The development of a methodology to assess the quality of EU-directives: a pilot study on basis of the Directive on Visual Display Units (Directive 90/270 EEC)

Integrated cross-national report

Evaluation of the VDU Directive 90/270 EEC

Integrated cross-national report (CZ, DK, DE, NL, FI, UK)

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List of abbreviations used in the text:

CANS Complaints of Arm, Neck and/or Shoulder
DSE Display Screen Equipment
OSH Occupational Safety and Health
SME Small and Medium Enterprises
ToR Terms of Reference (Common guidelines for the VDU evaluations in all countries)
VDU Visual Display Unit

1. Introduction

1.1 Background and aims of the study

In their Lisbon Strategy, the EU leaders expressed the aim to create more and better workplaces in Europe by enhancing the competitiveness of the European economy. Within this context, in recent years debates about the effectiveness of the body of Community legislation set as a common regulatory framework for economic activities within the European Union have been raised. Effective, lean and efficient regulation is considered to be an important aspect of competitiveness of European companies. It contributes – among others- to keep side costs low for the employer[1] and to guarantee good working conditions.

Within the context of this debate, a couple of countries started an initiative to scrutinize the specific area of Occupational Safety and Health (OSH) legislation. The European OSH legislation is directly aimed at higher quality of workplaces. It describes basic requirements for the continuous improvement of safety and health at the workplaces and for the effective organisation of work as regards ergonomics as well as information and involvement of workers. Hence the efficiency of European OSH legislation is subject to a growing debate, which produced a broad variety of often contradictory proposals for changes of almost each OSH Directive. The main aim of this evaluation initiative is to develop a new tool for the systematic assessment of effectiveness of the current European OSH legislation. This tool is meant to provide competent and evidence based advice for the policy making process concerning OSH legislation.

A European working group was formed in the context of this initiative, which started an ex-post evaluation of one specific field of OSH legislation, namely the legislation concerning safety and health at workplaces with visual display units (Directive 90/270/EEC). The evaluation of the VDU legislation has the character of a pilot evaluation. Its aim is not confined to the investigation of the effectiveness of the legislation on work with visual display units (VDU), but it also serves as a test and prototype aimed at investigating the general potentials of the evaluation methodology as a means for assessing the effectiveness of legislative measures in the area of occupational safety and health. The VDU Directive was chosen mainly for two reasons:
1. The VDU Directive had no similar predecessors in national legislation. Therefore it was supposed to be the OSH Directive that was transposed into national law in the most common way.
2. The VDU Directive can be regarded as a "typical" OSH Directive based on the Framework Directive 89/391/EEC. Therefore it is most likely, that results concerning feasibility and usefulness of an ex-post-evaluation also apply for other OSH Directives

[1] See e.g. the speech of EU commissioner Günter Verheugen, held in Brussels at 10th November 2005 (speech/05/673). This speech is regarded as one of the key elements of the so called “Verheugen initiative” aimed at reducing bureaucratic burdens.

In the set-up phase of the project, the European working group had met several times and had developed general guidelines called “Common Requirements” and a further specification of these in form of “Terms of Reference” (ToR) in order to establish a certain minimum level of comparability between the various national evaluations. The “Terms of Reference” were not compulsory for all participating countries, but allowed for modifications in order to give room for issues of specific national interest or to skip areas considered to be practically unfeasible or of limited importance. Where such modifications were made, they were agreed between the respective national members of the working group, the contractors of the evaluation and the involved stakeholders.

The Terms of Reference (ToR) consisted in a compilation of issues considered to be of interest for the evaluation of the VDU Directive, but did not yet contain tangible questionnaire questions. Transformation of the Terms of Reference into a practical questionnaire was made independently by the various national contractors, in cooperation with the respective national members of the European working group. For some of the issues listed in the Terms of Reference, transformation into practical questionnaire questions has proved to be difficult or even impossible. This was e.g. the case with the assessment of the costs and benefits of the application of the provisions of the Directive in monetary terms (see chapter 6 for more details). The participating countries chose different ways on how to deal with these difficulties. For these procedural reasons, national questionnaires differ to a notable extent, restricting at some points the possibilities of a strict cross-national comparison of the outcomes of the different national evaluation projects.

Apart from guidelines on the contents of the evaluation, the Terms of Reference also contain some requirements regarding the choice of a methodology for the evaluation. However, the final decisions on the data collection methodology and details of sampling etc. were agreed on a national level between the national members of the steering group, stakeholders and the contractor, taking into consideration among others the available budget. This led to a certain variety of methodologies in the various countries which again puts some restrictions for the cross-national comparison. Regardless of these methodological limitations, the central general results of the different evaluation projects can be compared and analysed in a cross-national perspective, although often on an aggregated level only (e.g. general positive or negative assessments but not exact incidences as percentage shares).

The European working group responsible for the organisation and steering of this evaluation was supported by representatives from OSH institutions and ministries from the following countries: the Czech Republic, Denmark, France, Germany, the Netherlands, Finland, Poland, Estonia, Ireland, Spain, Sweden and the United Kingdom. Among the participating countries, six have carried out own national evaluations: the Czech Republic, Denmark, Germany, the Netherlands, Finland and the United Kingdom[2]. For these evaluations, national evaluation reports dealing in more detail with the country specific situation are available already or will be made available in the near future. In Spain, an evaluation is also planned.

[2] Please refer to Annex 3 for a full listing of all institutions that participated in this project – be it as members of the European working group or as national evaluators.

TNS Infratest Sozialforschung Munich – the institute responsible for the German national evaluation - was commissioned with the cross-national report summarizing the results of the various national evaluations. This report is based on the national evaluation reports (where available) and/or on cross-tabulations of the data from the national evaluation surveys. Members of the European working group and the national evaluators also contributed to the report by critically commenting earlier draft versions. Final responsibility for the cross-national report is with TNS Infratest Sozialforschung.

1.2 National transpositions of the VDU Directive

The VDU Directive is a regulatory framework which had to be transposed into national law in each EU country. In all six countries referred to in this report, the transposition into national law closely followed the text of the European Directive. Differences in details of the transposition are described in Annex II.

The only difference of major importance refers to the applicability threshold of the legislation: In the Czech Republic, the regulations have to be applied in all establishments where any employees work at least 4 hours per day at display screen equipment, in Denmark and the Netherlands the applicability threshold is 2 hours. In Germany, Finland and the UK there is no defined minimum duration of VDU work. There, the legislation applies to all employees doing a "significant part" of their normal work at a display screen unit.

The main requirements of the VDU directive on the employer's side are the same in all countries:

- To undertake a **risk assessment** (also called "workstation analysis") in order to identify any hazards that can be attributed to the use of the VDU equipment and to undertake corrective action aimed at **reducing the risks** discovered hereby.
- To provide the employees working at VDU units with adequate **information and training** on health and safety related aspects of the workstation.
- **Plan the daily work routine** of users so that their work at the display screen unit is periodically interrupted either by other types of work or by short breaks.
- To provide display screen equipment users with **eyesight tests** and – if necessary – with ophthalmologic examinations and specific **corrective appliances**.
- To supply **VDU equipment** (hardware, software, furniture etc.) which is able to meet the requirements set out in the annex of the Directive. These requirements refer to various aspects of quality and adjustability of the work equipment and to the general work environment in which VDU work takes place.
- To ensure the **consultation and participation** of the concerned workers or their representatives on the matters covered by the Directive.

2. Overview and comparison of the different research methodologies used

To assess the effectiveness of the VDU Directive on a sound empirical basis, information was collected from different sources. Although both the modes of data collection and the types of sources vary somewhat between the countries involved in this project, there are some basic characteristics common to the data collection in all six countries. In each of the countries, a representative survey of employers was carried out. With the exception of the UK, in all countries a survey among employees was also conducted. Additionally, the following further elements were included in the study on the national level:

- In **Denmark**, a couple of exploratory interviews with employers, employees and relevant stakeholders took place before quantitative interviews started. These interviews were by nature semi-structured and face to face. They served to structure the questionnaires for the employer and employee surveys and gave important hints for the interpretation of the quantitative data.
- In the **German** evaluation, an additional questionnaire asking for the enforcement practice was directed at the heads of the regional labour inspectorate authorities (at the level of the 16 regions ('Bundesländer')).
- The **Dutch** evaluation also included several semi-structured interviews with stakeholders.
- In the **Finnish** evaluation, in addition to employers and employees, also occupational health care professionals were interviewed, using a slightly modified questionnaire. In total, n = 285 occupational health care professionals completed this questionnaire. Results of this additional questionnaire are not part of this report.

The **Czech Republic** joined the evaluation project only at a later stage, when most national evaluations were already in progress. Due to time restrictions, additional qualitative research elements like e.g. stakeholder interviews could therefore not be included.

In the following paragraphs, the methods used in the countries will be described in more detail, hereby concentrating on the most relevant differences between the applied survey designs and methodologies.

2.1 Surveys among employers

The survey among employers can be regarded as the core instrument of the evaluation in each of the countries. Although the ultimate aim of the VDU legislation is evidently the protection of employees, employers are the main direct addresses of the VDU legislation. It is the responsibility of the employers to take the provisions prescribed by the legislation in order to protect the employees from health and safety risks related to work at visual display units. The employees themselves are only indirectly addressed by the Directive, although their participation in health and safety preventive measures is essential for a positive impact of these measures. The employees are to be informed on health and safety related aspects of VDU work by their employer.

The main objectives of the employer survey were to assess "the employers'" knowledge and implementation of the VDU regulations and to get measures on the degree to which the Directive has managed to influence procedures and decisions on the establishment level. The perception of the employer regarding the effectiveness and efficiency of the various provisions and of the Directive as a whole were also a central part of the study.

The character of this international project as a rather loosely coordinated cooperating group following some central common guidelines led to a considerable variety in the details of the design of the employer survey. A full overview on the relevant characteristics of the national surveys is presented in the Annex of this report. Those differences which have major repercussions on the comparative interpretation of the data are shortly outlined in the following.

Definition of respondents
In the **Danish**, **German, Dutch, Finnish** and **British** evaluations, the respondent for the interviews on the employer's side was defined as the most senior manager in charge of personnel matters in the establishment. This person was meant to be the highest ranking manager involved in health and safety issues. In middle-sized and large establishments the highest ranking manager in charge of personnel is usually the Human Resources Manager, while in smaller establishments it is often the owner or managing director. In some establishments, however, the interview is likely to have been passed on to the establishment's health and safety specialist.

In the **Czech** employer survey, first the highest ranking manager was approached. This either answered the questionnaire personally or appointed an employee of her or his choice as respondent for the interview. Like in the other countries, respondents were therefore usually either managers or health and safety specialists within their establishment, possibly with a comparatively higher share of health and safety specialists responding the questionnaire.

Data collection methodology
The Danish, Dutch and Finnish surveys were conceptualised as online surveys. In the Danish and Dutch surveys, employers who were not willing to answer the online questionnaire were alternatively offered to answer the questionnaire by phone. In the Netherlands, a shortened version of the online questionnaire was used for these telephone interviews. In the UK survey, both telephone and online interviewing were offered to the respondents, with the majority of respondents opting for the CATI version. The German survey was conducted via telephone (CATI). In the Czech Republic, an interviewer delivered paper questionnaires to the respondents which were to be filled in by the respondents[3].

In general, both the CATI and the online data collection methodology have their advantages and disadvantages which will not be dealt with here in detail. It has to be noted that the types of questions that can be asked online differ somewhat from those to be asked via telephone. Likewise online surveys among employers generally tend to have relatively high item non-response rates (i.e. many answers of the category *"Don't know/No answer"*), especially for questions which are more sensitive or which are more difficult to answer. This was also the

[3] The interviewer was present during the completion of the questionnaire and gave additional advice where asked to do so.

case for some questions of the Danish and especially of the Dutch employer survey. In the Czech paper questionnaire, item non-response was also partially high.

Sample size
The net sample sizes of the employer interviews differ largely between the countries. The Dutch employer sample is the largest one, with more than 2.000 establishments covered. The Danish sample of employers, in turn, is relatively small, with a total of 208 establishments.

Table 1: Net sample sizes of the national employer surveys

Country	*Number of interviews with employers*
Czech Republic	n = 1.291
Denmark	n = 208
Germany	n = 1.000
The Netherlands	n = 2.222*
Finland	n = 942
The United Kingdom	n = 1.241

** Hereof 366 interviews were not completed and 163 were carried out by telephone, i.e. with a reduced questionnaire.*

Share of VDU workers and/or intensity of VDU work
Between the six national evaluations, there are important differences with regard to the precise definition of the establishments to be chosen for interview. While in some evaluations all establishments with any VDU work are included, others are confined to establishments where a minimum share of employees use display screen equipment with a certain frequency and intensity:

- In the **Czech** survey, there was no general restriction with regard to the duration or intensity of VDU use. Most of the establishments in the net sample have nevertheless at least one employee who works 4 hours or more per day at a visual display unit.
- The **Danish** survey was limited to establishments (workplaces) where "intensive screen work" is being performed. To identify establishments with "intensive screen work", screening questions on the number of VDU workers and the intensity of VDU work were asked. Only establishments where a substantive share of employees work for at least two hours daily at a visual display screen unit (at least 3 employees in small establishments with less than 100 employees and a minimum of 10 employees in establishments with 100 or more employees) were chosen for the full interview.
- In the **Dutch** survey, companies where the employees "seldom if ever work with display screen equipment" were also generally not among the target group. A small share (n = 81) of establishments where none of the employees uses the display screen equipment for more than two hours per day is nevertheless part of the net sample.
- The **German** study was not restricted to workplaces with intense VDU work. Establishments where VDU work takes place only occasionally were also included. This decision was taken because the national German VDU legislation also applies to establishments where none of the employees works at a display screen for two or more hours - provided that the visual display unit is an indispensable element of the work to be performed. For some comparative analysis in this report, the German sample will for reasons of comparability nevertheless be confined to establishments with significant VDU work, defined as es-

tablishments with at least one employee working "(almost) continuously" at a VDU workplace.

- In **Finland** establishments were interviewed if they had at least one employee regularly using VDU equipment. There was no minimum time limit of the VDU work per work day.
- In the net sample of the **United Kingdom**, workplaces where at least some display screen work took place on a regular basis were included.

The following table summarizes the scope of applicability of the VDU regulation on the one hand and the definition of the target units with regard to the number of VDU workers and the intensity of VDU work.

Table 2: Scope of applicability and definition of target units – cross-national overview

Country	*Applicability threshold of national Legislation*	*Choice of establishments/companies for the survey*
Czech Republic	≥ 4 hours of VDU work per day	Almost exclusively units with ≥ 4 hours of VDU work
Denmark	≥ 2 hours of VDU work per day	Only workplaces with intensive screen-work; minimum requirements: Units with <100 employees: at least 3 employees working ≥ 2 hours with DSE; Units with ≥ 100 employees: at least 10 employees working ≥ 2 hours with DSE
Germany	VDU work as an indispensable part of the work, no duration threshold	Establishments with at least one VDU worker, regardless of the daily duration of VDU work; some comparative analyses in the report are limited to workers with 2 hours or more of daily VDU work (where this is done, it is clearly indicated)
The Netherlands	≥ 2 hours of VDU work per day	Mostly units with ≥ 2 hours of VDU work, but also some units with >0 ≤ 2 hours VDU work
Finland	Use of VDU equipment as significant part of an employee's normal work. According to the Occupational Safety and Health Act (738/2002) e.g. risks assessment concerns everybody working in short periods.	Establishments with at least one employee regularly using VDU equipment.
The United Kingdom	Use of DSE as "significant part" of an employee's normal work	Establishments where any staff routinely uses DSE for work

Definition of the universe

The Danish sample contains only establishments with three or more employees, very small establishments with one or two employees were not part of the survey. This difference in the definition of the universe is important to keep in mind in the interpretation of the data, since in quantitative terms the group of establishments with less than 3 employees is significant. The exclusion of these very small units and especially the application of thresholds regarding the number of intensive screen workers in the Danish sample design lead to higher average values for all features which are clearly positively correlated with the size-class in these two countries. This is e.g. the case for the indicators on the knowledge and awareness of the VDU legislation or the implementation of the various provision foreseen in the legislation and should be kept in mind in the direct comparison of country figures.

For the Czech, Dutch and German surveys, sample designs with a disproportional size structure were chosen in order to have a sufficient number of interviews available within each size-class (for details see table in the annex). A sample which is proportional to the distribution of establishments in a country would lead to an extremely small number of interviews from larger establishments and thus would make the interpretation of data from the larger units fairly impossible. For the Danish employer survey a proportional sample design was chosen.

Weighting

The **German** and **Dutch** net samples were weighted in order to make them nationally representative. The weighting redresses both the disproportional sample design and eventual disproportional non-responses (by establishment size and sector of activity). All Dutch and German employer survey data shown in this report are establishment proportionally weighted data if not explicitly stated otherwise. They represent the distribution of establishments of the various size-classes, not the distribution of employees working in establishments of the different size-classes.

In contrast, data of the **Danish** employer survey are not weighted. The Danish sample is representatively drawn, but the size-composition of the Danish net sample is dominated by workplaces with extensive screen work and thus by medium and larger companies. Companies with less than 9 employees are somewhat under-represented because the selection criteria (number/share of employees working for two or more hours at display screens) are stricter in this size-class than in the larger ones. Also, the net sample size for establishments with more than 100 employees is relatively small (n=18), rendering it difficult to draw conclusions for these larger units.

The **Finnish** are also not weighed. The Finnish online survey shows a structure that is roughly in line with the distribution of employees (not establishments!) over the various size-classes. An exception is the smallest size-class (1 to 9 employees) which is clearly underrepresented even in employee-proportional terms.

Date from the **United Kingdom** are not weighted either. Interviews with establishments in the United Kingdom were distributed roughly equally over the various size-classes defined in the sampling matrix, with 32% of the net sample belonging to the smallest size-class (2 to 24 (!) employees).

In the **Czech Republic**, a weighting of the data was not carried out either. But a relatively large number of interviews were made in the smallest size-classes (35% in size-class 1 to 9). Therefore, the Czech employer data come – although unweighted – closer to the real size-distribution of establishments than those from the United Kingdom, Denmark and Finland.

For the interpretation of the data in the report, the existing differences with regard to the weighting and size composition of the net samples of the employer surveys are important. As will be shown, there are major differences between size classes for most issues concerning the awareness, knowledge, application and assessment of the VDU legislation, with larger units mostly rating much better than smaller ones. This leads to considerably higher average figures for these variables in all countries which used unweighted data.

In order to cope with this difficulty, results of the employer surveys will - where possible - be shown in a differentiation by size-classes for at least some of the key indicators such as degree of implementation of the provisions of the Directive. For the Danish data, cross-tabulations by size-classes were mostly not available.

2.2 Surveys among employees

The employee surveys have basically two functions. On the one hand, they serve to validate the statements of the employers, e.g. about the implementation of the provisions of the Directive. On the other hand, they also contribute additional perspectives on the subject, e.g. regarding reasons and motives driving the factual behaviour of employees at visual display screen work. This allows us to analyse factors that hinder and factors that foster the compliance of employees with certain measures of the VDU legislation.

In Denmark, Germany and the Netherlands, the sample of employees to be interviewed within the framework of this study was randomly[4] chosen and independent of the sample of employers. Results of the employee survey in these three countries do thus not directly reflect the situation in those establishments where the employer interviews were carried out. Yet, since both samples were drawn randomly and in a representative way, results of the employer and employee surveys are compatible in the sense that they look at the same topics from different angles.

Direct comparisons of employer's and employee's views in these three countries would be misleading and should be avoided because the employer surveys represent the size structure and distribution of establishments while the employee survey roughly represents the distribution of employees over establishments of the various sizes. In practice this means that there is a strong focus on the situation of small establishments in the employers' survey, whereas in the employee survey the larger workplaces have much more "weight". If directly comparing results from these two types of surveys, all features that are positively correlated with the factor "size of the establishment" tend to be positively biased in the employee survey. For the

[4] In the Danish sample there are certain restrictions of representativeness with regard to the sectors of activity: A quite high rate of 44% of all respondents of the employee survey work in the public administration, therefore this sector is somewhat over-represented.

Danish evaluation, a further restriction with regard to comparability of the results of both survey types is that most of the above mentioned restrictions with regard to the universe of the employer survey do not apply to the employee survey: The employee survey also includes employees from establishments smaller than 5 employees and is not restricted with regard to the (minimum) number of VDU workers in the establishment.

Table 3: Net sample sizes of the national employee surveys

Country	*Number of interviews with employees*
Czech Republic	n = 3.358 (from 1.291 different establishments)
Denmark	n = 577
Germany	n = 1.004
The Netherlands	n = 2.006
Finland	n = 1.870 (from 942 different establishments)
The United Kingdom	no employee survey carried out

In the Czech and Finnish evaluation, the employee interviews were carried out in those establishments where an interview with the management (respectively the health and safety professional) had been carried out. Results of the employee surveys in the Czech Republic and Finland therefore directly reflect the situation in the companies where the employers' survey was carried out. But for this report, a combined analysis of the statements of both employers and employees was not possible because for the cross-country reporting only aggregated tables were available.

In both countries, the number of employees to be interviewed was staggered by the size of the establishment: In small establishment, only one employee was interviewed, while in larger ones several employees were chosen for interview (in the Czech Republic e.g. 5 representatives in case of establishments with 250 or more employees). The advantage of this method is that the employee data from a larger establishment are less influenced by the personal perception of a single employee. The disadvantage, however, is a strong bias of the net employee sample in favour of large establishments. In Finland, for example, only 2% of the employee net sample belong to the smallest size-class (1 to 9 employees), while 53% of the interviews origin from establishments with 100 or more employees. This leads to an accentuated positive bias in the interpretation of the aggregated employee data since in most countries (as will be shown in the report) larger establishments tend to apply the VDU Directive much more consequently than smaller ones.

2.3 Interviews with social partners and stakeholders

The Dutch and Danish surveys among employers and employees were preceded by some exploratory and semi-structured interviews carried out with relevant stakeholders such as employer's federations, formal employee representative organisations, the Labour Inspectorate and a couple of employers and employees. One of the aims of these exploratory interviews

was to identify those areas which are of further interest and should therefore be included in the quantitative surveys. Additionally, these interviews also served to gain more insight into the different positions of both the employers' and the employees' side and were used in the national reports to analyse and explain the outcomes of the survey.

In Germany, a similar approach was also foreseen in the tender of the contractor, but due to budgetary reasons this element finally could not be included. The main stakeholders were nevertheless involved in the German evaluation, too: A counsel composed of government representatives on both the national and regional level and several stakeholders such as an employer's federation, a trade union representative, a member of the official Employers Liability Insurance Association (Berufsgenossenschaft), a member of the OSH inspectorates of the Federal Countries and members of official Occupational Safety and Health institutions (BAuA = Bundesanstalt für Arbeitsschutz und Arbeitsmedizin) accompanied the evaluation procedure from the very beginning, being involved in both the questionnaire design and the reporting of the German results.

