Telework as support to regional development

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Abstract

This abstract shows how telework supports regional development in one case study for employees and another for self-employed. One case study is situated in Estonia - a new economy in the quickly developing Eastern part of Europe. The other case study is situated in one of the more traditional economies in Western European, The Netherlands. From the regional development point of view it is important to mention that although there is not a big difference in the area of both countries (Netherlands 42 000 km^2; Estonia 45 000 km^2), the population of Netherlands is many times greater (in 2004 Netherlands 16,3 million and Estonia 1,4 million).

Technological innovation has caused changes in the meaning of the term "workplace". According to Maria Österåker (Österåker, 2003) the contemporary workplace is not anymore a physical place. The movement between the workplace and home that was earlier seen as merely a physical movement transformed into a mental movement between spheres. We can see these changes in data about telework usage in recent years. In Finland it was estimated that even 20% of the working population worked in professions suitable for telework and about 40% of occupations (at least to some extent) could be done as telework in the future (Heinonen, 2000). This phenomenon has made regional development more feasible. Importance of commuting decreases and the workplace as a physical place undervalues.

Discussion about the workplace – related to these two case studies – gives insights in the backgrounds of recent developments in European economy and shows perspectives and possibilities for sustainable social and economic growth.

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Introduction

Telework usage is increasing rapidly but still there is a lack of data about telework's impacts and potential. The goal of this article is to introduce the potential of telework as a tool for regional development and introduces two studies that were carried out among teleworkers. One of these studies was funded by the European Union and it was carried out among self-employed in Utrecht, Netherlands 2004-2006. Project was called to MKB Servicepoint project. The goal of this project was to stimulate the local economy, social integration and regional innovation (Eveleens, 2006a). Another research was carried out in TUT 2005-2006. This study measured telework usage and its impacts among academic personnel.

1. Telework

Concept of telework was first introduced by Jack Nilles in 1976 (Nilles, 1976). The goal was to reduce commuting: "why transport people when one can transport information?" Jack Nilles used term *telecommuting*, but later term *telework* became dominant. In recent years we can find that some studies use *e-work* instead of *telework*. It refers to that issue of commuting is not in focus anymore. As traffic jams are still big issues in most of the cities in the world telework plays an significant role for regional development allowing people to work from a distance at least part of their worktime.

There is still no general agreement on telework definition. Telework guru Lars Qvortrup has said: "Counting teleworkers is like measuring a rubber band. The result depends on how far you strech your definition." (Qvortrup, 1998). **Telework is defined in this paper as "a work carried out outside of the central office, involving new technology that permits communication."** Part-time teleworking that is far more common than full-time teleworking is also included in this definition.

Increasing popularity of teleworking is comprehensible. Telework offers a lot of options for employees, employers and for society and environment. But it is necessary to take threats of telework also into consideration. Advantages and disadvantages of telework for the employees, employers, society and environment are described in (Heinonen 2000). Therefore, telework has an impact on human factors and job satisfaction. It has an effect on the employee-company interaction. From the employees' point of view the benefits are:

- Savings in commuting time and expenses;
- Strengthening working motivation;
- Flexibility of the working mode;
- Fitting work into own rhythm and situation of life;
- Peace to do work, followed by a higher work efficiency;
- Emphasis on the contents of work;
- Increase in employability.

There are also advantages for employers. Benefits for employers and companies are as follows:

- Lower overhead costs;
- Increase in productivity;
- Keeping the skilled employees and recruiting new ones;
- A better company image concerning environmental issues.

Telework has also a positive impact on the environment. Advantages for the environment and society are as follows:

- Less traffic;
- Decrease in emission caused by fuel consumption and traffic;
- Less consumption of resources;
- Savings in infrastructure;
- Improved local economy.

There are also possible risks involved in teleworking. Disadvantages for employees are:

- Having to reserve space for work at home;
- The health hazards of office equipment;
- The risk of social alienation;
- The risk of burnout;
- The risk of discontinuing a promising career.

Disadvantages for employers are as follows:

- Initial investment expenses;
- Risk concerning data security.

Disadvantages for the environment and society are as follows:

- Scattered community infrastructure;
- Extending domestic telework abroad.

It is important to advise all parties about telework's impacts. Most of these risks can be minimised by proper work arrangements. The research in Tallinn University of Technology showed that the most common form for an individual (70% of respondents) is 1 to 20 hours of telework in a week. For companies and organisations investments are usually already made by their employees. It is ordinary

nowadays to have a personal computer with internet access at home. But employer cannot control the working conditions outside the office.

Telework's popularity in Estonia has increased rapidly. Only a minority of teleworkers work completely in a telework form. More common is to work part of the time in a telework form.

Working Life Barometer survey (sample of about 1000 individuals) was carried out in Estonia in 2005. According to this, 23% of the working age population was teleworking either sometimes (20% of respondents) or continuously (3%) (Working Conditions in Estonia, 2006). Teleworking has become a normal part of working style. Workers, especially those employed with intellectual jobs, do their work often from home or in a mobile form from a café or simply by sitting on a bench in a city park. Both authors of this paper have experienced teleworking for years and have worked even in the open air – on the beach, forest etc.

Still 56% of the respondents according to this survey have never tried nor are interested in teleworking. Only 7% of the respondents have never tried but are interested in doing telework. It is clear that not all occupations are suitable for telework. Furthermore, teleworking might not suit for every individual. Also employers might not allow their employees to work from outside the central office.

The same research shows that those who have used teleworking were doing so for on average of 9.5 hours per month. This is slightly more than one workday. 47% of teleworkers used their own ICT (information and communication technology) equipment while 20% used the employer's equipment and the others used partly their own and partly their employer's ICT equipment. Even today most of the homes have their PC with internet connection and this can reduce companies' investments on ICT equipment.

An earlier Estonia's telework research (Kilemit 2002) showed that 22% of the companies had experienced teleworking (this number was higher in small enterprises) in recent 10 years and 21% of companies still used teleworking. As the definition of telework is not yet very clear to everyone it is hard to compare results of different studies.

