http://www.telecom.no/artikkel.hbs?id=1281171>

<sup>45</sup> See description in Norwegian of “the IT town of Halden” at <http://www.halden.kommune.no/naeringsutviklingsprosjekter/itbyenhalden.html>

<sup>46</sup> See project objectives for the European Digital Cities project at <http://www2.echo.lu/telematics/urban/european-dc.html>

<sup>47</sup> Statement made by Erik D. Wilmar, Telenor, at press conference 14.8.1997.

<sup>48</sup> See programme of The G-7 Information Society Conference hosted by the European Commission, Brussels, Belgium, 25-26 February 1995, at <http://www.ispo.cec.be/g7/g7main.html>

Delors White Paper,<sup>49</sup> and the Bangemann report.<sup>50</sup> All these reports stress the importance of establishing an overall view first, which means a “top-down” approach in systems engineering.

As far as implementation is concerned, the *suitability* of choosing Salford and New Brunswick as models can be questioned. It is remarkable that major telematics efforts in urban areas initiated by the European Commission did not serve as models for the development in Fredrikstad. Within the Fourth Framework for EU research, several programmes were related to the field of ICT.<sup>51</sup> In particular, there existed a European Digital Cities (EDC) programme funded by the European Commission under the Telematics Applications Programme (TAP), which lasted from 1996 until the end of 1998. It was initiated by four major urban networks: TeleCities, POLIS, Car Free Cities, and the Eurocities Transport Committee.<sup>52</sup> For instance, the TeleCities network had a number of member cities, observers and associate members that could have been consulted.<sup>53</sup> Since Manchester was a TeleCities member, Salford and Gemesis 2000 were no doubt part of the European scene, although indirectly and at the very *periphery* of on-going activities. This is why this project remained a *questionable* choice as a model for the development of a future urban IT highway in Fredrikstad. A typical Infoville approach such as the one adopted for Villena in the Spanish province of Valencia might have been a better source of inspiration when it comes to choosing an alternative strategy.<sup>54</sup>

Of course, one can ask why Fredrikstad did not care to be a *member* or *observer* in one or more of these European urban networks or even try to obtain *part funding* from the EU for their IT highway project. The possibility of obtaining such funding should not have been overlooked, because many EU programmes, including the 671 million ECU Advanced Communications Technology and Services programme (ACTS), were open to and even encouraged participation from non-EU countries such as Norway.<sup>55</sup> In the case of Fredrikstad and Østfold Town Initiative, interest in EU funding should have extended beyond the limits of Interreg II, which had goals that prevented a local IT highway project from being funded. No doubt, sources such as the Telematics for Urban and Rural

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<sup>49</sup> “White Paper on Growth, Competitiveness, and Employment: The Challenges and Ways Forward Into the 21st Century”, Brussels: Commission of the European Communities, 1993, <http://www.ispo.cec.be/infosoc/backg/whitpaper.html>

<sup>50</sup> “Europe and the Global Information Society. Recommendations to the European Council”, Brussels/Luxembourg: ECSC-EC-EAEC, 1996, <http://www2.echo.lu/eudocs/en/bangemann.html>

<sup>51</sup> See overview at <http://www.uk.infowin.org/ACTS/ANALYSYS/INTRO/chap1.htm>

<sup>52</sup> See introduction of EDC at <http://www.edc.eu.int/about.html>

<sup>53</sup> See description of TeleCities at <http://www.edc.eu.int/telecities/index.html>

<sup>54</sup> See introduction in Spanish at <http://www.iponet.es/casinada/18info01.htm>

<sup>55</sup> See description of ACTS at <http://www.uk.infowin.org/ACTS/>



Areas (TURA) sector of the Telematics Applications Programme (TAP), under the Fourth Framework Programme for Research and Technology Development, should have been investigated.<sup>56</sup>

Apart from the telematics programmes mentioned above, inventive entrepreneurs are presented with *many alternatives* when seeking funding and co-operation within the European Union. In a Norwegian context, it is worth mentioning that the western province of Sogn og Fjordane, after taking part in ENCATA (European Network of Centres for the Advancement of Telematics in Urban and Rural Areas),<sup>57</sup> was awarded part of the EU-funded TITAN programme (Tactical Integration of Telematics Applications Across Intelligent Networks), worth NOK 17 million over a three-year period ending in the year 2000. The programme supports the redesign of information flow in the public and private sectors to ensure increased accessibility of information in all the municipalities of the province. In the eyes of a spokesman of the province of Sogn og Fjordane, attaining the status of a major *validation site* gave the province a chance to see how local solutions relate to international trends.<sup>58</sup> Perspectives such as these are sorely missed in the case of Fredrikstad as well as in the province of Østfold.

