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How to measure eWork in social surveys

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Abstract

One of the objectives of the STILE project[1] was to define indicators to detect teleworkers: for this aim a set of indicators was defined which could be inserted in the statistical inquiries on labour forces in Europe.
Initially, we analysed two possible strategies to detect teleworkers through a broad statistical survey:
a) by providing respondents with an exact definition of telework and asking them if they could categorise themselves in this work form;
b) by identifying teleworkers through an 'ex post' combination of different indicators on the main features of the phenomenon.
The first strategy, which has until now been used the most in inquiries on samples of the population, is easier to use but some problems do emerge in its application.
The first one is surely the difficulty choosing one of the definitions of telework available as any choice is bound to restrict or broaden the field of inquiry. Furthermore, any definition eventually risks becoming obsolete, compromising the continuity of future surveys.
By proposing a definition the respondents may be influenced by the social desirability/undesirability of their reply rather than give a true description of their situation.
Whereas with the cross tabulation (of indicators) approach it is not necessary to ask the respondents whether they consider themselves to be teleworkers as this can be discerned by combining several indicators on the main aspects of telework.
The essential aspects to detect teleworkers are those mentioned in the vast majority of definitions: the place where the worker carries out his job, the amount of time spent working at a distance from the main office and the importance of the use of information and telematic technologies.
On the basis of these considerations the cross tabulation approach was selected and a set of indicators was proposed to capture both the core traits, indispensable to quantify the teleworkers and additional traits, useful to qualify the various forms of eWork.

On the basis of the indicators selected in the first phase of the project, a questionnaire was put together and tested on 718 workers in Belgium, Italy, Hungary and Great Britain.
Apart from the questions on telework (main indicators) and on the work environment, the main indicators on the labour force (LFS) were inserted to ensure the comparability and congruence of the data surveyed in relation to current inquiries.
In the case of the pilot inquiry the cross tabulation approach proved to be highly productive as the combination of indicators allowed teleworkers to be detected as well as various

typologies to be ascertained based principally on prevalent workplace and systematic working at a distance.
Variables on the use of technologies were used only as a filter to distinguish the real teleworkers from those who work in a place other than the traditional office but without the help of ICT technologies (door to door sales reps, tailors, refuse collectors, drivers, etc.).

1. Introduction

1.1 Measuring telework: a definition problem

The multiple definitions used to describe telework have dominated the debate on this issue. This has inevitably had repercussions on measuring the phenomenon. To count teleworkers it is essential to agree on a definition as 'Measuring telework is like measuring the length of an elastic: it all depends on the how taut it is' (Qvortrup, 1998). Some authors extend the concept of telework to all types of work done at a distance even if the telephone is the only instrument used (De Masi, 1995[2]), others restrict telework to the case of employees with an exclusive contract (Bracchi and Campodall'Orto, 1995[3]).

The elements common to most definitions refer to an activity conducted in a place other than the traditional office with the systematic use of telecommunications.
These are elements which characterise the most well-known definitions at the European level, like the one of the International Labour Office of Geneva, that has defined telework as 'any form of work done at a place distant from the central office or from the production centre and which implies the use of new technology to permit working at a distance and facilitate communication' (Di Nicola, 1999), or like the one proposed by the European Foundation of Dublin 'Telework is any form of work conducted for an entrepreneur or a client by an employee or a freelancer or a homeworker which is done regularly and for a considerable amount of the working time from one or more locations other than the traditional workplace with the use of information and/or telecommunications technologies' (Blainpain, 1995).

The vast range of definitions proposed in literature highlights the multidimensional nature of the phenomenon thus requiring the use of a set of indicators to measure and define the phenomenon.

Such complexity derives from the fact that telework is not a type of work (nor type of task or contractual form) but only one of the possible forms of conducting various jobs. It is thus a transversal concept which can accompany the definitions of forms and types of work but not substitute them.

In recent years, various European research projects have produced more or less restrictive measurements of the phenomenon. Of these, the most prominent is surely the one proposed by the Ecatt project in 1999 which came up with an estimated 9 million European teleworkers (6% of the labour force).

According to the Eurobarometro inquiry (2001), which used a more 'restricted' definition, the number of teleworkers is 5.4% of the European labour force (6.1% of men and 4.7% of women), although a good quarter of European workers showed an interest in this form of work. Using a 'broad' definition of remote working, however, the SIBIS project estimates

that in 2002 the percentage of eWorkers of the European labour force was approx. 13%, identifying three main typologies: homebased, mobile and eWork conducted by freelancers or SOHOs (Small Office-Home Office)[4].

If on the one hand figures on teleworkers in the strict sense of the term (telehomeworkers) are now less than once thought, on the other hand, there is currently a 'contamination' of work forms which makes it more difficult to establish the confines between traditional work and telework. ICT and the diffusion of flexible forms of work now permeate all production sectors, to such an extent that in recent EU documents reference is made to eWork, rather than to telework, intended as 'any kind of work conducted from a remote location through the use of information and telematic technologies', including forms of cooperative work and virtual offices.

The development of Internet and ICT technologies allowed a shift of attention from the physical place where work is actually done (the telehomeworker's work station), to the virtual environment (the network) where the work is shared, thanks to the increasing diffusion of groupware systems which facilitate cooperative work through the sharing of documents and calendars and the development of discussion forums which have started to become widespread even within traditional firms (for instance to aid the exchange of information between various offices).