The same study reached a conclusion that the mobile form of telework is the most popular in teleworking (52% of companies and 56% of employees). A mobile form of telework usually needs more investments into ICT equipment, but laptops are becoming more popular. 19% of companies are using satellite offices. Partial teleworking seems to be a more common form than absolute teleworking.

According to the same study, 49% of teleworking companies use teleworking in selling, 35% in customer service, 29% in accounting, 22% in designing, 19% in data processing, 14% in consulting, 14% in information technology, 8% in information services, 3% in text processing, 3% in arts, literature and science, and 11% in other occupations. Telework's popularity in selling has become possible thanks to the PDAs, pocket PCs that can be connected to internet and because sales agents can send orders to the main office right from the client's shop.

63% of teleworkers are male and only 37% are female (Kilemit 2002). There are no significant differences in the age of teleworkers. 72% of those companies that are using teleworking think that teleworking has a positive or probably positive impact on company's efficiency. None of the non-teleworking companies believed that teleworking has a positive impact on company's efficiency (24% believed that the impact is likely to be positive). 13% of non-teleworking companies expressed their opinion that teleworking has a negative or probably negative impact on efficiency, while only 5% of telework-using companies believed that the impact is likely to be negative (none of telework-using companies believed in the negative impact of telework). It can be assumed that these positive attitudes can increase telework usage in the future.

The majority of companies found that the main obstacles in teleworking are lack of control and sophisticated managing and/or lack of job places that would suit to teleworking. Telework needs employers' trust in their employees. In the central office employers can be surer that their employees are doing work during all the working hours. So teleworking suits better to jobs that have clearly measurable results.

A study in Finland shows a great potential for telework in the future. In Finland it was estimated that even 20% of the working population were in professions suitable for telework and about 40% of occupations at least to some extent could be done as telework in the future (Heinonen 2000).

2. Regional development

Figures 1 to 3 show the impact of changes in economy to the places where people work and live. In the agricultural age (in the Netherlands in the 19th century; see figure 1) most people worked on and

around their farms. The working population worked and lived in local communities. People were closely connected to each other and hardly travelled to their towns or abroad nor left their village.

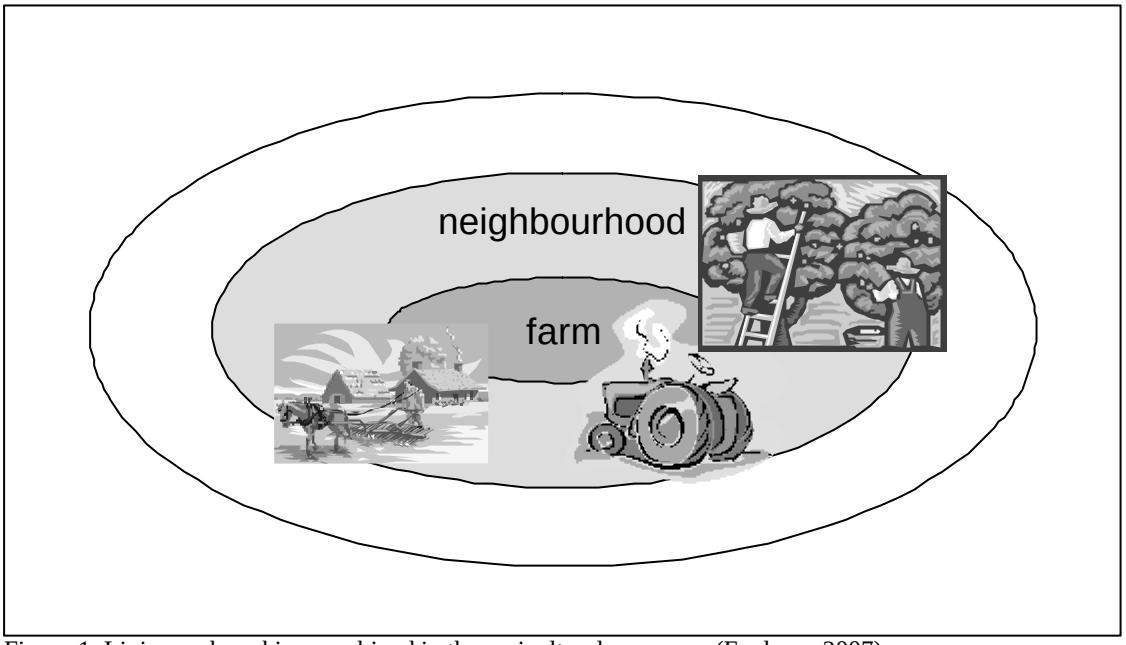

Figure 1. Living and working combined in the agricultural economy (Eveleens 2007)

In the industrial age (see figure 2) in the 20th century work was connected especially to factories. People decided to live separate from the workplace. They moved from home to work by car. Dormitory districts were created, with cars in front of the houses in the evenings and much room and rest during daytime. Roads and cars are essential for the connection between work and ordinary family life.

