



Technical assessment of the expansion of the Second European Survey of Enterprises on New and Emerging Risks (ESENER-2)

European Risk Observatory
Literature Review

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1 Executive summary

1.1 Introduction and objectives

The European Agency for Safety and Health at Work (EU-OSHA) commissioned Ipsos, working in partnership with the Cardiff Work Environment Research Centre (CWERC), to undertake a detailed technical assessment of the second European Survey of Enterprises on New and Emerging Risks (ESENER-2). The primary objectives of the review were to consider the impact of expanding the survey universe at ESENER-2 to include micro establishments with 5-9 employees and establishments in agriculture, forestry and fishing (NACE Rev. 2 Section A). Neither group was included at ESENER-1. The objectives of the review were therefore to:

1. Assess the impact of expanding the survey universe to cover establishments both with 5-9 employees and establishments on NACE section A (agriculture, forestry and fishing);
2. Provide sound evidence to feed into decisions about the universe definition for future waves of the survey;
3. Make methodological recommendations with a view to minimising any negative effects of the ESENER-2 universe extension on survey quality;
4. Assess the survey's effectiveness in covering public sector establishments in (mainly) NACE sections P, O and Q;
5. Assess the survey methodology more generally with a view to making suggestions for methodological improvements.

1.1.1 Analysis framework

The review was informed by the Total Survey Error (TSE) framework, and structured around the main types of survey error it identifies. Specifically, the review focused on:

- **Non-coverage bias** – do the sample frames include all eligible cases? Do they over-represent certain types of case? Do they permit clear identification of establishments or enterprises?
- **Sampling error** (both variable error and bias) – does the sampling mechanism deliver unbiased samples of sufficient precision?
- **Non-response bias** – do survey responders and non-responders differ in important ways?
- **Measurement error** (both variable error and bias) – do survey questions collect data in the manner intended? Are appropriate survey informants selected to provide the information required? Is the CATI¹ data collection methodology effective in collecting required data?
- **Adjustment error** – are weighting methods effective in reducing bias? Specifically, can we be confident that the population totals used to derive post-stratification weights are sufficiently accurate to render weighting effective in reducing bias?

The review proceeded by completing the following tasks for each of these error types: (i) operationally defining the relevant error type; (ii) providing an assessment of the level of error (of relevant type) for ESENER-2, as a whole and taking account of inclusion of public sector establishments; (iii) assessment of level of error (of relevant type) associated specifically with the extension of the survey universe to cover establishments containing 5-9 employees and establishments in NACE section A; and (iv) presentation of conclusions and recommendations.

1.2 Main findings

1.2.1 Sampling frames and coverage

This workstream considered the sample frames used in ESENER-2 and whether they were subject to non-coverage and related sample frame problems. A comparison was made of the main (and supplementary) sample frames used for ESENER-2 and the 3rd European Company Survey (ECS),

¹ Computer Assisted Telephone Interviewing

combined with an interrogation of the technical documentation on sampling difficulties encountered in both surveys and a consultation with our network of local fieldwork agencies on frame assessments and recommendations for alternative sample frames. This led to the conclusion that, in a number of countries, a sampling frame with properties superior to the frame used in ESENER-2 should be considered for ESENER-3. Using these alternative frames will help to reduce coverage bias in ESENER-3, but given that conducting cross-national establishment surveys is extremely complex, coverage errors cannot be fully avoided. For that reason, it will be important that detailed information, by applicable size and sector, of the size of the sample frames is collected during the kick-off phase of ESENER-3, and is included in the technical documentation for the study.

In ESENER-2, no countries required supplementary sampling frames to cover micro establishments with 5-9 employees and only four countries needed supplementary sampling frames to extend the survey universe to include establishments in NACE section A. However, to guarantee sufficient coverage of the NACE sector O, P and Q, it will be important to continue using additional sources to supplement the main frames. For ESENER-3, in addition to the Yellow Pages as an additional source, internet pages of public institutions can be consulted (as was done for the 3rd ECS). By switching sampling frame in Austria (from Compass to Herold) and Italy (from Dun and Bradstreet to Consodata), coverage of NACE sector O, P and Q can be improved without the need for additional sampling sources.

1.2.2 Sampling procedures

This workstream considered the ESENER-2 sampling procedures. Initially, the yield rates² of the survey were reviewed, across establishments groups, to consider how efficient the sampling procedures were. This showed that cases sampled from the NACE A sample stratum had very similar yield rates to those from other sectors. In addition, we compared the estimates for each country with and without the establishments in NACE A, across 53 variables in the survey dataset identified as most important to stakeholders. This analysis showed that, given the low prevalence of NACE A establishments in the underlying populations and hence sample, including this group made very little difference to the survey estimates. This gives confidence that including NACE A has not compromised survey quality.

Yield rates for establishments sampled from the micro size stratum were much lower than those from the larger establishment strata. This highlights the difficulties with sampling micro establishments, given firms operating in this part of the economy tend to be less stable, both in terms of fluctuations in numbers of employees and business continuity. This more rapid change is less easily picked up on the sample frames, leading to lower rates of eligibility during fieldwork, hence requiring more sample to be issued. These difficulties are not unique to ESENER. Micro establishments were also included as an analysis sub-group in their own right, given they make up 26% of the ESENER-2 sample (48% in the establishment proportional weighted sample). As such their inclusion is influential on the overall ESENER sample, however in terms of the sampling methodology, besides the difficulties outlined above, the review did not uncover particular quality issues with the inclusion of Micro establishments.

Turning to the sampling procedures, we considered and proposed sample designs that place more emphasis on establishment-level estimates than is currently the case, given they are of greater importance and value to users of the survey data than the employee-level estimates. The approach used on ESENER to date has been to set the sampling targets as the mid-point between the establishment-proportional and employee-proportional populations in each country. To consider this, analysis was undertaken across the 53 key survey measures to determine the optimal allocation favouring establishment-level estimates. This showed that, given the sample design needs to deliver a variety of different measures, the optimal design is the one that is in proportion to the establishment population³. However, this would mean that the sample consists of very few large establishments with 250+ employees. This would not be a sensible design given the importance of this group both

² Interviews divided by cases that were sampled and issued for fieldwork

³ The significance of this finding is that it is usually found necessary to boost the proportion of the largest establishments in an optimal allocation given there is more variance amongst these establishments. However, on a general purpose survey like ESENER, which has a range of measures, this is not the case as the different measures average out so that the proportions the groups are found in within the population becomes the main determining criteria.

economically and in terms of the numbers of people who work for firms of this size, and that number of employees is a key break variable for analyses. Two alternatives to the current approach were therefore considered, of setting a minimum target sample size per size group (and otherwise setting the targets in proportion to the population) and the 'planned optimal' approach. The approaches give slightly different results in terms of favouring (i) the precision of employee-size sub-group estimates and (ii) overall country estimates. We conclude that either of these two approaches, or the ESENER-2 approach, could work for ESENER-3, depending on EU-OSHA's priorities.

Finally, two areas were considered where the review team felt the ESENER-2 sampling procedures could be improved. These were the procedures for selecting establishments from multi-establishment enterprises in the countries requiring screening from enterprise-level sample frames; and the application of a stopping rule during fieldwork. These issues apply generally to the sample and are not specific to establishments in the extended survey universe (i.e. they are not more of an issue for micro and NACE A establishments).

On the first, a review of the current procedures for selecting establishments from enterprise-level frames (required in 22 out of the 36 countries) highlights the very low yield rate of establishments selected from multi-establishment sites (12% of the enterprises identified as multi-establishment responded to the survey), which means that subsidiary establishments are heavily under-represented in the sample. Further, analysis across the 53 key survey measures showed that on half of the measures the subsidiary establishments were significantly different to single-establishment sites. To counter this, it would be necessary to represent subsidiary establishments correctly in the sample, but this cannot be achieved under the current design unless accepting very large weights and consequent loss of precision. We therefore recommend that more than one establishment is selected from each multi-establishment enterprise to boost numbers of subsidiary establishments.

Turning to the second issue, extensive use was made during the fieldwork for ESENER-2 of closing stratification cells once the sampling targets had been met. This was applied in 90% of the sampling cells across the countries. While this is a common practice on business surveys, it is a concern for two reasons. First, the cases which are stopped after they have been dialled are not a random sample of all cases and can be expected to be the harder to contact cases, potentially introducing bias. The second reason is due to the presence of 'stratum jumpers', i.e. establishments which turn out to be in a different size/sector stratum to the one in which they were sampled. Analysis conducted as part of this review shows that, in combination with the stopping rule, the profile of the sample has been altered in survey-important ways by the stratum jumpers.

To deal with this we recommend two changes to the procedures. The first is to use information from the previous survey to set the sampling targets factoring in the relationship between establishments' size/sector membership on the frame and in practice in the interview. This approach relies on using the same sample frame in each survey iteration, but the level of frame overlap between surveys could be increased by pooling information from the ECS. This should mean that the sampling cells fill up more evenly during fieldwork, limiting the need to apply the stopping rule disproportionately. Second, attempts should be made to use the stopping rule less extensively, by managing the sample appropriately. The ESENER-2 technical report says that sample was initially issued at a ratio of 5:1 (i.e. to deliver a yield rate of 20%, interviews out of issued cases). Given that over half the countries finished with a yield rate of better than 20% it was inevitable that the stopping rule would be required so extensively, and so this ratio should be reduced.

1.2.3 Non-response

This workstream aimed to assess whether non-response bias was an issue on ESENER-2. Given this assessment is notoriously difficult, as it would rely on having survey estimates for both responders and non-responders, the assessment relied on indirect evidence by making comparisons of the response rates across the sample and with different surveys and comparing their estimates where available.

Analysis of the survey outcomes for micro and NACE sector A establishments showed they had similar response rates to the other parts of the sample. For micro establishments, the AAPOR3 response rate was comparable due to the lower eligibility rate, meaning it is reasonable to assume that a greater

proportion of the non-interviewed sample would be ineligible and so should not be counted in the base. Micro establishments did however have lower cooperation rates, which may be indicative of the presence of non-response bias. Contact rates were similar across the extended survey universe and rest of the sample, suggesting the sample frames used were of comparable quality in terms of accuracy of contact details.