In Finland, themed interviews with semi-structured questions were carried out with the following relevant stakeholders and their sub organisations: The Central Organisation of Finnish Trade Unions, the Confederation of Unions for Academic Professionals in Finland, The Finnish Confederation of Salaried Employees, and State Treasury and Local Authority Employers in Finland. The themed questionnaires were also carried out with relevant stakeholders of VDU office furniture suppliers and manufacturers and with associations of eyesight specialists (regarding the regulations and best practices on the eyesight tests). Some of the results of the Finnish stakeholder interviews are presented in this report in a descriptive manner.

Arguments of the qualitative stakeholder interviews reflect opinions of particular interest groups or of individual employers. Therefore, the lines of argumentation of the stakeholders which in the Danish and Dutch national evaluation report take a broader room are reflected only at very few occasions in this integrated report. It is clearly marked in the text where this is the case.

2.4 Some general remarks on the possibilities and limitations of the instrument of an ex-post evaluation

The current ex-post evaluation of the VDU Directive 90/270/EEC is taking place more than ten years after the transposition of this framework legislation into the national legislation of the majority of countries dealt with in this report[5]. In the meantime, a lot of organisational and technical changes have taken place simultaneously with the implementation and dissemination of this legislation and there has been a substantial general increase in the use of display screen equipment in both the work environment and the private realm.

[5] An exception to this rule is the Czech Republic where the Directive was transposed into national law in the year 2001 only.

The effects of these general developments sometimes interfere with the effects caused by the Directive as such and make the task of empirically “proofing” effects of the Directive in a quasi-experimental design impossible. Hard “proofs” that allow us to unambiguously identify the Directive as cause for an observed phenomenon therefore do often not exist. What can be done and has been done instead in the analysis of the evaluations is to identify strong and weak points in the implementation, hints for improvements etc. against the ultimate goal of increasing well-being in the workplace.

The empirical survey data collected in the context of this evaluation are based on the subjective assessments of the relevant actors, i.e. of employers and employees. This subjective assessment can be influenced by various factors, such as personal characteristics of the respondent, certain economic or political interests or one’s personal state of knowledge with regard to display screen equipment. But the combination of employer and employee survey allows a certain control of these subjective assessments, since both sides were asked on the same issues.

3. Awareness and knowledge of the VDU legislation and its provisions

The assessment of awareness and knowledge is essential for the statistic validation of all further aspects that were examined by the pilot evaluation. The measurement of the awareness of the VDU legislation in general and of its provisions in particular refers to the degree to which employers or employees know about the existence of the legislation and its provisions. Knowledge of the legislation, on the other hand, goes beyond mere awareness. Knowledge implies familiarity with the contents of the VDU legislation as such and/or with its provisions.

3.1 Awareness and knowledge of the legislation in general

Awareness

As has been said, the VDU Directive is mainly aimed at employers. All employers with employees using visual display screen units (with a certain minimum intensity) are required to take the basic provisions prescribed in the Directive in order to protect the health and safety of the concerned workers. While some of the provisions of the VDU legislation (like e.g. the correct instalment of the VDU workplaces) might be put into practice independently of the knowledge of legal obligations, others (like e.g. the provision of preventive eyesight tests) are unlikely to be practised by establishments in which no one at the management level is aware of the legal prescriptions. Therefore, a full implementation of the legislation presupposes a certain level of knowledge of the regulations on part of the employer.

Details of the European Directive respectively its national transposition, however, do not necessarily have to be known to the management itself, i.e. the owner, managing director or human resources manager of a business or organisation. Especially in larger establishments the task of dealing with the details of the Directive will usually be delegated to some sort of health and safety specialist within the establishment.

According to the results of the employer's survey, in the Czech Republic, Denmark, Germany and the Netherlands, a slight majority of between 50% and just above 60% of employers is aware of the existence of specific OSH legislation concerning the use of display screen units. In all four countries, a high positive correlation between awareness and establishment size can be observed: The larger the establishment, the more probable it is that the responsible persons are aware of the specific legislation.

In Finland, the measured average awareness of the relevant national laws and acts is considerably higher. Depending on the precise type of regulation[6], in Finland between 81% and 93% of employers stated that they aware of the existence of the respective legal provisions. The

[6] The Finnish evaluation asked separately for the awareness and knowledge of (1) the national Government Decision on VDU work, (2) the Finnish Occupational Safety Act and (3) the Occupational Health Care Act.

comparatively high measures for Finland can only partly be explained by the over-representation of larger units in the survey. Although knowledge of the provisions in Finland, too, is indeed less widespread among smaller units, even the businesses of the smallest size-class (1 to 9 employees) show high awareness figures: 70% of employers in these small organisations claimed to be aware of the national Government Decision on VDU work and 76% were aware of the Finnish Occupational Safety Act.

In the United Kingdom, as many as 93% of employers said to be aware of the OSH regulations related to VDU work. In the UK, too, awareness of the regulations is higher in larger business units. But with 84% of employers in workplaces with less than 25 employees claiming to be aware of the regulations, awareness in smaller units is at a very high level in the United Kingdom.

Some of the national evaluations asked not only for the awareness of the national regulations, but also for the awareness with regard to the European VDU legislation. Results show that the European legislation is considerably less often known among employers than the respective national legislation. Since neither employers nor OSH experts or the employees themselves are confronted with the European Directive in their daily work, this outcome is neither surprising nor a reason for preoccupation.

Knowledge of the regulations
With regard to the degree of knowledge, in all countries a broad range can be found. While in some establishments the laws as such are rather well known, in others the responsible persons are only aware of the existence of any type of regulation on these issues. Between these two extremes, further nuances with regard to the degree of knowledge exist.

Due to differences in the formulation of the questionnaires and in the methodology of data collection (e.g. the choice of respondents), a strictly comparable measure for the knowledge of the European VDU Directive or of its transposition into national law can not be extracted from the data. Despite these differences, the national evaluations nevertheless coincide that knowledge of the contents of the specific laws regulating occupational safety and health at VDU workplaces is considerably less widespread among employers than the mere awareness of their existence. This was to be expected and partly results from internal sharing of work regarding the compliance with OSH legislation within an establishment.

Employees
Employees do not need to know the VDU regulations as such. However, they should be aware that some sort of legislation exists which regulates their entitlements and duties with regard to their VDU workplace. It is among the duties of the employers to inform their employees on these legal provisions. But in most countries there are also additional offers of information where employees can directly inform themselves about their legal rights and obligations regarding VDU work, such as brochures of OSH institutions directed at employees or online portals where support in VDU-related OSH issues is offered to employers, OSH professionals and employees.

Results from Denmark, the Netherlands and Finland suggest that – as was to be expected – the knowledge of the specific VDU legislation is notably lower among employees than among

employers. In Finland for example only 7 % of employees at a VDU workplace stated to be familiar with the contents of the national VDU legislation comparing to 27 % of employers

In the German employee survey, respondents were meant to indicate whether or not they know that there are laws that prescribe certain minimum standards with regard to the health and safety protection at their VDU workplace. More than three quarters of the employees reported to have this general awareness. However, this does not mean that three quarters know the Directive or the German *"Bildschirmarbeitsverordnung"* as such. It only means that they have an (however vague) knowledge that there are laws they can recur to in case of conflicts with the employer regarding their VDU workplace.

3.2 Awareness and knowledge of the topics and provisions of the VDU legislation

Employers were also asked for their knowledge of the specific topics and provisions mentioned in the Directive respectively its national transposition. The mode of asking these questions varied largely between the countries. However, the following observations can be made:

Denmark
In Denmark, questions on the awareness or knowledge of the various provisions of the legislation were not part of the quantitative employers' questionnaire, but were asked of employers in the semi-structured qualitative interviews preceding the study.
Judging on base of the statements in these qualitative interviews, those Danish employers who know the VDU legislation show a high awareness on the existence of detailed regulations on the set-up of their workplace, albeit only limited knowledge of the details as such. The majority of employers are also aware of the regulations on the provisions of VDU glasses, while there is only a very limited awareness of the regulations regarding eye-tests. Knowledge regarding the coverage of regulations on daily work routines in the VDU legislation is rare.

Germany:
In Germany, questions on the knowledge and awareness of the various provisions of the VDU legislation were asked only to those employers who claimed to know the legislation. The areas they are most familiar with are the rules regarding the set-up of the workplaces and the regulations on workplace analyses. The regulations on the protection of eyesight are also among the better known parts of the VDU legislation. The least well known provisions of the VDU regulations are the rules for work organisation, the requirements with regard to information and training of the employees and – above all – the rules of software ergonomics. With regard to information and training it has to be added that in Germany this is integrated into a superordinated law *("Arbeitsschutzgesetz")* and not into the *"Bildschirmarbeitsverordnung*" where most of the other requirements of the Directive are transposed.

The Netherlands
In the Netherlands, knowledge and awareness of the different regulations were assessed by asking (all) employers whether or not they think certain provisions (among them also provi-

sions that do not exist) to be mandatory under the Dutch law governing work with display screen equipment.
The Dutch employers proved to be most aware of the physical aspects of the requirements on working with display screen equipment, such as the provision of suitable furniture. Likewise, the requirements with regard to the organisation of daily work routine – namely the rules for small interim breaks – are well known among the majority of Dutch employers. This is also true for the requirements of workplace analysis, although here it becomes evident that the physical aspects of the analyses are much better known than other aspects such as the assessment of mental strain. With regard to the requirements which are foreseen for the protection of workers' eyesight the picture is mixed: While a slight majority of employers is aware of the obligations with regard to curative measures to be granted in case that the employees should have problems with the eyesight, only a minority is aware that eyesight tests are to be granted also on a regular basis, namely before starting VDU work and in regular intervals thereafter. The area where awareness and knowledge of the Dutch regulations on VDU work is most limited is software ergonomics.

Finland
In Finland VDU work and working conditions are addressed in a Government Decision on VDU work, and in the Finnish Occupational Safety Act. When the employers responded being familiar with the content of the legislation, the percentages for "well-known" and "partly known" for different requirements of the regulation areas were as follows: 1) the evaluation of ergonomic hazard in workstations were reported as "*well known*" by 39% and as *"partly known*" by 58%, 2) ergonomics of equipment and furniture 44% and 55%, 3) the working environment 52% and 47%, 4) eye tests 39% and 55%, 5) prevention of mental overload 37% and 59%, 6) work organization (breaks, changes in activity) by 47% and 51%, 7) training and guidance of employees 48% and 50%, and 8) software ergonomics 16% and 66%.

In the Czech Republic and the United Kingdom, specific questions on the familiarity of employers with the various topics and provisions of the regulation were not asked.

3.3 Knowledge and awareness of the scope of the legislation

The Dutch evaluation measured in how far employers are aware of the precise scope of application of the VDU legislation, i.e. whether they know for which kind of VDU workplaces the legislation is valid and for which not. It turned out that the majority (about two thirds) of Dutch employers are not aware of the precise scope of application. About a fifth of the employers is of the opinion that *"it is currently unclear which employees are or are not covered by the legislation"* and thus see some ambiguity with regard to the scope of application in the legislation as such.

Doubts about the scope of application mainly concern the "two hours rule" according to which the regulations in the Netherlands are applicable only for employees with at least two hours of daily VDU work and for "atypical" kinds of display screen work such as the home workstations of telecommuters, workstations of laptop users or flexible workstations.

Doubts about the applicability of the VDU legislation to telecommuters and laptop users obviously exist in other countries, too. Although direct questions about the knowledge of the legislation were not asked in the other countries, the data indicate that employers often do not feel responsible for the set-up of the workstations of these groups of VDU employees.

3.4 Sources and accessibility of information

Most employers are not primarily obtaining their OSH-related information directly from laws and directives, but from supplementary sources of information. The proper analysis of sources of information therefore is indispensable for qualifying the subjective perception of legislation by employers and workers

In all countries involved in this comparative study, the national governments or institutions in charge of OSH issues have published material that illustrates the major elements of the law and explains what should be good practice at VDU workplaces. For example, in the United Kingdom the Health and Safety Executive (HSE) provides a series of three booklets on the topic. In Germany it is the BGI 650, a guidance provided by the Employers Liability Insurance ("*Berufsgenossenschaft*") and the Federal Institute for Occupational Health and Safety (BAuA). In other countries, similar publications exist.

The following list shows some more empirical details:

- In the Netherlands, 41% of the employers use information provided by the Occupational Health and Safety Service *Arbodienst* to inform themselves about VDU regulations, while only 6% use the actual text of laws.
- In Germany, only 17% of the employers named the legislative texts as most important source of information, while 42% mostly use the BGI 650.
- In Finland occupational health professionals and experts were mentioned as information source in 73% of responses of the employers, whereas the publications and www chapters of the Finnish Institute of Occupational Health in 58 %, and the publications and www chapters of the Finnish Occupational Safety and Health Inspectorate Administration in 58 % and legislative texts in 38 %.

In some of these illustrative publications or websites, clear and frequent references to the underlying laws are made, while in others the legal provisions as such are less explicitly mentioned. This further complicates a strict cross-country comparison of questions asking employers for the awareness or knowledge of the legal provisions.

To get access to information about VDU regulations is by most employers not perceived as a problem:

- In Germany, 47% evaluated the available information as just about right, while 24% thought it even to be too extensive or confusing and only 14% regarded it as deficient.
- Among the Dutch employers, 63% evaluated the access to VDU related information as *"good or adequate"*.

- In Finland, employers get knowledge about VDU regulations *"very easily"* in 10% and *"quite easily"* in 69 %, and respectively the employees in 4 % and 30 % of their responses.
- In the United Kingdom access to information was evaluated as *"good or adequate"* by 82% of employers.

This topic, though not primarily focused, illustrates how evaluation can also be useful for the improvement of information at company level. The evaluation shows, that not all establishments feel satisfactorily informed: In Denmark, for example, a substantial minority of about one third of employers (34%) stated that a government initiative they would like to see regarding the VDU legislation is *"Better information"* or *"More information".* This was the by far most frequently given answer to the question about potential improvements. In the Netherlands, too, more or better information about the legislation was among the most frequent proposals for improvements of the VDU legislation.

3.5 Conclusions

On the employer's side, overall **awareness** of the existence of some sort of compulsory legislation with regard to VDU work is given in a majority of larger establishments. In smaller units, awareness is considerable less widespread, with the notable exception of Finland and the United Kingdom, where the smaller units also show a very high degree of awareness of the legal regulations. In spite of the mentioned methodological restrictions regarding comparability of country results, this result suggests that the dissemination strategies in Finland and the United Kingdom are obviously more in accordance with the needs of smaller workplaces than those of the other four countries.

Awareness of the regulations also tends to be less extensive in private than in public organisations. Regarding the intensity of screenwork in the establishment, there is no clear tendency to be observed in the cross-national view: Whereas the Dutch evaluation found organisations with a low share of VDU workers among their staff to be generally less aware of the regulations, such a trend could not be observed for Germany.

The level of **knowledge of contents** of the European Directive respectively of the national transpositions of the Directive is considerably smaller in all countries than the level of awareness of the existence of the respective laws.

As far as the **knowledge of** the various **areas and provisions** of the VDU legislation is concerned, it can be concluded that in all six countries employers are most familiar with the existence of detailed regulations on the physical set-up of the workplaces of VDU workers. The requirements of workplace analyses which are the main instrument to ensure the correct set-up of the workplaces are also known in principle by most employers that are generally aware of the VDU legislation. Among the least well known provisions of the VDU legislation are those referring to the prevention of mental strain, an aspect which is closely connected to work organisation. The provisions on the interface between user and IT equipment (software ergonomics) are also little known.

The **procurement of information** is for most employers not considered as a problem. Access to information on the VDU regulations and the adequateness of the provided information are evaluated mostly positive by employers in all countries where respective questions were asked. The texts of the laws are also mostly considered to be fairly **understandable**.

It is noteworthy that in all six countries, the text of the law as such plays only a subordinated role in the dissemination of the Directive's contents. For many employers, the text of the legislation is not the most important **source of information** with regard to the shaping of the VDU workstations. Instead, many employers prefer to use brochures or internet portals provided by national safety and health institutions. These brochures are all based on the European and national legal prescriptions regarding VDU work.(Some of them, however, refer more explicitly to the laws the information is based on than others.)

4. Application at the workplace

In this chapter analysis will focus on the degree to which the specific provisions of the VDU Directive have been put into practice in the establishments. This is an important precondition for the detection and assessment of deficits in legislation, which may cause obstacles concerning the application at the workplaces. The following provisions will be dealt with:

- The analysis of the workstations
- Information and training of the employees
- Application of the provisions regarding daily work routine
- Protection of workers' eyes and eyesight (by way of providing eye-tests and specific corrective appliances)
- Consultation and participation of employers (and/or their representatives)

Although analyses on base of the German and Dutch survey data show that the application rate is higher in those establishments where the regulation is known, knowledge and awareness of the legal provisions are not necessarily directly linked to the application of the same. On the one hand, measures might be applied without knowledge of the legal provisions because they are considered to be useful. On the other hand, well known provisions might deliberately not be applied in the establishment, e.g. because they are considered to be too expensive or of limited use.

4.1 Analysis of workstations

Workstation analyses (alternatively also denominated as "risk assessments") are an important element of most OSH regulations. The main aim of the analysis of VDU workstations is to check whether these are properly equipped with regard to hardware, furniture, lighting etc. and whether the specific needs of the employee(s) using the workstation have been taken into account in the arrangement of the different elements of the workstation. The workstation analysis or risk assessment of VDU workstations is meant to be focused on risks to eyesight, risks to the physical well-being and problems related to mental stress. The detailed criteria set out in the Annex of the Directive with regard to the correct set-up of VDU workplaces and the rules on software ergonomics are important guidelines for the workplace analyses. In most countries, checklists or other manuals for the workplace assessment have been elaborated on base of the Annex.

According to the employers' surveys, workstation analyses are being carried out in between about half and four fifths of establishments in all countries[7] except for the Czech Republic. In the Czech Republic, where the VDU legislation was introduced much more recently, only 31%

[7] In Denmark, employers were not asked for workstation analyses in particular. The question was formulated in a more general way there: *"Does your company pay specific attention to the physical set-up of the screen work workstations?"* The Danish result (68%) presented in the table below refer to this question.

of employers stated to have undertaken risk assessments at the VDU workstations. On the other hand, for Finland and the United Kingdom application rates are particularly high: In the United Kingdom, where the question referred to regular assessments undertaken every 12 months and was thus even formulated narrower than in the other countries, 75% reported the application of this provision. In Finland, about 80 % of employees told that workstation analysis had been made. In Finland Occupational Health Care normally makes this kind of work in VDU workplaces, and according to employers 90 % of establishments have the Occupational Health Care. Occupational Health Care told in their answers to carry out workplace surveys in 94 % of companies.

In the Czech Republic, Germany and the Netherlands, the application of workstation analyses is strongly correlated with the size of the establishment: While application rates are below 50% in small organisations, it reaches more than three quarters in the larger sized ones. In the United Kingdom, workstation analyses are also positively correlated with the establishment size, albeit the correlation is weaker here. In Finland, a clear correlation between firm size and application of risk assessments can not be observed.

Workstation analyses are most frequently carried out at specific occasions such as the instalment of new office workplaces or rearrangements of existing workplaces or in response to employees'complaints about the situation at their VDU workplace. Assessments carried out in regular intervals are much less widespread: For example, only roughly half of the German and Finnish employers who generally carry out workplace analyses do so at regular intervals or consequently whenever new VDU workers are employed and start their work. In the Netherlands, the share of establishments assessing their VDU workstations on a regular basis is even smaller: there, only between 11% and 15% of all establishments (i.e. not only of those carrying out workstation analyses) carry out such workstation analyses on a regular basis.

Table 4: Application of workstation analyses at VDU workplaces – cross-national overview

Work station analysis	*Total*	*Size of establishment (number of employees)*			
		1 to 9	*10 to 49*	*50 to 99*	*100+*
Czech Republic	31%	13%	26%	54%*	
Denmark**	68%**				
Netherlands	50%	44%	58%	82%	86%
Germany	47%	41%	67%	77%	87%
Finland (employees)***	80%***	79%***	83%***	82%***	79%***
Regular workstation analyses	*Total*	*2 to 24*	*25 to 99*	*100 to 299*	*300+*
United Kingdom****	75%	71%	81%	83%	74%

Source: National employer surveys

* Differing size-class: 50 or more employees
** Danish figure based on a considerably differing formulation of the respective question, see footnote 7.
*** Data from employee survey; the respective figures are not available from the employers' survey.
**** Reference period: in the last 12 months

Employers' and employees' assessment of the application of workstation analyses roughly match with each other. This largely verifies the statements of the employers[8], although due to the methodological peculiarities an exact comparison of the statements of employees and employers is in most countries not possible on base of the material available for this .cross-country report.

4.2 Information and training of employees

4.2.1 Results from the national evaluation studies

One of the duties of the employer is to inform and instruct the employees on health and safety related issues with regard to work at display screen units. The European Directive 90/270/EEC is not very specific on this issue, but prescribes the duty of information only in general terms: *"…workers shall receive information on all aspects of safety and health relating to their workstation, in particular information on such measures applicable to workstations as are implemented under Articles 3 [analyses of workstations][9], 7 [daily work routine] and 9 [protection of workers' eyes and eyesight]."* The way how this information is to be provided to employees is left to the discretion of the employer.

As a matter of fact, employees at visual display units nowadays have numerous possibilities to adapt aspects of their VDU workplace to personal needs or preferences. These possibilities range from physical aspects like the multiple adjustability of modern office chairs or of the size of the signs displayed on the screen to matters of work organisation such as the decision of when to take breaks or how to avoid long spells of monotonous DSE work. To use the increased freedom of decisions in a health-beneficial way requires awareness and knowledge of the existing options. Therefore, in some of the national evaluation studies a strong emphasis was put on the issue of information and training.

Czech Republic
In the Czech Republic, only 37% of the employers stated to have instructed their VDU users in OSH issues related to their work at least sporadically. While the majority of large establishments fulfilled their information duties, in smaller units information is more rarely provided. Among the employees, about half (49%) stated to have received such information from the employer while the other half (50%) stated not to have been instructed on how to avoid health problems. According to the employees, the way of information most frequently chosen by the employer was individual instruction – either before or after commencing of work. The provision

[8] In the Danish and Dutch employee survey, questions did not directly refer to the application of workstation analyses. Instead, it was asked whether the establishment pays specific attention to risks of CANS (NL) respectively to the physical set up of screenwork (DK). If employees positively affirm these questions, this can be interpreted as implementation of some kind of work station analysis respectively risk assessment. For Germany, the questions on workstation analysis are very similar for both employers and employees and in both cases directly refer to the instrument of the analysis of workstation.

[9] Amendments in bracket made by the authors of the report.

of printed material or the provision of OSH information via the intranet played a subordinate role only[10].

Denmark
78% of the Danish employers stated to inform their employees about health and safety issues related to VDU work. Yet, since in the Danish question it is asked whether *"the employees or any of their representatives"* have been informed, results are not directly comparable with those of the other countries, where the respective questions referred to employees only.