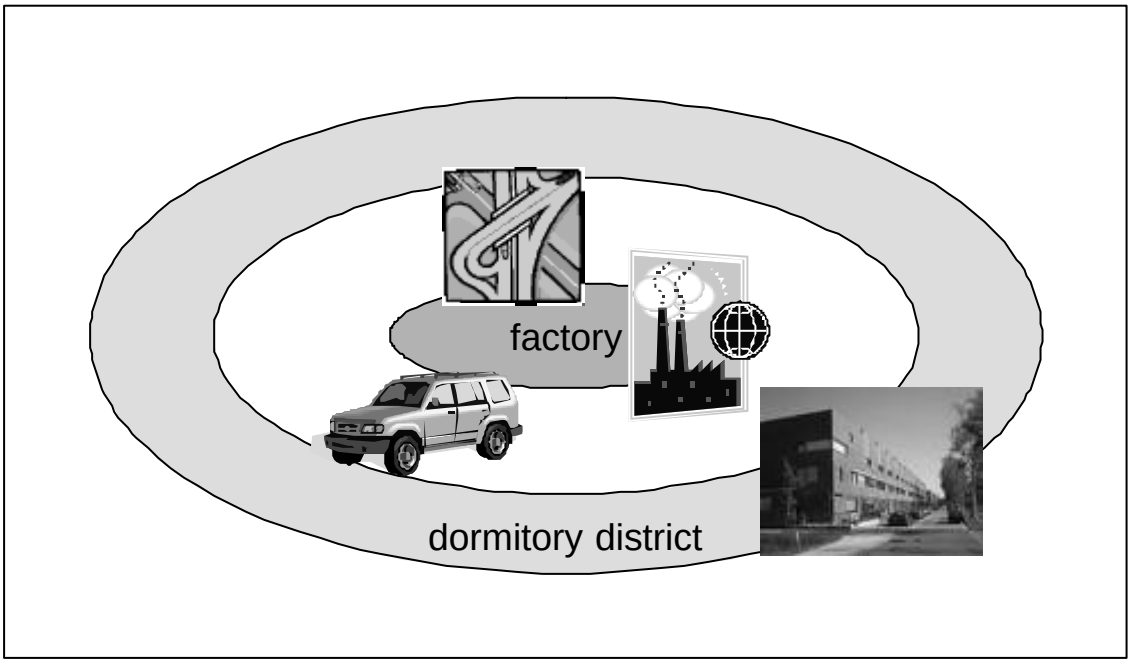

Figure 2. Seperation of working and living in the industrial economy (Eveleens, 2007)

In the knowledge economy (see figure 3) of the service industries the working population started to choose their favourite place to be. Much work can be done anywhere with the help of a computer and internet; with the client, at home or during travelling in a train or airplane. Figure 3 shows the new work style concept and model that was the result of the project MKB Servicepoint (Eveleens, 2006b).

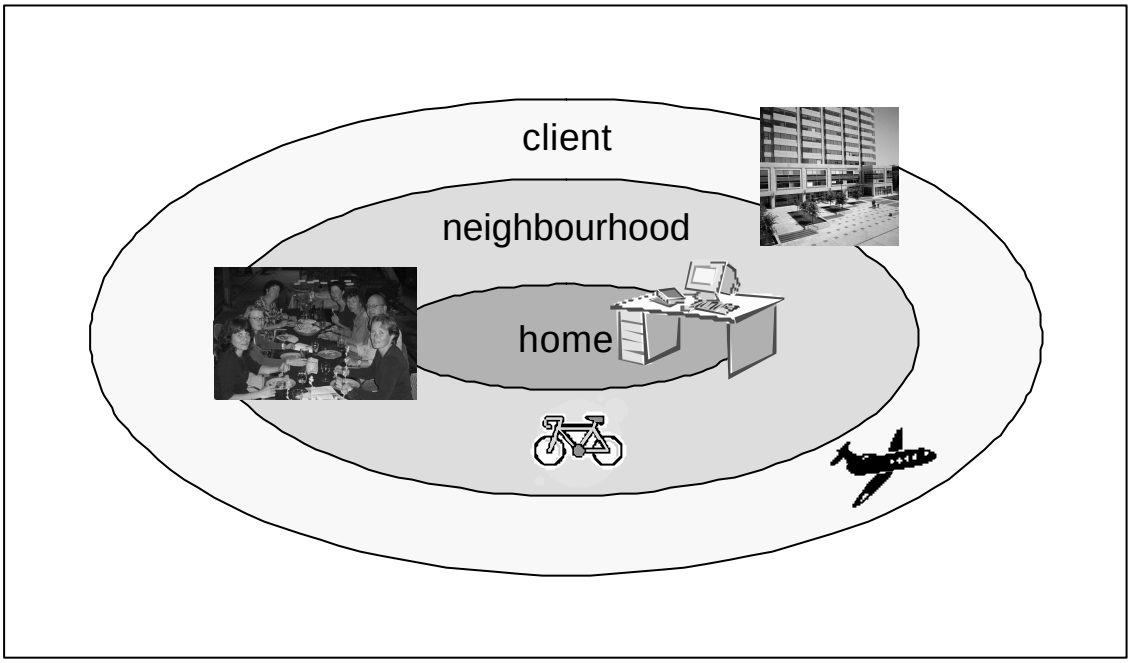

Figure 3. Working anywhere in the knowledge economy; with a workplace at home and on elsewhere (Eveleens 2007)

Hot issues in the Dutch economy in 2007 are: traffic jams, climate change, air pollution (restrictions in possibilities for building houses) and the possible rise of the seawater level (half of the country is under sealevel). This concept of working from home makes a variety of individual workstyles possible; both for organizations and their employees as well as for self-employed. New workstyles and changing in behaviour can create sustainable solutions.

3. Research methodology

The study in Utrecht was developed as a tool for creating awareness of possibilities for and with self-employed. And also for developing knowledge on the needs of self-employed related to area (postcode) and the characteristics of the self-employed entrepreneur. The questionnaire was used for that purpose and is to be found in table 1.

This Dutch research was initiated by Wietske Eveleens and carried out in four stages: feasibility study in 2004 and two pilot studies in 2005 and 2006. In 2007 the project is being evaluated and repositioned in the market in the form of a knowledge platform Wietske Eveleens graduated as an industrial designer (M.Sc.) in 1983. She is registrated as a European ergonomist and experienced in the field of office innovation and teleworking. She works from home as a work style specialist since 1999; the home is her flexible basis for working anywhere. In addition to the project's goal she also wanted to achieve risks minimization for her personal workplace. She had experienced that lot of other self-employed specialists in her neighbourhood appeared to be struggling with similar problems. Utrecht is a small city with 300 000 inhabitants and it is situated in the centre of the Netherlands. In 2007 the sample size grew up to 225. Respondents were asked to assess their needs as self-employed workers on a website and in meetings. The outcome of assessment was then analysed in working groups of self employed themselves and solutions for users were defined finally. The research methodology can be summarized as follows: to

design helps users in developing self-consciousness on their needs and wishes. That is a good basis for developing knowledge, innovative solutions and also for changing behaviour and smarter work styles.