It was not possible to uncover more direct evidence of non-response bias via comparison with other surveys. However, the comparisons that were possible were very limited, specifically, the UK ESENER-2 micro establishment sample was compared to the Workplace Employment Relations Survey (WERS) on a small number of estimates, showing they gave similar results. There is also undoubtedly a high risk that non-response might be present given the overall ESENER-2 response rates.

The review also showed that the response rates of ESENER-2 were similar overall to the 3rd ECS, the closest survey to ESENER in terms of methodology and country coverage. Comparisons at a country level showed more marked differences, which might give pointers as to where response could be improved. This comparison also suggested that ESENER-2 contact (and hence response) rates might be improved slightly by making more substantial efforts to improve the quality of the contact information during fieldwork. The response maximisation procedures of the two surveys were also compared, including the number of calls to each case, use of advance and motivation letters, offering an alternative interview mode, and use of incentives. The conclusion of this comparison was that the ESENER-2 procedures were broadly appropriate but more could be made of the online mode.

Given the potential for non-response bias amongst micro establishments, if they are included in ESENER-3, we recommend consideration be given to one of three possible strategies that could bring modest benefits to counter it: (i) a more intensive use of the online interview mode as a refusal conversion strategy, (ii) collecting information in a separate screener interview for non-response investigation and potentially adjustment, or (iii) a non-response follow-up study.

1.2.4 Measurement

This workstream considered whether the survey questions were applicable to establishments, and the selected survey informants, in the extended survey universe. The work was completed via three main tasks: (i) a review of the ESENER-1 and -2 questionnaires and relevant background information, (ii) an initial assessment of capability based on ESENER-2 interview responses, and (iii) in-depth qualitative interviews with respondents from establishments within the expanded survey universe. The first two tasks were used primarily as a means to develop the topic guide used for the third task.

Taken together, the literature review suggested the potential for measurement issues in the following areas, which were the topic of further exploration in the qualitative interviews:

- The extent of knowledge and understanding of occupational safety and health (OSH) requirements
- The influence of such knowledge and understanding over responses to key ESENER-2 questions such as Q250 (on risk assessments) and Q155 (documentation detailing OSH responsibilities and procedures), and over responses to and understanding of questions related to regulation and enforcement such as Q165 (visit by the labour inspectorate)
- The extent to which response options to questions such as Q156 (presence or absence of a specific budget set each year for OSH measures and equipment) and Q358 (regularity of discussions of OSH issues in staff or team meetings) capture workplace realities
- The supply chain position of the enterprise and its relationship to survey responses

The interviews were conducted in Spain and Romania, each chosen to represent the Southern/Latin Europe and Central and Eastern Europe groups of EU Member States⁴. Representation was chosen from these groups to focus data collection in areas where OSH implementation levels would be expected

⁴ The EU Member States have been divided into five country clusters on the basis of commonality with respect to OSH regulation and provisions, labour relations systems, nature of their economies and social welfare policies. The other three clusters are Western Europe, Northern Europe and the United Kingdom and Ireland.

to be relatively low. This was the case since these are the groups in which process-based participatory OSH management regulatory systems have been in place for a relatively shorter period. Within each country, in-depth interviews were carried out with representatives of 20 establishments: 10 operating in the agriculture or forestry branches of NACE A; and 10 micro enterprises, with quotas set to capture a range of establishment types from each group.

Overall, the findings from this workstream suggested that establishments that take part in ESENER are likely to be those at the 'better end' of the spectrum, both in terms of their business sustainability and continuity generally, and specifically in relation to their workplace OSH practice and the priority they afford to OSH. In addition, the findings indicated that factors including establishment size, sector, and regulatory and business contexts may be associated with differences in the understanding and interpretation of the ESENER questions and constructs by those responding to the survey on their behalf. It was recommended that consideration be given to:

- The possible influence of the use of external service providers on both recruitment and responses to ESENER-3 (regardless of establishment size or sector)
- The inclusion of micro enterprises in ESENER-3

For the former, that:

1. It is made clear during all recruitment contacts that the respondent should work in the establishment (rather than being an external consultant); and that the ESENER-3 questions are ones that such a respondent will understand and be able to answer without recourse to any such consultant
2. The ESENER-3 questionnaire be developed to collect details about the use of external services in such a way that these data can be included in, and controlled for, during multi-variate analyses

In relation to the latter, if micro enterprises are to be included in future surveys:

1. The questionnaire is developed to collect details of the supply chain position of all establishments and the influences of their relationships within that chain on their OSH decisions and procedures
2. Some areas of the questionnaire (and/or its prompts to interviewers) are revised for clarity – for example, Q165 (visit by the labour inspectorate), Q258b and Q305 (employee involvement) and Q250 (risk assessment)
3. Consideration is given to including a qualitative element for a proportion of establishments (of all sizes, but with the emphasis on the smallest) that explores the relationships between, for example, reporting that risk assessments are and are not carried out, and the realities of workplace practice. The power of such an element would be substantially increased if it were further extended to include a brief interview with a worker as well as the owner/manager in each case.
4. Finally, more intensive efforts could be made to convert micro establishment refusals during or after the survey, to provide quantitative evidence on non-response bias and improve survey estimates where applicable, as recommended under the non-response investigation workstream.

1.2.5 Weighting

This workstream evaluated the ESENER-2 weighting approach. The survey used a weighting approach commonly used for this type of survey, involving adjusting the achieved sample size so that the distribution of establishments/employees in the cells by NACE sector and size categories perfectly matched the population estimates for establishments/employees. For the countries with sampling frames that listed enterprises, an adjustment was made first for the selection of the establishments. While this is sensible as an overarching strategy, there were two areas where the review team felt improvements could be made to the weighting.

The first of these is the recommendation to add a stage of weighting prior to the current ESENER-2 adjustment to take account of the original disproportionate sampling probabilities across the sampling cells. This is a standard approach used on many business surveys (e.g. Workplace Employment

Relations Survey 2011⁵). The reason this is a good idea on ESENER-2 is due to stratum jumpers (see above), which alter the profile of the sample. By applying selection weights based on the original sampling strata applied, the profile of the weighted issued sample (in terms of the original sampling strata) will be identical however it is selected. This will feed in to obtaining more consistent weighted achieved samples in terms of the original sampling strata; varying only due to disproportionate non-response. It would be necessary to trim the weights, given the presence of stratum jumpers means that cases in any given analysis cell will have a range of weights (i.e. the weight based on the cell they were sampled in).

The second area relates to the approach for selecting subsidiary establishments and the related weighting procedures. With the current procedures subsidiary establishments are under-represented and this cannot be corrected by the weighting without accepting very large weights and consequent loss of precision. As discussed in the sampling section, we therefore recommend selecting additional subsidiary establishments at multi-site organisations to reduce the size of the weights required to represent them in their correct proportions.

⁵ http://doc.ukdataservice.ac.uk/doc/7226/mrdoc/pdf/7226_the_design_and_administration_of_the_2011_wers_5_august_2013.pdf

2 Introduction

The European Agency for Safety and Health at Work (EU-OSHA) commissioned Ipsos, working in partnership with the Cardiff Work Environment Research Centre (CWERC), to undertake a detailed technical assessment of the second European Survey of Enterprises on New and Emerging Risks (ESENER-2). This report presents the findings and recommendations from the assessment.

2.1 Background to the technical assessment

ESENER is a large-scale establishment survey carried out by EU-OSHA at five-year intervals. To date two surveys have been conducted, in 2009 (ESENER-1) and 2014 (ESENER-2). The most recent survey covered a total of 36 European countries including the European Member States (EU28) plus Albania, Iceland, the Former Yugoslav Republic of Macedonia (FYROM), Montenegro, Norway, Serbia, Switzerland and Turkey. The survey provides key information on occupational safety and health that contributes to the formulation and implementation of policy which aims to improve the protection of European workers' health and safety.

A number of changes were made to the survey between its first and second iterations; changes which aimed to improve its quality and coverage in order to provide further value for the survey's users. Of particular relevance was the decision to expand the coverage of establishment sizes and sectors with the inclusion of:

1. micro establishments with 5-9 employees (in ESENER-1 the smallest establishments employed at least ten people), and
2. establishments in agriculture, forestry and fishing (NACE Rev. 2 Section A), meaning that establishments from almost all activity sectors (NACE Rev. 2 sections A to S) were covered by ESENER-2.
3. This expansion of the survey universe gave rise to a series of challenges, particularly related to the survey sample frames, which are potentially amplified given the multi-country scale of the survey.

2.2 Objectives

The main aims of this project were to provide a technical assessment of the expansion of the ESENER-2 survey with a view to making recommendations for future survey implementations. Specifically, it set out to do the following:

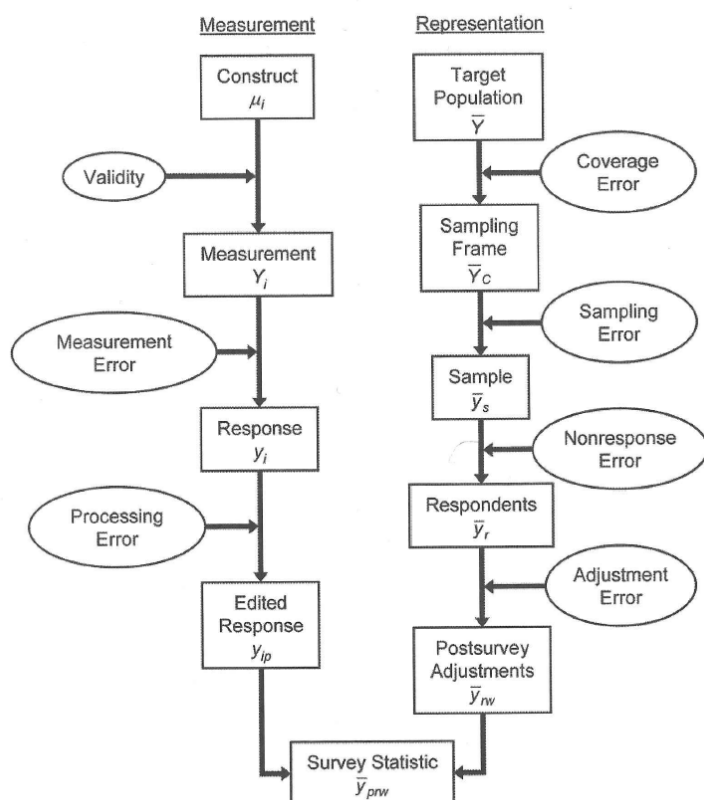
1. Assess the impact of expanding the survey universe to cover establishments both with 5-9 employees and establishments on NACE section A (agriculture, forestry and fishing);
2. Provide sound evidence to feed into decisions about the universe definition for future waves of the survey;
3. Make methodological recommendations with a view to minimising any negative effects of the ESENER-2 universe extension on survey quality;
4. Assess the survey's effectiveness in covering public sector establishments in (mainly) NACE sections P, O and Q;
5. Assess the survey methodology more generally with a view to making suggestions for methodological improvements.