There are evidently clear differences in the diffusion of typologies of eWork in the various countries, in relation not only to the diffusion of technologies but also to the various regulative and cultural systems. Telehomeworking is common in North Europe (15-20%) whereas it is less so in Mediterranean countries (approx. 5%). 4% of European workers are mobile eWorkers. In general, eWork in Europe seems to be more common among the self-employed rather than employees; about 3,4% of eWorkers are self-employed .

The various cultures and economies of European countries have corresponding differentiated eWork practices. According to the results of the Emergence project, Holland is the country where telehomeworking is the most widespread, to such an extent that one out of 10 employers have adopted this work modality even due to the promotion of eWork following the introduction of a platform on telework. Even in Denmark telework has been the focus of public debate and an innovative collective agreement has been signed which has contributed to making it the second country for its use. Lastly in Sweden, Finland, Austria, Belgium and England approx. 3-4% of employers make use of full time telehomeworkers.

The E-gap[5] project, which studied employers' attitude to telework, highlighted how employers were more inclined to use remote freelancers rather than teleworkers from within the firm. Yet numerous studies have demonstrated that telework is advantageous for the firm as it allows space to be saved and increases the personnel productivity (Di Nicola, 2002). The most frequent reasons for resorting to telework are either specific personal requirements (maternity, disabled workers, caring for the elderly, moving home) or the necessity to entrust part of the work to external consultants. Research conducted on employers' attitude to telework shows that there is considerable distrust (especially in small firms) of eWork, as this prevents the visual control of the workers, and introduces complex organisational variables, such as project work organisation, target-based assessment and planning of activities. It is firstly a problem of firm culture and only secondly of technologies and telematic connection systems.

The Lisbon strategy stresses the importance of creating not only 'more jobs' but also 'better jobs' and in European policies, eWork is closely linked to the development of a knowledge society (eEurope 2005, action plan). This is why research objectives in the next few years will not only be aimed at counting eWorkers, but also at reflecting the wider changes that ICT technologies are causing in work modalities, organisation and conditions. In fact eWork allows some firm functions to be decentralised, to find resources in places far from the main offices, to acquire greater flexibility in the management and organisation of work forms.

This brings both advantages and disadvantages for workers and work conditions which can be more or less accentuated depending on the professional groups involved. According to some experts,[6] nowadays firms encourage a type of 'sick' telework as workers can be reached constantly by mobile phones whereas they reject 'healthy' telework (focussed on the workers' self-organisation).

The greatest risk of telework (or better eWork), is its potential to intensify some particular features of some types of work. It can thus make the work of creative workers more productive but also invasive and activities that are already 'bitty' can become more fragmentary or isolating. It so follows that there is an urgent need for norms to regulate the phenomenon and protect the workers, especially those who do high 'risk' tasks, from isolation and overwork.

2. The STILE project and WP5

The aim of WP5 consisted in the identification of comparable indicators, useful to measure and monitor the development of *e*Work and telework practices in employee surveys. Once the indicators to measure telework were defined, questions were put together to be inserted in Labour Force Survey questionnaires and pilot testing was conducted to assess the questions.

The first step of WP5 STILE was to discuss a set of indicators to be inserted within the statistical inquiries on European labour forces. The technique for the administration of specific questions on telework could follow the 'piggybacking' method, already experimented in the USA as an effective method to reach, through a limited set of questions, a small population of workers that represent less than ten per cent of the work force.

In the STILE project a strict definition of telework was not used because there is no general agreement on a definition and because new forms of work at a distance can emerge in an ever-evolving organisation practice. It is however opportune to give data users the freedom to use more or less rigid definitions of telework to quantify the phenomenon.

To select the indicators useful to describe eWorking practices, it is necessary to clarify the definition of telework intended to be used.

STILE definition of telework extends the concept to any occupation that uses telecommunication *links*, as long as they are performed *systematically* (full or part time on a daily or weekly basis) and entirely or partly conducted *outside the traditional workplace.*

This means that telework can be performed at the worker's *home* (home based), from a *location belonging to a third party* (such as customer premises) or from a *mobile station* (mobile telework).

3. The cross tabulation of indicators approach: pros and cons

Which strategy can be used to detect teleworkers in a broad statistical survey? At least two quite different options are feasible:

a) providing respondents with an exact definition of telework and asking them if they could categorise themselves in this work form;

b) identifying teleworkers through an 'ex post' combination of different indicators on the main features of the phenomenon.

The first strategy, which has until now been used the most in inquiries on samples of the population[7], is easier to use but some problems do emerge in its application.

The first one is surely the difficulty choosing one of the definitions of telework available as any choice is bound to restrict or broaden the field of inquiry, in contrast with the users' flexibility requirements.

Furthermore, by proposing a definition the respondents may be influenced by the social desirability/undesirability of their reply rather than give a true description of their situation[8]. Lastly, any definition eventually risks becoming obsolete, compromising the continuity of future surveys.

During the project this effect occurred during the pilot survey conducted in Hungary. The pilot was conducted by the Hungarian Central Statistical Office, within the labour force survey.

Given the vastness of the sample, the Hungarian team decided to precede the telework module by a filter question which asked the respondents if they could recognise themselves in the definition of teleworker presented.