From the end of 2005 till the beginning of 2006, René Arvola, his colleague PhD Ülo Kristjuhan and two former bachelor students (Mari Arnover and Kadri Rohulaid) carried out a study at TUT. Purposes of the study in TUT were to measure telework usage in case of knowledge work, to identify factors that have impact on workers' telework usage, and to find possible differences in health, age etc between workers who do telework and those who do not.

The research sample consisted of academic personnel of Tallinn University of Technology. All departments were participating. Participation in the study was fully voluntary. The questionnaire was available on paper and it was also sent by e-mail to most of the academic personnel. The questionnaires on paper were supplied with an empty envelope with the address on it so that the respondents could easily return their answers. The survey population was 1394 (all academic personnel in TUT) and the sample 260 persons (returned completed questionnaires). The representative sample needed to be at least 100.39 respondents (see Eq. 1). As the sample was much bigger than necessary, the results of the study are representative.

$$n = \frac{t^2 s^{\,2} N}{\Delta^2 N + t^2 s^{\,2}} = 100.39$$
$$t = 0.95$$
$$\Delta = 0.5 \qquad (1)$$

The respondents were also asked to answer the questions about their activity of publishing articles, their age, health issues and their proficiency in working with a computer. There were also questions about commuting time spent daily from home to office and how many times a week respondent commutes between home and office. There were open questions as well as multiple choices. The respondents could characterise positive and negative sides of telework.

4. Research Results

The results in the Dutch study show the needs of a fast developing group of self-employed in the Netherlands. In 2004 in a report of EIM (www.eim.nl) the size of the total group was said to be 144.000 people (about 16.000.000 inhabitants). In the beginning of 2007 it is being said, that the size of the group self-employed (or indepent entrepreneurs without personal, the so-called zzp'ers in Dutch) is about 500.000 people. And there is an estimation that within 5 years the populations will be about 2,5 times bigger so about 1.250.000; about 25% of the working population).

Table 1. General questions concerning enterprising-from-home (translated from Dutch) on the website www.smeservicepoint.eu.

Is enterprising from home a definitive (or temporary) solution?	yes	a little bit	no	no opinion
Do think enterprising from home is a good solution?	yes	a little bit	no	no opinion
Do you have contact with a facility center for small entreprises in your neighbourhood?	yes	a little bit	no	no opinion
Would you like it, if you could go there for support?	yes	a little bit	no	no opinion
Do you have contact with other self-employed of enterprises in the neighbourhood?	yes	a little bit	no	no opinion
Would you like to have more contact with other self-employed or enterprises in the neighbourhood?	yes	a little bit	no	no opinion
Is innovation and learning important for your business?	yes	a little bit	no	no opinion
Do you need more services for innovation and learning in the neigbourhood?	yes	a little bit	no	no opinion

For the self-employed the home is a good place to work (52%); a basis for work activities in different places (at home, on the road, with the client). 73% of the respondents think that home is a good solution for their work. There are some existing facility centers in neighbourhoods; but there is not much contact between self-employed and (entrepreneurs with an office in) these centers (12%). Anyhow the self-employed in the neighbourhood would be happy if they are offered more tailor-made flexible facilities and services for their convenience (48%). As self-employed are often well educated; it is no surprise, that they consider learning and innovation to be core activities (79%). 46 % would be happy if there were more solutions for learning and innovation in their neighbourhood (see figure 5).

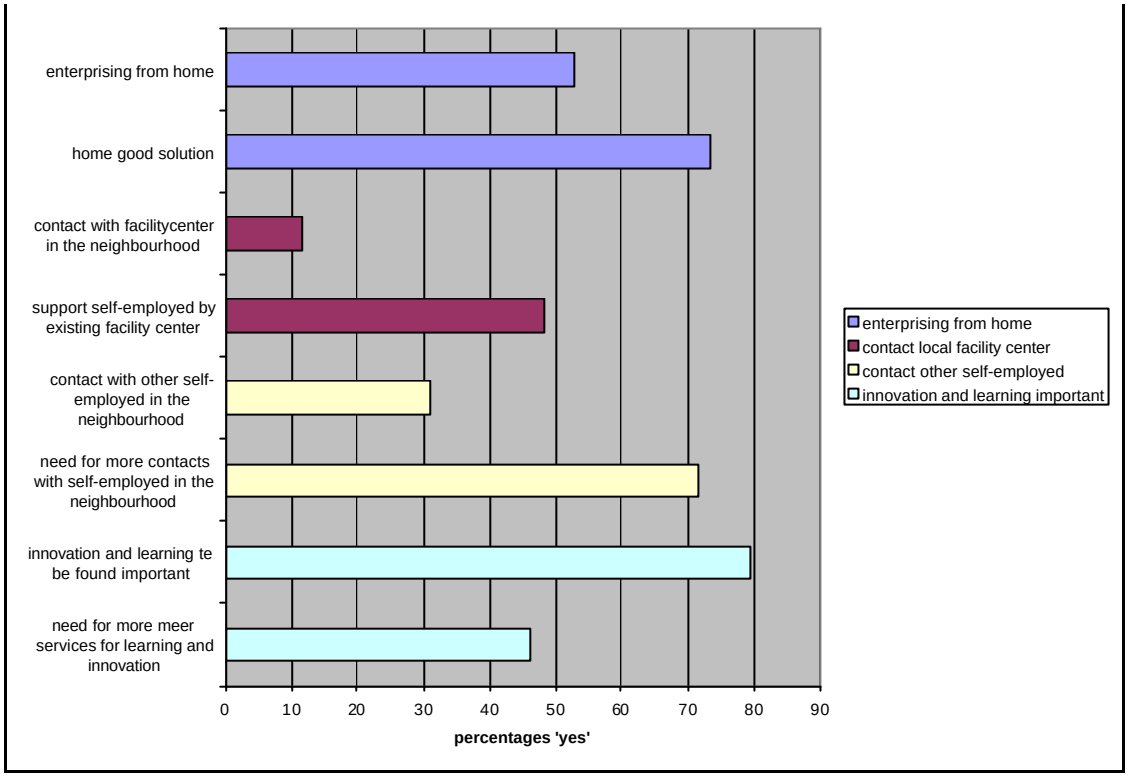

Figure 5. Results of general questions for self-employed (225 respondents in the Netherlands).