3 Technical assessment

3.1 Analysis framework

This investigation was informed by the Total Survey Error (TSE) framework. The framework methodically identifies all possible errors which can arise at each stage of the survey process. It divides the survey process into two main strands, a 'representativeness' strand and a measurement strand. The relationship between survey process and error type is shown in Figure 1.

Figure 1: Total Survey Error framework



Error can be simply defined as the difference between the true value of a survey parameter for the population as a whole and the survey estimate of this value. Errors can take two forms: (i) variable error and (ii) fixed error. If (hypothetically) a survey were to be conducted a very large number of times, each implementation would deliver a different set of estimates from the others. Some of the discrepancy between the survey estimate and the true population value within a survey would be essentially random (and would average zero over all survey implementations) and some would be consistent, being measured as the difference between mean values for all implementations and the true population value. The first kind of error (random) is generally measured as estimate variance whilst the second (usually termed bias) is estimated as a simple value.

The investigation was structured into five workstreams covering the TSE error types considered particularly relevant to this work:

- **Non-coverage bias** – do the sample frames include all eligible cases? Do they over-represent certain types of case? Do they permit clear identification of establishments or enterprises?
- **Sampling error** (both variable error and bias) – does the sampling mechanism deliver unbiased samples of sufficient precision?
- **Non-response bias** – do survey responders and non-responders differ in important ways?

- **Measurement error** (both variable error and bias) – do survey questions collect data in the manner intended? Are appropriate survey informants selected to provide the information required? Is the CATI⁶ data collection methodology effective in collecting required data?
- **Adjustment error** – are weighting methods effective in reducing bias? Specifically, can we be confident that the population totals used to derive post-stratification weights are sufficiently accurate to render weighting effective in reducing bias?

The sections which follow each cover one of the error types identified, covering the following activities:

- Operationally defining the relevant error type;
- Providing an assessment of level of error (of relevant type) for ESENER-2, as a whole and taking account of inclusion of public sector establishments;
- An assessment of level of error (of relevant type) associated specifically with the extension of the survey universe to cover establishments containing 5-9 employees and establishments in NACE section A (agriculture, forestry and fishing);
- Presentation of conclusions and recommendations.

3.2 Assessment of non-coverage bias and other sample frame issues

The objectives of this workstream were: (i) to establish the extent to which the sample frames used in ESENER-2 were subject to non-coverage and related sample frame problems, (ii) to establish whether there were particular problems with non-coverage for establishments with 5-9 employees and establishments in NACE section A, and (iii) to establish whether any such problems might be reduced by changing sample frames.

3.2.1 ESENER-2 procedures: selection of sample frames

One of the features with a great influence on overall survey quality for cross-national establishment surveys is the availability of high quality sample frames with detailed information on the population of establishments. Conducting cross-national establishment surveys is extremely complex due to various factors of which several are related to the target population and sample frames⁷:

- **great heterogeneity of the universe:** In ESENER-2, the universe was expanded to cover micro establishments employing at least five people and establishments in agriculture, forestry and fishing (NACE Rev. 2 Section A).
- **definition of the statistical units:** business surveys can choose either establishments or companies as the sampling unit and unit of enquiry; the survey population of ESENER-2 is defined in terms of establishments. In a significant number of countries no high quality sample frame is available that covers establishments and such enterprise-establishment mismatches can lead to increased error levels in establishment surveys.
- **quality of the register/frames:** ESENER-2 covered 36 European countries – the European Member States (EU28) plus Albania, Iceland, the Former Yugoslav Republic of Macedonia (FYROM), Montenegro, Norway, Serbia, Switzerland and Turkey, and even though in each country the best available address register for the purpose of ESENER-2 was selected, questions remain as to the comparable quality of such registers.

An interrogation of the technical documentation of ESENER-2 and other relevant surveys shows that the same key considerations are made across surveys when **selecting the best available sample frame** in each country:

1. owner of the frame and accessibility for research purposes (registers vs. commercial frames),

⁶ Computer Assisted Telephone Interviewing

⁷ Rivière, P. (2002), *What Makes Business Statistics Special?*. International Statistical Review, 70: 145–159

2. data source (i.e. how the sample frame was compiled),
3. frequency of sample updates,
4. unit of enquiry (company vs. establishment),
5. sample frame coverage, and
6. quality of firmographic information and quality of contact details especially telephone numbers.

The ESENER-2 technical report lists, for each country, sampling difficulties encountered in the sample preparation phase or when working with the sample during the fieldwork period. The issues reported mainly focus on the last consideration mentioned above: quality of firmographic information. Issues of this type are easily detected, while sample frame coverage is a lot more difficult to assess. The main difficulty being that information about the total number of units listed in a frame does not provide any information about the quality of this information; for example, the units in the frame can be unevenly distributed across NACE sectors leading to an uneven coverage across sectors, or the frame can be outdated and contain a lot of units that no longer exist. Identifying coverage issues is also difficult due to the fact that, in many countries, there are very limited or no official statistics on the size of the universe of specific NACE sectors (A, O, P and Q) and on the size of the universe of establishments with 5 to 9 employees.

In the following sections, we present an overview of the main (and supplementary) sample frames used for ESENER-2, and compare these with sample frames used in the 3rd ECS. We also reviewed the recommendations on sampling frames formulated in the Feasibility study regarding methodology, design and mode of the European Company Survey (KANTAR Public, 2017) and we consulted with our network of local fieldwork agencies to ask their advice on frame assessments and recommendations for alternative sample frames. This comparison of sample frames, combined with the consultation, allowed us to assess whether there may be alternative sample frames with properties superior to those used in ESENER-2.

3.2.2 Assessment of main sample frames used in ESENER-2

Table 1 summarises the main sample frames used in ESENER-2 and the 3rd ECS. We selected the 3rd ECS for this comparison due to the similarities in target population and unit of enquiry (survey of establishments and coverage of NACE sectors P, O and Q). Unfortunately, the most important difference is that the 3rd ECS does not cover establishments with 5-9 employees, nor establishments in NACE section A. In ESENER-2, where primary sample frames poorly covered specific sectors, supplementary frames were resorted to – the use of supplementary frames is discussed in section 3.2.3.

Looking at the comparison of main sample frames provided in Table 1, the following observations (and suggestions for alternative frames) can be made:

- For 18 out of the 32 countries included in both surveys, the same ‘main’ sample frame was used in ESENER-2 and the 3rd ECS (for some of these countries, however, different supplementary frames were used – see section 3.2.3). For most of these countries, this sample frame is most likely to be the ‘best available’ frame – although there are some exceptions where a better frame is available (Austria, Italy and Finland – see Table 1 for more details).
- In the remaining countries, different sample frames were used in ESENER-2 and the 3rd ECS. An interrogation of the technical documentation of ESENER-2 and the 3rd ECS (incl. recommended sample frames to be used for 4th ECS), and a consultation with our network of local fieldwork agencies, led to the conclusion that for some of these countries an alternative frame to the one used in ESENER-2 should be considered (see the ‘Notes’ in Table 1 for more details).
- Of the 36 countries included in ESENER-2, the samples for 14 were selected from sample frames that list establishments; for the remaining 22 the sample frames listed enterprises/organisations. Taking into account that enterprise-establishment mismatches can lead to increased error levels in establishment surveys, and the poor performance on ESENER-2 when it came to including additional establishments from multi-establishment organisations selected from enterprise-level frames, sample frames that list establishments are the preferred

type of sample frame. However, for one of the 22 countries using sample frames listing enterprises/organisations, an alternative frame that list establishments could be found: Belgium – see Table 1 for more details.

- In a few countries, an interrogation of the technical documentation of ESENER-2 (and of the 3rd ECS, if the country was covered by the survey) shows that some coverage and sampling issues were encountered with the frame used, however, no alternative sample frame with properties superior to that used in ESENER-2 could be found. This was the case, for example, in Cyprus, where no alternative could be found for the Statistical Business Register.
- Table 1 shows that in a small number of countries, multiple 'primary' sampling frames were used in ESENER-2 (Albania, Bulgaria, Iceland, Montenegro, the Netherlands and Switzerland). Dual (and multiple) frame sampling can potentially lead to issues with duplicate entries. Duplicate entries can result where two or more sample frames are used and duplicates are not detected and removed when the sampling frames are combined. In Section 3.2.5, bias resulting from the presence of duplicate entries is discussed, but it appears that most issues detected arise from more complex frame-population mismatches rather than from combining multiple frames.

Table 1: Comparison of sample frames used in ESENER-2 and the 3rd ECS

Note: recommended sampling frame(s) for each country shown in bold.

