

Summary:

A comprehensive study of the relation between teleworking and transport

A comprehensive perspective on teleworking

The purpose of this report is to examine how teleworking influences activities and travel patterns of households. The following research questions are addressed:

- What are the motives for teleworking?
- How do teleworkers organize their work at home and how often do they telecommute?
- Does teleworking impact travel patterns of the teleworker and/or the rest of the household?

Previous research has often been occupied with the interaction between teleworking and transport has mainly been concentrated on the work trip. The research questions have been related to travel distance, use of transport mode, and the environmental effects of the reduction of work trips. Our perspective is broader; we will try to bring forth the comprehensive effects on the daily travel patterns in a household.

Interaction between ICT and transport

There are four ways in which information- and communication technology (ICT) interact with transportation:

1. *Substitution or replacement* – new technology (ICT) replace old (transport/travel purpose). ICT substitute travel.
2. *Modification* – new technology is used to conduct or change planned activities.
3. *Generation* – new technology gives more information, new acquaintances and possibilities which induce more travel.
4. *Neutrality* – new technology comes in addition to old, and there is no specific relation between them.

The consequences of telework can be related to these effects. Telework can substitute work trips, modify travel patterns or generate more travel. Since the work trip is not done on days the employee works at home, the fourth effect will be of no interest in this context.

Previous research on telework and transport

In Norway, studies of the effects of telework on transport have not been conducted. Most Norwegian studies on telework have been related to impacts on the working environment, and organisational and/or juridical effects.

International research on this subject has very often been related to pilot projects at different workplaces, and results are not unambiguous. In some of projects car use was reduced, while total travel activity was unchanged. Other studies have shown increased car use, due to an increase in trips done outside the rush time hours. On this time of the day it is easier to use the car and the public transport supply is not so good as within the rush time hours.

It is difficult to generalize on the basis of the results from the pilot projects and experiments from the USA and the Netherlands. The samples in these studies are selected and the sample sizes are small, and represent a very small part of the working population. However, the results indicate an immediate reduction of travel length for the teleworker, but how much is not clear.

In depth interviews with employees of three companies in Oslo

The sample of employees was drawn from three companies in Oslo, partly for saving resources and partly due to the composition of the working force in the area. Knowledge and ICT based companies are concentrated to the region. Oslo and Akershus (the surrounding county) comprise half of the total employment of the country in cultural service industries, media, data processing, research and development, and other service industries. The composition of the work force indicates a fairly considerable potential for telework among the employees.

The companies contacted, had previously participated in a survey about use of videoconferences, a study which was part of the same project as this for the Ministry of Transport and Communication. All companies had some sort of telework arrangement for all or some of their employees. The final sample consists of 16 employees from three different companies.

The employees from the selected companies are people with high education and competence. The companies belong to what can be called knowledge- and ICT-intensive industries.

Since our perspective on telework and transport is not used before, we have chosen a qualitative method to get insight into and an adequate understanding of the phenomenon. We used in depth interviews and employed an interview guide.

Motives for working at home

The motives for working at home are multiple. In this study we have grouped the motives into five categories; *lifecycle, housing-/labour market, the need for concentration, prevention of stress, and practical reasons*. These five motives

lead to different impacts on transportation related to substitution of trips, generating trips and modification of travel patterns.

If the motive for working at home is related to lifecycle (family obligations), and also connected to housing market or place of living, the amount of home based work will be up to two – three times a week. The question is whether this arrangement will last when the children are getting older and the time pressure is less. Do mother or father wish to maintain the frequency of home based work or do they want a less “homeintensive” arrangement?

The adjustment related to housing- or/and labour market, which may result in long work trips, are dependent on people’s preferences for housing and opportunities on the labour market, which both will vary over time. The transportation effects of this adjustment will be of about the same amount per week as the arrangement related to lifecycle. Since it may be lasting, it will not necessarily be changed over the lifespan.