In spite of missing relations with similar projects, Frihus 2000 in shape of a telecottage implementation will undoubtedly be a *success*. Social conditions have changed noticeably since the 1980s, and the world is ready for teleworking. When a *major partner* such as Policy Management Systems Norden steps in and makes extensive use of the telecottage facilities in Fredrikstad, teleworking will most probably catch on among other firms as well. Also, the *general demand* for competent ICT employees in the Norwegian labour market will be greater than the supply for years to come, so that many workers will be given the option of teleworking if they find the customary option of commuting or relocating to Oslo undesirable.

Worries concerning the future of Frihus 2000 stem from the fact that the *ambitions* are far from being satisfied with the establishment of an office block for telecommuters. Visions of a digital city cabled by an IT highway are yet to find a solution. Many of the requirements specified by the citizens group, the local administration group and the government group are a long way from being implemented. Obviously, many of the requirements are of a *general* nature and will find their solutions in other contexts. For instance, there already exists a

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<sup>56</sup> See description of TURA at <http://www.tweuro.com/tura/>

<sup>57</sup> See description of ENCATA at <http://encata.org/contents.html>

<sup>58</sup> Eva Tønnessen: "EU-prosjekt til 70 millioner", *Computerworld Norge*, 10.10.1997, p. 7, mirrored at <http://fjordinfo.vestdata.no/itforum/cw/titan.htm>

major community web server solution, NoByKom,<sup>59</sup> currently used by several Norwegian municipalities, which could be adapted to the needs of Fredrikstad. If the strategy is adopted to implement *standard software solutions* such as this one, many of the requirements specified in the feasibility study report will be fulfilled quite easily.

However, ambitions exceed by far the scope of pre-packaged software solutions. A recently published government report points out that “extensive use of IT in local regions assumes that there exist centres of competence capable of furnishing the industries with expertise and guidance as required”.<sup>60</sup> The report stresses the importance of planning for the proximity of technology-based firms, i.e. establishing *centres of innovation*, and also of implementing *high-capacity networks*. In the eyes of the government, these are the main factors that will cause regional centres of competence to develop and more workplaces to be created locally.

The Fredrikstad telecottage is a start but by no means the final stage when trying to fulfill these ambitions, not least because the explicit aim of Fredrikstad is to be Norway’s most user-friendly municipality. As the mayor explained: “The establishment of an IT motorway as a network is the easiest part. Connecting various kinds of services—call centres, technical support, virtual shopping malls, etc.—to the network is of utmost importance in order to *develop an ICT environment* in Fredrikstad. Small firms will not be able to utilise the new technology without receiving support from this kind of environment.”<sup>61</sup>

It is still too early to tell if Fredrikstad will succeed in their endeavours and eventually become Norway’s most user-friendly municipality with a strong ICT environment. If the Frihus 2000 project, in spite of the worrying aspects mentioned above, turns out to be a success, the Norwegian commitment to applying a user-oriented approach when realising an information highway in a non-metropolitan area will become a *major contribution* to social learning in this field. For the time being, the Frihus 2000 approach has to be regarded as a *social experiment* with no guaranteed success. Ambitions in the ICT field are not easily transformed into successful projects. Systems development is *costly* and there are few people and firms sufficiently *knowledgeable* so as to act as managers for the implementation. Most probably, Fredrikstad will have to

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<sup>59</sup> See description in Norwegian of NoByKom at <http://nobykom.intech.no/>

<sup>60</sup> “Norge—en utkant i forkant: Næringsrettet IT-plan for perioden 1998-2001”, Oslo: Ministry of Trade and Industry, 1998, ch. V.5.2., <http://odin.dep.no/nhd/it-plan/plan/index.html>

<sup>61</sup> Statement made by Mayor Svein Roald Hansen at press conference 14.8.1997.

invest a lot more in terms of budgeting, project organisation, and international relations to get beyond the telecottage stage.

As far as methodological considerations are concerned, my analysis has shown that *preconditions* set by past technological experiments and by anti-centralisation policies can explain much of the activities going on in the Frihus 2000 project. The translation terrain, as far as telecottages and user participation are concerned, was fashioned by experiences originating from the technically convincing social experiments of the 1980s and the socio-technical experiences of projects in the 1960s and 1970s, which merged with a historically motivated and deeply rooted decentralist political and cultural movement in an attempt to combat the effects of latter-day economic setbacks in backward regions.

The Frihus 2000 feasibility study was marked by the *absence* of considerations based on *economy of scale* and *effectiveness* prevalent in Western culture. These characteristics are signs that in Norwegian culture, new technology is transformed into a device for promoting *decentralisation* as the overarching goal. Frihus 2000 supports the statement made recently by the Minister of Trade and Industry about being uncomfortable at the thought of using public money in order to centralise the most decentralised technology in the world. This statement as well as the ambitions of the Frihus 2000 project epitomise much of the way that information technology as well as other imported artefacts are domesticated in Norwegian culture. Also, we see the importance of relying on a broadly conceived *translation terrain* when attempting to analyse the way technology is adopted and adapted in modern Norwegian society.