Country	Sample source used for ESENER-2 (2014; TNS)	Sample source used for 3 rd ECS (2013; Gallup)	Alternative sample frames
Albania	Daxy Market, Dun & Bradstreet (company)	Not covered	National registry centre (company)
<i>Note: The technical report of ESENER-2 lists several sampling frame issues (82% of used addresses were without size classification; low number of contacts available from Dun & Bradstreet). As such, accessing a sample from the national registry centre might be a better alternative. Access to the National registry centre is only possible for official institutions, but Ipsos followed this procedure for a business survey commissioned by the World Bank (Albania STEP Skills Measurement Employer Survey - January 2017). There are also issues with the Registry (e.g. not updated regularly and some contact details are missing), but there appear to be fewer than with the alternative frames.</i>			
Austria	Compass (company)	Dun & Bradstreet (establishment)	HEROLD (establishment)
<i>Note: Herold should be considered as alternative frame: (1) Compass does not systematically cover establishments; (2) although D&B covers establishments, the final achieved sample of the 3rd ECS contained only a very low share of subsidiaries. HEROLD Business Data systematically covers establishments; moreover, both in ESENER-2 and in the 3rd ECS, Herold was used as additional sampling source for NACE sectors O, P and Q.</i>			
Belgium	Belfirst (company)	Infobel (establishment)	Graydon (establishment)
<i>Note: Infobel and Graydon are two alternative frames that could lead to a higher sample quality than Belfirst; the reason for this is that Infobel and Graydon systematically covers establishments, while this is not the case for Belfirst (which requires screening for establishments). Graydon and Infobel are very similar in terms of data source (i.e. how the sampling frame is compiled), frequency of updates, coverage and quality of firmographic information etc.</i>			

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Country	Sample source used for ESENER-2 (2014; TNS)	Sample source used for 3rd ECS (2013; Gallup)	Alternative sample frames
Bulgaria	ICAP; Daxy Market; TNS BBSS (company)	Company register of Bulgarian National Statistical Institute (company)	APIS Register (company)
<i>Note: APIS Register can be considered as alternative frame: (1) the sampling frames used for ESENER-2 did not contain 'young' establishments, (2) requesting a sample via the company register is time consuming. Our initial (qualitative) assessment of APIS Register suggests this is a suitable frame for business surveys. Apis combines information from different registers, such as BULSTAT register, tax register, register of social insurance contributors etc. (The data from BULSTAT are updated once a week, the data from the tax register and the other national registers are updated on a monthly basis).</i>			
Croatia	Bisnode d.o.o. (company)	FINA Financial Agency (company)	
<i>Note: The technical report of ESENER-2 reports that information on number of employees was outdated on Bisnode. Both sampling frames offer good coverage.</i>			
Cyprus	Central Statoffice: Statistical Business Registry (company)		
<i>Recent editions of the Statistical Business Registry no longer contain phone numbers as part of the contact detail information. However, no 'better' frame could be identified. Note: This frame was also used by Ipsos for Business Environment and Enterprise Performance Survey (BEEPS, 2014-15).</i>			
Czech Republic	Albertina (company)		
<i>No alternative frames identified</i>			
Denmark	Experience (KOB) (establishment)	Soliditet (a Bisnode company) (establishment)	Bisnode (former NN Markedsdata and other frames) (establishment)
<i>Note: In Denmark, multiple sample frames of similar quality are available, and these frames use the same sources and receive daily information from a variety of providers – public as well as private (company information: e.g. Erhvervsstyrelsen/Danish Business Authority and Danmarks Statistik/Statistics Denmark).</i>			
Estonia	Business Register of Statistics EE (company)	Kreddiinfo (company)	
<i>Note: In ESENER-2, the Business Register of Statistics EE was evaluated positively in terms of up-dateness, number of inoperative telephone numbers, and sector and size switches; as such, there is no need to consider an alternative frame.</i>			
Finland	Fonecta (establishment)	Bisnode (establishment)	
<i>Note: according to the Feasibility study regarding methodology, design and mode of the European Company Survey (KANTAR Public, 2017), there have recently been quality issues</i>			

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Country	Sample source used for ESENER-2 (2014; TNS)	Sample source used for 3rd ECS (2013; Gallup)	Alternative sample frames
	<i>with Fonecta. Our local network partner was not able to confirm this due to having limited experience with using Fonecta.</i>		
France	Cegedim (establishment)	LBM Direct (establishment)	
	<i>Note: In the ESENER-2 documentation, no issues are reported for Cegedim as sampling frame. Cegedim is based on La base Sirene from Insee, and there is no need to consider an alternative frame.</i>		
Germany	Heins & Partner (establishment)	Dun & Bradstreet (establishment)	
	<i>Note: Heins & Partner has a better coverage at establishment level (the share of subsidiaries was 25% in ESENER-2 for establishments with 10+ employees, compared to 5% in the 3rd ECS).</i>		
Greece	ICAP Database (company)		
	<i>No alternative frames identified</i>		
Hungary	KSH (Central Statistical Office) (company)		
	<i>No alternative frames identified</i>		
Iceland	National Registry (Icelandic Register of Companies) and Credit Info (company)	Icelandic Register of Companies (company)	
	<i>Note: Combining the Icelandic Register of Companies and Credit Info offers more complete and up-to-date coverage.</i>		
Ireland	Bill Moss (establishment)		
	<i>No alternative frames identified</i>		
Italy	Dun & Bradstreet (establishment)	Consodata (establishment)⁸	
	<i>Note: A few years ago, Dun & Bradstreet stopped operating directly in Italy. In the 3rd ECS, Consodata was used as additional sampling source for NACE sectors O, P and Q. Consodata offers good coverage and can be considered as an alternative to Dun & Bradstreet. Consodata accesses data directly from the Chamber of Commerce – i.e. where each business is registered - and updates its own database on a monthly basis and several sources are used to keep the database updated. Based on our initial assessment, Consodata will also have less issues than B&B with reaching subsidiaries (without screening).</i>		
Latvia	Business Register of CSB (StatOffice) (company)	Lursoft	

⁸ Archivio ASIA from the National Statistical Institute (ISTAT) was also considered as an alternative sampling frame; however, access to this frame seems to be limited to ISTAT. Moreover, the frame contains limited contact details for the listed entries (e.g. no telephone numbers).

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Country	Sample source used for ESENER-2 (2014; TNS)	Sample source used for 3rd ECS (2013; Gallup)	Alternative sample frames
<i>Note: The Business Register would be the best available sampling frame. Lursoft is a commercial provider that brings together all info from the Register, and as such, access to this frame tends to be easier and faster.</i>			
Lithuania	JSC Creditinfo Lietuva (company)		
<i>No alternative frames identified</i>			
Luxembourg	Editus (Yellow Pages provider) (establishment)		
<i>No alternative frames identified</i>			
FYROM	Central Register of companies in FYROM (company)		
<i>No alternative frames identified</i>			
Malta	National Statistics Office (NSO) (company)	Employment & Training Corporation (company)	
<i>Note: the registers used for ESENER-2 and the 3rd ECS are no longer accessible.⁹ No alternative frame was identified, and it will be necessary for future surveys to use an internal database of the survey agency.</i>			
Montenegro	Central Business Register CRPS; Daxy Market BG (company)	Stat. Office/Central Reg. of Commercial Court MNE (company)	Business Intelligence Consulting d.o.o. (BInfo.me)
<i>Note: the Commercial Court does not longer update the Central Registry, and registration is taken over by the Central Business Register. A sample from the Central Business Register would need to be requested by an official institution. If this option is not possible, Business Intelligence Consulting d.o.o. (BInfo.me) could be used as an alternative frame (private entity that collects data from the Central Court Register and Tax Administration, and merges this with other sources).</i>			
Netherlands	Chamber of Commerce + LISA (establishment)	Chamber of Commerce (establishment)	
<i>Note: the Chamber of Commerce is a suitable sampling frame, but a combination with LISA database is needed when also covering NACE sector O, P and Q.</i>			
Norway	Bisnode Matchit (company)	Not covered	
<i>No alternative frames identified</i>			
Poland	Polskie Firmy (establishment)	PCM (Polskie Centrum Marketingowa) (establishment)	Bisnode (establishment)

⁹ The Chamber of Commerce was considered as alternative provider, but it only appears to hold a register of its members (and as such would only offer limited coverage of the target population of ESENER).

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Country	Sample source used for ESENER-2 (2014; TNS)	Sample source used for 3rd ECS (2013; Gallup)	Alternative sample frames
<i>Note: according to the sampling report of the 3rd ECS, coverage of PCM was below 60%, while the technical report of ESENER-2 refers to low coverage of small establishments in Polskie Firmy. Bisnode has a better overall coverage than Polskie Firmy and PCM; it also offers a fairly good coverage of NACE sectors O, P and Q.</i>			
Portugal	Informa Dun & Bradstreet (company)		
	No alternative frames identified		
Romania	Business Register of CSB (StatOffice) (company)	Listafirme (company)	
	<i>Note: the Business Register of CSB is updated only every 2 to 3 years, leading to an undercoverage of “young” establishments). Listafirme, on the other hand, is continuously updated and offers good coverage.</i>		
Serbia	Serbian Business Register Agency (company)	Not covered	
	No alternative frames identified		
Slovakia	Albertina and Registry of StatOffice (synthesis) (company)	Albertina (company)	
	<i>Note: the technical report of ESENER-2 refers to a high share of invalid numbers in the frame for Slovakia; however, the number of invalid numbers was lower in the 3rd ECS (that only relied on Albertina) than in ESENER-2 (that combined two frames); this is an unexpected result. A potential reason for this difference might be that in the 3rd ECS a more recently updated version of Albertina was used.</i>		
Slovenia	iPis (company)¹⁰		
	No alternative frames identified		
Spain	Data Centric (Schober) (establishment)		
	No alternative frames identified		
Sweden	PARAD database of Bisnode (establishment)		
	No alternative frames identified		
Switzerland	AZ Direct and BUR (establishment)	Not covered	
	No alternative frames identified		

¹⁰ The technical report of 3rd ECS reports that the iPis is an establishment-level frame; however, this appears not to be the case. In Table 2.1, we classified iPis as an enterprise-level frame.