The subsequent control questions then demonstrated that a large percentage of those who declared being a teleworker didn't in actual fact have any of the requisites. It thus seems that the respondents had either a poor familiarity of the term 'telework' or were anxious to please the interviewer by giving an affirmative answer.

It is also possible that the exact opposite may occur: some professionals (especially men) who practice forms of telework may conceal it for fear of being categorised as the less prestigious homeworker.

Whereas with the cross tabulation (of indicators) approach it is not necessary to ask the respondents whether they consider themselves to be teleworkers as this can be discerned by combining several indicators on the main aspects of telework. Such a combination also allows the various typologies of teleworkers to be detected and characterised and to adapt statistical data to specific user requirements.

The essential aspects to detect teleworkers are those mentioned in the vast majority of definitions of telework: the place where the worker carries out his job, the amount of time

spent working at a distance from the main office and the importance of the use of information and telematic technologies.

The work location can be considered to be one of the most discriminating elements of telework. In fact this indicator allows a distinction to be made between a telehomeworker or *home based* teleworker and a teleworker who works on the move (mobile) or from a telecentre. Such an important indicator should detect those who work exclusively from home, a telecentre, customer premises or a mobile station as well as those who work from both the main office and the outlying branches, including home.

The amount of time spent working away from the main office allows the frequency of telework to be identified, and a distinction to be made between regular and occasional teleworkers (supplementary teleworker). The threshold generally advised to distinguish between these two types of teleworkers is at least one whole day a week spent teleworking.

The amount of time spent working at a distance also allows a distinction to be drawn between permanent teleworkers (at least 90% of working time conducted at a distance) and alternating teleworker (Ecatt, 1999).

Lastly, the importance of ICT use, allows telework to be distinguished from other home based work (or work conducted from outlying branches) for which information and telematic instruments are not indispensable. This is surely the most complex dimension which is susceptible to obsolescence. However, it can supply important information and allow a distinction to be made between various types of technical organisation or levels of interconnection between workers (on-line and off-line), and between types of telework defined on the basis of various levels of importance of /necessity for ICT tools.

The choice to detect teleworkers through a combination of various indicators makes data management more complex but it ensures that final data is more adaptable to user requirements. Furthermore, the combination of the indicators ensures better results in comparative inquiries as it is easier to identify comparable indicators of the three dimensions rather than use a definition which is attributed the same meaning in the various economic and cultural contexts.

4. Significant indicators considered for the analysis of telework

On the basis of these considerations, the cross tabulation (of indicators) approach was privileged through the creation of a set of indicators. The multidimensionality of the phenomenon clashes with the need for 'parsimony', typical of vast statistical inquiries like European surveys on the labour force. Given that there might only be very few questions added to the questionnaires, a distinction was made between core indicators, indispensable to detect teleworkers, and additional indicators, useful to describe teleworkers and work environment.[9]

The core indicators (four questions) in the first pilot test was related to the essential dimensions of the phenomenon and measure the *place* where the worker performs his/her working activity, the degree of importance of information use and telematic *technology* (quota of time that the worker uses a PC and is on-line, kind of technologies used, who provides technologies) and the *quota of working time* spent on work at a distance.

In addition to these three dimensions, several additional indicators were selected on the 'work environment' of telework in order to describe the phenomenon:

- kind of activity done from a distance (open question with list);
- motivation for teleworking (finish or catch up with work; to avoid interruption; because of a bad working environment or bad working relationships; required by job or employer; to co-ordinate your work schedule with personal or family needs; experimentation; reduce commuting time or expense; health reasons; for greater autonomy or independence);
- who initiated the arrangement (employer, worker, both);
- whether formal or informal arrangement;
- reversibility (to have the opportunity to interrupt the telework experience);
- assessment on health and safety of work;
- assessment on work pressure after starting to telework

After having done the pilot test, the research group proposed a new ad hoc module of 6 indicators (and relative questions) referred to the three main dimensions of telework (place, time, technology). Such questions allow the interviewer to ascertain if the respondent can be considered a teleworker. Those who get by the filter question can be asked more detailed questions .

The proposed indicators are as follows:

- a1. Use of computer for main job. (Do you use a computer for your work?) (yes/no question to put to all respondents) [FILTER QUESTION]
- a2. Use of Internet and electronic mail for main job . (Do you use the Internet or email for your main job?) (yes/no question to all respondents)
- b. Workplace. (In the last four weeks - reference week and 3 weeks before - have you carried out work at any of the following places?) (multiple option question to all respondents)
  1. In your own home
  2. At locations belonging to a third party (such as customer premises)
  3. On the move (while travelling)
  4. In more than one location belonging to customers or clients
  5. Other places different from traditional workplaces (hotels, conferences, etc.) (specify: _____)
  6. In more than one location belonging to your employer
     [no teleworker - stop questionnaire]
  7. At just one location belonging to your employer
     [no teleworker - stop questionnaire]
  8. Other traditional workplaces (specify: _____)

- c.Time spent working at a distance. (In the last 4 weeks - reference weeks and 3 weeks before -, approximately how many hours a week, on average, did you spend working at a distance (from your employers' premises)?
- d.Use of computer for work at a distance. (Do you use the computer for work conducted at a distance from the main office?) (yes/no question) Would it be possible to work in this way without the technology? (yes/no question)
- e. Use of internet and electronic mail for work at a distance. (Do you use Internet and electronic mail for work conducted at a distance from the main office?) (yes/no question)

The order of the questions may be adapted to suit the context of the specific inquiry. In the case of very large samples two simple filter questions can be inserted to ascertain the general use of the computer and Internet at work (a1 e a2), before going on to questions targeted at determining the condition of teleworker. It is also necessary to ascertain whether telematic technologies are actually used in the case of work at a distance to distinguish between the teleworker and homeworker. Of course, the filtering power of a question on the use of the computer at work is destined to decrease in time, even if information on the characteristics of those who use the computer and Internet for work has a relevance which goes beyond the debate on telework. The use modalities of technological instruments can be discerned through further questions.