A selection was made of possible services for self-employed (see figure 6). The goal was to offer additional services and facilities for a workplace at home in order to improve working conditions, comfort and efficiency of the worker. A self-employed worker – working from home – has chosen an innovative work style; an office is not necessary anymore for many types of work. You can think of activities such as writing, developing software or websites and giving trainings. Additional solutions are necessary in order to neutralize risks; such as social isolation, lack of support of colleagues or unwanted combinations of work and private situation. The services in figure 6 are not a complete list of all useful solutions, but give an indication of possibilities and needs.

The study also brought out an overview of 17 selected possible services that were desired and percentage rankings. The chosen services would give an indication of the possibilities to develop and offer tailor made solution in the future by SME Servicepoint. The most important service (mentioned by almost 70 percent of respondents) was mutual help by other self-employed workers. There was also need for booking facilities on a web site. After workshops where self-employed discussed on a basis of the questionnaire's results tailor-made solutions were created. In figure 6 is shown the percentages 'yes' answers on the online questionnaire on www.mkbservicepoint.nl or www.smeservicepoint.eu.

The need for mutual help between self-employed appears to be greatest (79%); self-employed hope to find colleagues close to their homes to cooperate with. Every self-employed person - journalist, trainer, webdesigner, artist, accountant, physiotherapist or consultant – means something else with these

words. Needs varied, dependant on his or her occupation, situation and personal wishes. In mutual help the self-employed find his or her own way in fulfilling his or her needs.

The results of the other services can be found in figure 6: need for innovation 63 %, courses and meetings 61%, knowledge point 60%, meetingroom 52%, lunch 51%, room creative sessions 48%, temporary projectroom 46%, computer support 43%, booking 41%, experimenting 40%, renting electronics 39%, pillar 37%, trial of software 36%, secretary 34%, flex workplace 26%, comfort services 18%.

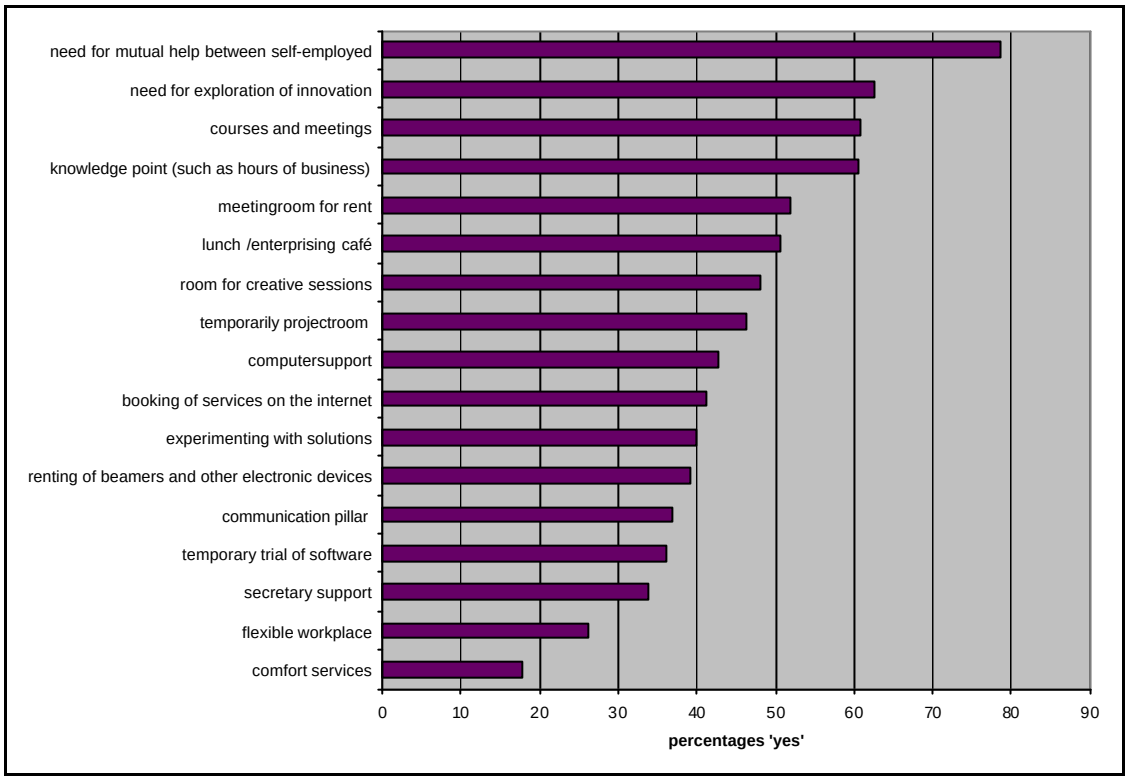

Figure 6. Results of the question: Which services would you choose considering additional solutions for your workplace at home (225 Dutch respondents)

The answer of the last question (not shown) is promising: almost 50% of the respondents expect that they can improve their market position with solutions as mentioned.

The project in the Netherlands showed how an infrastructure (site, place) and self organization by self-employed created a basis for the local economy in the city of Utrecht. Inspired by the success of the project self-employed started to organize their selves in about 15 other cities and villages as well. The project is now being transformed into a national knowledge platform on support for enterprising from home. The website is a central platform for communication and exchange of information under construction. Both on the national level and on the local level.

Study in TUT measured telework usage, work productivity, overworking, health factors, distance between home and office, age etc. Only 8% of respondents were not using teleworking (See Figure 7). There were no age or sex differences among teleworkers and non-teleworkers. There were no significant age difference neither which tells us that using ICT technology is not problem for older workers.