Country	Sample source used for ESENER-2 (2014; TNS)	Sample source used for 3rd ECS (2013; Gallup)	Alternative sample frames
Turkey	TOBB; Chambers of Commerce; others (company)	Dun & Bradstreet (company)	TURKSTAT Business Data base (company)
<i>Note: The ESENER-2 technical report describes various issues with the sampling for Turkey; as such, it will be worth evaluating alternative sampling frames. The Business Data base of TUKSTAT is the most up-to-date frame available. Based on our assessment, the frame is better than D&B, but the quality is below that of the frames in many other countries. For example, only about half of the entries on the frame have an up-to-date phone number (and the other numbers will need to be added/looked up by the local team).</i>			
United Kingdom	Dun & Bradstreet (establishment)	Experian NBD (establishment)	
<i>Note: Coverage of establishments is poorer in D&B which lists 1.6 million local units whereas Experian lists around 1.9 million. Experian database has fairly similar coverage to the government database IDBR in terms of number, size and geographical distribution of local units.</i>			

3.2.3 Assessment of supplementary sample frames used in ESENER-2

The ESENER-2 technical report highlights that in a number of countries primary sample frames poorly covered specific sectors, and lists the additional sources that were used to supplement the main frames:

- **Coverage of NACE sector A:** Albania (Yellow Pages), Cyprus (Yellow Pages), FYROM (Yellow Pages), Romania (Yellow Pages).
- **Coverage of NACE sector P, O and Q:** Albania (Yellow Pages), Austria (Herald), Bulgaria (Yellow Pages), Greece (Yellow Pages), Croatia (website of Ministry of Public Administration and CBS), Hungary (Yellow Pages and government websites), Cyprus (Yellow Pages), Estonia (register of constitutional institutions, local governments etc.), Italy (Yellow Pages), Luxembourg (Yellow Pages), Montenegro (Yellow Pages), FYROM (Yellow Pages), Romania (Yellow Pages), Serbia (Yellow Pages and official government websites), Turkey (list of Ministry of Education, official registers and websites).

In only four countries, supplementary sampling frames were needed to extend the survey universe to include establishments in agriculture, forestry and fishing (NACE Rev. 2 Section A). No countries required supplementary sampling frames to cover micro establishments with 5-9 employees. A review of the additional sources used in ESENER-2 vs. the 3rd ECS for guaranteeing better coverage of the NACE sector O, P and Q suggests that ESENER-2 had a larger focus on the Yellow Pages as an additional source, while the 3rd ECS made additional use of various internet pages of public institutions; moreover, for two countries (Austria and Italy), an additional commercial frame was used to cover these sectors.

3.2.4 Comparison of size of ESENER-2 sample frame populations with external data by applicable size and sector

A common way to assess sample frame coverage is to compare the size of the sample frame population (i.e. the number of frame units for the defined survey universe) with external data on the size of the target population. This type of comparison, however, will provide only very limited information about the actual frame coverage. As noted in the previous section, information about the total number of units listed in a frame does not provide any information about the quality of this information; for example:

- The units in the frame can be unevenly distributed across NACE sectors leading to an uneven coverage across sectors; this is especially relevant in the context of ESENER and our efforts to specifically look at problems with non-coverage for establishments in NACE section A (and NACE section P, O and Q).
- The frame can be outdated and contain a lot of units that no longer exist. Additionally, if a frame does not regularly update the information on the number of employees for the listed units, units that decreased in size and fall under the threshold of 5+ employees are wrongly counted when assessing the size of the sample frame population. Both factors would lead to an overestimation of frame coverage.

A more reliable way to assess sample frame coverage is to compare the size of the sample frame population in each stratification cell (current design for ESENER-2: seven categories for NACE sectors by four categories in terms of number of employees) with external data on the size of the target population in that specific stratification cell. This type of more detailed comparison, however, is also difficult for two reasons:

- Reference statistics for a large number of countries do not cover all NACE sectors¹¹, and those that do exist tend to list enterprises rather than establishments, and the lack of reliable statistics for specific sectors raises the necessity to calculate best estimates. When estimates are calculated, it is inevitable that assessments of non-coverage will not be quantitatively precise and involve an element of expert professional judgement.
- Detailed information on the sampling frames is not always available, and requests to provide this type of information do not always lead to a satisfactory response. The technical report of ESENER-2 does not contain detailed numbers on the size of the sample frame populations that would allow for a comparison, by applicable size and sector, of the size of ESENER-2 sample frames with external reference statistics. In fact, for some frames, even the information on the total number of addresses with 5+ employees is not available.

Due to the difficulties described above, our technical assessment of non-coverage issues in ESENER-2 is not quantitatively precise and involves an element of expert professional judgement. For each country, the 'best available' sample frame was identified, and in some countries, an alternative sample frame with properties superior to that used in ESENER-2 should be considered. Using these alternative frames will help to reduce coverage bias, but given that conducting cross-national establishment surveys is extremely complex, coverage errors cannot be fully avoided. We recommend that the ESENER-3 contractor initiates conversations with the sample frame providers to collect more detailed information, by applicable size and sector, of the size of the sample frames selected for ESENER-3. Collecting this type of information will be important to detect 'quantitative' evidence of non-coverage bias in the samples of ESENER-3.

It was mentioned above that one of the reasons why it is difficult to assess the coverage of a sample frame is linked to the need to first evaluate the quality of the information on all units on the frame. In the next chapter of this report, we present diagnostic analysis, based on the sample outcome records, on the extent of two issues: the accuracy of telephone contact details and extent of over-coverage (ineligible records). We will highlight any areas (countries, establishment types) of unusually high ineligibility where survey efficiency may have been affected, to feed into the review of potential alternative sample frames.

3.2.5 Procedures used to deal with duplicates

At ESENER-2 there were duplicate entries on the sample frames which were identified for 0.5% of the issued sample. The presence of duplicate entries can deliver estimate bias because the sample selection probability of a frame element is proportional to the number of times it appears on the sample frame. Duplicate entries can result where two sample frames are used and duplicates are not detected

¹¹ The Structural Business Statistics for many countries only cover enterprises in the 'business economy' (NACE Rev. 2 Sections B to N and Division 95). The Farm structure statistics are based on the Agricultural Census of 2010.

and removed when they are combined, or due to more complex frame-population mismatches, for example an establishment may be identified by more than one head office site.

While 0.5% appears a low number, these are confirmed duplicates, where in addition to the business appearing on the sample frame more than once, it was then sampled more than once and was subsequently successfully contacted for interview (so that the duplication could be 'discovered'). The level of duplication on the sample frame implied by this outcome is much higher, of about 7% of the cases on the initial sample frame. This problem was also much worse for some countries than the average, the level of duplicate identification from the issued sample was 2.3% for Romania, 2.8% for Luxembourg and 3.7% for Malta. This implies a level of frame duplication of around 19% for Malta. We note that the problem does not appear to be related to the level of sample frame used: across these three countries both types were used (Romania: enterprise, Luxembourg: establishment, Malta: enterprise).

Importantly however, in the context of this review, this issue did not affect the ESENER-2 extended survey universe disproportionately, as the level of duplicates is similar to the average for these cases (0.4% of Micro establishments in the issued sample, and 0.3% of NACE A establishments, were identified as duplicates during fieldwork).

The bias resulting from the presence of duplicate entries can be dealt with in one of two ways: (i) either remove all duplicates from the frame *before* the sample is selected or (ii) apply corrective weights after selection. The current practice on ESENER involves making attempts at the interview stage to avoid interviewing the same firm more than once, presumably relying on employees at the contacted firms to report this to the field team. The first interview where such an identification occurs is retained in the data. This strategy is fine, as removing the first interview would not make any difference to the sample. This is because removing duplicates from a sample *after* it has been selected will not correct the relevant sampling bias, as most duplicate frame entries appear once only in the *sample* but in larger numbers than they would in an unbiased sample (given the odds of selecting both firms in a pair of duplicates are much lower than selecting just one, even though each of those in a pair have double the chance of selection to non-duplicate cases).

Practically, however, dealing with duplicates is extremely difficult, and it is not clear that this could be resolved in any meaningful way. To deal with it, we suggest a multi-pronged approach. First, using the information from the previous survey, the ESENER-3 contractor could initiate conversations with the sample frame providers about the presence of duplicates (and provide estimates as to the extent of this, where the same frames are used) and ask that they make more efforts to remove them before sampling. In practice we expect this would be very difficult to do, and so may not yield much in the way of benefit, but something could be learnt from their responses. Second, sample frame providers could be asked to attempt to identify the number of times a case appears on the frame *after* sample selection and the fieldwork has taken place. Criteria would need to be specified for doing this e.g. based on a match on address, partial match on name, etc. The idea here is that this should involve a lot less work for the frame providers than the first option, and so may be an approach they would be more willing to look at. Having obtained estimates of the number of times each interviewed unit is listed on the frames this could then be used to apply corrective weighting to these cases. We suggest that this sort of action would be worth considering in the countries identified during the survey to have particularly high levels of duplicates, rather than across the board, so that the efforts are focused only in the more problematic areas.

3.2.6 Conclusions and recommendations

The comparison of the main (and supplementary) sample frames used for ESENER-2 and the 3rd ECS, combined with an interrogation of the technical documentation on sampling difficulties encountered in both surveys and a consultation with our network of local fieldwork agencies on frame assessments and recommendations for alternative sample frames, lead to the conclusion that in a number of countries, a sampling frame with properties superior to the frame used in ESENER-2 should be considered for ESENER-3. Using these alternative frames will help to reduce coverage bias in ESENER-3, but given that conducting cross-national establishment surveys is extremely complex, coverage errors cannot be fully avoided. For that reason, it will be important that detailed information, by applicable size and sector,

of the size of the sample frames is collected during the kick-off phase of ESENER-3, and is included in the technical documentation for the study.

In ESENER-2, no countries required supplementary sampling frames to cover micro establishments with 5-9 employees and only four countries needed supplementary sampling frames to extend the survey universe to include establishments in agriculture, forestry and fishing (NACE Rev. 2 Section A). However, to guarantee sufficient coverage of the NACE sector O, P and Q, it will be important to continue using additional sources to supplement the main frames. For ESENER-3, in addition to the yellow pages as an additional source, internet pages of public institutions can be consulted (as was done for the 3rd ECS). By switching sampling frame in Austria (from Compass to Herold) and Italy (from Dun and Bradstreet to Consodata), coverage of NACE sector O, P and Q can be improved without the need for additional sampling sources.

3.3 Assessment of sampling error and sampling procedures

The objectives of this workstream were (i) to assess whether the overall sampling procedures followed in ESENER-2 were likely to have inadvertently generated errors in survey estimates, (ii) to assess whether any such errors may have been especially pronounced for establishments with 5-9 employees and establishments in NACE section A and (iii) if appropriate, to develop recommendations for improvements to sampling procedures.

Additionally, as part of this work, we considered and proposed sample designs that place more emphasis on establishment-level estimates than is currently the case, given they are of greater importance and value to users of the survey data than the employee-level estimates.