Germany
In Germany, half of all employers reported to inform their employees on health related issues of VDU work. Of these, about half provide this type of information at regular intervals. The others do so only at specific occasions, e.g. when new personnel is employed, when there are changes in the duties and functions of employees or at the occasion of workstation analyses. The most frequently applied way of information and training is the distribution of written information, either in paper form or via the company intranet. With regard to the contents it can be said that information related to the reduction of mental stress (e.g. by measures of work organisation) is the issue which is least often included in information and training measures.

The Netherlands
The total rate of employers informing their employees on VDU related health and safety issues in the Netherlands is somewhat higher than in Germany if establishments stating to give *"some"* information are regarded as establishments informing their employees. Shares then range from 48% for information on the prevention of health risks to 60% for instructions on how to arrange the workstation. If counting only the clearly positive answers (the provided answer categories were yes/some/no), then the Dutch shares amount to only 24% to 36%, depending on the topic of information.

Finland
In Finland, most employers (92%) provide ergonomic information and guidance related to the VDU work in connection with workplace surveys and inspections. About four out of ten employers (40%) provide this type of information (also) when new employees begin their job. In most cases (92%) the information is given as a person-to-person instruction (mainly by occupational health care during their workplace surveys), but written information on paper or in the intranet is also being used. The topic most frequently dealt with is the adjustment of chair, furniture and other equipment. Information on the correct working posture and its variations and on pause gymnastics (62%) are also often provided.

United Kingdom
In the United Kingdom, a broad majority of 78% of employers stated to have provided all DSE users with information on how to prevent health risks associated with display screen work. Another 8% of the employers did so at least for some of the DSE users. In sum, information was thus provided in 88% of the establishments. Three quarters of the employers provide this

[10] Instructions with printed material or via internet were hardly mentioned by both employers and employees in the Czech Republic. This could be a hint that the Czech question on the provision of instructions might have been interpreted as a reference to personal instructions only.

type of information to the employees at the commencement of the employment and about half inform their VDU users at regular intervals.

General observations

The information rates reported from part of the employers are largely confirmed by the employee surveys. A majority of employees gets some information on health and safety related aspects of their VDU work. An exception is Denmark, where the rate reported from the employees is considerably lower (47%) than that reported by employers[11]. The exhaustiveness of the received information varies, however. From Denmark, Germany and the Netherlands we know that considerable shares of employees (roughly 30% in each of the three countries) wish to get more or better information from the employer about the health risks related to display screen work.

Table 5: Provision of information on health and safety aspects of VDU work – cross-national overview

Provision of information and/or training	*Total*	*Size of establishment (number of employees)*			
		1 to 9	*10 to 49*	*50 to 99*	*100+*
Czech Republic	37%	19%	34%	58%*	
Denmark	78%				
Netherlands	48%-60%**	46%-57%**	53%-68%**	65%-72%**	79%-85%**
Germany	50%	45%	57%	72%	78%
Finland**	a) 40% b) 89%	a) 38% b) 76%	a) 30% b) 86%	a) 42% b) 88%	a) 46% b) 95%
*Provision of information****	*Total*	*2 to 24*	*25 to 99*	*100 to 299*	*300+*
United Kingdom	86%	76%	85%	95%	99%

Source: National employer surveys

* Differing size class: Establishments with 50 or more employees

** The Finnish question presented various situations at which information and training was provided, as an example a) *"when employee begins a job",* and b) "*in connection with workplace assessment*", but a category for "no information provided" was not actively offered. Results are therefore not directly comparable to those of other countries.

*** Figures for the UK refer to the provision of "information" only. Establishments providing information to "all" users and those providing it to "some" users are summarized in the table.

All aspects considered, the provisions on information and training have been applied in a majority of establishments. Nevertheless, in several of the countries covered by the study, there still exist noteworthy information and training deficits. Generally, information and training is

[11] Part of the explanation for this are differences in the definition of the universe: While small establishments with less than 5 employees are excluded in the employers survey, they are included in the employee survey. This smallest size-class of establishments is quantitatively important and tends to have the lowest application rates.

more likely to take place in middle-sized and large establishments than in small units. This size effect is more accentuated in Czech, German and Dutch establishments than in those of the United Kingdom.

4.2.2 Secondary analyses from the 4th European Working Conditions Survey

The Fourth European Working Conditions Survey 2005 offers a unique possibility to get additional and really comparable information on the quality of health and safety information in the six countries involved in this evaluation. In the Working Conditions Survey, respondents were asked for a (subjective) assessment of the health and safety related information they received: *"Regarding the health and safety risks related to performance of your job, how well informed would you say you are?"*.[12]

This question was analysed for those employees only who stated to work at least half of their working time at a visual display screen unit. The results give us a hint on the perceived quality of the instructions with regard to the work at visual display units.

Table 6: Quality of health and safety information – cross-national overview

Country	Very well informed	Well informed	Not very well informed	Not at all well informed	DK/ Refusal	Index (mean)*
CZ	54%	40%	5%	2%	0%	**1,53**
DK	57%	31%	9%	3%	1%	**1,57**
DE	45%	47%	4%	3%	1%	**1,63**
NL	33%	48%	13%	6%	0%	**1,91**
FI	50%	49%	2%	0%	0%	**1,53**
UK	64%	27%	7%	1%	1%	**1,44**

Base: 4th European Working Conditions Survey 2005, valid answers to Q12 only (employees working half of their time or more at a display screen unit)

* The lower the figure, the better is the assessment (very well informed = 1; not at all well informed = 4);

The overall picture is very positive: In all countries, a broad majority of employees feels well or even very well instructed on health and safety risks related to their VDU work. The countries that score best in the assessment of the employees are the United Kingdom and Finland. The Czech Republic also receives very good scores from the VDU workers. In Denmark and Germany, the assessment is slightly less positive. The judgement of Dutch employees is the least positive within this group, but in the Netherlands, too, it is only a minority of employees that feel insufficiently informed.

These results from the EWCS largely back the findings of the evaluation surveys, with the exception of the Czech Republic: There, the good rating in the EWCS does not fit with the

[12] 4th EWCS 2005, question Q12. Although the majority of employees is likely to have related this question mainly to the information given at the workplace, in some cases also information received outside the workplace will have been considered in the answer.

relatively low information rates found in the employer and employee surveys carried out in the framework of the evaluation. For the UK, where no employee survey was carried out, the very good rating in the EWCS backs the particularly high information rates reported by the employers. A possible explanation for this good rating might be the application of a dual channel strategy in the United Kingdom: There, employees are not only informed about health risks by way of the employer, but they are also directly addressed by information material and campaigns issued by the national OSH institutions in a kind of dual channel strategy.

4.3 Daily work routine

The Directive obliges the employer to plan the employee's activities in such a way that work at the display screen is either alternated with other types of work or that breaks are taken at regular intervals. In Denmark, Germany and the Netherlands, for example, national specifications recommend that such breaks should be taken after two hours of consecutive VDU work. As the country results show, most employees generally have the possibility to either take interim breaks or to alternate their VDU work with other types of work:

Czech Republic
In the Czech Republic, a vast majority of 89% of employers give employees the possibility to interrupt their VDU work with breaks. This is confirmed from part of the employees. In most cases, breaks can be taken at own discretion and are not prescribed by superiors.

Denmark:
In Denmark, according to the employers' survey roughly a quarter of the establishments have employees who often work for longer than two hours at VDU workplaces without interruptions by either other activities or short breaks. Likewise, in the employee survey a quarter of employees state to often work for more than two hours at the display screen without any interruption, another 16% regularly do so. But among those who state to work without interruptions, only a very small minority of 3% does so because they are not allowed to take any breaks.

Germany:
According to the employers' side, in Germany a broad majority (83%) of all establishments does not have any employees who don't have the possibility to interrupt their VDU work with other activities. The vast majority of those – relatively few – employers who have such employees state to give them the possibility to take short breaks.

This very positive assessment of the employers is not totally confirmed by employees. But on the employees' side it is also a majority that says that their VDU work is regularly interrupted by other types of work. Among those whose VDU work does not regularly alternate with other types of work, two thirds regularly take small breaks while one third does not do so. In those cases where employees state to never change the type of work or take any short breaks to interrupt VDU work the reason for not doing so is mostly not the employers' attitude, but time pressure or the personal feeling not to need any interruptions. The share of employees stating that the employer does not want them to take any interruptions is very low.

The Netherlands:
According to the employees' statements, the share of VDU workers hardly taking any breaks is higher than in most other countries: About half the employees report that breaks never or only occasionally occur and 41% state to regularly work for more than two consecutive hours at a display screen. The most frequently (44%) stated reason for not taking breaks is that work does not permit it, e.g. due to deadlines and work pressure. Quite a broad share of employees forgets to take breaks or is not interested in taking them. Only a minority of 11% states not to take them because the employer does not encourage them to do so.

Finland
Among Finnish employers and employees, the percentages for expressing the following opinions were (the rates for employees are in parentheses): 1) the nature of the work ensures that VDU work alternates with other type of work; 53% for employers (39% for employees), 2) employees are able to take breaks independently; 74% (78% for employees), and 3) the official labour norms upon breaks are sufficient (e.g. lunch and coffee breaks); 53% (34% for employees). In Finland the official labour norms in this field consists of the Working Hours Act and the Generally Applicable Collective Agreements. It is noteworthy that among those employees who don't take breaks, almost every second (45%, multiple answers possible) says that work pressure is too high as to take any breaks.

The United Kingdom
In practically all (99%) establishments where spells of intensive display screen work occur, the affected employees are allowed to take breaks or changes in activity. In the vast majority of establishments where any DSE work occurs, breaks either occur naturally or it is left to the employees' discretion to take breaks or change activities.

General observations
In all six countries only very few employers openly deny their employees the possibility of breaks or changes in the type of work. The requirements of the VDU legislation regarding the concessions of breaks or changes in the work are thus fulfilled to a large degree.

Most of the employers do not set fixed interim breaks but prefer to leave it to the respondents whether and when they take these breaks. This gives employees an enhanced degree of freedom in the organisation of their daily work. But the evaluation also shows that many employees factually do not take any breaks although they are entitled to take them at their own discretion. The most important reasons hindering employees from taking such breaks are on the one hand personal habits (many employees do not regard these breaks as necessary or simply forget to take them) and on the other hand factors of the work organisation within the establishment. Thus, in Germany and the Netherlands a considerable share of employees renounces on taking breaks because *"work does not permit it"* or because *"work pressure is too high".* In order to improve this situation and to incite the employees to take breaks in spite of high work pressure, some employers use specific software that reminds people of taking breaks.

4.4 Protection of the workers' eye and eyesight

The Directive prescribes that workers should be entitled to an eye and eyesight test before starting display screen work, in regular intervals thereafter and whenever they experience problems with their eyes. If at the occasion of such an eye-sight test the need for specific VDU glasses should arise, costs of these must not be borne by the employee.

Provision of eyesight tests
The share of establishments providing their employees with eyesight tests is relatively small in all countries:

- In the **Czech Republic**, 17% of the employers stated to provide their employees with the opportunity of an appropriate eye and eyesight test. Among the employees, about a fifth (19%) reported that their employer provides DSE workers with an appropriate eyesight test. In most cases (95%), this is done in the context of periodic preventive examinations.
- In **Denmark**, the share of employers offering eyesight tests amounts to roughly two thirds, but the vast majority of these offer the tests only if employees complain about visual problems. The share of those granting these tests preventively at the beginning of VDU work and/or in regular intervals thereafter hardly amounts to some 20%. The values from the employee survey largely confirm the low average rates obtained from the employers' survey for preventive eye-sight tests.
- In **Germany**, eyesight tests are offered in 28% of establishments. A broad majority of those who offer such tests do so on a regular basis and not only in the case of problems. The share of employees stating to have been offered an eyesight test is higher, amounting to about 50% In large establishments, preventive eye-sight tests are largely being offered[13]: The vast majority of employees in Germany who were offered an eye-sight test by the employer actually have made use of this offer.
- Around 40% of the **Dutch** employers in principle grant eye-examinations, but many of them only in case of emerging problems. The share of those who offer them regularly or at the beginning of VDU work amounts to just 17%. The results from the employee survey largely confirm the low average rates obtained in the employers' survey.
- Two out of three **Finnish** employers stated that with the current system of occupational health care employees can visit an optician or an ophthalmologist for an ophthalmology examination covered entirely by the employer. Half of the employees state having taken an eyesight screening examination through occupational health care. One in five employees reports having personally visited an optician or an ophthalmologist for an ophthalmologic examination.
- In the **United Kingdom**, three quarters of all employers state that they provide eyesight tests for users of display screen equipment. In a majority of establishments these tests are offered only on request of the user or if the user experiences visual difficulties due to display screen work. 34% of employers generally offer eyesight tests for all employees using DSE – be it either before or after starting display screen work. In larger establishments eyesight tests are more widely offered than in smaller ones.

[13] The higher percentage reported by employees is plausible: If a phenomenon – like the application of eyesight tests in Germany - is positively correlated with the size of the establishment, then the value measured in the employee survey should be higher than that measured in the employers' survey because the absolute number of large establishments is very low but the number of employees working in large establishments is much higher.

General observations:
Results show that eye-tests are frequently not applied in a proactive way, although the respective requirements are clearly set out in the Directive. With the notable exception of Finland, in none of the countries more than 30% of the establishments generally offer such tests to their DSE workers on a regular basis or before the beginning of display screen work. Especially smaller establishments rarely offer tests in a proactive way to all employees.

If an employer does not offer eyesight tests to the employees, the consequences this has for the latter can vary, depending on the regulations in the national health care system: While for example in Denmark or Germany all insurants of the public health insurance have the right to require a cost-free eyesight test and ophthalmologic examination whenever they feel the need of it, the public health insurance in the United Kingdom does usually not cover costs of preventive eye-tests undergone by their insurants.

There are various reasons why eyesight tests are frequently not offered: In the Danish survey, the majority (71%) of those employers not offering eyesight tests argued that the employees did not request such a test. This argument is not in line with the requirement of the Directive since the employer should offer such a test proactively instead of reacting only to employees' demands. A minority of 16% of Danish employers, however, does not apply the tests because they don't consider this legislative provision as relevant and reasonable. In the United Kingdom, a significant minority of just one third (31%) of the employers share the opinion that the employer should not have to pay for eye tests or spectacles. A large majority of employers in Germany consider the measure of eyesight tests to be useful, thus not generally denying its' sense. Similarly, only few Dutch employers think that paying attention to the protection of the eyesight of their employees at visual display units is not useful for the company. The discrepancy between the high share of employers considering the measure to be useful and the low share of those actually applying it as foreseen by the legislation is striking.

Table 7: Provision of eyesight tests – cross-national overview

Eyesight tests	*Total*	*Size of establishment (number of employees)*			
		1 to 9	*10 to 49*	*50 to 99*	*100+*
Czech Republic	17%	9%	14%	28%*	
Denmark	65% [19%]				
Netherlands	43% [17%]	39% [14%]	54% [27%]	70% [32%]	81% [34%]
Germany	28% [25%]	18% [16%]	43% [38%]	67% [64%]	82% [80%]
Finland	79%	73%	74%	87%	81%
	Total	*2 to 24*	*25 to 99*	*100 to 299*	*300+*
United Kingdom	75% [34%]	50% [23%]	75% [32%]	92% [44%]	96% [41%]

Source: National employer surveys; Values before brackets show the total share of establishments offering eyesight tests (either preventive or curative), the values in brackets refer only to those establishments applying preventive eye-sight tests, i.e. tests before commencing work and/or at regular intervals.

* Differing size class: Establishments with 50 or more employees

Provision of VDU spectacles

If from an eyesight test the need for specific VDU spectacles should arise, the employer is obliged by the VDU legislation to cover the costs of these spectacles. According to the national evaluation results, this obligation is quite often not fulfilled:

- The lowest values are reported from the **Czech Republic**, where only 4% of employers stated to provide employees with specific corrective appliances if necessary.
- In **Denmark**, in turn, the willingness to pay for such corrective appliances is - according to employers' self-statements – the highest within this group of countries. A broad majority of more than 80% stated to provide them if required.
- In **Germany**, only roughly a tenth of all establishments provides corrective appliances if needed. This very low average figure is strongly influenced by the behaviour of small establishments. In larger establishments from 200 employees onwards the German rate amounts to slightly more than 50%.
- In the **Netherlands** roughly one third of employers generally provide specific corrective appliances for the eyes if they are required.
- In **Finland** the employers and the employees gave the following responses to statements regarding the distribution of the costs of special glasses for VDU work if such glasses are found necessary (the figures for employees are stated in parenthesis): 1) 23% of employers reported that the costs are covered entirely by employer (13% for employees), 2) 36% of employers stated that the costs are covered partially by employer (e.g. lenses and reasonable frames) (24% for employees), 3) 4% of employers responded that lenses covered by employer (4% for employees), while 4) 21% of employers reported no contribution from the part of the employer (20% for employees).
- From the **United Kingdom**, comparable figures are not available due to differences in the wording of the questionnaire.

One reason for the very low values found for the provision of specific VDU appliances in some of the countries might be the fact, that many employees already have glasses of their own, which are also suitable for the use at VDU Workplaces, so that there is no need for extra VDU-glasses. Another possible explication might be associated to uncertainties on whether it is the employer or rather the health insurance that has to cover the costs. Nevertheless, these considerations do not explain the strong correlation between the size of the establishment and the provision of VDU glasses, since the regulations of the health insurances do not differentiate their insurants by the size of the establishment they work in.

General observations

Summarizing, it can be said that the measures of eyesight protection foreseen by the VDU Directive are - although generally acknowledged as useful – applied by the establishments to a relatively small degree only. Especially preventive, proactive offers of eyesight tests are often not made. The provision of corrective appliances by employers is also far from being a matter of course, with the notable exception of the situation in Denmark. In many countries, only a minority of employers feels obliged to cover the costs for specific VDU glasses. However, when asked for health risks they typically associate with VDU work, the risks most often named by employers were those regarding the eyesight.

4.5 Consultation and participation of employees

The Directive prescribes that *"consultation and participation of workers and/or their representatives shall take place […] on the matters covered by this Directive, including the Annex".*[14] The Directive is, however, not very specific about how and when this consultation and participation is to take place, which makes it difficult to prove in how far an establishment applies the consultation and participation requirements in practice. Generally speaking, three channels of consultation and participation can be regarded as relevant with regard to the VDU legislation: The formal employee representation body, OSH experts/institutions at the establishments and the employees themselves. Which of these channels are used in an establishment depends mainly on the internal sharing of OSH duties.

(1) The role of formal employee representation bodies

Not all establishments have a formal employee representation body. Depending on national legislation, establishments are meant to have an employee representation body only from a given size-category on (in the Netherlands e.g. only establishments with 50 or more employees must have a works council). Therefore, information and participation in matters related to the VDU legislation can be provided through this channel only in a limited number of establishments. In the Netherlands, according to the employer sample the overall share of establishments with a formal employee representation amounts to 17%, in Germany the share is even smaller (10%). The Danish, Finnish and UK evaluations did not contain questions on the existence of employee representation bodies. From other sources[15] it is known that formal employee representation bodies are widespread in Denmark and Finland, but less frequent in British establishments. In all countries, a majority of large establishments has an employee representation body.

In those German and Dutch establishments where an employee representative body exists, this body is in a slight majority of cases involved in aspects concerning the working conditions at display screen work: In Germany, 14% of these establishments say that OSH aspects related to display screen work play a big or a rather big role in negotiations between employee representation and management, for another 46% the topic plays at least a minor role and for about 40% the topic does not play any role. In the Netherlands, the overall picture is quite similar: There, also roughly 60% of the employee representative bodies concern themselves with working conditions relating to display screen work, albeit about half of them only to a minor degree. In the Czech Republic the issue of VDU work is being consulted with the trade unions or other employee representatives in 20% of all establishments. These are roughly half of all those establishments where a formal employee representation exists.

If the employee representative body of an establishment is not involved in OSH issues related to VDU work, this does not necessarily mean that the requirement of information is not fulfilled

[14] The Directive refers to Article 11 of Directive 89/391/EEC, which regulates consultation and participation of employees and/or their representatives in general.

[15] See e.g. Riedmann et al. 2006: Working time and work-life balance in European companies, European Foundation for the Improvement of Living and Working Conditions, Dublin 2006, p. 62.

there by the employers' side. It is also possible that the employee representation bodies in these establishments do not see any necessity in concerning themselves with the topic, either because they think everything to be OK in this field or because there are other institutions like internal OSH experts that take over this task.

(2) Occupational Safety and Health experts in the establishment

A second channel for involving employees in matters covered by the VDU Directive is via the establishment-based occupational safety and health experts.

Germany
According to the German employer survey, in slightly more than every second establishment any kind of OSH expert exists. The rate is strongly correlated with the size: while only a quarter of the establishments with less than 5 employees has an OSH expert, in larger establishments with 20 or more employees the rate amounts to about 90%. Results from the survey show that in Germany matters related to the VDU legislation are often, but not necessarily dealt with by the establishment's occupational safety and health experts. Only a small majority (57%) of the German employers that have an own OSH expert said that aspects related to display screen work are part of the general health and safety efforts undertaken in the establishment.

Finland
In Finland the questionnaire survey was additionally carried out among occupational health care professionals (N=285), but the results are not included in this report. According to the Occupational Health Care Act (1383/2001), in Finland the employer shall arrange occupational health care. This includes e.g. the assessment of the healthiness and safety of the work and the working conditions through repeated workplace visits and by using other occupational health care methods, having regard to the workload and the working arrangements and taking these factors into account in planning the work, working methods and work spaces and in situations in which the working conditions are changing.

In the Czech Republic, Denmark, the Netherlands and the United Kingdom the existence of establishment-based OSH-experts was not a topic of the evaluation survey.

(3) Direct involvement of the employees

Especially in establishments where neither a formal employee representation nor an OSH expert exists, the consultation and participation duties of the employers should be exerted by a direct involvement of the concerned employees.

Direct consultation and participation can take various forms and can take place at various occasions. Workstation analyses or information and training measures in OSH-related issues usually imply to a certain degree the consultation and participation of the employees. Apart from the application of these provisions, the reaction of an employer on wishes of the employees related to the display screen workplace is also an indicator for the degree to which the consultation and participation requirement is met. If individual requests are usually fulfilled, this

is an indicator that employees indeed have a certain say in issues concerning the working conditions at their VDU workplaces.

4.6 Application of the legislative provisions in 'atypical' work environments

The classical association connected to workplaces with visual display units is that of a personal computer placed at a desk in the firm's offices. For the majority of VDU workplaces, this association is still correct. But the evaluation surveys have shown that 'atypical' VDU workplaces such as laptops or telecommuters' home workstations are not longer rare exceptions: In Germany, for example, every seventh VDU worker uses a laptop as standard VDU equipment. Many of them use the laptop not only for visits to clients or other mobile purposes, but also stationary at their regular workplace in the firm. Telecommuting is also widespread, with about every tenth VDU worker regularly doing part of the work at home.