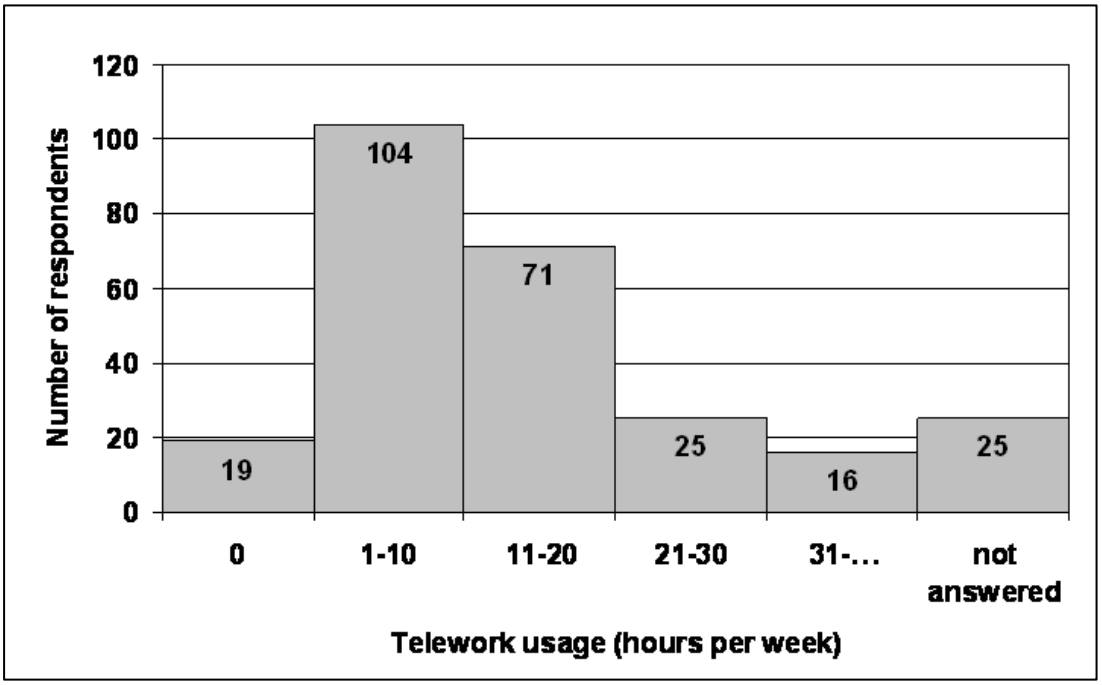

Figure 7. Histogram of telework usage. (Arvola, 2006)

Productivity was also took into account. Productivity was measured through hours that respondent spent on scientific work (working with literature, planning and carring out the research) and amount of scientific publications respondent had published during last year. There wasn't difference in productivity comparing teleworkers and non-teleworkers in both cases . Though 57% of respondents said that they use telework because of better concentration on work while working outside of the office (e.g. from home). 54% answered that they telework because it enables them to save time and money. Difference in perceived stress level is demonstrated in Figure 8.

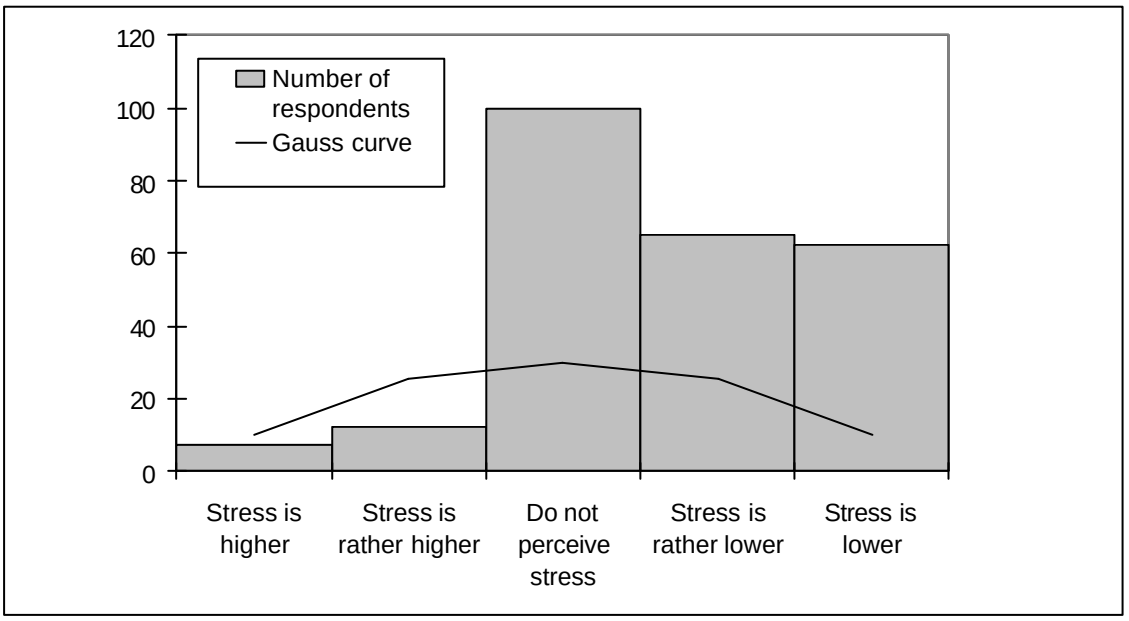

Figure 8. Perceived Stress Level of Employees outside the Office Compared to Stress Level at the Office. (Arvola, 2006)

Perceived stress level was much lower while working outside the office. Almost 70% of respondents said that there is more privacy while working from home and 10% of respondents said that there is more privacy in office. One quarter of respondents had better IT equipment at home compared to IT equipment at employer's office, but 42% had better IT equipment at employer's office.

Only one fifth of the respondents said that they are willing to work only in office provided by employer. 22% would do so only in case of better work and wage conditions. 18% said that they are not willing to work only in office provided by employer. These results give us a good picture that willingness to work in a telework form varys individually and remarkable part of knowledge workers take telework as inescapable.

More than half of the respondents visited workplace at employer's office 5 times a week. 36% visited office less than 5 times a week (18% - 4 times, 10% - 3 times, 5% - twice and 3% once a week) and 10% of respondents visited office more than 5 times a week. Comparing these results to hours worked in telework form we can conjecture that teleworking in most cases did not decrease commuting. Most of the teleworkers still visited employer's office as regular basis. Though flexible working hours can decrease traffic jams and less hours would be spent on commuting. But there is still an option for decreasing commuting by better planning of the workweek. The solution seems to be if a worker plans some days in week to work without visiting employer's office. This enables to save time on commuting. Following results show that commuting time in week is sometimes even 8 hours – a whole work day (See Table 2).