3.3.1 Assessment of ESENER-2 procedures: optimising sample design

▪ NACE Section A

In terms of the sampling design, the sample issued in the NACE A stratum performed as well as the samples in the other sector strata for most countries. Table 2 shows the achieved sample sizes and corresponding yield rates for all cases issued¹² in the NACE A stratum. The first column shows the issued sample size in each country in the NACE A stratum minus the sample where fieldwork efforts were halted because the stratification cell was full (response code 21¹³). The second column shows the number of interviews achieved with establishments that reported they were in NACE A during the interview; the third column the number of interviews with establishments that were sampled in the NACE A sampling stratum (i.e. the sample frame classified them as NACE A) but reported being in a different NACE section. From these, we calculated the yield rate for NACE A (the percentage of NACE A interviews achieved in the NACE A stratum from all issued in this stratum) and the overall yield rate from the NACE A stratum (the percentage of all interviews regardless of sector achieved in the NACE A stratum). The final column shows the yield rates for the other non-public sector NACE sampling strata for comparison.

The overall yield rate for the NACE A stratum is very similar to that of the other non-public sector NACE strata: 15.3% compared with 16.9%, and the correlation across the countries of the two rates was fairly high ($r = 0.55$). This suggests that the sample frames were, overall, as efficient for sampling NACE A establishments as they were for establishments in other sectors. There are a few countries which have a low yield rate for NACE A, but a relatively high yield rate for the other strata: Malta, FYROM and the Netherlands had yield rates between 9% and 11% for NACE A, but 20% to 38% for the other non-public sector strata. Therefore, arguably in these countries it would be worth using an alternative sample frame to sample NACE A establishments more efficiently. However, in all these countries it has been possible to identify one main source of sample frame only, therefore such efforts would need to rely on additional

¹² The issued sample refers to the total volume of cases sampled and dialled in the fieldwork for ESENER-2. Source: ESENER-2 gross data (survey para-data file)

¹³ Note: we have taken these cases out of this analysis as they have the potential to distort the findings, given that the practice of closing stratification cells was widely used across the sample – see later in this section.

sources such as the Yellow Pages (which was done for FYROM). Otherwise, the yield rate for the NACE A stratum was within 10 percentage points of the other non-public sector strata, and/or was greater than 15%.

Table 2: Interviews achieved in the NACE A stratum

Country	Issued: Sector A	Interviews: Sector A	Interviews: Other Sector	Yield Rate: Sector A estabs	Yield Rate: Sector A stratum	Yield Rate: Other strata
AL	43	11	2	25.6%	30.2%	32.0%
AT	104	11	1	10.6%	11.5%	20.5%
BE	85	9	3	10.6%	14.1%	25.3%
BG	99	21	1	21.2%	22.2%	24.0%
CH	31	4	3	12.9%	22.6%	17.5%
CY	67	11	1	16.4%	17.9%	10.9%
CZ	245	39	1	15.9%	16.3%	9.7%
DE	335	26	2	7.8%	8.4%	9.4%
DK	211	38	1	18.0%	18.5%	34.5%
EE	42	20	0	47.6%	47.6%	47.9%
EL	45	20	0	44.4%	44.4%	41.1%
ES	975	108	18	11.1%	12.9%	12.9%
FI	84	24	1	28.6%	29.8%	37.6%
FR	170	21	0	12.4%	12.4%	20.7%
HR	87	17	2	19.5%	21.8%	30.7%
HU	354	36	4	10.2%	11.3%	8.8%
IE	48	7	2	14.6%	18.8%	15.7%
IS	134	29	1	21.6%	22.4%	30.8%
IT	204	28	3	13.7%	15.2%	16.5%
LT	22	11	0	50.0%	50.0%	30.3%
LU	5	3	0	60.0%	60.0%	25.3%
LV	38	22	0	57.9%	57.9%	30.6%
ME	25	2	1	8.0%	12.0%	9.8%

Country	Issued: Sector A	Interviews: Sector A	Interviews: Other Sector	Yield Rate: Sector A estabs	Yield Rate: Sector A stratum	Yield Rate: Other strata
MK	149	15	1	10.1%	10.7%	34.4%
MT	47	3	1	6.4%	8.5%	38.5%
NL	220	20	1	9.1%	9.5%	20.4%
NO	142	11	4	7.7%	10.6%	13.3%
PL	792	45	9	5.7%	6.8%	6.2%
PT	78	22	3	28.2%	32.1%	42.7%
RO	190	29	2	15.3%	16.3%	11.5%
RS	0	0	0	n/a	n/a	32.6%
SE	85	14	1	16.5%	17.6%	21.5%
SI	100	27	1	27.0%	28.0%	48.4%
SK	163	22	1	13.5%	14.1%	11.2%
TR	106	12	3	11.3%	14.2%	13.1%
UK	1562	188	81	12.0%	17.2%	30.4%
ALL	7087	926	155	13.1%	15.3%	16.9%

Establishments in NACE A were added as part of ESENER-2 to widen the coverage of the survey, importantly given the specific risks and hazards of the sector and that establishments operating within it remain a significant employer in several countries. To assess the impact, we compared the estimates for each country with and without the establishments in NACE A included. This was done using 53 variables in the survey dataset (these variables covered the questions EU-OSHA considers to be most important to stakeholders - see Appendix A for a list of the corresponding survey questions). As well as giving a measure of the change on the estimates from covering NACE A in the survey, it was also gives an indicator of the size of the difference from the previous wave of the survey that would have resulted from including NACE A.

Table 3 shows the percentage of interviews in each country that were with an establishment in NACE A and compares that against the percentages based on the population estimates for establishments and employees (the first four columns). The sample proportion of NACE A is low (less than 5%) in every country, given the sample design accurately reflects its fairly low prevalence amongst both establishments and employees. The impact of including NACE A establishments had minimal impact on average – just 0.4 percentage points across all questions and countries. The largest difference across all questions and countries was 2.5 percentage points. As would be expected, the larger differences are observed where NACE A has a higher national prevalence – the correlation across the countries between the NACE A establishment prevalence and the value of the largest national difference is 0.8. While, of course, had larger differences between NACE A and other sectors been observed, that would not prove that there were quality issues with the sample. Rather, this may have reflected genuine differences in OSH management practices in this sector. However, this analysis does give confidence

that the inclusion of NACE A has not distorted the sample, and hence is helpful given the terms of this review.

Table 3: Prevalence of the NACE A sample and impact on estimates

Country code	Sector A / All Interviews ¹⁴	% Interviews: NACE A	% Population Establishments	% Population Employees	Maximum impact across items	Average Impact
AL	12 / 750	1.6%	0.8%	0.5%	0.49	0.14
AT	13 / 1503	0.9%	1.4%	0.6%	0.67	0.17
BE	11 / 1504	0.7%	0.9%	0.4%	0.36	0.12
BG	22 / 750	2.9%	3.9%	2.5%	2.51	0.70
CH	6 / 1511	0.4%	3.0%	1.0%	2.08	0.53
CY	11 / 751	1.5%	2.2%	1.0%	0.91	0.36
CZ	44 / 1508	2.9%	3.3%	2.5%	1.65	0.37
DE	26 / 2261	1.1%	1.4%	0.8%	0.83	0.18
DK	40 / 1508	2.7%	3.6%	1.3%	1.71	0.48
EE	21 / 750	2.8%	3.4%	2.0%	1.46	0.44
EL	20 / 1503	1.3%	1.0%	0.6%	0.36	0.11
ES	119 / 3162	3.8%	5.4%	2.8%	2.23	0.52
FI	25 / 1511	1.7%	1.8%	0.8%	0.74	0.21
FR	22 / 2256	1.0%	1.3%	0.8%	0.54	0.16
HR	18 / 751	2.4%	2.0%	1.7%	0.92	0.29
HU	52 / 1514	3.4%	3.2%	2.7%	1.35	0.36
IE	8 / 750	1.1%	0.9%	0.6%	0.44	0.18
IS	30 / 757	4.0%	4.0%	2.4%	1.87	0.50
IT	34 / 2254	1.5%	0.4%	0.3%	0.25	0.06
LT	12 / 774	1.6%	2.4%	2.1%	1.29	0.35
LU	4 / 752	0.5%	0.2%	0.1%	0.09	0.03

¹⁴ Note: the NACE A figures in this column include all interviews where the respondent reported that their establishment belonged in NACE A, whereas the previous table reports on those that were also sampled from the NACE A stratum, therefore the table figures are often different.

Country code	Sector A / All Interviews ¹⁴	% Interviews: NACE A	% Population Establishments	% Population Employees	Maximum impact across items	Average Impact
LV	24 / 753	3.2%	3.3%	2.2%	0.99	0.34
ME	9 / 452	2.0%	2.1%	1.2%	1.32	0.30
MK	16 / 750	2.1%	2.1%	1.5%	1.54	0.33
MT	3 / 452	0.7%	0.5%	0.3%	0.34	0.11
NL	22 / 1519	1.4%	2.4%	0.9%	0.88	0.32
NO	13 / 1513	0.9%	1.6%	1.0%	0.96	0.28
PL	50 / 2257	2.2%	2.6%	1.5%	0.96	0.25
PT	24 / 1513	1.6%	2.3%	1.2%	0.79	0.24
RO	31 / 756	4.1%	3.3%	1.9%	1.85	0.30
RS	8 / 752	1.1%	2.4%	1.8%	1.43	0.42
SE	14 / 1521	0.9%	1.6%	0.6%	0.82	0.24
SI	27 / 1051	2.6%	0.7%	0.5%	0.30	0.08
SK	22 / 750	2.9%	3.3%	3.1%	2.21	0.39
TR	65 / 2251	2.9%	6.5%	3.0%	2.13	0.50
UK	189 / 4250	4.4%	2.1%	0.8%	1.62	0.45
ALL	1067 / 49320	2.2%	2.4%	1.3%	2.51	0.36

▪ Establishments with 5 to 9 Employees

Table 4 shows the equivalent table for establishments with 5 to 9 employees to the one produced above for NACE A (Table 3). This table highlights the very low yield rates (percentage of addresses issued in the 5 to 9 employees stratum that yielded an interview with an establishment with 5 to 9 employees) for some of the countries. Sixteen countries had a yield rate of less than 10%, with Cyprus and Poland having yield rates of about 2%, meaning that on average about 50 cases had to be issued in the smallest size stratum to obtain each interview with an establishment with 5 to 9 employees. Further analysis is provided on the reasons for this when we look at eligibility, response and cooperation rates in section 3.4.