The European VDU Directive 90/270/EEC is not very explicit about these new forms of VDU work. For the use of laptops, it only states that the legislation is not applicable to *"'portable' systems not in prolonged use at a workstation"*. For laptops in permanent use at normal workstations the legislation is thus applicable, but it is not further specified what this means in practice with regard to the fulfilment of the criteria of the Annex. Regarding the workplaces of telecommuters, the Directive does not contain any direct hints. But in several national legislations, the responsibility of providing an adequate workstation at home is attributed to the employer if the employee does not yet have such a (privately owned) workstation.

For the VDU legislation, these more recent developments therefore pose challenges. For example, the provision on workstation analysis can hardly be applied to the home-office workplace of a telecommuter. Since the telecommuter's workstation is out of scope of the classical OSH institutions established in the firms, other mechanisms should make sure that the VDU work done at home does not cause health problems. Such mechanisms could be an enhanced emphasis on information and training, enabling the telecommuter to properly set-up and use the workstation in the home office.

Such specific instructions are obviously rarely given to telecommuters: Among the Finnish employees, 23% do part of their VDU work from home, but only 4% (of all employees) stated to have received instructions from the employers' side on how to assemble the workstation at home in an ergonomically correct way. For Germany analyses of the evaluation results showed that the share of employees receiving information and training is not higher mong telecommuters than among the other employees. This also suggests that specific information related to the set-up of the telework-station at home is not habitually provided.

For laptop users, the fulfilment of some of the provisions of the Annex – like e.g. a monitor that can be turned to the left and to the right – require the provision of additional equipment components such as a separate keyboard and monitor. The German evaluation has shown that this requirement is often not fulfilled: Only 28% of employers generally provide employees who use a laptop at their regular workstation with a separate keyboard. 23% do so on request and 46% do generally not provide separate keyboards. It is however noteworthy that among estab-

lishments which are aware of the VDU regulation, the share of those generally denying the provision of keyboards is considerably lower (24%). In Finland, the provision of separate keyboards is also not a matter of course: About one third of the laptop users said that a separate keyboard is not available to them. Finnish employers and employees (responses of the employees are in parentheses) reported that the computer equipment for telework at home is normally purchased 1) *"by the employer*" (83% of employers and 44% for employees), 2) *"by the employee"* 9% of employers (39% for employees), and 3) *"by both the employer and the employee"* 5% of employers (16% for employees).

4.7 Conclusions regarding the application of the provisions

The application of the main provisions of the Directive is mostly better in medium and large companies than in smaller ones. While for the majority of provisions application is quite satisfying for establishments with 100 or more employees, there are application deficits in smaller units, especially in those with less than 10 employees. These deficits are most accentuated in the Czech Republic, Germany and the Netherlands. In Finland and especially in the United Kingdom, compliance by small establishments is usually much better, albeit not for all provisions. For Denmark a breakdown of the data by size-classes does not exist for most of the measured items.

All in all, the measured degree of application is highest for the information and training requirements. It is also relatively high for the analysis of workstations. The requirement to provide eyesight tests show the lowest application rates in most of the countries. The level of application is particularly low for regular, preventive tests.

5. Effectiveness

The present chapter will deal with the effectiveness of the VDU Directive. Effectiveness will be interpreted as the degree to which the general aims of the Directive and the specific aims of its various provisions have been reached. In general terms, the Directive can be regarded as effective if the physical set-up of VDU workstations is largely in accordance with ergonomic standards, if health and safety aspects are taken into account in the work-organisation and if employees are not deterred (by either a lack of knowledge or objective restraints such as an excessive workload or insufficient VDU equipment) from shaping their VDU work in a health preventive way, but are on the contrary incited to do so.

In the analysis of effectiveness, we will differentiate between these two levels. First, we will ask whether there are any indicators showing to which degree the various provisions of the Directive contribute to reach their specific aims. At a second level, then, the overall situation and influences will be analysed. The main indicators for the latter will be degree of overall satisfaction of employees with their VDU workstation in general and with the occupational safety and health activities of their employer in the field of VDU workplaces.

5.1 Effectiveness of the various instruments of the Directive

The first subchapter will focus on the degree to which the following main provisions of the VDU Directive have reached their aims:

- Analyses of workstations (risk assessments)
- Information and training of employees
- Protection of workers' eyes and eyesight (by way of providing eye-tests and VDU glasses)
- Provisions on daily work routine
- The requirements set out in the Annex

The analysis of effectiveness of the various provisions is focused on the question whether the specific measures foreseen by the Directive are effective in the sense that they reach their aim if applied at the workplace. This is an immanent analysis of the effectiveness of the measures. The question whether or not the application of the measures can finally be attributed to the existence of the VDU legislation will be analysed in the subsequent chapter dealing with relevance (chapter 6).

5.1.1 Analysis of workstations

The main aim of the analysis of workstations is to discover deficiencies in the VDU workstations, i.e. workstations which do not fulfil the requirements of the Annex of the Directive and/or

are not properly adjusted to the user. Subsequently, these deficiencies are to be corrected, e.g. by buying new equipment, readjusting the workplace setting or instructing employees on how to adequately use and adjust the equipment by themselves.

A measure for the effectiveness of workstation analysis is the degree to which these analyses lead to the detection of insufficiencies and a subsequent improvement of the workstations in an establishment. If workstation analyses lead to a notable share of improved individual workstations, the instrument can doubtlessly be considered as effective. Low shares of VDU workstations identified as deficient during workplace assessments, in turn, are not necessarily a sign of ineffectiveness: A consequent application of the instrument in the past or consequent training of employees on how to set up a VDU workstation can also have led to a situation where in a number of establishments workplace assessments currently hardly lead to any further improvements.

The various national evaluations contained different indicators of an effectiveness of the instrument of workstation analyses:

Czech Republic
The Czech evaluation did not include questions specifically dealing with the effectiveness of the analysis of workstation. Moreover, the risk analysis has been implemented only in 31 % of inquired establishments. Nevertheless, based on the analysis of the spectrum of responses to the question *"Who set off to carry out the risk assessment"*, we can speculate how this instrument is perceived by major players in the field. The risk analysis was initiated in 16 % of all establishments carrying out the risk analysis by the OHS supervising institutions such as public health authorities, labour inspectorate, external OHS experts or employees and their representatives. It suggests that the major institutions taking part in the enforcement of the VDU legislation rely on the work analysis as useful tool.

Denmark
The Danish employer survey did not include indicators for the effectiveness of workstation analyses. But it is interesting to see that 30% of all employees answered to the question *"What could your employer do to improve the conditions affecting screen work at your workplace?"* that the employer should conduct a workstation analysis. Together with the provision of information about health risks this is the most frequently expressed wish regarding possible improvements of the workplace. Obviously many employees know this instrument and are convinced of its usefulness and effectiveness.

Germany
In Germany, employers that have applied the instrument of workstation analyses were asked whether by this way any possibilities for improving the workstations had been encountered. In almost three quarters (73%) of these establishments this was in fact the case. The realization of these improvements, in turn, led – according to the employers - in a vast majority of 81% of all concerned establishments to a *"notable and enduring improvement of work satisfaction"* of the employees. 10% of the employers even noted a reduction of absenteeism caused by VDU related health problems.

This positive impact of workstation analyses is largely confirmed by the employee survey: More than every second employee (58%) whose current workstation had been submitted to a workstation analysis reported that this led to the identification of possibilities for improvements. These were mostly (86%) also put into practice, thus contributing to better workstations. Following workstation analyses, the following improvements were most frequently made: Readjustment of workstations and measures to improve the work environment (83% each), purchase of new VDU equipment (68%) and purchase of new furniture (60%).

The Netherlands

The Dutch evaluation shows that in every fifth establishment where adjustments to the workstation had been made, these resulted from an analysis of workstations[16]. However, the most frequent reason for adjustments of the workstation according to the Dutch employer survey has not been the workstation analysis but requests of individual employees (50%).

Finland

In 3% of the Finnish establishments applying the instrument of VDU workplace assessments, these lead to *"plenty"* needs for changes in the working environment, in another 81% they induced such needs *"to some extent"*. In 13% of the establishments, only minimal needs for changes were discovered by this way. The most frequent changes made as response to workstation analyses were adjustments of furniture and equipment (92%), the purchase of new furniture (80%) or the replacement of furniture and equipment (71%). A broad majority of the employees, too, reported that the analysis of their workstation led to adjustments of their VDU workplace.

The United Kingdom:

Although employees were not surveyed in the UK, employers are asked what they had changed as a result of workstation analyses. The most common changes were to adjust the workstations and incorporate various measures to improve the working environment (65%), to purchase new equipment (40%) and to replace furniture (62%). To a smaller degree, also non-physical improvements like the redesigning of tasks (24% of all establishments) were directly triggered off by workstation analyses. Additionally, 70% of the employers agreed there was a positive reaction from their staff to the changes made.

General observations

The available indicators show that the instrument of workplace analyses has been highly effective. It has in fact led to numerous improvements at the VDU workplaces, ranging from adjustments of furniture to the purchase of new VDU equipment or – in some cases – the rearrangement of tasks. For Germany, the evaluation could also show that in many establishments the improvements incited by previous workstation analyses have – in the views of employers – directly led to an enhanced work satisfaction or even to a reduced absenteeism.

[16] This figure is considerably lower than the German figure cited above, but it has to be taken into account that it does not only refer to the 40% of establishments having carried out workstation analyses in the past, but to all establishments where any adjustments to the workstations had been made.

5.1.2 Information and training of the employees

The provision of information and training is an instrument that aims at influencing the behaviour of the addressee, in this case the user of the VDU workplace. Employees should be enabled to contribute to an appropriate set-up and use of the VDU workplace. It is e.g. of little use if the employer provides for window shutters or sophisticated office chairs but employees do not use these properly because they do not know how to adjust them or why an adjustment is important. Ideally the instructions serve not only to enable and incite employees to properly use the equipment, but also motivate them to take additional health beneficial measures (such as pause gymnastics or sports activities in the leisure time) in order to balance out the one-sided strains of VDU work. Information can thus be regarded as being effective if it leads to a conscious, health-preventive behaviour at the workplace and even beyond the workplace.

The Czech Republic
In the Czech evaluation, a relatively small rate of establishments (37 %) stated that they train the employees, at least occasionally. Most of establishments, however, do not provide workers with information and training related to OSH issues of VDU work at all. Direct indicators on the effectiveness of the provided information on the behaviour of employees are notavailable from the Czech data. But the analysis of the motivation for the application and/or non-application of this tool at level of the establishments gives some insight into employers' perception regarding the effectiveness of the instrument: Most (45 %) of those establishments which did not provide training and education to VDU workers in OSH issues stated as a reason for this that they do not consider it necessary. Further 22 % stated that they have other priorities than training and education. Close to one third of the establishments (30 %) intend to introduce the training and education of VDU workers in a near future. It follows that the majority of employers do not recognize the information and training to be relevant instrument, at least at present.

Denmark
In the *Danish* evaluation, 30% of the employees expressed the view that one thing their employer could do to improve the conditions of their screen work is to provide information about the health risks of display screen work. This can be interpreted as an indicator that the employees themselves regard the provision of information and training by the employer as important and as an effective measure for an improvement of their VDU workplace.

Germany
In the German evaluation, all employees who received health related information from their employer were asked in how far they are taking into account this information in their daily behaviour at the VDU workplace. While 12% never do so and 37% only sometimes, about half of the employees state that they practically always follow the instructions. Within this group of employees the information efforts have had a positive impact. Among those who follow the instructions never or only sometimes, only a small part does so because they consider such information generally to be useless (4%). Mostly the instructions are not taken into account because employees do not care as long as they have no complaints (54%) because work pressure does not allow it (45%) or because people do not remember the recommendations exactly (30%).

The way how the information on health and safety issues had been transmitted – i.e. whether in written form, as information in the intranet, in a personal consultation at the workplace or as a general staff briefing – had little influence on the degree to which employees stick to the recommendations and also on the assessment of the quality of the received information. But establishments that provided information in more than one way scored better than those confining themselves to one way.

Another indicator for the effectiveness of the health and safety information provided at the establishment is the fact that for a majority of employees the workplace is the most important or even the only source from which they get useful information about health and safety issues related to work at visual display units. Although information on health related issues concerning the use of display screens is increasingly available from private sources (through information material provided by magazines, computer equipment instructions, information campaigns of health insurances etc.), the information provided by the employer still remains the most important source.

The Netherlands
In the Netherlands, 30% of the employees stated to actually use the information on health prevention they received from the employer, 52% use at least some of this information. In sum, the provided information is of use for a broad majority of 82% of recipients. This high share indicates that in the Netherlands, too, the information has been effective in the sense that it contributed to change the work habits of employees at display screen workplaces. Furthermore, the majority of employees (81%) are convinced that the information provided by the employer is of at least some help for the prevention of CANS.

Finland
Most Finnish employees (81%) named the occupational health care at the workplace as source from which they have gained health-specific knowledge about VDU work. Private sources such as newspapers or the internet were used by a much smaller share of respondents (33% respectively 20%). About two thirds of the employees who received any health-specific information for their VDU work follow the suggestions mostly or even generally. A third does so only sometimes and only very few (3%) never follow these suggestions.

The United Kingdom
The United Kingdom evaluation showed that 86% of employers stated that they provided information to all or some of their employees and 76% of employers provided training to all or some of their employees on how to arrange their workstation to avoid health problems. However, 45% of employers agreed that their employees forget how to use DSE equipment properly, while 41% disagreed with this statement.

General observations
As the data from the employee surveys show, the information provided by the employer with regard to the prevention of health risks is helpful. A majority of the employees who receive such information take it into account in their factual behaviour when working at visual display units, albeit part of them only sometimes. The fact that for many people the employer is the most important or only source for helpful information of this type also backs the assessment of the measure as being generally effective.

Nevertheless the results also show that to know what is good for oneself does not automatically lead to a change in behaviour. Two major obstacles are impeding people to implement what they have learnt about health preventive behaviour at the display screen workplace. The first obstacle is the general circumstances of work: it turned out that many of the employees abstain from sticking to the recommendations due to time pressure or because the workplace situation does not allow their application. Here, efforts to reduce work pressure on the employers' side or to provide suitable facilities e.g. for doing exercises would help. A second obstacle are the "traditional" behaviour patterns of employees: Employees not actually using the information they received from their employer most often say this is because it has no priority for them as long as they do not have health complaints.

5.1.3 Protection of workers' eyes and eyesight (by way of providing eye-tests and VDU glasses)

Indicators for the effectiveness of measures aimed at the protection of workers' eyesight are more difficult to identify. But if an employee becomes aware of an eyesight problem at the occasion of an eye-test or ophthalmologic examination organised by the employer, this can doubtlessly be interpreted as a positive effect of the measure: The detection of the visual problem will lead to curative measures and thus enhance the well-being and productivity of the employee.

Therefore, in the German evaluation those employees that participated in an eyesight test provided by the employer were asked whether by this way a visual problem was detected which had not been known to them before. 11% of them gave an affirmative answer. This rate is at the first sight not particularly high. But not everybody will develop any visual problems during his or her working time and many do regularly visit an oculist on private initiative anyway. Taking into account these aspects and the fact that those German employers who offer eyesight tests mostly do so on a regular basis and not only in case of emerging visual problems, the measured rate of 11% is remarkably high and can be interpreted as an indicator for the effectiveness of the measure.

If eyesight problems are discovered, the use of corrective appliances specifically designed for the use at the display screen equipment (where needed) doubtlessly enhances the well-being of the affected employees.

5.1.4 Daily work routine

The provisions on daily work routine leave an ambiguous impression with regard to the assessment of effectiveness. The immediate aim of this provision is to ensure that breaks are granted by the employer or that display screen work can be alternated with other types of work. In this regard the provision was quite successful since only few employers openly deny their employees the possibility to take such breaks. But the aim behind this is, as is insinuated in the text of Article 8 of the Directive, "*reducing the workload at the display screen"*. This aim

has obviously been reached only partially, since many employees regard precisely the existing work pressure as one of the main reasons for not taking breaks and also for not sticking to other health-beneficial recommendations they receive in information and training measures of their employer.

The article on daily work routine had originally been designed in the first place for work units with monotonous types of work such as data entry or the typewriting of documents which were dominant types of display screen work at the time when the Directive was discussed and prepared. For workplaces that imply larger degrees of autonomy but at the same time a high pressure of work, the effectiveness of the measure is limited since breaks can actually often not be taken and a *"reduction of the workload at the display screen"* does therefore not take place. One effort some establishments undertake to solve this problem is the application of screensavers or other software applications reminding people of taking individual breaks.

5.1.5 Fulfilment of the provisions set out in the Annex

In the Czech, German, Dutch and Finnish evaluations employees were interrogated about the shape of selected aspects of their VDU workstation. The assessment of the own workstation on part of the employees is mainly based on questions related to selected aspects named in the Annex as minimal criteria for a good workstation. The Annex formulates aims referring to the set-up and technical state of the VDU equipment, but also to the physical work environment in general (e.g. noise, temperature, humidity at the workplace) and the applied software.

The assessment of the various physical aspects of workplaces by part of the employees is evidently a subjective indicator only. Satisfaction with the own VDU workplace can for example be influenced by the employee's knowledge about the correct set-up of a VDU workplace: Employees sensitized by a thorough knowledge might tend to be more critical than employees who are not aware of the criteria for an "ideal" workplace setting[17].

All in all the level of fulfilment of the criteria of the Annex is high, ranging mostly between some 70% and 90% in all four countries where this type of questions was asked. Each single aspects asked with regard to the general quality, the physical arrangement and the adjustment of the own VDU workstation were perceived as satisfactory by a clear majority of employees. At this generally high level of satisfaction, nevertheless some differences in the assessment can be identified, although the mode of asking these aspects slightly differed between the four countries:

[17] This applies to a different degree to the various national evaluations. In those evaluations where the various aspects of the physical workplace situation were asked for in great detail and with more objective measures (e.g. *"There is enough space in front of my keyboard to support my hands and arms.Yes/No"*), the subjective, discretionary element is smaller than in others where only an overall satisfaction with certain aspects was asked. Questions about the physical workplace situation were most detailed in the Dutch employee questionnaire and least detailed in the Czech survey.

- In both the Dutch and the German evaluation the quality and/or set-up of the furniture are the aspect where satisfaction is lowest: 35% of Dutch employees say that the height of their desk and/or chair is not adjusted to the length of their body and 22% of the German employees are not content with the quality or adjustability of their furniture. The Finnish questionnaire contained only one indicator related to the furniture (existence of sufficient space in front of the keyboard). This aspect of the workstation scored slightly less positive than most other aspects asked for.

- Relatively large shares of employees in Germany and the Netherlands expressed dissatisfaction with regard to glares and reflections, caused e.g. by inadequate light or missing window shutters.

- As far as aspects related to the display screen equipment (PC, monitor, keyboard or mouse) are concerned, satisfaction is generally high. In a broad majority of around 90% of workstations for example the signs on the monitor are large enough, flicker-free and adjustable in size. Monitors can also be mostly swivelled and tilted.

- The majority of users are also reasonably content with the habitually used software: In the Netherlands, 87% of employees consider their software to be suitable for the tasks to be performed and 93% assess it as *"easy to use"*. In Finland, 97% of employees consider their software to be easy to use and suitable for the task. In Germany, a comparable question was not asked.

- Satisfaction of Czech employees with the (few) selected aspects asked in the evaluation is high: 87% expressed their satisfaction with the lighting at the workplace, 77% are content with the physical set-up of their workstation and just over two thirds (68%) are satisfied with the microclimatic conditions.

It is noteworthy that the fulfilment of the criteria of the Annex is generally only slightly lower in small establishments than in larger ones. In the Czech Republic, the workstations in small establishments were evaluated even slightly better than the larger ones. The basic criteria set out in the Annex of the Directive are thus generally fulfilled in smaller establishments, too. This is interesting since it was shown earlier that in the Czech Republic, Germany and the Netherlands the measured degree of implementation of the various instruments of the Directive was much lower in smaller than in larger units.

This does, however, not mean that the instruments are ineffective. For Germany it could be shown that those establishments which apply one or all of the instruments of the Directive rate still better in the assessment of most criteria named in the Annex, albeit differences are mostly not very accentuated:

Table 8: Compliance with the requirements of the annex by implementation of instruments – Results from Germany

Criteria for evaluating the quality and set-up of the workstation	Application of instruments of the Directive*		
	All	1 or 2 instruments	None
Signs on the screen are well readable and flicker-free	98%	96%	91%
Contrast and brightness of the screen are adjustable	97%	93%	92%
A flexible positioning of screen, keyboard and other work equipment is possible	93%	86%	80%
Satisfaction with the light situation and blinding possibilities	92%	86%	82%
Satisfaction with the quality and adjustability of the furniture	86%	76%	69%
Suffienct space for changing work postitions and for movements	94%	88%	84%
Irritating noise caused by parts of the VDU equipment	14%	15%	13%
Content with temperature and humidity at the workplace	82%	82%	82%
Separate keyboard for stationarily used laptops	15%	11%	10%

Source: Employee Survey of the national German evaluation
Base: All employees working at a display screen unit

* The instruments taken into account for this analysis are: Workplace assessment; Information and training of employees; eye-tests

The all in all very high level of satisfaction with the quality and physical set-up of the VDU workstations can not unambiguously be attributed to any single instrument of the Directive or to the Directive in general. The factors leading to this satisfactory situation are instead manifold and the relative influence of the various factors is likely to differ from establishment to establishment. Among the factors contributing to an ergonomically good workstation are:

- The application of the requirements of the Annex in form of checklists in workstation analyses
- Consideration of the requirements of the Annex by producers of furniture, software and – to a smaller degree – the producers of hardware.
- Consideration of the requirements of the Annex in the purchase and instalment of new equipment.
- Technical developments that are largely independent from OSH norms (e.g. the development of flatscreen monitors)
- Correct arrangements made by informed employees.

5.2 Satisfaction of the employees with the OSH activities of their employer and wishes for further improvements

Regarding the satisfaction of employees with the OSH activities of the employer, the following picture can be deduced from the empirical results of the employee surveys:

Czech Republic
Among the Czech employees, 42% had requested any type of ergonomic equipment. In a majority of cases (95%), these requests were fulfilled. To what degree the fulfilment of these wishes was related to the VDU Directive is not known.

Denmark
In the Danish survey, about a third (34%) of employees stated that there is nothing their employer could do to further improve the conditions affecting screenwork at their workplace, while the majority (60%) saw possibilities for improvement.

Germany
In Germany, a broad part of the employees at VDU workplaces showed a general confidence in the OSH activities in the establishment: 70% were of the opinion that the topic of occupational safety and health generally receives a high priority in their establishment and about half recognised a specific engagement of their employer in OSH issues related to VDU work. Asked whether they desire any further improvements of their personal VDU workstation, about a third of the employees (30%) saw any need for improvements while 70% were fully content.

The Netherlands
In the Netherlands, 41% of the employees were fully satisfied with what the employer has been doing in order to protect the health and welfare of employees who work with display screens in the organisation. A similar share (36%) thought that the employer has only partly been doing enough and 18% are of the opinion that their employer is not doing enough in this respect. Satisfaction with the overall ergonomic quality of their own workstation is larger: A slight minority of 55% of VDU workers expressed full satisfaction, 35% were partially satisfied and a relatively small minority of 10% were not satisfied.