Information obtained in such a way can be enriched with other indicators which allows the characteristics of teleworkers to be more thoroughly described. The research team selected seven which had given the most significant results during the field research:

- intensity of work at a distance;
- means used to transfer result of work (personally, post courier, fax, telephone, email, internet, software for remote collaboration, other);
- equipment used when working at a distance (computer, email, telephone, fax, internet, intranet, software for remote collaboration, other);
- who initiated the arrangement (employer, worker, both);
- whether formal or informal arrangement;
- reversibility (to have the choice of ceasing to telework);
- assessment of changes in work pressure after starting to telework;
- motivation for teleworking (to finish or catch up with work; to avoid interruption; because of a bad working environment or bad working relationships; required by job or employer; to co-ordinate your work schedule with personal or family needs; experimentation; to reduce commuting time or expenses; health reasons; for greater autonomy or independence).

The first three indicators are particularly useful because they supply additional information on the use of ICT. Further information on teleworkers can be obtained from the intensity of their connection (occasional or constant connection), on the means used to consign the work or on the technologies used. The following three indicators are useful for employees to ascertain the type of agreement which regulates telework, whereas the indicator on judgement regarding changes in work pace is useful as a control indicator to assess

impact on work performance and stress of this form of work. A thorough inquiry aimed at considering the impact of telework not only on the working sphere but also on other aspects (use of time, sleep, stress, family relations, social relations) have not been considered here because they are too subjective for an official statistical survey.

Lastly, of the other indicators considered by the team, worthy of mention is the room in the house where the work is conducted (whether or not there is a specific room for work); the type of activity conducted in the telework mode (cognitive or communicative tasks), the property of the telework instruments (belonging to worker or employer), the amount of the time spent working at distance dedicated to activities which require the use of a PC and Internet.

In the case of the pilot inquiry the cross tabulation approach proved to be highly productive as the combination of indicators allowed teleworkers to be detected as well as various typologies to be ascertained based principally on prevalent workplace and systematic working at a distance, as is illustrated in the subsequent paragraphs.

5. The results of the pilot inquiry

5.1 The sample

The pilot testing of the *e*Work module was carried out in the countries involved in the Stile project (Belgium, Hungary, Italy, Ireland and United Kingdom). The configuration of the pilot testing differed from country to country, depending on national opportunities.

On the basis of the indicators selected in the first phase of the project, a questionnaire was put together which was tested on 718 workers in Belgium, Italy, Hungary, and Great Britain (table 1).

These questionnaires were composed of the most relevant LFS-indicators, the common core indicators on *e*Work and, depending on national features, additional and more detailed questions on the commonly agreed indicators. In some countries additional issues were dealt with in the questionnaire. In Hungary, the pilot test was carried out as an ad hoc module to the quarterly Labour Force Survey. This is an important test, because in this case the module can be tested in a 'real' LFS-context.

Ireland got the opportunity to test an *e*Work module within the context of the Ireland's Quarterly National Household Survey (QNHS). For this pilot test the existing UK-*e*Work indicators were adapted slightly, accounting for the experienced difficulties with them, and attached to the QNHS. In addition to this, the Irish partner will carry out a small-scale test of the commonly agreed STILE *e*Work indicators, in order to be able to account for the specific language and culture.

Before describing the characteristics of the STILE sample it is useful to reiterate that the objective of the project was not to measure the extension of telework but to identify the indicators that allow it to be measured and to gather some qualitative characteristics.

In short, the pilot inquiry was aimed at testing the validity of a research instrument, its comprehensibility and ease of use but also its success in capturing the range of indicators previously identified by the STILE partnership.

When putting together the sample, an attempt was made to ensure the typological representation of the population under analysis (workers and eWorkers), and to include a sufficient number of eWorkers to allow the functioning of specific questions on telework to be tested.[10]

Table 1. Samples of workers and eWorkers

	Workers	eWorkers	Total
Belgium	79	97	176
Italy	100	100	200
England	101	101	202
Hungary	-	-	140
Total	280	298	718

Source: Data of STILE pilot study on telework, 2002, processed by IRES

It was thus decided to interview one hundred workers and one hundred teleworkers, without dismissing the possibility of finding teleworkers among the hundred workers interviewed. For the two subgroups we pursued two different methodologies, with some differences in the various national contexts (see report STILE D5.1).

Whenever available, specific lists of practising or aspirant teleworkers were used, in other cases a snow-ball sample method was applied as illustrated in detail in the individual national reports (see report STILE D5.1). The following table shows the number of interviews conducted in the various countries.