Table 4: Interviews achieved in the 5-9 employees stratum

Country code	Issued: 5-9 empl	Achieved: 5-9 empl	Achieved: > 10 empl	Yield Rate: 5-9 empl	Yield rate: 5-9 empl stratum	Yield rate: Other strata
AL	102	21	12	20.6%	32.4%	32.9%
AT	3066	363	88	11.8%	14.7%	28.6%
BE	1248	169	89	13.5%	20.7%	30.8%
BG	1046	129	50	12.3%	17.1%	28.5%
CH	4716	309	158	6.6%	9.9%	26.7%
CY	3653	68	30	1.9%	2.7%	21.9%
CZ	3828	202	55	5.3%	6.7%	13.1%
DE	10181	387	235	3.8%	6.1%	13.8%
DK	2004	304	171	15.2%	23.7%	46.8%
EE	507	156	27	30.8%	36.1%	56.3%
EL	1521	396	150	26.0%	35.9%	45.5%
ES	9851	731	367	7.4%	11.1%	14.3%
FI	1505	280	72	18.6%	23.4%	52.1%
FR	3284	458	156	13.9%	18.7%	25.7%
HR	891	153	32	17.2%	20.8%	37.3%
HU	5857	265	126	4.5%	6.7%	10.9%
IE	1535	116	50	7.6%	10.8%	21.1%
IS	957	148	44	15.5%	20.1%	40.8%
IT	5378	490	105	9.1%	11.1%	23.4%
LT	777	146	48	18.8%	25.0%	36.6%
LU	769	134	42	17.4%	22.9%	28.0%
LV	820	153	37	18.7%	23.2%	43.0%
ME	438	22	22	5.0%	10.0%	10.7%
MK	442	88	17	19.9%	23.8%	38.8%
MT	312	18	26	5.8%	14.1%	45.1%

Country code	Issued: 5-9 empl	Achieved: 5-9 empl	Achieved: > 10 empl	Yield Rate: 5-9 empl	Yield rate: 5-9 empl stratum	Yield rate: Other strata
NL	3452	313	160	9.1%	13.7%	26.0%
NO	1778	84	43	4.7%	7.1%	18.7%
PL	19351	388	374	2.0%	3.9%	13.2%
PT	1424	391	92	27.5%	33.9%	50.1%
RO	2209	132	53	6.0%	8.4%	13.8%
RS	881	165	47	18.7%	24.1%	39.0%
SE	1473	188	57	12.8%	16.6%	27.9%
SI	920	279	63	30.3%	37.2%	59.3%
SK	2441	182	37	7.5%	9.0%	15.9%
TR	n/a	n/a	n/a	n/a	n/a	n/a
UK	7672	1053	345	13.7%	18.2%	49.9%
ALL	106289	8881	3480	8.4%	11.6%	23.5%

Micro establishments with 5-9 employees make up a significant proportion of the ESENER-2 interviews: 26% unweighted and 48% when the multi-country establishment proportional weight is applied. They are also an important sub-group for analysis; the survey aims for sufficient interviews with this group to allow for separate analyses as they are a distinct group in terms of OSH practices. As such, their inclusion in the survey has most certainly affected the overall survey estimates, but this was the point of including them in the first place.

▪ Sampling Strategy

In this section we consider the overall sampling strategy for the survey and whether it could be improved. The ESENER-2 sampling was based on a single-stage (unclustered) stratified sample design¹⁵. The sample was stratified, disproportionally, by the sampling frame information on grouped NACE sector (seven categories) and size of company in terms of number of employees (four categories: 5-9, 10-49, 50-249 and 250 or more). As in the United Kingdom the sample size was larger it was possible to use a more complicated stratification strategy, consisting of additional cells within those listed above, but also equivalent to the one above in aggregate.

When designing the target number in each cell, the efficiency of the sample is considered both in terms of establishment-level and employee-level estimates. The near-optimal designs for both levels of estimates are produced, and the final design is produced as the mid-point between the two designs.

Everything else being equal, the optimal design is one that achieves the sample sizes in each stratification cell in proportion to the population totals. However, this assumes that the variance is approximately the same in each cell. If that is not the case, then a more efficient design is to push a

¹⁵ See ESENER-2 technical report, section 5.5, page 25 for details of the sample design.

higher proportion of the sample into the cells with more variance. This is called optimal allocation and the optimal sample size in each cell can be calculated using a formula based on the sampling variance.

For cell K, the optimal sample size is:

$$n_k = n \times N_k S_k / \sum (N_i S_i)$$

where N_k is the population sample size in cell k and S_k^2 is the variance in cell k.

In order to assess the optimal sampling design therefore we considered the optimal allocation of the sample based on the 53 measures from the survey and took the overall optimal design as the average across all the measures. We estimated the optimal design both in terms of establishment-level and employee-level estimates based on the sample in terms of the number of employees.

The conclusions from this analysis was that the optimal design for establishment-level estimates was to select the sample to achieve counts within each cell that were approximately in proportion to the population counts for establishments. Similarly, for the employee-level estimates the optimal design was achieved as a sample of establishments for which the employee counts matched the population estimates. The analyses were carried out for both Switzerland and Italy (see Tables 5 and 6, and appendix E for the population figures that were used in the calculations), but the same results would have been observed for any country. This is because the optimal allocation is usually not consistent for every measure and so the design that is the most efficient on average over a range of measures is the proportionate allocation one. The optimal allocation design would only in practice deviate from this if there were either only a few key measures and/or the measures were highly correlated.

Table 5: Sample sizes for Switzerland sample

Size	Establishments			Employees		
	Proportionate	Optimal	ESENER-2	Proportionate	Optimal	ESENER-2
5-9	725	698	466	192	182	466
10-49	645	665	562	514	516	562
50-249	119	125	310	470	480	310
250+	15	16	166	328	326	166
All	1,504	1,504	1,504	1,504	1,504	1,504

Table 6: Sample sizes for Italy sample

Size	Establishments			Employees		
	Proportionate	Optimal	ESENER-2	Proportionate	Optimal	ESENER-2
5-9	1,186	1,167	581	386	373	581
10-49	896	910	811	830	820	811
50-249	127	132	455	589	604	455
250+	14	14	376	418	426	376
All	2,223	2,223	2,223	2,223	2,223	2,223

As part of this review, we have been asked to consider and propose a sample design that places more emphasis on establishment-level estimates than is currently the case, given they are of greater importance and value to users of the survey data than the employee-level estimates. As can be seen from Tables 5 and 6 though, the design that is optimal on average for establishment-level estimates is one that would have achieved very few interviews with large establishments – just 16 for establishments with more than 250 employees in Switzerland and 14 in Italy.

This would not be a very sensible design for a number of reasons. First, there would be a risk of getting very few establishments in the 250+ employees stratum which would undermine the results of the survey. Second, even though the emphasis is towards establishment-level rather than employee-level estimates, one should still acknowledge that a large proportion of employees (e.g. 22% in Switzerland and 19% in Italy) work in establishments with more than 250 employees. It would therefore be inappropriate to design the sampling to generate imprecise estimates for a sub-group within which a sizeable proportion of the employees work. A third important reason is that number of employees is a key break variable for analyses – the sampling therefore needs to be designed to achieve sufficient numbers in each establishment size category to generate precise estimates.

Therefore, although the optimal design for analyses of the full sample would be to sample in proportion to the population counts of establishments in each stratum, the best design in terms of getting precise estimates for each establishment size category would be to achieve equal numbers in each size stratum; however, this would be inefficient for the all country estimates. We would therefore suggest setting criteria for a minimum sample size in each stratum (e.g. 150 or 15% of the full sample size, whichever is the larger).

An alternative approach to balance the need for efficient estimates at the country level with more precise estimates size categories would be to use optimal sample allocation for planned domains (Kish¹⁶, 1988; Rao and Molina¹⁷, 2015). With this approach, the sample size within each category (in this case for establishment size) is a weighted average of the sample size for a proportionate design (n_p) and for the equal sample size design (n_e):

$$n_{opt} = d \cdot n_p + (1 - d) \cdot n_e \quad \text{where } 0 \leq d \leq 1$$

So when 'd' is equal to zero this is equal allocation and when 'd' is equal to 1 it is proportionate allocation, and for 'd' between 0 and 1 it is a mix of the two. There are methods for obtaining the 'best' compromise, but as for the optimal allocation estimates described above, these are for a specific *single* measure and so are not appropriate for a general survey like ESENER with a range of measures.

By way of example, the following table (Table 7) shows the sample sizes for four sampling scenarios for Switzerland: proportionate design; equal allocation design; minimum sample size design (set at 150); the planned optimal sample for planned domains design (with $d = 0.5$).

Table 7: Sample sizes for Switzerland sample: actual and for four sampling designs

Size	Population	ESENER-2	Proportional	Equal allocation	Min sample (150)	Planned optimal (d = 0.5)
5-9	79,275	466	725	376	637	550
10-49	70,525	562	645	376	567	510
50-249	13,066	310	119	376	150	248

¹⁶ Kish, L. (1988). Multipurpose sample designs. Survey Methodology, 14(1), 19-32

¹⁷ Rao, J. N. K. and Molina, I. (2015) Small Area Estimation, 2nd Edition. Wiley Series in Survey Methodology. John Wiley & Sons, Inc., Hoboken, New Jersey

Size	Population	ESENER-2	Proportional	Equal allocation	Min sample (150)	Planned optimal (d = 0.5)
250+	1,636	166	15	376	150	196
All	164,502	1,504	1,504	1,504	1,504	1,504

For the purposes of example, to show the likely impact on precision from the competing designs, the following table (Table 8) shows comparisons of the confidence intervals around the percentage estimate of Trade Union representation for each employment size category and for the all country estimate for Switzerland. This demonstrates the wide confidence intervals for the 250+ employees category under the proportionate design. That is reduced under an equal allocation design, but to the detriment of the precision for the small (10-49) and micro (5-9) size categories and the all country estimate. The minimum sample and planned optimal designs are both compromises which give a balance between the precision for each category and for the all country measure.