Finland
Satisfaction of employees with the employers' efforts to improve the workplace and with the overall ergonomic quality of the own workstation was measured with several indicators:
- 18% of the interviewed employees are convinced that at their workplace a great deal of attention is paid to the improvement of VDU workstation ergonomics. 60% perceive that some attention is paid to this aspect, while a notable minority of 21% is of the opinion that the improvement of VDU workstation ergonomics receives hardly any attention.
- Asked whether their employer has made sufficient measures in ergonomics in VDU work only a third gave a clearly affirmative answer, 45% said that the employer had only partly done so and 17% said that this was not at all the case.
- About a fifth (19%) of employees totally agreed to the statement *"My workplace follows the regulations stated in the VDU Government Decision"*, 55 % agreed somewhat.

These results show that the overall satisfaction is reasonably high in a broad majority of establishments, but that nevertheless there is a significant minority of about one fifth of employees that is clearly dissatisfied with both their workstation and the employer's OSH efforts.

General observations
The results from the national evaluations presented above show that only a minority of employees is totally satisfied with the OSH activities of their employers with regard to VDU workplaces. Most employees are, however, partly or largely satisfied, although they see possibili-

ties for improvements. In all countries where respective questions were asked, considerable minorities of employees are completely unsatisfied with what is done with regard to occupational safety and health at their VDU workplace. The situation seems therefore not yet fully satisfactory.

Among those employees who have any wishes with regard to VDU workplaces, three groups of wishes seem to have priority:

(1) Physical aspects of the VDU workplace
Better furniture (desk or chair) and/or a rearrangement of the workplace are at the very top of the list of wishes for further changes at the VDU workstation. An improvement of the light situation (light, shutters etc.) is also frequently mentioned, especially by Dutch employees. A further frequently mentioned wish with regard to an improvement of the physical set up of the workstation refers to new and better display screen equipment.

(2) Aspects of work organisation
Wishes for improvements of the work organisation, namely the introduction of breaks, changes in the work organisation or the reduction of pressure of work are also frequently mentioned, although they do mostly not reach the same priority as wishes regarding the physical set-up of the workstation.

(3) Provisions of the Directive
A broad group of the not fully satisfied employees names the application of core provisions of the Directive as fields where they think their employer should do more in order to improve their workstation: In the Dutch survey, two thirds of all not fully satisfied employees would like the employer to arrange for a workstation analysis and about a third wishes more information on VDU related health risks. In Denmark, workstation analyses and the provision of information are also the most frequently desired improvements. In Finland, among the not fully satisfied employees more than half wish improvements with regard to arrangements of ophthalmologic examinations or assessments of the workplace.

General observations
These wishes of the employees show that – in spite of the generally quite high degree of satisfaction with the personal workstation - there are several fields where a larger share of establishments can still make improvements. Among the wishes for physical improvements of the workstation, the predominance of aspects related to the furniture is noteworthy. The fact that a large share of the not fully satisfied employees wishes the implementation of work station analyses and more or better information and training shows that many employees are aware of these provisions of the Directive and the responsibilities of employers and that they consider these measures as effective means towards an improvement of VDU work.

5.3 Conclusions

Satisfaction of employees with their own VDU workstation and with the OSH activities of their employer is reasonably high in all countries. Although the database did not allow for an unambiguous attribution of this situation to the Directive, the available indirect indicators have shown that the Directive has contributed to this state of affairs in many ways.

It could also be shown that the various provisions of the Directive are reasonably effective in so far as they all reach their specific aims to a considerable degree and thus contribute to an improvement of their VDU workplace. The instrument where positive effects have become most clearly visible in the evaluation are the workplace evaluations, often also denominated as risk assessments.

6. Relevance

The relevance of a measure – in this case a legal intervention - refers to the degree to which it influences reality. The central question is: Does it make any difference whether the law exists or not? And if it makes a difference: How much of a difference does it make? What would be different?

In the specific case of the VDU Directive, the central question is whether the health and safety standards at workplaces with visual display units would be different from the current standards if no legislation existed. This refers not only to the quality and arrangement of the physical workstation, but also to the question in how far the daily work routines and decision processes (e.g. decisions on the purchase of equipment or on the shaping of work procedures) are (still) influenced by the VDU legislation.

Sometimes, relevance is not interpreted in this qualitative manner, but in quantitative terms: According to this interpretation, relevance is attributed to a phenomenon if it frequently occurs. In the case of occupational safety and health, an OSH regulation would then be considered relevant if it concerns many workstations.

In the Danish and Dutch qualitative interviews several stakeholders interpreted relevance in this sense: When asked on the relevance of the VDU legislation, they argued that the high and increasing quantitative importance of VDU work make it necessary to regulate health and safety at this type of workplaces by way of a law. The statistical information collected in the national evaluations and other available statistics all confirm the high quantitative importance of work at display screens: There is hardly any establishment which does not have at its disposal a VDU workstation and large numbers of employees at such workstations spend most of their working day at the display screen equipment. But the mere quantitative importance of a phenomenon is a weak indicator for the relevance of a legislative measure. Laws are often especially important where only minorities are affected. In the area of occupational safety and health, for example, the fact that workplaces at blast furnaces in the steel industry are much less widespread than VDU workstations should not lead to the conclusion that these workplaces are less in need of protection than the much more widespread VDU workstations. If the situation at a specific workplace would most probably be the same without specific legislation, then the legislation is not really needed – no matter how many workplaces of this type exist. The mere quantitative approach is therefore not sufficient for the evaluation of the relevance of a legislative measure.

In the current evaluation, the interpretation of the concept of relevance and its operationalisation was up to the national evaluators or - where the concept was not further specified in the questionnaire questions – it was left to the respondents. Consequently, the concepts applied for an analysis of the relevance of the legislation varied largely within and between countries. A cross-nationally comparable statement on the relevance of the legislation can therefore not be made. Nevertheless, there are some indicators which allow for a rough assessment of the overall relevance. These will be presented and discussed in the following.

Denmark

In the Danish survey conducted among employers, respondents were directly asked about their assessment of the relevance of the legislation *("Do you believe that the current legislation is relevant?")*. A broad share of 37% of employers could not answer this question and half of all employers attributed relevance to the legislation, while only a minority of 10% considered it to be out-of-date or no longer necessary. The answer items suggested that relevance was to be interpreted as up-to-dateness. But it remains unclear what precisely employers here interpreted as the *"relevance*" of a law. The concept is very theoretical and it is likely that interpretations of this question differed largely between employers. Some will have related their answer to the quantitative importance of screenwork, others will have referred to the qualitative aspects, i.e. to the degree to which the VDU legislation influences their behaviour.

Asked about their behaviour in the hypothetical case that no legislation on display screen work existed, a majority of just above two thirds (69%) of Danish employers stated that in this case they would still offer the same working conditions. A fifth (18%) of employers said that they would devote less attention to the working conditions. The Danish employees confirm this self-assessment of the employers: 16% of the interviewed Danish employees expect their employer to devote less attention to working conditions in relation to display screen work.

Germany

For Germany, some more indirect indicators also show that the attention given to health aspects of VDU work in many establishments would be less without the VDU legislation. Thus, employees reported that the inclusion of VDU work into the general occupational health and safety measures at establishment level has been initiated mostly by *"new laws"* and *"information campaigns"*. When asked on when their establishment started to deal with these aspects, many of those who named "new laws" as initiating elements started their efforts considerably later than 1995 (the year when the VDU legislation became effective in Germany). This shows that the legislation is frequently still a trigger for the inclusion of the topic in the OSH activities of an establishment.

The employees were asked whether they had made any claims for an improvement of the work situation at the VDU workstation and – if so – how the employer reacted to these claims. Almost one third of employees (30%) had in fact expressed wishes for newer or other equipment, better information etc. Of those only about half (46%) stated that the employer quickly and readily fulfilled the uttered wishes. In 14% the wishes were fulfilled, yet only after exerting pressure on the employer. In 37% the employers refused to satisfy the requests for changes with regard to their VDU workstation. Interestingly, the willingness to comply with individual wishes of employees proved to be much higher in establishments where the core provisions of the Directive are applied: While of establishments that do not apply any of the core provisions[18] of the VDU legislation, 29% fulfilled these wishes *"quickly and willingly"*, the rate is 42% in establishments that apply one or two of these measures and amounts to 64% in establishments that apply all three provisions. This can be interpreted as sign for the relevance of the Directive.

[18] Here defined as workstation analyses, eyesight tests and information and training of employees on health related issues regarding VDU work.

A further indicator for the relevance of the legislation is the employers' perception of the usefulness of the provisions. If employers consider a legal provision to be useful, this expresses that they are convinced that its implementation has an impact (in this case: a positive one) on the workplace situation. They thus attribute relevance to it. Although this is not a hard empirical proof of factual relevance, it shows that employers are convinced that the application of the instrument has repercussions on the factual OSH situation at establishment level. A broad majority of between 86% to 96% (depending on the provision) of German employers considered the main provisions of the VDU legislation to be useful or partly useful, while between 4% and 13% considered the respective instruments as unsuitable. The provision most often considered as unsuitable (13%) is the requirement on information and training of employees. Employers who considered these instruments as not or only partly useful most often argued that employees are already sufficiently informed by other sources (39%) or that employees do not stick to the instructions anyway (37%).

Asked whether they think the VDU legislation has become redundant due to technical progress, a minority of 14% of those who are aware of it fully agreed. Close to half (47%) agreed partially, 25% did rather not agree and 12% totally disagreed. Employers thus do mostly not consider the whole legislation to be redundant.

The Netherlands

Asked whether they would devote less attention to measures concerning screen work if there were no regulations, many Dutch employers agreed. This counts for all provisions of the Directive which have been asked about. Risk assessments, measures concerning daily work routine, provision of information and protection of eyesight would get less attention by many of the employers (between 38% and 49%, depending on the measure) if the legislation was abolished.

Employers in the Netherlands were also asked whether they think that paying attention to certain aspects of VDU work is useful for their company. The aspects asked about were closely connected to the main measures foreseen by the Directive. Between 37% and 46% of employers attributed usefulness to the various measures, while a similar share neither agreed nor disagreed and minorities of 14% to 18% (depending on the measure) clearly considered them not to be useful. Smaller companies were less positive in their assessment than middle and large-sized units. This especially holds for workplace analyses and the provision of information. Answers on the two other aspects asked about - paying attention to breaks/alternations of work and to the eyesight - are correlated with the size of the establishment to a somewhat smaller degree.

The Dutch question on reasons for adjustments to workstations gives some further hints on the relevance of the Directive. Of those employers who had made such adjustments in the past 2 years, half said that these were made on request of individual employees, 44% made them because the equipment had to be replaced anyway. 20% made the changes in response to risk assessments and 14% said that the changes were made in order to comply with legislation (multiple answers were possible). Assuming that the realization of risk assessments was induced by the VDU legislation, this means that in total up to one third (34%) of the changes can directly be attributed to the VDU legislation. The initiative of individual employees to request changes at the workplace is certainly also in some cases more or less directly influ-

enced by the VDU legislation, but the data-base does not allow to exactly specify the influence of the legislation on these requests.

Finland
About every second (49%) Finnish employer knowing the legislation agreed totally or somewhat to the statement *"the regulations increase the interest of the employer to health and well-being of employees"*. 18% of employers partly or totally disagreed with this statement, 33% were undecided and neither agreed nor disagreed. This clearly attributes the VDU legislation an important role in the initiation and maintenance of efforts concerning health protection at the VDU workplace.

Finnish employers were also asked whether the various measures of the Directive would receive equal, less or no attention in their establishment as compared to the actual situation if there would be no legal provisions for VDU workplaces. This question gives interesting insight to the degree to which the application of the various measures is directly linked to the VDU legislation. Results are shown in the following table:

Table 9: Relevance of the VDU Regulations – Results from Finland

"Assuming that there were no legal provisions for VDU workplaces, which of the following measures would nevertheless be applied to the same extent in your workplace?"

Measure/ aspect	Equal attention	Less attention	No attention at all	Don't know
Identification of ergonomic risks	56%	38%	2%	3%
Improvement in ergonomics in VDU stations	60%	34%	3%	2%
Purchasing better computer equipment	73%	21%	2%	4%
Purchasing ergonomically better furniture	61%	33%	3%	3%
Avoidance of mental stress	38%	40%	11%	10%
Ophthalmology examination covered entirely by employer	41%	40%	12%	6%
Purchasing glasses with cost covered entirely by employer	28%	41%	22%	10%
Training the employees in health issues	45%	41%	8%	6%
Promoting of breaking arrangements	51%	33%	8%	8%

Source: Finnish employer survey
Base: Establishments which know the content of the national VDU regulations

While the figures in the table above show the degree to which the legislation influences the respondents own behaviour, the Finnish questionnaire asked a similar question related to the behaviour of employers (and employees) in general: To the following statements, Finnish employers' and employees' responses were as follows (percentages for employees in parentheses): 1) *"The regulations promote the assessment of ergonomic hazards"*: among employers 20% totally agree and 66% somewhat agree (20% and 67% for employees), 2) *"The regulations promote the arrangement of ergonomically appropriate work stations"*: among employers 19% totally agree and 66% somewhat agree (17% and 64% for employees), 3) *"The regula-*

tions increase the number of health checks of eyes and vision": among employers 22% totally agree and 48% somewhat agree (19% and 54% for employees), These answers also indicate that the regulations are relevant in the sense that they initiate measures and processes at the firm level which lead to an enhanced attention on health prevention at VDU work.

The United Kingdom

The majority of employers in the United Kingdom found the Regulations relevant (61%) and useful (55%). The more relevant the employers found the Regulations, the more useful they found them. Further, 85% of employers mentioned complying with the Regulations as a reason for making changes to workstations and the working environment within their organizations, which in turn could improve the working conditions and the safety and health of their employees.

General observations

The presented empirical results indicate that many of the measures prescribed in the Directive would most likely be applied to a reduced extent or sometimes even not all if there were no legislation. But there are marked differences between the various provisions: Judging e.g. on the data from Finland, it is likely that the quality of display equipment and software would be areas where only a relatively small share of employers would invest less if no VDU legislation existed. Other areas such as the avoidance of mental stress, eye-tests or the information of the employees in health related issues would probably suffer much more from a (hypothetical) absence of legal regulation.

An overall assessment of the relevance of the law is closely connected to the issues of implementation and effectiveness tackled earlier in this report. A provision that has been shown to be effective is – if applied – doubtlessly also relevant according to our definition since it incites changes at the VDU workplaces or in the behaviour of VDU workers.

In the empirical evaluation, the assessment of relevance was confined to employers and employees. But they are not the only actors potentially influenced by the Directive. Other important players are e.g. the producers of computer hard-and software. The Directive is likely to have influenced these in various ways, e.g. by inciting the definition of specific industrial norms VDU products have to comply with. The influence of the Directive on these actors was not in the focus of the present evaluation, but a measurement of the influence of OSH Directives on this type of actors should be considered for future evaluations.

7. Estimation of costs and benefits

This chapter examines costs and benefits of compliance with the VDU regulations. Is the investment that on the employers' side has to be made in order to fulfil the requirements of the Directive worthwhile? Or are the financial costs greater than the benefits the employer has if complying with the legislation? And of which type are the benefits employers perceive?

These questions are doubtlessly interesting. But to answer them precisely in monetary terms has proven to be hardly possible in the context of an this ex-post evaluation mainly based on the empirical data collection at company level and exclusively focussing on the status quo is not possible. The first and most important reason is that more than ten years have passed since the implementation of the law. A comparison of indicators like e.g. the development of absenteeism rates or productivity indexes of VDU workers before and after the implementation of the VDU Directive would not make much sense after such a long time (if at all), especially since a lot of other relevant parameters like e.g. technical standards, organisational changes helping to increase productivity etc. have also changed in the meantime.

These factors can hardly be isolated by the chosen methodology. Due to the increased importance of computers in private life, basic rules about the correct set-up of a computer workstation are no longer exclusive knowledge of experts, but are common sense in broad parts of the general public. This development has among others been influenced by the VDU Directive and the information campaigns it triggered off. As consequence, it is hardly possible to construct comparison groups which allow to compare establishments aware of the VDU regulations and applying them consequently with others where none of the employees is aware of the provisions of the Directive and - more or less directly - influenced by it.

7.1 What are costs and benefits incurred by the Directive? (How) Can they be measured?

Costs and benefits at the firm level

For some of the provisions of the Directive it is theoretically possible to estimate **costs** of application. This is for example the case for the costs incurred by workstation analyses, information and training measures or eyesight examinations. Also, in principle the costs of purchasing ergonomic furniture or for replacing flickering monitors by flicker-free models could be asked for.

In practice one is however confronted with the situation that by far not all establishments record costs of this type in detail and in a systematic way. As such a specification is not required by law and is – because of the involved expenses and difficulties – usually not in the self-interest of a company, only relatively few establishments will record costs accordingly. Judging by the item response rate obtained for this type of questions in the Dutch survey (10%) , it is only a small minority that keeps book of this type of expenditures. This minority can not be

assumed to be representative for all establishments. It is rather very likely that certain types of establishments (e.g. establishments of a certain size, establishments of a specific ownership type or establishments that want to emphasize their efforts in OSH-related issues in public) keep book of these expenditures in a clearly over-proportional way.

A further practical difficulty is that among those establishments which in principle keep record of such costs, some take into account only external costs (e.g. for the acquisition of computer hardware or for an external consultant carrying out workstation analyses) while others also take into account internal costs such as the working time spent by employees for attending eyesight tests or information and training sessions on health and safety. Moreover, issues which for some firms cause external costs (e.g. eyesight tests at an optician), for others do not cause any such costs because they have their own personnel for doing this task. Nevertheless, this way of organising the issues also causes costs in the end.

Even seemingly simple costs for the acquisition of material (like e.g. desks, monitors, chairs, software etc.) are also not easy to clearly classify as costs of the VDU Directive. In the Danish evaluation, for example, costs for purchasing flat-panel computer displays or height-adjustable tables were named by employers as compliance costs with the Directive. But, as the Danish report says *"it was characteristic for the equipment they mentioned and for which expenses had been incurred not to be specifically required by the legislation, although this equipment still contributed to meeting the provisions of the latter"* (Danish evaluation report, p. 35). To give an example: If an employer buys new standard TFT monitors in order to replace CRT displays which still fulfilled the requirements of the Directive, the incurred costs are not really costs of compliance with the Directive. If some of the replaced monitors, in turn, flickered, then the costs for their replacement can be classified as compliance costs.

As these examples show, the estimation of monetary costs is extremely difficult. It can certainly not be made on a sound basis – if at all – within the few minutes that are disposable for answering the questions in an interview, but would in most cases require considerable efforts and investigations in the companies' books.

Calculating the **benefits** in financial terms is even more difficult than calculating the costs. Econometric calculations of that type appear from time to time in journals or in the media, but their reliability and value can be put in doubt. In the qualitative interviews, employers mentioned a number of benefits, such as greater satisfaction among employees, a lower degree of work related health complaints and absenteeism or an increased labour productivity. Such effects certainly exist. But as mentioned before, the magnitude of these effects and the degree to which they can be directly attributed to the VDU Directive can not be calculated with scientific precision.

For example, cost estimates based on a comparison of the days of absenteeism due to VDU-related health problems between the years 1990 and 2005 would probably be possible in countries where record of these occupational diseases is kept. But their value would be very restricted: In these 15 years, too many conditions of VDU work have changed independently of the VDU legislation. Among them are both factors which are favourable for the health situation of VDU workers (technical advancement of the VDU equipment and software, widespread knowledge about VDU issues etc.) and factors which tend to be unfavourable (increased daily

duration of VDU work, increased pace of work, additional strains caused by increasing private use of VDU equipment etc.).

Comparisons over shorter periods of time would also be possible in specific cases only: An unambiguous assignation of e.g. changes in absenteeism to the VDU Directive could be done for those (few) companies where until recently a large part of the workplaces had not complied with the regulation, but are doing so now due to a change in the OSH politics. If in these establishments, improvements in productivity, absenteeism etc. could be clearly noticed after a while, then these could indeed by assigned to the Directive - provided that at the same time no other relevant parameter had changed. Case studies in such firms could shed some more light on the ratio between the investments in ergonomics at VDU workstations and the financial return, provided that an ex ante measurement has taken place before the changes were made and provided that these firms documented the costs of the changes. But quantitative studies would not be suitable for this scenario since the number of firms with this constellation will be very limited.

Costs and benefits in a broader view

Large parts of the costs resulting from consequences of an unsuitable workstation design (such as costs for medical treatment or costs for a person's inability to work in the long term) are usually not allocated to the employers but have to be borne by the employees themselves and/or by the social system (e.g. health insurances or – in case of early retirement due to health problems – the old age pension system). These costs nevertheless are real and can even be considerably higher than those the employer has to bear. They should be taken into account in a comprehensive cost and benefit evaluation of the legislation. In the current evaluation project, a specification of these wider costs was not possible, mainly due to budgetary restrictions. The fact that there are no acknowledged occupational diseases directly linked to the use of VDU equipment also poses general limits on the calculation of such costs in the case of work at DSE.

7.2 The ratio of costs and benefits – an alternative, non-monetary approach

In view of the difficulties of identifying costs and benefits and of clearly attributing them to the Directive, it seemed appropriate not to restrict the cost-benefit equation to monetary aspects. As mentioned already, in the Dutch evaluation the monetary approach had been tried. But the empirical results were disappointing, mainly due to extremely high non-response rates for these questions. Of the total net sample of 2.222 establishments, only between 175 and 254 establishments answered the questions asking for the costs of the implementation of the various instruments[19]. Analyses of these questions were therefore not included in the national Dutch report. In the United Kingdom, employers were also asked for the total costs of complying with the Regulations in the past 12 months. This question remained unanswered by an

[19] The base for calculating the share of item response would not be the total of 2.222 establishments, but only those which applied the instrument costs were asked for. If calculated in this way, for most issues item response for the various specific cost questions was about 20%.

even larger share of employers: 94% of the respondents could not or did not want to answer this question.

In view of these problems, in this evaluation instead subjective of the relevant players will take priority over the seemingly "objective" estimation of so-called "hard facts". Subjective valuation of the cost-value ratio by the employers can give valuable advice about the perceived usefulness of the Directive. The assessment of the relation between costs and benefits was inquired in several of the national evaluations by the balanced effect whether the employer thinks that the benefits exceed the costs, the costs exceed the benefits or the relation is counterbalanced.

Measured in this manner, it can be said that an all in all positive attitude of the employers towards the cost-benefit ratio of the VDU legislation can be observed:

Czech Republic
In the Czech Republic, a majority of 61% of employers felt unable to judge the cost-benefit ratio of the implementation of the VDU legislation. Many of these had not yet implemented the instruments of the Directive and could therefore not give a valuation of costs and benefits. Among those who felt able to answer the question, the judgement was mainly positive: A quarter felt that benefits significantly exceed costs, nearly half (47%) considered the ratio to be approximately balanced and 29% were convinced that costs are definitely higher than the benefits.