5.2 Detecting the Typology of teleworker

As already mentioned, it is not possible to differentiate the teleworkers through a single question, given the multidimensional nature of the phenomenon. It is thus necessary to combine various questions. Having said this, it would be possible from the juxtaposition of location, technology and intensity to derive many different definitions of 'teleworkers', '*e*Workers', 'mobile workers', 'multilocational workers' or 'occasional teleworkers' that would allow researchers to address quite different policy issues.

From the data surveyed during the inquiry, it was decided to come up with a typology useful to categorise the teleworkers based on prevalent workplace and intensity of working at a distance. Variables on the use of technologies were used only as a filter to distinguish the real teleworkers from those who work in a place other than the traditional office but without the help of ICT technologies (door to door sales reps, tailors, refuse collectors, drivers, etc.).

The starting point was to analyse the combination of the various workplaces mentioned by the respondents, illustrated in Table 2. Of those who supplied one reply it is possible to distinguish between traditional workers, or non teleworkers, as they declared working exclusively from the employer's premises; the mobile workers, distinguishing between

those who use ICT technologies (mobile teleworkers) and those who don't (mobile workers) and the tele-homeworkers who declared working exclusively from home.

In at least a third of the cases the reply wasn't so easy to interpret as the respondents indicated more than one response, declaring that they worked in their office but also at home or on the move or at the client's premises, highlighting the multilocational nature that some professions are taking on.

The individuals who gave mixed replies have been called 'multilocational eWorkers,' a type of teleworker or eWorker that can be added to the more traditional tele-homeworker and mobile teleworker. As seems to be emerging in the countries in question, a new type of eWorker is becoming more common, superimposing itself on the classic division between the tele-homeworker, mobile teleworker and the telecentre worker.

Changes have occurred in the way these workers operate allowing them to conduct part of their work at a distance without completely transforming their work into full time telework (for example due to family problems, maternity, transferrals, etc.). In some cases the work relationship is formalised as alternating telework, a practice which has been on the rise in recent years, in other cases the characteristics of the work make it possible to choose the workplace on the basis of various requirements, work-related and non.

Table 2. Combination of workplaces - results of pilot

	Belgium		Italy		UK		Hungary	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Traditional workers	58	33.0	94	47.0	39	19.3	10	7.1
Mobile no teleworkers	-	-	6	3.0	-	-	-	-
Mobile workers	5	2.8	0	0.0	3	1.5	4	2.9
Telehomeworkers	18	10.2	26	13.0	21	10.4	21	15.0
Mobile and remote workers	28	15.9	20	10.0	19	9.4	17	12.1
Stationary and remote workers	26	14.8	48	24.0	16	7.9	57	40.7
Stationary and mobile workers	27	15.3	0	0.0	13	6.4	13	9.3
Stationary, remote and mobile workers	14	8.0	6	3.0	91	45.0	10	7.1
No answer	-	-	-	-	-	-	8	5.7
Total	176	100.0	200	100.0	202	100.0	140	100.0

Source: Data of STILE pilot study on telework, 2002, processed by IRES

Using the temporal variable on the amount of time spent working at a distance it is possible to further refine the typology. Those who declared working from a remote location for less than 20% of working time were considered to be occasional teleworkers, whereas the others were considered to be stable, producing the following theoretical typology:

Table 3. Typology of individualised eWork

More than 20% of the time worked at a distance out of total time worked during reference week	Less than 20% of time worked at a distance out of total time worked during reference week
Telehomeworker	Occasional telehomeworker
Multilocational *e*Worker	Occasional multilocational *e*Worker
Mobile *e*Worker	Occasional mobile *e*Worker

To sum up, using the questions proposed in the adapted module, the following process was used to construct the typology:

- analysis of the combination of work locations: this operation is aimed at constructing a typology of teleworker based on the work location(s) the respondent worked from in the reference period. In this question it is possible to supply more than one answer. In order to ensure sufficient cell sizes for any analysis, there is a need to aggregate some of the locations;
- by combining the answers it is possible to detect four types of workers: the stationary workers who work only at their employer's location, the mobile workers who work exclusively 'on the move', the workers that work exclusively from remote stations (either from home), the multilocational workers that work both from mobile, or remote stations, or from their employer's location (see Tables 2 and 3);
- labelling workers who declared working only in traditional locations as 'non-teleworkers' (CATI programme can do this automatically);
- calculation of the percentage of hours worked at a distance out of the total hours worked in the reference week and the aggregation of the variables in two groups, from 100% to 20% and from 20% to 0%;
- distinction between occasional and stable types of teleworkers (see Table 3).

Table 4. Combination of workplaces to obtain the STILE typology of workers

Typology	Possible answers	Kind of workers
Traditional workers (stationary workers)	'In more than one location belonging to your employer' *and/or* 'At just one location belonging to your employer' *and/or* 'Other traditional workplaces'	Non-teleworkers
Mobile workers	'On the move (while travelling)' *and/or* 'At locations belonging to a third party'	Mobile workers
Telehomeworkers	'In your own home'	Telehomeworkers
Mobile and remote workers	'On the move' *and/or* 'At locations belonging to a third party' *AND* 'In your own home'	Multilocational workers
Stationary and remote workers	'In more than one location belonging to your employer' *and/or* 'At just one location belonging to your employer' *and/or* 'Other traditional workplaces' *AND* 'In your own home'	
Stationary and mobile workers	'In more than one location belonging to your employer' *and/or* 'At just one location belonging to your employer' *and/or* 'Other traditional workplaces' *AND* 'On the move (while travelling)' *and/or* 'At locations belonging to a third party'	
Stationary, remote and mobile workers	'In more than one location belonging to your employer' *and/or* 'At just one location belonging to your employer' *and/or* 'Other traditional workplaces' *AND* 'In your own home' *AND* 'On the move (while travelling)' *and/or* 'At locations belonging to a third party'	

Obviously this strategy is only one of the possible methods of classifying teleworkers: other combinations can be determined by modifying the aggregations of the variable obtained with the combination of the work locations or by modifying the threshold for the definition of occasional workers or by using the information on the technology used to further define the teleworkers.