As seen in figure 7 the majority of academic personnel worked 1-20 hours in a telework form which is about 1 or 2 days a week. Working two days a week from home can save time at least about 1 to 4 hours a week. Together with saved time there is also a remarkable saving in fuel and less air pollution.

Table 2. Time that is spent on commuting

Time that was spent to commuting to work	Assumed time spent on commuting in week when working on regular basis (5 days a week)	n	%
Up to 15 minutes	Up to 2,5 hours	42	16%
15 to 29 minutes	2,5 to 5 hours	112	44%
30 to 60 minutes	5 to 10 hours	79	31%
Over 60 minutes	Over 10 hours	22	9%

Teleworkers had less complaints on stress, hypertension and tired eyes than non-teleworkers (See Figures 9, 10 and 11). Academic personnel preferred working from home mostly because of the privacy and silence (Arvola, 2006).

Discussion

Telework looks like a two-edged sword. As study in Netherlands showed full-time teleworkers recognize the lack of mutual help or communication with other self-employed people. Whereby study in TUT showed that one of the major drivers making intellectual workers prefer working from home is need for privacy and peace. Needs of employees complement those of self-employed. Employees look for silence since they already have social contacts in their organization or company. Self-employed want social contacts since they mostly work solely. These are the two sides of the sword of working independently from time and place. This leads us to the conclusion that working people need both concentration and contact during their work. This phenomenon is closely connected to findings in other studies in the Netherlands concerning the character of work in the knowledge economy. The effects of telework on employees and self-employed strengthen the same conclusion. Many workers both communicate and concentrate intensively during their work. They alternate between these different tasks. Employees and self-employed want to decide by themselves where to do these tasks. Thus they optimize the environment and their working conditions related to the task.

Estonia has transferred rapidly from the soviet agricultural and industrial economy into the knowledge economy in recent 15 years. The economic development of the Netherlands seems to be more the result of transformation of society and economy in a few hundred years since the golden age and international trade with colonies. The Dutch economy is open and has a strong infrastructure for transport – roads, railways, seaports and airports. There is no strong focus on an infrastructure for the knowledge

economy yet. A growing numb er of inhabitants is moving abroad because they do not like the environment anymore.

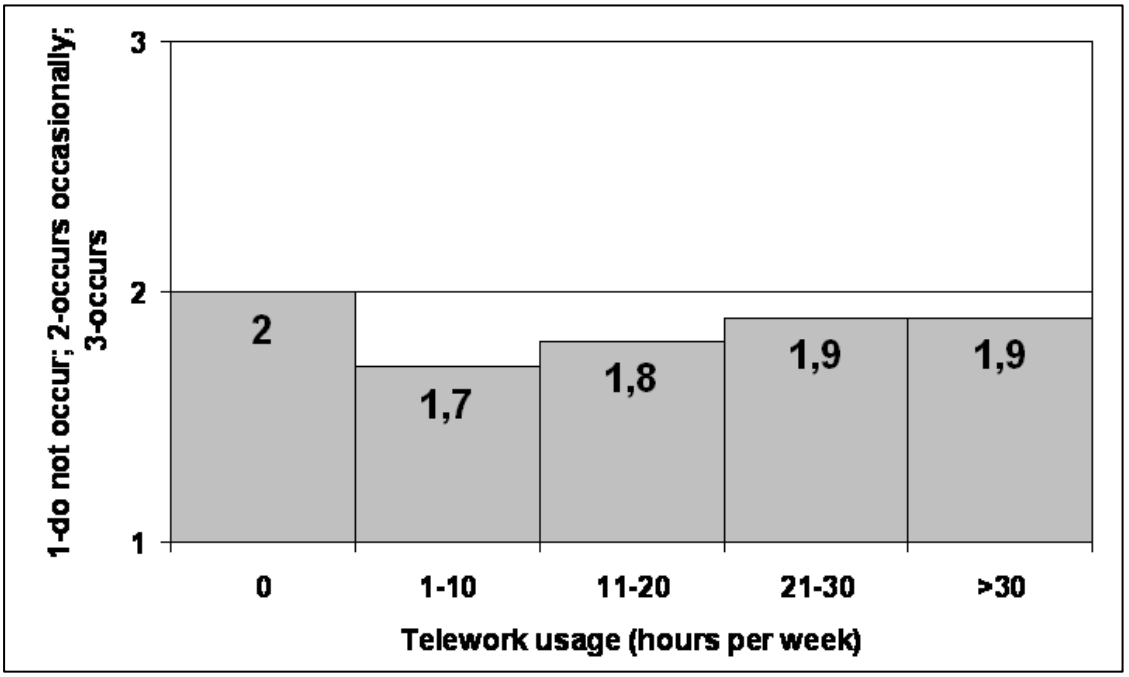

Figure 9. Complaint on stress. (Arvola, 2006)