Denmark
According to qualitative interviews in Denmark most of the employers felt that the benefits were reasonable in relation to the costs and regarded expenditures on the work environment as a worthwhile investment. In the quantitative interviews, a question of this type was not asked.

Germany
In the German employer survey about half of respondents assessed the relation between cost and benefits of regulations concerning VDU work as balanced, 13% estimated the benefits to be higher than the costs. Slightly less than a third (29%) of employers felt that the effort of the implementation of the Directive exceeds its benefits.

The Netherlands
In the Netherlands this kind of subjective cost-benefit assessment lead to a less positive result. There, a minority of employers (5%) reports that the revenues of the implementation are greater, 13% feel that the costs and revenues outbalance each other. For 19% the costs of implementing the regulation outbalance the revenues. About a third was unable to judge the ratio of costs and benefits and for another third the question did not apply because they had not implemented the regulations. If recalculating the Dutch results on base of the valid answers only (i.e. without the cases with *"Don't know"* or *"Not applicable"*), it turns out that 14% consider the benefits to be greater than the costs, while 35% consider the ratio to be balanced and a slight majority of 51% finds costs to be greater than benefits. This assessment of costs and benefits is strongly influenced by the rather sceptical judgement of many smaller companies. In larger units with 100 or more employees, a balanced or positive assessment prevails.

The Dutch stakeholder interviews suggest that the costs of compliance are nevertheless not a problematic issue for most Dutch employers: *"Some stakeholders (amongst employers' federations) argue that at the time of the introduction of the legislation the costs of implementation were high, but since the techniques have increased tremendously, costs at this moment are not problematic. Most workstations are reasonably up-to-date and the additional costs of implementing the regulations are probably not too high. On the other hand, some stakeholders (amongst employers' federations, branch organisations) argue that complying to all details of the regulations is too expensive." (Dutch evaluation report, p.56).*

Finland

In the Finnish questionnaire, employers were asked in how far they agree to the statement that financial profits are bigger than the costs caused by the application of the regulations. Close to a quarter (23%) of employers totally agreed with this statement, while about half (48%) somewhat agreed. Employers were also asked to assess a statement related to the costs and benefits of *"good ergonomics"* which can be regarded as one aspect of the VDU Directive. Close to half of all employers totally agreed to the statement *"good ergonomics causes more benefits than are costs of improvements"* and about another half (49%) agreed at least somewhat to this statement. Disagreement was extremely low, with only 1% of answers.

The United Kingdom

In the UK evaluation, the general cost-benefit ratio was asked in a slightly different way: Employers were asked to express their agreement or disagreement with the statement *"Benefits to the organisation of compliance with the Regulations outweigh costs"*. Nearly two thirds (65%) of all employers agreed to this statement, and for those who were aware of the regulations, this rose to 69%. Benefits most commonly mentioned were improved staff morale (64%), reduction in stress (61%), and improved productivity (52%). One fifth of employers neither agreed nor disagreed with the statement and 11% disagreed. This reflects a positive judgement about the costs and benefits of implementing the regulations and shows that in the perception of a majority of employers good VDU workplaces lead to a series of benefits, many of which directly contributed to the positive development of their business.

General observations

The presented country results show that the cost-benefit ratio of the guidelines is mostly seen as balanced or positive. With the exception of the Netherlands, a majority of employers in all countries was convinced that costs and benefits of the implementation of the legislation are balanced or that the benefits even outweigh the costs. In the Netherlands about half of those who gave a valid answer considered the cost to be higher than the revenues. In the Czech Republic and Germany significant minorities of employers exist who do not share the generally positive cost-benefit assessment. The group of employers considering the ratio to be negative is smallest in the United Kingdom.

7.3 Conclusions

The efforts undertaken in the Netherlands and the United Kingdom with regard to a monetary estimation of costs and benefits of the compliance with the VDU regulation did not lead to

usable results. On the one hand, these costs and benefits are generally hardly quantifiable in monetary terms and only very few establishments keep record of them. On the other hand, many years have passed by since the implementation of the Directive into national law took place and (too) many intervening variables have changed in the meantime, making a clear attribution of observed costs or benefits to the Directive itself virtually impossible: Currently it is therefore not possible to precisely and unobjectionably measure the influence of the VDU Directive on productivity, absenteeism, work satisfaction etc. at VDU workstations in financial terms. For future legislative measures, such a measurement could more easily be done - provided that an ex ante evaluation takes place before the introduction of the law.

Nevertheless, the results of the evaluating countries altogether showed a largely balanced or – especially in the United Kingdom – even positive estimation of the relation between costs and benefits. Most employers stated that the benefits were reasonable in relation to the costs and they viewed their expenditures on the work environment as an investment.

8. Is the Directive comprehensible and fit for purpose?

This short chapter will focus on the comprehensibility of the Directive and the question whether there are indicators for deficiencies and ambiguities in the concept and text of the Directive as such. It will also refer to indicators on any other obstacles that hinder the workability of the Directive.

The mode how questions about the comprehensibility of the legal regulations were asked to the employers varied considerably between the countries, thus not allowing any conclusions regarding differences regarding the clarity of the transposition of the European Directive into national laws:

Czech Republic
Czech employers were asked whether they consider the current OSH legislation for VDU workplaces to be appropriate. Among those who gave a valid answer to this question (i.e. excluding answers of the categories *"don't know"* or *"no answer"*), a majority of about two thirds (65%) considered the legislation to be appropriate. Every fourth employer (25%) considered the legislation to be unnecessarily extensive and every tenth (10%) was of the contrary opinion that the legislation is insufficient.

Denmark:
Only 2% of Danish employer stated to have encountered any obstacles in complying with the legislation concerning display screen work. An issue where obstacles were reported was the regulation about taking breaks which was by (very few) employers regarded as impracticable in some cases.

Germany
In Germany, employers who know the regulations were asked whether they consider any of the VDU regulations as unclear or open to misunderstandings. A majority of about three quarters of respondents (73%) did not see any such deficiencies in the law. About a quarter (24%) stated that there are such unclear paragraphs, but only very few could specify these. The low absolute number of valid answers in the open-ended questions aimed at a further specification of the encountered deficiencies does not allow drawing any representative conclusions. A couple of employers complained about a lack of detailedness in parts of the Directive, but there were also some (albeit less) employees who found the law too detailed.

The Netherlands
When being asked for obstacles their company might have encountered in complying with the VDU legislation, just above half of employers (57%) did not encounter any obstacle and for 15% lack of information was an obstacle. Obstacles inherent to the Directive such as a lack of clarity were mentioned by 8%, while 10% found the legislation too extensive.

Finland:
The Finnish employer survey contained several indicators referring to the comprehensibility and completeness of the (national) regulations:

Table 10: Comprehensibility of the VDU Regulations – Results from Finland

Statement	Totally agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Totally disagree
Regulations are clear	7%	66%	20%	6%	1%
Regulations are easy to understand	7%	60%	25%	7%	1%
It is easy for the employer to follow regulations	4%	42%	40%	12%	1%

Source: Finnish employer survey
Base: Establishments which know the content of the national VDU regulations

The table shows that most employers consider the regulations to be reasonably clear and easy to understand. The statement *"It is easy for the employer to follow regulations"* received a less positive assessment – possibly more due to the organisational efforts to be undertaken when implementing the instruments than due to a lack of clarity of the regulations as such.

The United Kingdom
In the United Kingdom, respondents were asked to indicate on a 5-item scale ranging from 1 (difficult to understand) to 5 (easy to understand) how understandable the Health and Safety Regulations in their opinion are. Only a small minority of 6% of the respondents evaluated the comprehensibility with "1" or "2", i.e. as difficult or quite difficult. The remaining 94% thought the regulations to be reasonably understandable. Likewise, to the statement *"The regulations are complex and definitions confusing"* only a minority of 22% agreed, while more than half of respondents (54%) disagreed and 20% neither agreed nor disagreed. In sum, the comprehensibility of the regulations seems to be a problem for only a minority of employers in the UK.

General observations
The majority of employers consider the VDU regulations to be fairly clear and understandable. Some employers consider it to be too extensive, but there are also others who complain about a lack of detailedness. Due to the fact that only relatively few employers know and apply the VDU legislation directly, it can hardly be said whether these judgements refer to the law itself or rather to the explications and illustration of the law in form of manuals issued by the national OSH institutions.

Aspects of the comprehensibility could therefore be best judged by those persons who directly deal with the laws. These are on the one hand the persons responsible for the transposition of the Directive into national legislation and on the other hand representatives of labour courts. None of the national evaluations included interviews with these actors. But the fact that the national transpositions of the law in all 6 countries closely followed the text of European Directive 90/270/EEC and was only slightly modified or amended is an indicator for a good comprehensibility of the Directive. One of the few points where amendments were made in some of

the countries is a clarification of the applicability of the provisions to mobile workstations which are in permanent use at a fix workplace.

9. Conclusions and recommendations related to the VDU Directive

The conclusions drawn in this chapter are based on the empirical indicators discussed in the previous chapters and on the conclusions drawn by the various national evaluators. The empirical figures the conclusions are based on are mostly not repeated here since in view of the diversity of indicators and methodologies a precise citation of the results would go on the expenses of the readability of the text. Please refer to the earlier chapters for more information on the exact measurements. A summary of the various national conclusions as well as links to the complete documentation of the six national evaluations can be found in Annex II.

9.1 The EU Directive 90/270/EEC: Achievements and limits

The final aims of the Directive are to ensure that VDU workplaces are physically well equipped, that they are used in an appropriate way and that employees are not exposed to one-sided physical strains or excessive mental stress. The present chapter will summarise indicators allowing a conclusion on the achievement of these objectives.

The role of the Directive in building up consciousness about VDU-related health risks

In many establishments, the national implementations of the VDU Directive have contributed to an enhanced consciousness of VDU related safety and health issues. The legislation has also triggered off the production of information material and information campaign destined at employers, OSH experts and partly also the employees. This material is widely known and used. There are nevertheless some issues dealt with in the VDU legislation for which awareness at establishment level is still limited. This especially holds for aspects of mental stress and work pressure are – although dealt with in the Directive – often not yet in the focus of the OSH activities.

The legislation also had a positive impact on the awareness and behaviour of employees, as several indicators prove:

- A majority of employees stick at least partially to the recommendations for health beneficial behaviour at the display screen received from part of the employer
- A broad majority takes up the offer of eyesight tests
- Considerable shares of employees ask their employer on own initiative for ergonomic improvements at the VDU workplace.

OSH activities in the establishment are nevertheless not the only source and driver for health preventive information and behaviour on part of the employees. In view of the large importance of VDU work and the widespread use of VDU equipment also for private purposes at home, other information sources such as public media or health insurances have also taken up the topic, informing display screen users and trying to motivate them to a health-preventive behaviour.

In spite of these achievements regarding awareness of the potential risks, the employee surveys have also shown that consciousness about risks and knowledge about health-beneficial behaviour do not automatically lead to factual changes in behaviour. Thus, offered breaks are not taken and other instructions are likewise ignored by considerable shares of employees as long as they do not have health complaints. Reasons for this are on the one hand personal behaviour patterns and on the other hand structural hindrances such as high time pressure at VDU work or the lack of facilities for doing exercises during work etc.

The provisions of the Directive

As shown on base of the empirical data, the instruments of the Directive have been chosen correctly in the sense that they all contribute to the improvement of VDU workplaces:

- **Workplace analyses** have proved to be effective means for discovering deficiencies in the set-up of the workplace and in the quality of hardware or furniture, thus contributing to the well-being of employees and finally to an enhanced motivation and job satisfaction.
- The provisions on **work-organisation**, namely the rules for mixed work and short-breaks, have induced most employers to grant breaks or possibilities for mixed work, hereby contributing to a reduction of stress especially among employees with monotonous VDU work[20].
- Where provided, **Information and training** measures incite a broad part of employees to change their behaviour in a health-beneficial way and to use their VDU equipment properly.
- Offers of **eyesight tests** are mostly taken up by the employees and lead to the discovery and correction of previously unknown visual problems, hereby contributing to a reduction of health symptoms like headaches or malpositions.

On part of the employers, there is all in all a broad support for the major instruments of the Directive. Most employers consider them to be useful or partly useful. Despite this generally positive assessment, many employers say that they would not apply the instruments to the same extent if there would be no law obliging them to do so. This is a clear sign that legislation in this field is still necessary if the reached standard of implementation of the requirements is to be upheld.

In spite of the generally positive assessment of the various provisions, some problems and deficits related to their application in practice can be identified:

- Although in the provisions on workstation analyses in the Directive the consideration of mental strain is foreseen, this aspect in practice receives relatively little attention in many workstation analyses. This raises the question whether the assessment of aspects of mental strain in the context of workstation analyses is adequately dealt with in the Directive and/or whether the workstation analyses is the adequate instrument to deal with the issue of mental strain and work pressure.

[20] The factual effects that short breaks have on the well-being of employees was not investigated in the framework of this evaluation, but has empirically been proved by other studies, e.g. for Germany: IG Metall (ed.), 2006: *Gute Arbeit braucht Erholzeiten* (*Good work need times of recreation*), p. 28ff.

- The measures of work organisation foreseen by the Directive are sometimes in conflict with work pressure and deadlines. These often do not allow employees to take breaks, although they are in principle granted by the employer.
- The information and training requirements of the VDU legislation are felt to be too vague and not sufficiently clear by a substantive share of Dutch employers, causing some uncertainty about the type and quantity of instructions to be given to the employees. The measured large discrepancies regarding the content and quality of information and training provided by employers in Germany support this observation.
- Although telecommuting is on the increase, many employers do not include the home office workplaces in their OSH activities (e.g. in the information activities).
- The use of laptops at regular workplaces has also rapidly increased. Nevertheless, these workplaces are also often not in the focus of OSH activities at establishment level, as is reflected by the limited willingness of employers to provide ergonomic extra equipment such as separate keyboards or monitors for this type of workstations. In principle, the Directive provides for the use of laptops, but is often not fully applied to these workstations.

The physical quality of VDU workplaces

In the Annex of the Directive, details of the minimum criteria that a well equipped and arranged workstation should fulfil are set out. These criteria are – according to the users - fulfilled at the majority of workplaces in the countries where these aspects were investigated (CZ, DE, NL, FI). Between about 70% and 90% of the VDU workstations comply with requirements such as flicker-free monitors, avoidance of glare at the screens, availability of adjustable office furniture etc. This holds not only for large establishments, but also for small-sized firms.

Some of these physical requirements are being fulfilled largely independently of the application of the instruments due to general technical advancements such as the widespread use of the flicker-free flat screen technique or the self-interest and common sense of employers (most employers will be interested in providing a fairly adequate equipment and a productive work-organisation in order to optimize the output of their workforce).

At the firm level, deficits nevertheless exist in some cases in the fields of lighting and the prevention of glare at the display screens and with regard to the quality, adjustability or arrangement of the furniture.

9.2 Deficiencies and obstacles of the EU Directive 90/270/EEC

Judging from the evaluation results, the text of the Directive as such seems to be fairly clear. A lack of clarity of the provisions was mentioned only by a minority of employers as an obstacle for their application. Deficiencies of the “body of law” of the Directive could hardly be discovered in the evaluation. The only issues where more clarity might be desirable are a specification of the requirements for users of laptops at permanent workstations and for the home-office workplaces of telecommuters.

9.3 Potentials for the further Improvement of Safety and Health at VDU workplaces

The following conclusions and proposals are not directly linked to the assessment of the quality of the VDU Directive, but were deducted from the empirical results. They should not be omitted in this report, as they illustrate the broad scope of the methodology and especially some interesting and useful additional results.

(1) Towards more prevention

Results from almost all the national evaluations show that improvements of the workplace or the application of instruments of the Directive such as eye-tests and workstation analyses are often done in a curative way only. Employers often only react to initiatives of the employees instead of taking the proactive and preventive role of the Directive more seriously. The reasons for this can be manifold, ranging from a lack of knowledge or a misinterpretation of the regulations to financial considerations: in the short run, applying a measure to the whole workforce in a preventive way appears to be more costly than limiting it to some employees who have problems. In any case, the proactive and preventive character of legislation needs generally to be underlined more extensively.

(2) The application of VDU legislation in smaller establishments

An issue of debate is the situation in smaller establishments. Evaluation results for the Czech Republic, Germany and the Netherlands have clearly shown that in smaller establishments major deficits exist with regard to both the awareness of the VDU legislation and the application of the main instruments of the Directive (workstation analyses, eyesight tests, information and training). The Directive respectively its transposition into national law is much more widely known in larger than in smaller establishments. And practically all instruments are quite widespread in larger establishments, but are applied by a minority of small establishments only. This holds especially for the instrument of preventive eyesight tests.

These deficits can have various reasons. The evaluation has shown that information on the legislation often does not reach the employers' side in smaller units. The focus or concept of the applied national information policies or the internal organisation of the responsibility for OSH issues in smaller establishments are likely to be factors contributing to this deficit.

Also the lower acceptance of some of the provisions by managers in smaller establishments can to a certain extent explain the lower application of provisions such as workstation analyses, eyesight tests and information & training: Employers in larger units consider these instruments more often as useful or partly useful than those in smaller units[21], as they often pay more attention to a systematic and continuous improvement of the working conditions in general.

[21] The size-effect regarding the assessment of the usefulness of the provisions is more accentuated in the Netherlands than in Germany. The size-effect can be observed in both countries for the provision on risk assessments, in the Netherlands also for the information and training requirements and to some extent for aspects of work-organisation or the protection of eyesight. In the other countries, respective questions were not asked.

The analysis of potential causes for the low awareness and implementation rates in SMEs measured especially in Czech, German and Dutch establishments leads to two general options for action. Which of these options is most adequate for a certain country, certain sectors of economy or types of establishment has yet to be analysed and discussed by the responsible actors at the national as well as at the European level. The two options can also be combined, possibly leading to an enhanced effect.

(a) Revision and adaptation of dissemination strategies

Awareness and knowledge of the VDU legislation is an important prerequisite for an implementation of the core provisions of this legislation. To tackle the awareness and knowledge deficits observed especially in smaller and medium sized establishments, is therefore one option for an improvement of compliance rates. In this context it might be helpful

1. to spread examples of good practice in order to show economic benefits of compliance with OSH legislation.
2. to offer support , e.g. practical guidelines and specific consultation, for the individual implementation in SME´s

(b) Alleviating legal provisions for SMEs

Another relevant reason for the quite low awareness and knowledge of the VDU legislation in SME is the internal OSH infrastructure. In small establishments there is often no person specialised in OSH issues. Additionally or as an alternative to optional offers for specific advice as mentioned above under point (a), also modifications of the legal requirements for internal OSH experts can be discussed (e.g. better qualification, more rights and duties). However, such measures would be likely to increase side costs of many smaller establishments and would be contradictory to the various national and European initiatives aiming at a reduction of bureaucratic burdens.

(3) More focus on recent and future developments in VDU work

(a) Mobile display screen equipment

The use of mobile display screen equipment such as laptops respectively notebooks is in principle dealt with in the Directive already. The Directive is referring to laptops, if they are *"in prolonged use at a workstation"* (Section I, Article 1, 3d of the VDU Directive 90/270/EEC). Hence the Directive is usually applicable, if laptops are regularly used at stationary workplaces. But this relatively new type of display screen equipment which is increasingly used as standard office equipment and not only for mobile applications, in practice still receives insufficient attention.The initiation or intensification of information campaigns specifically devoted at the use of mobile equipment could help to improve this situation.

(b) Home office workplaces of telecommuters

As has been shown, the home office workplaces of telecommuters are frequently not yet in the focus of employers. Here, more information on the responsibilities of employers and employees would be useful. Classical OSH-instruments like workplace inspections are hardly practicable for home office workplaces, but the provision of specific advice to telecommuters by the

OSH experts of the firm would contribute to an optimization of working conditions at the VDU workstation in the home office.

(c) Information and training of workers

The general quality and thoroughness of the OSH information and training on display screen work provided by the companies is not always convincing. Likewise, it has become evident that such information and training should ideally be provided on a regular basis in order to have a better impact on the factual behaviour of the VDU workers.

Information and training in safety and health related VDU issues is an aspect of the Directive which will gain even more importance in the future. Employees at VDU workplaces have more and more possibilities to adjust their workplace properly on their own – e.g. by varying the size of the signs on the display screen, by changing the adjustment of their chair in various ways etc. In order to enable them to use the possibilities offered by modern equipment in a way that helps to prevent health problems, good instructions on how this is done best are essential. A considerable share of employees themselves explicitly expressed their wishes for more and/or better information and training.

10. Evaluation methodology: Conclusions and recommendations

As initially stated, this evaluation has two purposes. On the one hand, it serves as an assessment of a specific legislation, the screenwork Directive 90/270/EEC. Conclusions to be deducted with respect to this regulatory framework were discussed in chapter 9. On the other hand, the evaluation shall also serve as a prototype for testing the suitability of the methodology of an ex-post evaluation for the purpose of evaluating the European framework legislation on occupational safety and health at work. To this end, possibilities, shortcomings and future perspectives of the methodology will be shown, based on the experiences made in the pilot evaluation.

10.1 The added value of an evaluation of OSH legislation

So far, the European occupational safety and health legislation has mainly been assessed by so called national "progress reports" to be delivered to the European Commission every four years. In these reports, the experiences made with the legislation in the preceding period are reflected by a couple of relevant stakeholders (e.g. employers' federations, trade unions, enforcement institutions) and new challenges are to be identified. The national ministries are in charge of compiling a final national progress report on base of the reports received from the various stakeholders. These reports mainly describe the observed state of implementation and acceptance of the legal provisions, point out deficient or conflictive aspects and try to indicate future developments.

What is the main added value of an additional evaluation study on such a legislative framework? Does it provide any additional or better insight which can be made use of for the legislative process? To answer this question, we will recur to what the evaluation of the Directive in fact could provide and will also ask whether or under which circumstances such an evaluation could provide more insight than the current evaluation did.

The main advantages of the evaluation methodology can be shortly summarized under the following topics:

(1) Provision of information on a statistically solid and reliable base

The progress reports are mainly based on the views of a few stakeholders claiming to be representative of the addressees of the legislation, namely employers and employees. These views are often more or less directly influenced by specific interests. Likewise, in the progress reports it is hard to distinguish between majority and minority opinions since usually none of the different views can be quantified on a sound basis.

A direct survey among employers and employees on the one hand allows to gain largely unfiltered insight into the perception of the most relevant actors in the field – the concerned employers and employees themselves - into the perceived benefits and shortcomings of the law.

It is also suitaible for verifying whether a certain concern is really the concern of a broad, representative share of affected organisations or individuals or only that of very few but powerful stakeholders.

To get an unfiltered and representative overview of the opinions of employers and employees is important for a broad series of issues, ranging from the real significance of obstacles to an implementation to the estimation of cost benefit aspects.