In the inquiry conducted (718 people interviewed) the distribution of the types is reported in Figure 1. The typology shown is one of many that can be applied to new forms of work. Our recommended strategy for collecting data in objective terms allows defining teleworkers in different ways that correspond to various policy questions, which could involve labour issues, transportation, diffusion of technology or others.

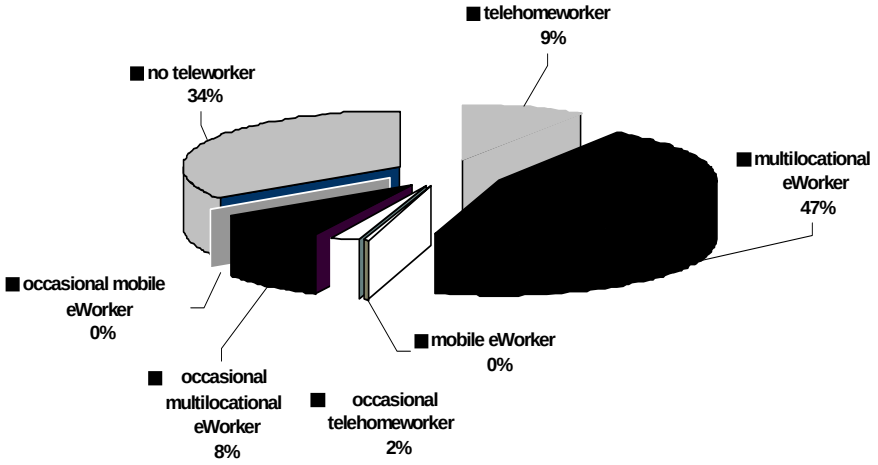

Figure 1. The STILE typology in the pilot (Belgium, Italy, UK and Hungary)

5.3 Other possible derived typologies

Based on the actual policy interest or research question, other typologies are possible. Because there is no absolute, agreed upon definition of telework, we recommend the collection of data in objective terms. This strategy allows defining teleworkers in different ways that correspond to various policy questions, which could involve labour issues, transportation, diffusion of technology or others. Table 5 illustrates definitions of telework that can be derived from data such as that collected in the Quarterly Household Survey of Ireland.

The Irish survey uses the CLFS homework question 'Do you work from home?' with 'usually', 'sometimes' or 'never' as answering categories. Thus, transportation planners interested in work at home as a way to reduce commuting trips would limit the Irish total of 238,100 persons who *never* do any of their work at home to define teleworkers as the 170,000 who *usually* work at home. In their analysis planners might exclude the 68,100 individuals who 'sometimes' work there because their work at home has less impact on traffic reduction.

Further restrictions may be placed on what constitutes telework. Policymakers interested in the impact of ICT on employment would define teleworkers as those individuals who use a computer and telecommunications link or more narrowly, to those for whom the ICT link is essential. That reduces the 65,400 who have a link, to 40,800 who could not work at home without it. Clearly, if any of these or other definitions of teleworker had been used in the questionnaire, rather than at the point of analysis, it would preclude using the data so widely.

Table 5 also underscores that when reporting the number of teleworkers, it is essential to state the definition underlying the data. In the third column the percent of teleworkers ranges from 13.3% to 0.1% of the employed labour force, depending on how teleworkers are defined.

Table 5. Alternate derived definitions of telework

	Number	Percent of all in employment
Sample size	44,500	100.0
Persons in employment	1,795,000	100.0
1. An employed person who does any work at home	238,100 (1)	13.3
1a. An employee who does any work at home	66,500	3.7
1b. A self-employed person who does any work at home	159,900	8.9
2. An employed person who does any work at home using a computer with a telecommunications link	65,400	3.6 (2)
3. An employed person who could not work at home without a computer and telecommunications link	40,800	2.3 (3)
4. An employed person who works in multiple locations using home as a base	34,100	1.9
5. An employed person who works in multiple locations using home as a base and uses a computer and telecommunications link	5,700	0.3
6. An employed person who works in multiple locations using home as a base and could not work at home without the use of a computer and telecommunications link	2,500	0.1

(1) Includes persons who work at home assisting relatives.

(2) 27.5% of persons who work at home.

(3) 62.4% of those who work at home with computer and telephone.

Source: Irish Quarterly National Household Survey Q3 2002

Conclusions

The telework-module may be easily added as an ad hoc module to present labour force surveys.

The 'piggybacking strategy' (Pratt, 2001) is an excellent tool to obtain lots of information on eWorkers, in fact the test showed that the cross-tabulations, with a huge variety of characteristics on the labour force obtained in this survey, allowed a lot of new information on telework to be generated and the characteristics, similarities and differences of various types of teleworkers to be investigated. To cite some examples, the telework-module can be cross tabulated with gender, age, educational level, professional status, occupation, working time, atypical work etc.