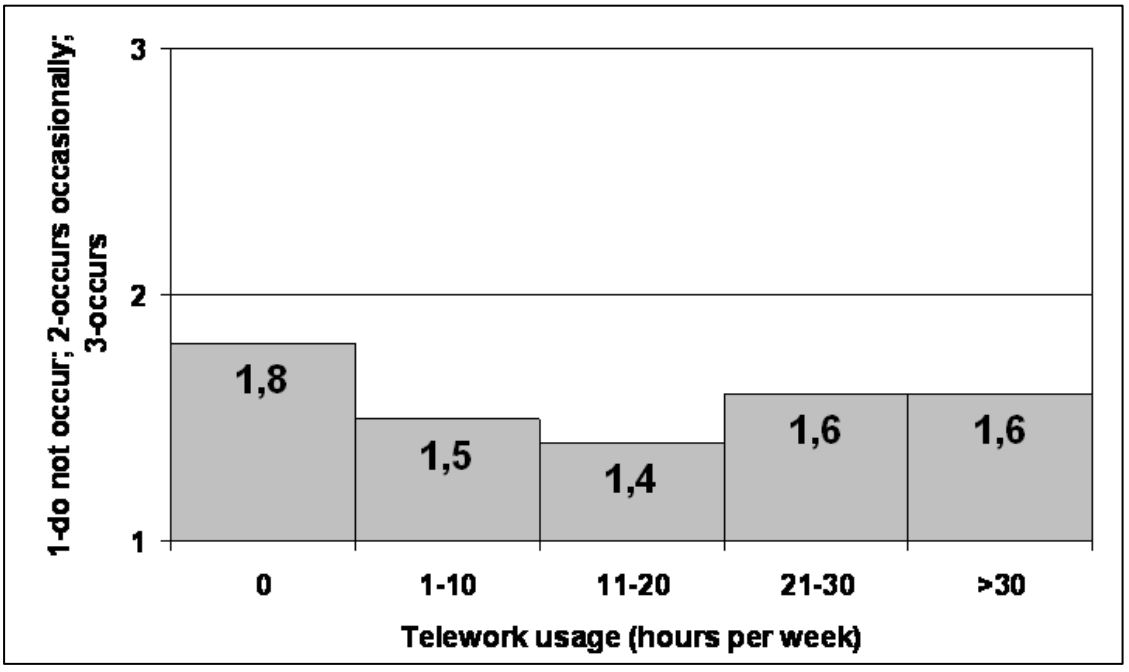

Figure 10. Complaints on hypertension. (Arvola, 2006)

Estonia could jump directly to a healthy new economy with nice green and fresh environments – whished by the knowledge worker - by focusing on infrastructure that supports both local social integration

and also international communication. The missing of a strong industrial tradition could appear to be an advantage.

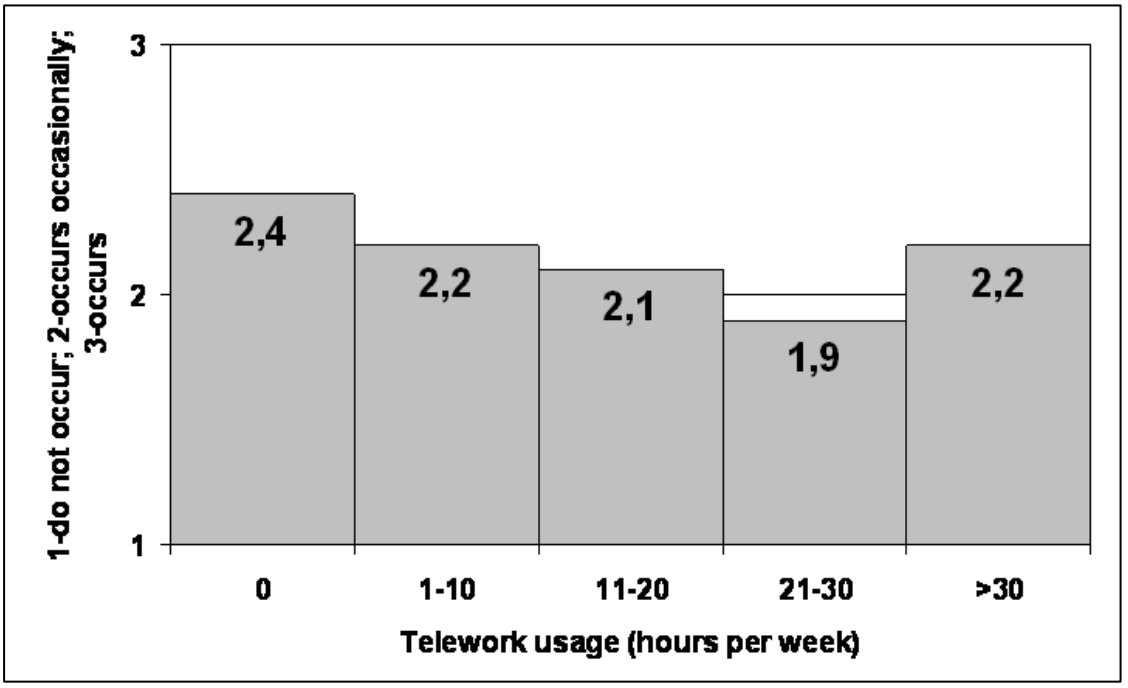

Figure 11. Complaints on tired eyes. (Arvola, 2006)

Results of the Dutch project are surprising for policy makers, political parties and authorities in the Netherlands. Friction between actual policies (supporting especially industries) and a quickly changing market of independent knowledge and creative workers (now about 10% of the working population) is slowly being recognized. Until now there was little support for this new quickly growing group in the Netherlands. This international publication – comparing the situation in Estonia and Netherlands - might help to get the subject higher on the national and regional agenda. That might speed up the creation of suitable solutions.

Conclusions

Telework has a positive effect on regional development as research in Netherlands showed. This new work style concept supports the local economy, social integration and regional innovation. Trust and social structures and security are important conditions for sustainable economic growth.

Research in TUT showed clearly that part-time telework (1 to 3 days a week) is an optimal solution in many aspects (regional development, age management, environmental issues etc).

- Telework adds flexibility to work environment;
- The greatest potential seems to be in part-time telework where direct contact with colleagues is combined with privacy and ability to have more concentration on work.

These two cases and developments concerning telework for employees and for self-employed have the same effect in the neighbourhoods: appearance of working people during daytime in areas meant for living. Both choose for partly working at home. The research in Netherlands shows what type of solutions and services the self-employed prefer. The employee will find most needed additional solutions in the office of the employer, but could also be happy with extra solutions close to the home. This is something for further investigation and also being explored in other projects.

Services and infrastructural solutions will support the regional society and economy. This would also be profitable in the light of new European regulations on minimising the CO_2 in the air. Clever tailor made work styles for the knowledge, service and creative economy can support regional development,

social integration, well being as well as economic competitiveness. Solutions in the field of new ways of working contribute to the development of a social, sustainable and competitive European economy.

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