(2) "Objective" Information about the actual state of workstations

One of the most important advantages of the evaluation methodology is the possibility to check the quality and correct set-up of the workplaces by asking employees and to put this information in relation to the application of the instruments of the legislation. This enables researchers to analyse for a large, representative choice of workplaces whether any correlations exist between the application of the instruments of the legislation and the shape of the workstation. If a positive correlation between the actual state of the workstation and a measure aimed at improving the physical state of the workstation exists, this is an indication for the effectiveness and relevance of the legal provision. It should be noted that this type of analysis requires a solid empirical base (number of case).

(3) Information on the impact the instruments of the legislation have on employees and their behaviour.

The combination of employer and employee surveys allows to analyse the effects a measure has on the behaviour and/or the well-being of employee. It also allows to analyse factors that impede effectiveness. The progress reports in turn do not allow any empirically funded conclusions of this type but only – if at all – assumptions and isolated observations. An example for this type of analysis would be the analysis of the information provided by the employer. If certain recommendations and instructions are not applied in practice by the employee, this can have various reasons. For further improvements it is for example important to know whether instructions are not applied because they were not helpful or because important preconditions are missing (e.g. enough room for gymnastics or adjustable chairs) or because work pressure does not allow it.

(4) Identification of best practice strategies.

Strictly cross-nationally comparable evaluation indicators enable researchers to measure differences in the degree of application, awareness, effectiveness etc. of the legislation in the involved countries. This type of cross-national data is not an aim in itself, although – unfortunately - country rankings seem to be the most popular outcome of European wide surveys. A cross-country study enables researchers to analyse for example in how far different approaches with regard to the transposition of European law into national law or with regard to national dissemination and implementation strategies lead to different results. By this way, the most successful implementation and dissemination strategies can be identified and other countries would have the chance to learn from these "good practice" models. Learning from "good practice" models does however not mean that successful approaches of other countries can be simply transferred. The context in which OSH activities are embedded (e.g. the nature

of the social dialogue, national social security systems or country specific company cultures) and the history of their development differs widely between the European countries and has to be taken into account.

(5) Measurement of changes over time

A periodic repetition of systematic evaluations would help to identify and measure changes over time. If, for example, an instrument should become irrelevant due to changing circumstances, this could be identified by comparing effectiveness and relevance indicators measured in different years. Just to indicate one example: In the German evaluation, employees were asked for the sources from which they draw relevant and useful information regarding the health-beneficial set-up and behaviour at the VDU workplace. It turned out that all in all the sources within the establishment are clearly more important than private sources. But for the youngest age group, the private sources were more important. This indicates an important change with regard to the way and point in time of the socialisation of people with VDU equipment and might have repercussions on the conceptualisation of future information strategies.

(6) Evaluation of external factors

A systematic evaluation allows aspects that are not directly related to the workplace, but which nevertheless influence the effectiveness of the legislation under investigation, to be included. In the pilot evaluation this was done for some aspects, e.g. the sources of employees' information and knowledge on VDU health aspects. In addition, some national evaluations collected data on the private use of personal computers because it was considered health problems attributable to VDU work did not necessarily originate from the professional use of display screen equipment, but might also be associated with ergonomically suboptimal use of VDU equipment for private purposes. Information about external factors, or unintended effects of the legislation, could be collected using semi-structured qualitative interviews with employers, employees and OSH experts within selected establishments. This methodological element played a minor role in the pilot evaluation, but could be a useful tool for future evaluations.

10.2 Limitations of an ex-post evaluation

The most important general limitation of the present ex-post evaluation has already been discussed in previous chapters: In the case of the VDU legislation, more than ten years have passed since the legislation became effective and various significant changes have taken place in the meantime which can hardly be controlled in the empirical research design. These changes concern the technical standards of VDU equipment, organisational changes of work, the spread of computers in private homes and – connected to the latter – the spread of VDU knowledge derived from private sources.

The construction of a counterfactual situation was therefore not possible for this legislation. It is not possible any more to say exactly what would have been if the legislative measure to be

evaluated – the VDU Directive in this case - had never become effective. What can be done and was done instead is to ask the relevant actors on their perception of the influence of the legislation, on the usefulness of the provisions etc. and to search for empirical indicators that allow for an assessment of the effectiveness of the single instruments. For future evaluations of other OSH activities, the possibilities of defining comparison groups should nevertheless be thoroughly checked at the very beginning of the conceptual work.

Another limitation already pointed out is related to the precise measurement of the cost-benefit ratio in case of the evaluation of legislative measures. The limitations in this field are closely related to the above discussed difficulties of a clear and unambiguous attribution of perceived changes to the legislation. Specific additional difficulties were in the case of the VDU Directive the lack of information on specific compliance costs at the firm level and the fact that acknowledged occupational diseases do not exist for VDU work because the typical health problems are not monocausal. For the evaluation of other OSH Directives, the attribution of costs can be considerably easier. Costs of protective equipment for workers in the mining or construction sector are certainly easier to collect than the costs for ergonomic VDU equipment. Also, benefits can be attributed more clearly to the application of the legislation (e.g. developments in the number of work accidents or of specific disease patterns like silicosis).

10.3 Practical experiences with the pilot evaluation

The chosen procedure of steering the national evaluations by a rather loose network of OSH and ministry officials with only rough guidelines on questionnaire and methodology has its advantages and disadvantages and was mainly chosen because participation in the project and the financing of the evaluation were national matters.

The major advantage of this procedure was that the survey instruments could be focused more on the national situation, enabling evaluators to fully take into account differences in the national implementations of the EU Directive. As a further advantage of this approach the broad variety of methodologies and questionnaire approaches that could be tested by this way is worth mentioning. The time lag between the various national evaluations led to the situation that results and experiences from the first evaluation (the Dutch one) could already be taken into account in the design of later studies and helped to identify and consequently avoid questions which turned out not to work well, e.g. those producing very high rates of *“no answer”* or *“don’t know”*.

But these advantages hold mainly for a pilot study aiming at identifying best practice methodologies. The disadvantages of this approach are obvious. They mainly refer to the comparability of the national results: Differing data-collection methodologies, sampling characteristics and – above all – questionnaires made the international comparison a very demanding and at some points almost impossible task. At some points, only general trends could be shown and cross-national comparability of the six evaluations this report is based has clear limitations.

In spite of these limitations, the pilot study is a good base for future evaluations of OSH issues since a broad pool of question types on OSH topics could already be tested by this way. For

future studies, we strongly recommend to put much more emphasis on an ex-ante harmonization of the evaluation methodology. The major organisational and methodological changes we propose to this aim will be outlined in the following section. It is a way which has been applied for a series of surveys on the European level which are carried out with strict requirements regarding cross-national comparability.

10.4 Recommendations for future evaluations

(1) Possible links between national progress reports and evaluations

The progress reports about the implementation of EU legislation (provided by the members states to the European Commission at regular intervals) have a different focus than evaluations. They concentrate on the degree of implementation rather than on the quality of legislation. Nevertheless, the progress reports can give hints on potentially conflictive or problematic issues in the legislation itself and can indicate recent or future developments which might cause needs for changes in the legislation. Such hints could be taken up and be empirically investigated in the framework of an evaluation. An example for this from the present evaluation was the examination of the empirical significance of telework and laptops and of the degree to which they are already covered by the existing OSH routines.

(2) Use of existing European-wide data on the relevant topics

For future evaluations, it should be checked in the preparation phase already whether any existing data sources at the European level can be made use of for the evaluation. Such sources can be either official statistics or representative, well-established surveys such as the European Working Conditions Survey. These sources could serve for a verification of results, and for the provision of additional information (e.g. statistics on health complaints attributed to workplace conditions).

(3) The role of qualitative, semi-structured interviews

Qualitative, semi-structured interviews with a number of employers, employees and stakeholders are useful. Among the groups of stakeholders, producers of hardware, furniture and software are interesting additional target persons. Also actors responsible for the handling of disputes related to the law (e.g. labour judges) as well as institutions responsible for enforcement (e.g. the Labour Inspectorate) could provide valuable additional insight.

Such interviews can help to focus the questionnaire on the most relevant questions and can provide important information on issues which are difficult to ask in a standardized questionnaire. In the analyses phase, such interviews are also helpful since they allow a further deepening and discussion of the findings from the quantitative parts of the evaluation. In the conclusions to be drawn results of the stakeholder interviews should however not be mixed up with the analysis of the representative data.

(4) Combination of employer and employee surveys

The combination of representative employer and employee surveys has proved to be an important and very fruitful element. The employee survey served not only as a validation of the employers' statements. It also provided important additional insight, e.g. into the factors that hinder employees to comply with recommendations regarding their behaviour at the VDU workplace. Practically all OSH legislation concerns both the employer and the employee and requires a cooperation of the two sides.

Linked employer-employee samples have their advantages when it comes to a verification of the statements of the employer. But this method implies methodological problems (selection bias) which are far from being trivial and which have to be solved in a satisfactory way (see discussions in chapter 2).

The independent employee samples of Denmark, Germany and the UK have also proved to be valuable and suitable instruments for the aim of a validation of employers' statements. And for the main aim of providing additional information from the employees, e.g. on factors influencing their factual behaviour at the VDU workstations, then both methodologies – linked and independent employee samples – provide valuable results. Since independent samples are much easier to handle and less costly, they should in our opinion be the first option.

(5) Application of a harmonized methodological concept

In order to establish real cross-national comparability, the following recommendation regarding the organisation of cross-national evaluations can be made:

- As it was the case in the present evaluation, on the contractors' part a steering committee should be formed which includes experts, researchers and stakeholders from different countries or country groups. The multi-country composition ensures that differences in the national context are taken into account from the very beginning of the project. The participation of relevant stakeholders enables evaluators to take into account different experiences, interests and angles of view on the subject in the preparatory phase already. Participation of the relevant stakeholders is also likely to raise the acceptance of the evaluation and the willingness to deal with the results in a constructive way.

- Ideally, a research institute familiar with both international surveys and the methodology of evaluation should be chosen as responsible coordinator for the whole project. In close cooperation with the steering committee this institute should be responsible for the elaboration of the questionnaire and the methodological design and for the overall coordination of fieldwork. This ensures that the possibilities and practical limitations of the applied data-collection method are taken into account in the development of the questionnaires.

- Fieldwork as such should be the task of national research institutes since they have the best knowledge on technical matters such as sampling and the provision of the statistical information required for the weighting. However, field-work should follow uniform guidelines with compulsory character for all involved countries in order to guarantee that differences between countries resulting in the analysis phase are really due to differences in

reality and not merely a result of methodological differences. Such relatively simple issues as an agreement on a common definition for the size-classes and sectors of activity to be used in the cross-tabulations considerably facilitate cross-national comparability.

- We recommend to jointly develop an English core master questionnaire for all those indicators for which a strict cross-national comparability is desirable. This should be the joint task of the European steering group (or some of its representatives) and the co-ordinating research institute. The elaboration of common Terms of Reference was a good starting point for the international coordination, helping to get an idea about the contents of the study. But many difficulties only turn out when trying to operationalize the research questions, i.e. to transform them into a practical questionnaire.

- The choice of the data collection method can have a strong impact on the results. Methods like online interviews and especially mail questionnaires which do not involve an interviewer tend to have a much stronger self-selection bias than methods involving an interviewer (telephone and face-to-face). The latter methods are therefore preferable from the point of view of representativeness. In any case, the data-collection methodology should be uniform across all countries.

- Sampling for the establishment survey should be made in a disproportional way, ensuring that from each size-class a sufficiently high number of interviews is available for later analysis. Results should then in any case be weighed so that they are really representative for the economy in a country. Whether the weighing is to be made establishment- or employee-proportional is not crucial, but the same type of proportionality has to be used for the data of all national evaluations and therefore has to be decided before starting the project.

- The researchers in charge of the cross-country analysis should get access to the datasets of all national evaluations. This would enable them to do additional analyses not contained in the national reports. It would also allow for the application of more sophisticated multivariate research methods. By this way, e.g. country effects could be clearly identified and analytically separated from other effects (like e.g. differences in the economic structure between the countries).

ANNEXES

Annex 1: The Council Directive 90/270/EEC

Council Directive 90/270/EEC of 29 May 1990 on the minimum safety and health requirements for work with display screen equipment (fifth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC)

Official Journal L 156 , 21/06/1990 P. 0014 - 0018
Finnish special edition: Chapter 5 Volume 4 P. 0203
Swedish special edition: Chapter 5 Volume 4 P. 0203

COUNCIL DIRECTIVE of 29 May 1990 on the minimum safety and health requirements for work with display screen equipment (fifth individual Directive within the meaning of Article 16 (1) of Directive 87/391/EEC) (90/270/EEC)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 118a thereof,

Having regard to the Commission proposal (1) drawn up after consultation with the Advisory Committee on Safety, Hygiene and Health Protection at Work,

In cooperation with the European Parliament (2)

Having regard to the opinion of the Economic and Social Committee (3),

Whereas Article 118a of the Treaty provides that the Council shall adopt, by means of Directives, minimum requirements designed to encourage improvements, especially in the working environment, to ensure a better level of protection of workers' safety and health;

Whereas, under the terms of that Article, those Directives shall avoid imposing administrative, financial and legal constraints, in a way which would hold back the creation and development of small and medium-sized undertakings;

Whereas the communication from the Commission on its programme concerning safety, hygiene and health at work (4) provides for the adoption of measures in respect of new technologies; whereas the Council has taken note thereof in its resolution of 21 December 1987 on safety, hygiene and health at work (5);

Whereas compliance with the minimum requirements for ensuring a better level of safety at workstations with display screens is essential for ensuring the safety and health of workers;

Whereas this Directive is an individual Directive within the meaning of Article 16 (1) of Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to

encourage improvements in the safety and health of workers at work (6); whereas the provisions of the latter are therefore fully applicable to the use by workers of display screen equipment, without prejudice to more stringent and/or specific provisions contained in the present Directive;

Whereas employers are obliged to keep themselves informed of the latest advances in technology and scientific findings concerning workstation design so that they can make any changes necessary so as to be able to guarantee a better level of protection of workers' safety and health;

Whereas the ergonomic aspects are of particular importance for a workstation with display screen equipment;

Whereas this Directive is a practical contribution towards creating the social dimension of the internal market;

Whereas, pursuant to Decision 74/325/EEC (7), the Advisory Committee on Safety, Hygiene and Health Protection at Work shall be consulted by the Commission on the drawing-up of proposals in this field,

HAS ADOPTED THIS DIRECTIVE:

SECTION I

GENERAL PROVISIONS

Article 1

Subject

1. This Directive, which is the fifth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC, lays down minimum safety and health requirements for work with display screen equipment as defined in Article 2.

2. The provisions of Directive 89/391/EEC are fully applicable to the whole field referred to in paragraph 1, without prejudice to more stringent and/or specific provisions contained in the present Directive.

3. This Directive shall not apply to:

(a) drivers' cabs or control cabs for vehicles or machinery;

(b) computer systems on board a means of transport;

(c) computer systems mainly intended for public use;

(d) 'portable' systems not in prolonged use at a workstation;

(e) calculators, cash registers and any equipment having a small data or measurement display required for direct use of the equipment;

(f) typewriters of traditional design, of the type known as 'typewriter with window'.

Article 2

Definitions

For the purpose of this Directive, the following terms shall have the following meanings:

(a) display screen equipment: an alphanumeric or graphic display screen, regardless of the display process employed;

(b) workstation: an assembly comprising display screen equipment, which may be provided with a keyboard or input device and/or software determining the operator/machine interface, optional accessories, peripherals including the diskette drive, telephone, modem, printer, document holder, work chair and work desk or work surface, and the immediate work environment;

(c) worker: any worker as defined in Article 3 (a) of Directive 89/391/EEC who habitually uses display screen equipment as a significant part of his normal work.

SECTION II

EMPLOYERS' OBLIGATIONS

Article 3

Analysis of workstations

1. Employers shall be obliged to perform an analysis of workstations in order to evaluate the safety and health conditions to which they give rise for their workers, particularly as regards possible risks to eyesight, physical problems and problems of mental stress.

2. Employers shall take appropriate measures to remedy the risks found, on the basis of the evaluation referred to in paragraph 1, taking account of the additional and/or combined effects of the risks so found.

Article 4

Workstations put into service for the first time

Employers must take the appropriate steps to ensure that workstations first put into service after 31 December 1992 meet the minimum requirements laid down in the Annex.

Article 5

Workstations already put into service

Employers must take the appropriate steps to ensure that workstations already put into service on or before 31 December 1992 are adapted to comply with the minimum requirements laid down in the Annex not later than four years after that date.

Article 6

Information for, and training of, workers

1. Without prejudice to Article 10 of Directive 89/391/EEC, workers shall receive information on all aspects of safety and health relating to their workstation, in particular information on such measures applicable to workstations as are implemented under Articles 3, 7 and 9.

In all cases, workers or their representatives shall be informed of any health and safety measure taken in compliance with this Directive.

2. Without prejudice to Article 12 of Directive 89/391/EEC, every worker shall also receive training in use of the workstation before commencing this type of work and whenever the organization of the workstation is substantially modified.

Article 7

Daily work routine

The employer must plan the worker's activities in such a way that daily work on a display screen is periodically interrupted by breaks or changes of activity reducing the workload at the display screen.

Article 8

Worker consultation and participation

Consultation and participation of workers and/or their representatives shall take place in accordance with Article 11 of Directive 89/391/EEC on the matters covered by this Directive, including its Annex.

Article 9

Protection of workers' eyes and eyesight

1. Workers shall be entitled to an appropriate eye and eyesight test carried out by a person with the necessary capabilities:

- before commencing display screen work,

- at regular intervals thereafter, and

- if they experience visual difficulties which may be due to display screen work.

2. Workers shall be entitled to an ophthalmological examination if the results of the test referred to in paragraph 1 show that this is necessary.

3. If the results of the test referred to in paragraph 1 or of the examination referred to in paragraph 2 show that it is necessary and if normal corrective appliances cannot be used, workers must be provided with special corrective appliances appropriate for the work concerned.

4. Measures taken pursuant to this Article may in no circumstances involve workes in additional financial cost.

5. Protection of workers' eyes and eyesight may be provided as part of a national health system.

SECTION III

MISCELLANEOUS PROVISIONS

Article 10

Adaptations to the Annex

The strictly technical adaptations to the Annex to take account of technical progress, developments in international regulations and specifications and knowledge in the field of

display screen equipment shall be adopted in accordance with the procedure laid down in Article 17 of Directive 89/391/EEC.

Article 11

Final provisions

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 31 December 1992.

They shall forthwith inform the Commission thereof.

2. Member States shall communicate to the Commission the texts of the provisions of national law which they adopt, or have already adopted, in the field covered by this Directive.

3. Member States shall report to the Commission every four years on the practical implementation of the provisions of this Directive, indicating the points of view of employers and workers.

The Commission shall inform the European Parliament, the Council, the Economic and Social Committee and the Advisory Committee on Safety, Hygiene and Health Protection at Work.

4. The Commission shall submit a report on the implementation of this Directive at regular intervals to the European Parliament, the Council and the Economic and Social Committee, taking into account paragraphs 1, 2 and 3.

Article 12

This Directive is addressed to the Member States.

Done at Brussels, 29 May 1990.

For the Council

The President

B. AHERN

(1) OJ No C 113, 29. 4. 1988, p. 7 and OJ No C 130, 26. 5. 1989, p. 5.

(2) OJ No C 12, 16. 1. 1989, p. 92 and OJ No C 113, 7. 5. 1990.

(3) OJ No C 318, 12. 12. 1988, p. 32.

(4) OJ No C 28, 3. 2. 1988, p. 3.

(5) OJ No C 28, 3. 2. 1988, p. 1.(6) OJ No L 183, 29. 6. 1989, p. 1.

(7) OJ No L 185, 9. 7. 1974, p. 15.

Annex MINIMUM REQUIREMENTS (Articles 4 and 5) Preliminary remark

The obligations laid down in this Annex shall apply in order to achieve the objectives of this Directive and to the extent that, firstly, the components concerned are present at the workstation, and secondly, the inherent requirements or characteristics of the task do not preclude it.

1. EQUIPMENT

(a) General comment

The use as such of the equipment must not be a source of risk for workers.

(b) Display screen

The characters on the screen shall be well-defined and clearly formed, of adequate size and with adequate spacing between the characters and lines.

The image on the screen should be stable, with no flickering or other forms of instability.

The brightness and/or the contrast between the characters and the background shall be easily adjustable by the operator, and also be easily adjustable to ambient conditions.

The screen must swivel and tilt easily and freely to suit the needs of the operator.

It shall be possible to use a separate base for the screen or an adjustable table.

The screen shall be free of reflective glare and reflections liable to cause discomfort to the user.

(c) Keyboard

The keyboard shall be tiltable and separate from the screen so as to allow the worker to find a comfortable working position avoiding fatigue in the arms or hands.

The space in front of the keyboard shall be sufficient to provide support for the hands and arms of the operator.

The keyboard shall have a matt surface to avoid reflective glare.

The arrangement of the keyboard and the characteristics of the keys shall be such as to facilitate the use of the keyboard.

The symbols on the keys shall be adequately contrasted and legible from the design working position.

(d) Work desk or work surface

The work desk or work surface shall have a sufficiently large, low-reflectance surface and allow a flexible arrangement of the screen, keyboard, documents and related equipment.

The document holder shall be stable and adjustable and shall be positioned so as to minimize the need for uncomfortable head and eye movements.

There shall be adequate space for workers to find a comfortable position.

(e) Work chair

The work chair shall be stable and allow the operator easy freedom of movement and a comfortable position.

The seat shall be adjustable in height.

The seat back shall be adjustable in both height and tilt.

A footrest shall be made available to any one who wishes for one.

2. ENVIRONMENT

(a) Space requirements

The workstation shall be dimensioned and designed so as to provide sufficient space for the user to change position and vary movements.

(b) Lighting

Room lighting and/or spot lighting (work lamps) shall ensure satisfactory lighting conditions and an appropriate contrast between the screen and the background environment, taking into account the type of work and the user's vision requirements.

Possible disturbing glare and reflections on the screen or other equipment shall be prevented by coordinating workplace and workstation layout with the positioning and technical characteristics of the artificial light sources.

(c) Reflections and glare

Workstations shall be so designed that sources of light, such as windows and other openings, transparent or translucid walls, and brightly coloured fixtures or walls cause no direct glare and, as far as possible, no reflections on the screen.

Windows shall be fitted with a suitable system of adjustable covering to attenuate the daylight that falls on the workstation.

(d) Noise

Noise emitted by equipment belonging to workstation(s) shall be taken into account when a workstation is being equipped, in particular so as not to distract attention or disturb speech.

(e) Heat

Equipment belonging to workstation(s) shall not produce excess heat which could cause discomfort to workers.

(f) Radiation

All radiation with the exception of the visible part of the electromagnetic spectrum shall be reduced to negligible levels from the point of view of the protection of workers' safety and health.

(g) Humidity

An adequate level of humidity shall be established and maintained.

3. OPERATOR/COMPUTER INTERFACE

In designing, selecting, commissioning and modifying software, and in designing tasks using display screen equipment, the employer shall take into account the following principles:

(a) software must be suitable for the task;

(b) software must be easy to use and, where appropriate, adaptable to the operator's level of knowledge or experience; no quantitative or qualitative checking facility may be used without the knowledge of the workers;

(c) systems must provide feedback to workers on their performance;

(d) systems must display information in a format and at a pace which are adapted to operators;

(e) the principles of software ergonomics must be applied, in particular to human data processing.