Combining indicators also allows different types of ICT-mediated distance work to be discerned, while variations in combinations of these indicators bring into picture a broad range of eWork forms.

As previously demonstrated in the STILE project a typology was developed based on the various places where employees worked. The use of ICT and the intensity of working at a distance refine the typology.

Even though the questionnaire was tested on a sample which is not representative of the population, the results of the inquiry do show that multilocational *e*Work is an emerging type of telework superimposing itself on the classic division between the telehomeworker, mobile teleworker and the telecentre worker.

Even though only a pilot test was conducted in the STILE project, the results have been corroborated by recent research projects on telework (SIBIS, EMERGENCE). The results of these researches seem to demonstrate that along side the figure of telehomeworker, whose number is on the decline, a mobile, nomadic or multilocational eWorker is becoming increasingly more widespread, who alternates working from the office, home, on the move or from customers' premises due to personal and work requirements. Mixed forms of telework are increasing even because alternating between home and office seems to be a solution to some of the problems of telework, like isolation (social or organisational) and the poor visibility in the firm of those who work at a distance. The Emergence project for example reports that almost half of the establishments interviewed practice some kind of eWork.

An important conclusion is that a narrow definition of eWork referring to the 'traditional' full time telehomeworker does not reflect real tendencies. Outsourced forms of eWork are more common than telehomeworkers so much so that the multilocational eWorkers seems to be a more contemporary typology.

The consequences of such a result are relevant even for statistical measurement strategies of the eEconomy: if eWork is no longer an isolated phenomenon involving a small quota of workers, but rather an experience involving an increasingly larger section of workers, it becomes even more important to survey its progress, although changes produced by new technologies on work organisation methods and forms are impossible to capture at the statistical level. However, for such variable and differentiated forms of eWork, a flexible measurement strategy, like that of the cross tabulation (of indicators) approach seems to be more appropriate.

Those who give some comment on questionnaire underlined the necessity to ask questions also on positive or negative aspects of telework.

The following positive aspects were mentioned: benefits for the family, better time management, autonomy, possibility to work better avoiding bad office relations, the opportunity to recuperate social relations and above all time-saving benefits which allow a better balance between work and family responsibilities. Of the negative aspects much reference was made to solitude, isolation or sense of abandonment of the teleworker, less career opportunities for those who decide to work from home, technological difficulties encountered, overwork provoked by working at a distance and difficulties separating work from private life.

There were also some respondents who highlighted that it would be a good idea to look into teleworkers' satisfaction level, on the eventual improvement of work quality and the importance of incentives to increase the diffusion of this form of work.

Lastly, for the choice of the basic questionnaire, it is important to be aware that the decision on the inclusion of a module is often a political decision. It depends on the general context of the questionnaire, socio-economic circumstances, interests of influential policymakers. This means that it is important to convince influential decision makers of the importance of the *e*Work module, which requires a profound knowledge of the objectives of the organisation concerned.

This is of special importance in the case of promoting an ad hoc module to the Labour Force Survey, as there is a much request for the inclusion of ad hoc modules. What's more the variance of influential policy interests is very broad in the Labour Force Survey framework.

Some practical points need special attention when including an ad hoc module to an existing questionnaire. The experience of the STILE pilot has taught that a module should be composed of:

- a limited list of core indicators that can be translated into simple questions;
- a list of relevant additional indicators that allows the user to choose certain indicators that may be of interest within the specific context of the survey;
- the list of reply categories should keep in mind the consequences for the resulting number of variables and the related data processing burden;
- the specific wording of the questions is to be adapted to the general character of the survey concerned;
- the routing of questions depends on the objectives, the target group, the composition, etc. of the basic questionnaire. Specific attention should be paid to the impact of the order of questions on the interviewer burden and on the kind of respondents that should answer a specific question;
- the inclusion of the module should not change the authorised questionnaire.

Annex 1 . Proposal of ad hoc module for eWork

a) eWork questions

a1) Do you use a computer for your work?

1. yes
2. no [FILTER QUESTION: stop questionnaire]

a2) Do you use the Internet or email for your main job?

1. yes
2. no

a3) In the last four weeks (reference week and 3 weeks before) have you carried out work at any of the following places? *(multiple answer)*

1. In your own home
2. At locations belonging to a third party (*as customer p*remises)
3. On the move (*while travelling*)
4. In more than one location belonging to customers or clients
5. Other places different from traditional workplaces (*hotels, conferences, etc*) (*specify*: _____)
6. In more than one location belonging to your employer [no teleworker - stop questionnaire]
7. At just one location belonging to your employer[no teleworker - stop questionnaire]
8. Other traditional workplaces (*specify*: _____) [no teleworker - stop questionnaire]

a4) In the last 4 weeks (reference weeks and 3 weeks before), approximately how many hours a week, on average, did you spend working at a distance (from your employers' location)[11] [or: at locations selected in question a3]?

_____ *(Proportion of hours a week spent on distance work can be calculated using total hours worked in week)*

a5) Would it be possible to work in this way without the technology?

1. yes
2. no

b) additional questions

b1) When you work at a distance (from your employer's location), how often are you connected to your company or customer?