The three last motives for selecting home work arrangements are probably rather common, but the weekly working days will be fewer than for the two previously mentioned adjustments. People using telework as a protection or shelter against a demanding work life or for practical reasons, will possibly keep the frequency of working at home on the same level as our respondents, two till three times a month. The need for working undisturbed and concentrated might vary to a much larger degree. In some periods three times a week will be appropriate, while in other periods there will be little need for sitting at home. Telework related to these three types of motives takes place independently of travel distance. The impact on travel and transport of these motivated type of arrangements, will depend on both the companies’ willingness to invest in equipment and permission for the adjustment on one side and the employees wish to work on distance on the other. In our sample, more than a couple of days a week is not wanted.

Working at home and the others in the household

The majority of those working at home have their own “home-office” or at least a special place to work. Most of them are trying to make a physical division between the private and the working sphere. The organising of the work at home is related to the type of motive for teleworking. Those with a lifecycle-motivated telework have a well planned and structured workday at home. Also others have planned their days, but for the first group planning is an absolute condition for managing the time budget with two employed parents.

Almost everyone claim that it is more efficient to work at home than at the working place, whether they have single offices or they sit in landscapes. People tell they are more effective at home and have longer working hours.

Some think it is practical to combine different tasks when working at home, and they have no problem doing it. For instance, many women report doing domestic work while working at home. Women experience a mixing of working-time and family-time, they merge into each other.

It seems to be somewhat different for men. Most of them separate work task and household tasks, but they very often go back to the pc in the evenings after they had finished some household tasks.

The flexibility of the telework arrangement is favourable for the employer, according to the employees. They feel more efficient, they work more concentrated and they do more. But they also experience that the work sometimes becomes predominant. It is too easy to log on when the pc is available. To reduce the pressure it is easy to check the e-mail in the evening and do some preparations for the next day.

Even if the work trip is eliminated, the tasks usually related to it have to be done. Children have to be brought to kindergarten or primary school, but the trip might be done in a different way when mother or father is working at home.

Different kinds of shopping are often done in the local areas on the days people are working at home. This is also true for other tasks. The car is used very often for these local trips, even though most of our respondents are using public transport on their work trips.

Concerning transport, teleworking for one of the members of a household has no unambiguous effect for the other members of the family. In most cases this work arrangement results in more local trips, which also to a certain degree involves others in the family.

Our main findings are presented in the table below.

Motives for teleworking	Interaction effects between ICT and transport		
	Substitution/the amount of (whole) days working at home	Generation of trips	Modification of travel patterns
Lifecycle	Up till two-three times a week	Few/some	More local trips by car
Housing-/labour market	Up till two-three times a week	Few/none	More local trips by car
Concentration/undisturbed work	Periodic, from very seldom up till several times a week	None	Little
Prevention of stress	Two-three times a moth	None	Little
Practical reasons	Varying, seldom	Some	More local trips by car

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Further research

The results from this study draw attention to different research subjects of interest. We will mention three of them:

- This qualitative study has established a helpful basis for developing a *quantitative survey of the relation between telework and transport*. In Norway today there is a lack of information about the amount of telework, how many who work at home whole days, and thus there is very little information about the transportation effects of this arrangement. Our study has illuminated the interaction with the total travel pattern, and given a good basis for asking the relevant questions in such a survey.
- Telework and organizing everyday activities are parts of the *total communication and travel activities in a household*. The increasing use of

mobile phones, e-mail, Internet etc will also be of significance in relation to everyday travel, how they are planned, changed and eventually carried out. There is a lack of knowledge about this total communication pattern.

- The third subject is about the *interaction between urban development, land use, localisation and telework/use of ICT*. A review of the literature has shown that this research area is insufficient and needs more input. Today there is little empirical knowledge of what is happening, both about the individual adjustments related to distance and mobility and what companies are doing. In relation to this it is important to discuss how teleworking might be used in connection with land use and transport infrastructure development. It is also important to get more knowledge about people's experience of the work trip, distance and a possible accept of increased mobility.