Annex 2: Country specific information

1. Differences in the transposition of the VDU Directive 90/270/EEC into national legislation

1.1 The Czech screen work legislation

The Czech Republic joined the European Union not until 1 May 2004, i.e. considerably later than the other five countries covered by this report. The inclusion of the EU Directive 90/270/EEC into Czech law therefore has been made only recently.

In the Czech Republic, the VDU Directive is incorporated in the Governmental Order No. 178/2001 Coll. There are certain differences between the Czech Law and the European VDU Directive, but these differences are of minor nature only.

1.2 The Danish screen work legislation

The Danish legislation differs from the VDU directive on the following points:

- The VDU Directive requires that employers must undertake a risk assessment to identify any potential hazard from the use of the equipment covered by the Directive. This is not specified in the Danish Decree. The Danish legislation governing occupational health and safety prescribes that employers must perform a Workplace Evaluation (known as *Arbejdspladsvurdering* (APV). The guidelines for the Workplace Evaluation focus on some of the same issues as the VDU Directive, but the legislation is not based on the VDU Directive.
- The VDU Directive requires employers to consult and inform workers and/or their representatives about the areas covered by the Directive. This is not specified in the Danish Decree. The general legislation concerning occupational health and safety contains provisions regulating these areas. This legislation states that workplaces with 10 or more employees are obliged to organize the company's health and safety work within the framework of a safety organization containing employee representatives. In workplaces with fewer than 10 employees, the employer is obliged to inform the employees about health and safety.
- The Directive requires that employers should plan the work routines of VDU users so that their display screen work contains periodic breaks. In Denmark, a guideline specifies that other kinds of work or breaks should interrupt a maximum of two continuous hours of display screen work.

1.3 The German screen work legislation

In Germany, the European VDU Directive was transformed into German legislation in the *"Verordnung über Sicherheit und Gesundheitsschutz bei der Arbeit an Bildschirmgeräten*"

(„*Bildschirmarbeitsverordnung*“, further on called the “*German VDU Decree*“) which came into force in December 1996. Some parts of the Directive were not implemented in this specific screen work decree but were instead integrated into the general legislation governing occupational health and safety (“*Arbeitsschutzgesetz”*). The following specifications of the transformation of the VDU Directive are noteworthy:

- The requirements concerning the instruction and information of employees are not regulated in the German screenwork decree, but are part of the general OSH legislation. The same applies to the article regarding participation and consultation of employees which is also part of the more general OSH legislation.
- The Directive’s provision about daily work routine is further specified in German legislation. A mandatory guideline regulates that VDU work should be organised in such a way that it is interrupted regularly by other work, which is unattached by a screen display. If this alternation of work is not possible, short brakes of ideally 5 to 10 minutes should be taken. Generally, continuous work should not last more than two hours without alternation by other work or interruption by breaks.

1.4 The Dutch screen work legislation

There are also minor differences between the European Directive and the Dutch rules (worked out in the Occupational Health and Safety Act or “*Arbowet*”). On the following points the Dutch regulations are somewhat concretized:

- The Dutch law states that display screen work should be alternated with other work or interrupted by a break after a maximum of two consecutive hours.
- The Dutch Occupational Health and Safety Act requires that employers carry out a Risk Assessment and Evaluation or “RI&E” (*Risico Inventarisatie en Evaluatie*). This regulation is not based on the VDU Directive. The Dutch VDU regulations on this point refer to these general requirements, and specify that the risk assessment should include risks to eyesight, physical and mental strain.
- The Dutch VDU legislation in general also applies to employees who work at home. An employer should provide a good workstation for employees who work at home and do not yet have a proper workstation.

1.5 The Finnish screen work legislation

In Finland VDU work and working conditions are dealt with in the Finnish Government Decision on VDU work (1405/1003), the Finnish Occupational Safety Act (738/2002) and - regarding work place assessments and medical health examination - in the Occupational Health Care Act (1383/2001). The scope of application and the content of the Finnish Government Decision on VDU work (1405/1003) are similar with the Council Directive 90/270/EEC.

The Finnish Occupational Safety and Health Act (738/2002) contains detailed information on the implementation of the analysis and assessment of the risks at work, the instruction and

guidance to be provided for employees as well as on the avoidance and reduction of workloads. It also says that the structures of a workstation and the work equipment used at work shall be chosen, designed and placed in an ergonomically appropriate way. Employers are required to take care of the safety and health of their employees while at work by taking the necessary measures. For this purpose, employers shall consider the circumstances related to the work, working conditions and other aspects of the working environment as well as the employees' personal capacities. Employers shall design and choose the measures necessary for improving the working conditions as well as decide the extent of the measures and put them into practice.

According to the Occupational Health Care Act (1383/2001) the employer shall arrange occupational health care in order to prevent and control health risks and problems related to work and working conditions and to protect and promote the safety, working capacity and health of his employees. The implementation includes e.g. the investigation and assessment of the healthiness and safety of the work and the working conditions through repeated workplace visits and by using other occupational health care methods, paying regard to the workload and the working arrangements. These factors are to be taken into account in the planning of work, working methods and work spaces and in situations in which the working conditions are changing. The aims of a medical health examination are e.g. to identify the symptoms of work-related illnesses and embark on the necessary measures to prevent them. This includes also that the employees shall be entitled to an appropriate eye and eyesight test carried out by a person with the necessary qualifications.

1.6 The screen work legislation in the United Kingdom

In the United Kingdom, the European VDU Directive 90/270/EEC has been implemented by the Health and Safety (Display Screen Equipment) Regulations 1992. The regulation became effective on 1st January 1993. An amendment to this regulation was made in 2002.

The national regulation of the United Kingdom does not differ significantly from the European Framework Directive. The Health and Safety Executive has published guidance on implementing the national regulations for both employers and workers and a checklist based on the Annex to the Directive is widely used to assist in workstation analysis.

2. Summaries of the findings of the national evaluations

The summaries of country specific findings presented in the following are based on the executive summaries and conclusions of the respective national evaluation reports which were elaborated by different research institutes and discussed on the national level. For the Czech Republic, a national reports is not (yet) available. Country specific conclusions for the Czech Republic were therefore made by the authors of this report on base of the available cross-tabulations. For Finland, there is no national report either, but the summary included here is authored by the researchers responsible of the Finnish national evaluation.

2.1 The Czech Republic

In the Czech Republic, the level of awareness and knowledge of the OSH regulations on work with visual display screens is reasonably high and roughly comparable to that in Denmark, Germany or the Netherlands.

As far as the implementation of the regulations is concerned, the balance is mixed: The share of employers offering workplace analyses, eyesight tests and instruction and training of employees is relatively low. Other aspects of the Directive such as the obligation to grant employees interim breaks, the provision of ergonomic equipment or the consideration of software ergonomics in the acquisition of new software are quite well implemented.

The reasons for the relatively low levels of implementation for some of the instruments of the VDU legislation are not unequivocal. A substantial share of employers felt too occupied with other issues with a higher priority and is in principle willing to introduce the respective instrument(s) in the future. Others seem to have doubt in their effectiveness or relevance: A broader share of employers considered some of the instruments (e.g. the requirements on information and training of the employees) as not being necessary. A quite broad minority of just above one third does generally not see a need for regulating this field by legislation,

The majority of Czech employers, however, acknowledge the usefulness of the legal provisions, with about two thirds being convinced that the legislation is appropriate and about the same share being convinced that it helps to improve the well-being of employees. Also, most employers acknowledge the fact that VDU work can indeed cause health problems. The cost-benefit ratio of the regulations is evaluated mostly as positive by those who felt able to give a statement at all, but a significant minority of somewhat less than a third of employers finds that costs exceed the benefits.

At the current stage of the national Czech evaluations, country specific recommendations can not be given yet. National reporting is still in progress and results will be available only after the completion of this cross-European report.

2.2 Denmark

In Denmark about half of employers are aware of the VDU legislation. Awareness is higher in large firms than in medium-sized and small ones.

Implementation of the Directive varies across the core provisions. According to employers, the provisions concerning the set-up of the work environment are being implemented to a substantial degree and information on health and safety issues is granted to about three quarters of employees. The picture for the requirements on daily work routine is mixed: Almost all employers state to give their employees working at display screens the opportunity to interrupt their work. But many employees (about 40%) often or regularly work for more than two hours without interruption at the display screen. Only relatively few employers intentionally organize

work so that continuous work at display screens does not occur. Instead they mentioned three principal factors that prompt their employees to take breaks: The nature of the work, the existence of formal breaks and employees deciding their own breaks. Regarding the provision of eyesight tests, it seems that a majority of employers are not offering these, unless employees make a request or experience problems with their eyesight as a result of their display screen work. VDU spectacles are granted by a broad majority of Danish employers if they are needed.

A slight majority of Danish employers considered the VDU legislation to be relevant. But a majority of just above two thirds of Danish employers would nevertheless not devote less attention to working conditions concerning display screen work if the legislation did not exist. This self-assessment of the employers is confirmed by the employees.

Obstacles in complying with the legislation were hardly at all encountered by Danish companies. Nevertheless, close to a third of the Danish employers would like to get more information on health and safety issues from part of the government.

Among the employees, the most frequently uttered wishes for improving conditions at VDU workplaces are related to the core provisions of the VDU regulations: About every third to fourth employee would like to have a workplace analysis carried out, a modification of the workstation, more information on health risks, an eyesight test and/or a reduction of work pressure. This shows on the one hand that Danish employees consider these provisions to be useful, on the other hand it indicates that the situation seems not yet fully satisfactory at the workplace level.

2.3 Germany

In Germany, just above half of all employers is aware of the existence of specific legislation on health and safety at VDU workplaces. Familiarity with the contents of the European VDU Directive respectively its transposition in German law *("Bildschirmarbeitsverordnung")* is, however, low. Especially in smaller establishments knowledge is limited. The most well known provisions of the legislation are the rules on the set-up of the workstations and on lighting. With the provisions on work-organisation, information and training of employees and software ergonomics, employees are less familiar. Most employers do not get their information on OSH-related issues at DSE workplaces directly from the laws, but from the information provided by the liability insurance (BGI 650).

The degree of implementation of the various provisions varies: Breaks or changes in the tasks are in principle granted to VDU employees in a broad majority of establishments, but are not always taken by the employees. Partly, the employees forget to take such breaks, partly they feel unable to take them due to high work pressure. Workplace assessments and information and training measures are all in all provided in every second establishment. According to employees' assessment, the quality and completeness of information vary however largely from firm to firm. The provisions with the lowest implementation rates are those regarding the protection of eyesight, be it the offer of eyesight tests or the take-over of costs for specific correc-

tive appliance on part of the employers. For all investigated provisions of the Directive, there is a strong positive correlation between establishment size and application.

The provisions on workstation analysis were assessed as very effective by both employers and employees: In most cases, they had led to the detection of potentials for improvements. Implementing these improvements has resulted in notable and enduring improvements of work satisfaction in more than 4 out of 5 eligible establishments. The information and training measures also showed positive effects: About half of the employees who received information by the employer mostly stick to them. The other half partly forget or ignore the recommendations or feel unable to put them into practice due to high work pressure or unsuitable workplace surroundings. An interesting outcome of the employee survey was that in spite of the existence of many private sources of information on VDU-related health aspects, the information provided by the employer is still the most important one for the majority of employees – albeit not for the younger age groups.

The level of satisfaction of employees with central aspects of their workstation – such as well readable signs at the monitor, the noise level at the workstation or the adjustability of the furniture – is relatively high. One aspect of workstation equipment not yet satisfactory taken into account by employers is related to the set-up of mobile equipment (laptops) regularly use at permanent workstations: A quite broad share of employers stated generally not to provide separate keyboards, i.e. not even on the requirement of employees.

The specific provisions of the legislation and the legislation in total are in principle accepted by the majority of employers: Only small minorities considered any of the provisions to be unsuitable for its purpose, the broad majority in turn thought them to be useful or at least partly useful. The overall cost-benefit estimation was also positive: A majority of employers considered the overall cost-benefit ratio of applying the legislation as either balanced or positive.

2.4 The Netherlands

In the Netherlands, awareness and knowledge of the national VDU regulations turned out to be reasonably good among employers, albeit in smaller establishments larger deficiencies were discovered. The prescriptions regarding the physical aspects of the workplace, including the instrument of workplace analyses, and the obligation to grant employees breaks were the most well known aspects. The requirements regarding the avoidance of mental strain and the obligation to inform and train employees on health related issues regarding the use of DSE, in turn, were much less known among employers. A notable share of employers was not aware of the scope of the regulations, notably the applicability to telecommuter workplaces, flexible workstations or working units with laptops.

Implementation of the various instruments was all in all also reasonably good, but deficits became apparent regarding the information and training of employees and the measures for a protection of the eyesight. Many establishments offered measures only in a reactive way, i.e. on demand of the employees, instead of proactively taking care of the health and well-being of the employees.

The Dutch evaluators found the lack of awareness and knowledge of the regulations among part of the employers to be the most important obstacle regarding the workability of the regulations. Apart from this, the workability was considered to be quite good and the law in general as sufficiently clear. Some more precision, however, was considered to be useful for the requirements on the information and training of employees, while parts of the Annex, in turn, were considered to be excessively detailed.

All in all, the law was evaluated as being relevant and useful. It is notable that high shares of employers stated that they would devote less attention to such aspects of work organisation, the set-up of workplaces etc. if the legal regulations on VDU work would not exist.

The cost-benefit evaluation of the regulations by the employers was rather critical. About half of them were convinced that costs of compliance are higher than benefits. Nevertheless, many employers acknowledged benefits such as reduced absenteeism or increased productivity.

Recommendations that can be detracted from the Dutch evaluation mostly concern the issue of information: On the one hand, more measures to improve employers' awareness of the regulations and of their proactive character would improve the implementation of the instruments in the establishments. On the other hand, an improvement of the efforts undertaken by employers to inform and train their employees would enhance the general effectiveness of the regulations since then the – usually satisfactory - VDU equipment at the workplaces would be used in a more health-beneficial way.

2.5 Finland

The Finnish results of Questionnaire of the Employers, Employees and Occupational Health Care Professionals and Experts are presented on the following pages: www.ttl.fi/VDU-directive-survey. In Finland the content of the national legislation concerning VDU work is not sufficiently known among employers. The personnel of the mandatory Occupational Health Services (OHS) is well-acquainted with VDU regulations. Therefore, more co-operation is needed between employers and OHS actors. The regulations are mostly clear and easy to understand. More detailed information should mainly cover sight questions, like sight examinations and compensation of VDU spectacles. The employers have easy access to information about VDU regulations. The half of the employers who know VDU legislation well, are well-informed of detailed requirements on topics such as the evaluation of ergonomic hazards related to work stations, ergonomics of equipment and furniture, working environment requirements, organization of work (breaks, alternating between different types of activity), and training and guidance of employees. The employers are rather familiar with the legislation concerning the eye tests and prevention of mental overload, but their knowledge of regulations on software ergonomics was rather poor. Employees often reported not knowing the content of the regulations at all.

It is notable that both employers and employees perceive the impact of VDU legislation to be important. They perceive that the legal obligations for VDU workplaces have had the greatest

impact on measures concerning the avoidance of mental stress, the availability of ophthalmology examinations, and the possibility to purchase glasses with costs covered by employer. The legislation also promotes the following measures: identification of ergonomic hazards, improvements in the ergonomics of VDU work stations, purchasing ergonomic furniture, and the provision of health-related training for employees. However, the regulations have had only minor effects on the purchasing of VDU equipment.

In Finland, the sequence of breaks is well-organized based on laws, collective agreements, and normal work practices. Four out of five employers state that appropriate breaks are currently provided in VDU work. They report that employees are able to take breaks according to need and alternate between different types of work, and that breaks based on legislation and collective agreements are sufficient (e.g. regular coffee and lunch breaks). Three out of four employees state that they are free to have their breaks as needed. More information and guidance should be provided to employees concerning the necessity to take breaks regularly.

According to employers, information and guidance about the prevention of possible health hazards in VDU work are mostly given in connection with workplace surveys and inspections; in case of employees starting a new job; and after rearrangements in work or the work environment. Both employers and employees state that the information and guidance is mostly given by occupational health care, and sometimes by safety representatives or management. Employees perceive colleagues as important information sources. Information on VDU work is transmitted as face to face communication and most commonly concerns adjustment of chairs and other furniture or equipment, working posture and its variation, and stretch breaks.

Employers feel they have sufficient knowledge on how VDU workplaces are supplied and adjusted correctly. Half of the employers also believe that employees not only have knowledge on these topics but also apply it successfully.

Both employers and employees report that the ergonomic quality of VDU work stations is assessed mostly whenever the need arises (e.g. at the occurrence of neck and eye symptoms); and after a rearrangement of the workplace or when purchasing new equipment. Employers also believe that assessment is quite often conducted at regular intervals, or when a new employee starts his or her job. The employers and the employees report that in the assessment of workplace ergonomics, much attention is directed to, for instance, the suitability of work stations and furniture and their adjustment and on the prevention of physical (e.g. back, neck, hands) overload. Less attention is paid to the prevention of eye problems and mental overload.

Workplace surveys are often conducted when problems have already turned up. More efforts should be focused on prevention. The employers and employees feel that the role of occupational health service professionals is crucial in assessing and developing VDU workplaces. For instance, occupational safety personnel and other internal experts are considered to have only a minor role. The assessments often reveal needs for changes in the work or the work environment. As the most common measures taken as a result of the assessments, the employers and employees mention adjustment of furniture and equipment, and quite common purchase of new furniture (e.g. chair, table), purchase of new equipment (e.g. PC, keyboard, mouse,

display) or accessories, change of working posture to reduce physical load, and improvements in lightning.

The improvements made in the workplace are perceived frequently as in sufficient. To overcome the situation the employers and employees mostly rely on interference of occupational health care staff, the organization's own safety personnel, and line or top management. The next position after a clear gap is held by the Occupational Safety and Health Inspectorate.

The employers state that an ophthalmology examination carried out by an optician or an ophthalmologist is mostly covered by the employer. The costs of special glasses for VDU work is covered by the employer in most cases. Interestingly, the rates estimated by the employees are remarkable lower. However, the number of no-contribution and do-not-know responses is rather high for both employers and employees, so it is likely that the system is not clearly understood in the enterprises.

The employers are clearly aware of that good ergonomics decreases loading on the back, neck and hands; causes more benefits than are costs, decreases sickness absences, improves work quality, productivity, and work motivation; and decreases mental loading. According to the employers, the most important reasons for employers to promote workers' health in VDU work are willingness to improve the work environment and suggestions from personnel, while reasons related to demands of occupational health care, legislation, results in ergonomic assessment, and productivity reasons take second place.

The Finnish Government Decision on VDU work (1405/1003) is very similar to the Council Directive 90/270/EEC in substance, structure, and scope of application. In addition, the vast impact of the VDU legislation also in small and medium-sized enterprises is based on close co-operation between employers, employees, and the Finnish occupational health care system. According to the Occupational Health Care Act (1383/2001) the employer shall arrange occupational health care in order to prevent and control health risks and problems related to work and working conditions and to promote the work ability and health of the employees. This includes, among other things, investigation and assessment of the healthiness and safety of the work and working conditions by means of repeated workplace visits.

The cooperation between employers and employees in VDU-work is in Finland handled by law on more general level, the newest version of the law is *"the Act on Occupational Safety and Health Enforcement and Cooperation on Occupational Safety and Health at Workplaces (44/2006)"*. In workplaces more than 10 employees must elected an occupational safety representative representing the employees in occupational health and safety matters.

2.6 The United Kingdom

According to the survey results from the United Kingdom, the level of awareness and knowledge of the Directive and its instruments is generally high in the United Kingdom. Also, it could be observed that many changes to the workplace were made in order to improve them with regard to health and safety standards. These changes were not always incited by the legisla-

tion, but the legislation played a major role as driver for these changes. The evaluation could show that for the United Kingdom there is a clear correlation between the level of awareness and knowledge of the regulations and the readiness to change the situation at workplaces in accordance with the legal requirements.

The degree of implementation of the various instruments is generally high according to the statements of the employers. This is especially true for workplace assessments and for information and training efforts. The latter, however, could still be improved in smaller establishments. The instrument where implementation deficits are largest is the eyesight tests or ophthalmologic examinations. Many employers offer these only in a reactive way, i.e. if single employees require them or have visual problems. The national evaluation therefore concludes that with regard to information and training and the protection of eyesight a more proactive approach of employers would be beneficial.

Regarding the reasons for existing deficits, the British evaluators found that if deficits existed, *then they are rather connected to the implementation of the legislation than to deficits in the Directive or its transposition into national law as such: "There is no evidence from the present study or the reviewed literature that changes to the legislation are necessary. However, there are indications that more needs top be done to improve its practical implementation" (UK evaluation, p.78).* Regarding the effectiveness of the Directive or its single instruments, the evaluation form the UK concluded that there is little evidence that would clearly prove the general success of the Directive and its instruments, but there is also no evidence that would show any part of it to be ineffective or inefficient (cf. UK evaluation, p.77)[22].

As regards the practicability and degree of detailedness of the legislation, the British evaluation also could not find any indicators for any substantial changes: *"The project has not found any convincing indications that it is necessary to either remove, adapt or replace the existing legislation. Caution would therefore be advisable in contemplating any changes. It is important also that the focus of legislation remains as goal setting and does not introduce technical detail that could go out of date quickly. The UK's experience has been that the existing Directive, while it does contain detail in its annex, is sufficiently flexible" (UK Report, p.78)*.

Smaller businesses proved to be less aware of the Directive and applied most of the instruments to a smaller degree than middle-sized and large establishment. But it is noteworthy that for most of the indicators the size differences are much smaller in the United Kingdom than in most other countries covered by this report. Especially awareness and knowledge of the Regulation and the implementation of risk assessments were to be found in a remarkably high share of smaller establishments, too. Nevertheless, the UK evaluators concluded that their may be a need for a still stronger emphasis on providing information to smaller businesses in order to further improve the awareness and knowledge levels.

Due to the fact that the evaluation in the United Kingdom was based on an employer survey only, a validation of the comparatively very positive results regarding knowledge, awareness

[22] This lack of evidence regarding the effectiveness of the legislation is partly due to the limitation of the UK evaluation to an employer survey. In the other evaluations, indicators for effectiveness of the single instruments were mainly found in the analysis of the employee survey.

and implementation of the Directive by the concerned employees is lacking. Nevertheless, there are good arguments to nevertheless not generally put in doubt the employer-based results from the United Kingdom: On the one hand, employee surveys from the other five countries have mostly at least roughly confirmed the statements from the employer's side. Therefore there is a quite high probability that this would be similar for the UK. On the other hand, the available indicator of the information about health and safety at the workplace which is available form the European Working Conditions Survey 2005 – an employee survey – shed a very positive light on at least this one important aspect of the Directive.

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