	Phone connection	*data connection*
1. The whole working day	□1	□1
2. Several times a day	□2	□2
3. Once a day	□3	□3
4. At least once a week	□4	□4
5. Less than once a week (occasionally)	□5	□5
6. Never	□6	□6

b2) When you work at distance (from employers' location), do you transfer work results in the following ways:
[multiple response allowed]

1. personally
2. post courier
3. fax
4. telephone
5. e-mail
6. Internet
7. software for remote collaboration
8. Other (specify)

b3) Which of the following list of equipment do you use when you work at a distance (from your employer's location)? *(more answers are possible)*

1. Computer (desktop or laptop)
2. e-mail
3. telephone
4. fax
5. Internet
6. Intranet
7. software for remote collaboration (groupware)
8. other (specify)

b4) Who initiated arrangement for working at a distance? [only employees]

1. Employer
2. Yourself
3. There is no arrangement
4. Other (specify)

b5) Is the arrangement to work at a distance from your employer's location a formal or an informal initiative? [only employee]

1. Formal: there is a written agreement *(go to question b5.1)*
2. Informal
3. DK

b5.1) For this agreement can you stop working at a distance? [only employee] *(only if respondent answer 1 to question b5)*

1. Yes if I want
2. Yes, but it depends on my employer
3. Yes, but only at the end of agreement
4. No
5. Other, specify (_____)

b6) What is the main reason for working at a distance (from your employer's location)? *(only one answer)*

1. Finish or catch up with work
2. To avoid interruption
3. Because of a bad working environment or bad working relationships
4. Required by job or employer
5. To co-ordinate your work schedule with personal or family needs
6. Experimentation
7. Reduce commuting time or expense
8. Health reasons (your own physical condition)
9. For greater autonomy or independence
10. Some other reason – please specify (_____)

b7) Do you want to continue working at a distance (from your employer's location)?

1. Yes
2. No

b8) Since you began working at a distance (from your employer's location), has your level of work pressure changed?

1. More work pressure
2. Less work pressure
3. As much work pressure as before
4. Don't know
5. I can't judge because I don't have any other experience to draw on

c) other questions

c1) If you work from home, in which room do you work? (only if respondent chooses answer 1 to a3 question)

1. study
2. living room
3. bedroom
4. kitchen
5. other

c2) Who provides ICT equipment used working at distance? [only employee]

1. employer
2. Respondent
3. Both
4. Third party (specify)

c3) When you work at a distance (from your employer's location), what proportion of that time do you use a PC?

_____ % of the time worked during an average day

OR

____ fraction of the time worked during an average day

c4). Have you used the internet for the following work-related activities?

- Looking for a job/sending job applications □1
- Finding information relating to your work/business □2
- Sending work to the work place □3
- Accessing files on the employer's server □4
- Communication (including e-mail) □5
- Other work-related activities (specify_____) □6

c5). How is your work controlled when you work at a distance from your employer's location? [only employee] (maximum 2 answer)
Supervision:

- direct supervision □1
- automatic recording of performance □2

Non direct supervision but:

- delivery of output within specified deadlines □3
- definition of individual goals □4
- definition of team goals □5
- Other, please specify (_____) □6

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Notes

1 The present article is the result of a collective effort of the STILE consortium. In the present article Giovanna Altieri edited the Introduction and Conclusions, Francesca della Ratta chapter 5 and Cristina Oteri chapters 2, 3 and 4.

2 Any activity conducted at a distance from the office or firm, even without the use of telematic instruments, *Teléma,* 1995.

3 An activity which is defined as telework has the following features:

- a relocation of the activity with respect to the traditional workplace;
- telematic instruments are used to conduct work;
- the activity conducted at a distance is done systematically;
- there is a work relationship based on an exclusive contract (G. Bracchi and S. Campo dall'Orto, 1995).

4 Other data on Telework in Europe are presented by J. Pratt in this same chapter.

5 E. Como, F. della Ratta-Rinaldi, P. Di Nicola, 2003, http://www.egap-eu.com/egapdocuments.html#.

6 See: Interview with Domenico de Masi (www.kataweb.it/lavoro).

7 This approach is the one used by Empirica to conduct the Ecatt inquiry, which provided the most reliable estimates on the phenomenon in Europe (1998).

[8] On the risks of inadequate replies to questions to which respondents do not have a precise opinion, see C. Pitrone, 1996 and G. Gobo, 1997.

[9] The indicators, tested during the pilot survey in the STILE project, were represented with some changes as a final product of WP5 in the form of recommendations for surveying telework. This article refers to the final proposal of the project. (della Ratta F., Oteri C., (eds), *Working at a distance. How to know about it*. STILE report D5.3, HIVA-KUL, 2003)

[10] The best solution to meet such an objective was to divide up our sample of two hundred units, as outlined in the initial phases, between workers and eWorkers. If we had opted for a random sample of workers, we would have had little possibility of obtaining a sufficient number of eWorkers to test the validity and reliability of questions on telework. If on the other hand, we had interviewed only teleworkers, we would not have had the opportunity to test how the questions are perceived and understood by the general public. Moreover, the core indicators could reveal new forms of work if they were also asked to people who don't work in a typical form of telework.

[11] In self employed questionnaires it is better to omit "from your employers' location"; so in following questions the expression is bracketed.