Table 8: Comparisons of confidence intervals for Union Representation (Switzerland)

Size	ESENER-2	Proportional	Equal allocation	Min sample (150)	Planned optimal (d = 0.5)
5-9	±1.8%	±1.5%	±2.0%	±1.6%	±1.7%
10-49	±2.6%	±2.4%	±3.2%	±2.6%	±2.7%
50-249	±3.9%	±6.3%	±3.6%	±5.6%	±4.4%
250+	±7.1%	±23.6%	±4.7%	±7.5%	±6.5%
All	±1.5%	±1.4%	±1.7%	±1.4%	±1.5%

3.3.2 Assessment of ESENER-2 procedures: Application of sampling procedures

This section of the report reviews the application of sampling procedures on ESENER-2 with a view to considering whether they may have introduced bias to survey estimates. Two aspects of the procedures are worth consideration:

- The procedures used to select establishments from enterprise level sampling frames; and
- the stopping rules under which fieldwork efforts are called to a halt when sampling matrix targets were met.

For each, we describe the current survey practice and make an assessment of the potential for error.

▪ Selecting establishments from the enterprise-level frames

Of the 36 countries included in ESENER-2, the samples for 14 were selected from sampling frames that list establishments; for the remaining 22 the sampling frames listed enterprises/organisations. For those countries, a consistent screening approach was used to select the enterprises. This approach

involved first asking whether the organisation consisted of a single establishment or multiple establishments. For organisations that consisted of multiple establishments the following screening procedure was carried out:

- If the initial contacted establishment (i.e. the one listed on the sampling frame for the enterprise) had more than five employees, then it was screened in for the survey (main establishment).
- Of the remaining establishments in the organisation, one from all those that had five or more employees was selected at random to be included in the survey (second or subsidiary establishment).

These procedures gave a higher probability of selection to head offices over subsidiary establishments. This would result in bias if (i) these types of establishments differ on key survey estimates and (ii) the affected establishments make up a sufficiently large proportion of the sample. In other words, that the selection produced could be systematically introducing bias to the estimates by over-representing head offices.

In order to test the potential bias, we analysed the same 53 variables as used for the previous analyses to look for systematic differences between the main ($n = 3,717$) and second ($n = 376$) establishments interviewed for any multi-establishment organisations. Ideally we would have matched the establishments to only include those for organisations for which we obtained interviews for two establishments. Without an organisation identifier, we instead fitted regression models controlling for: size of establishment, sector and country.

The analysis showed that there were significant differences (at the 5% level) between the main establishments and second establishments for 11 of the 53 measures - more than we would expect to observe by chance (21% Vs 5%). The mean difference across the 53 measures was 2.9 percentage points, and the highest was 8.9 percentage points. This result does not show conclusively that there are systematic differences between them. For example, with a second establishment interviewed for only about 1 in 8.4 main establishments (there were 3,151 organisations identified with more than one establishment with 5 or more employees) it could be that bias was introduced by the relatively low participation rate of the second establishment. However, it does show that the screening for establishments is contributing some bias to the estimates.

Table 9 shows a summary of the screening process. The first column shows the number of enterprises at which an interview was carried out at the address listed on the sampling frame. The second column shows the number at which it was identified that the organisation was a multi-establishment organisation – this can be used to estimate the percentage of organisations that are multi-establishment in the sample, which is in the third column. The next two columns show the number of second interviews achieved and the implied response rate of that second interview of those issued. This is the response rate just for that screening stage – and it is low, being about 10% on average. The composite response rate for these additional establishments can be estimated by multiplying these with the response rate for the original enterprise and so would be much lower. With an initial response rate of 15%, then the composite response rate is $15\% \times 12\% = 1.8\%$. This composite response rate seriously undermines the credibility of the sample of additional establishments. In practice, it does not contribute much to the final estimates anyway as, on average, the additional establishments are on average less than 2% of the achieved sample in the screening countries.

Table 9: Summary of screening at multi-establishment organisations

Country code	# Enterprises interviews	# Identified as multi-establishment	% Multi-establishment	Second interview achieved	RR: Second establishment	% Interviews with second establishment
AL	742	8	1.1%	0	0.0%	0.0%
AT	1041	431	29.2%	27	6.3%	1.8%

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Country code	# Enterprises interviews	# Identified as multi-establishmt	% Multi-establishmt	Second interview achieved	RR: Second establishmt	% Interviews with second establishmt
BE	995	454	31.1%	46	10.1%	3.2%
BG	611	123	16.7%	15	12.2%	2.0%
CY	628	106	14.4%	17	16.0%	2.3%
CZ	1221	274	18.3%	11	4.0%	0.7%
EE	659	76	10.3%	14	18.4%	1.9%
EL	1132	322	22.1%	47	14.6%	3.2%
HR	641	105	14.1%	5	4.8%	0.7%
HU	1341	167	11.1%	4	2.4%	0.3%
IS	575	147	20.4%	35	23.8%	4.8%
LT	715	50	6.5%	7	14.0%	0.9%
LV	671	70	9.4%	12	17.1%	1.6%
ME	384	66	14.7%	2	3.0%	0.4%
MK	583	122	17.3%	45	36.9%	6.4%
MT	397	45	10.2%	10	22.2%	2.3%
PT	1062	395	27.0%	52	13.2%	3.6%
RO	668	73	9.8%	10	13.7%	1.3%
RS	612	136	18.1%	2	1.5%	0.3%
SI	862	184	17.6%	5	2.7%	0.5%
SK	698	47	6.3%	3	6.4%	0.4%
TR	1921	316	14.1%	7	2.2%	0.3%
ALL	18159	3717	17.0%	376	10.1%	1.7%

One could therefore question whether the effort involved in obtaining the interviews is justified, given that the additional establishments at which an interview is achieved represent a very small sub-sample of those in the population and contribute little to the estimates. However, repeating the regression analysis on the relevant groups with the screening countries shows that these subsidiary establishments are different to the single site establishments as well – the number of significant differences in the 53 regression models being 27 (51%). There is therefore no weighting strategy that could be employed to compensate for the deficit in this group other than applying large weights to the subsidiary establishments interviewed (see Section 3.6). We would therefore recommend trying to increase the sample size of interviews with subsidiary establishments.

One approach to achieve this would be to adjust the screening to select more establishments from the multi-establishment organisations identified. Given that currently only one interview is achieved at a second establishment for every ten main establishments interviewed, this approach would make the screening less efficient in terms of fieldwork, but is the only feasible option to increase the sample size of these subsidiary establishments (see section 3.6 for further detail on how this proposal would work).

In the context of this review it is worth noting that this issue affected establishments in the extended survey universe to a lesser extent than establishments in the rest of the population. Across the screening countries, both micro establishments with 5-9 employees and those in NACE section A are more likely to be single site (micro: 88%, NACE A: 89%, compared with 81% on average and 68% of Large establishments with over 250 employees).

▪ Closing stratification cells

The sampling is designed to achieve target numbers of interviews in cells defined by grouped NACE sector (seven categories) and size of company in terms of number of employees (four categories: 5-9, 10-49, 50-249 and 250 or more). (In the United Kingdom, more cells were used to define the stratification.) The issued sample is selected using the sampling frame information for NACE sector and size of company with the aim of achieving the target number of interviews, within a certain tolerance level, for each of the stratification cells. In order to control the numbers in the achieved sample, a stopping rule was applied when a cell reached its target. As an example, the target for the sector group 3 (NACE C) with 50 to 249 employees in France was set to be 68, and 251 cases were sampled and issued for fieldwork in this cell to meet this target. During the course of the fieldwork that target was reached, at a point when 170 of the issued cases had been completed (i.e. they had met the required fieldwork contact rules and a final outcome had been assigned to them), and so the cell was assigned as filled. As a result, 81 cases that had been selected for that cell based on the information in the sampling frame, that were in still in field, were closed and so were no longer worked – in effect, they were removed from the sampling frame. So, of the 251 cases originally sampled in that cell, 81 or 32% of those cases were effectively removed from the sample.

In order to make this method work, the sample size issued was larger than that required based on likely response rates, so much so that this stopping rule was applied to some extent in 90% of all the cells across the countries. The technical reports states that “... *this sample design is not to be mixed up with a (non-probability) quota sampling procedure.*” In terms of the process of filling up cells to pre-defined targets, this actually does look like a quota sample, as the cases that are closed are not a random subset of those issued in each cell. However, it is clear that more effort is made to obtain a response with each issued case to maintain a higher response rate, so that in practice there is a difference, but it is the case that applying a stopping rule means that the approach deviates from a strict random probability sample, and as discussed further below, there are reasons to believe that it is affecting sample quality.

There are two concerns with applying this stopping rule. This first is that it is only applied to cases which have been called one or more times (“... non-response code 21 (stratification reached and called 1+ times”). This implies that some attempt has been made to contact them but without success. This would suggest that these cases were on average harder to contact – or less willing to participate – and so it is likely that the stopping rule is disproportionately removing harder to reach establishments.

The second concern is that it is subtly adjusting the profile of the achieved sample. This is because of what are termed ‘stratum jumpers’ – establishments that end up in a different analysis cell to the one in which they were sampled.

Table 10 shows the original sampling cells for the 74 cases that were in the analysis cell for sector group 3 (NACE C) with 50 to 249 employees in France. Although it is the case that most of the cases (58) in this analysis cell were originally selected in the equivalent sampling cell, 16 were not – so more than 1 in 5 cases in this cell were originally selected in a different sampling cell.

Table 10: Sampling cells for establishments in sector group 3 (NACE C) with 50 to 249 employees in France¹⁸

Sector group	10-49	50-249	250+	All
2 (NACE B,D,E,F)	0	1	0	1
3 (NACE C)	6	58	4	68
4 (NACE G,H,I,R)	0	1	0	1
5 (NACE J,K,L,M,N,S)	0	4	0	4
All	6	64	4	74

This therefore means that if the stopping rule is applied differently across the original sampling strata then it will have an impact on the profile of the final achieved sample. Table 11 shows how the stopping rule was applied disproportionately for sector group 3 (NACE C) in France. For the smaller sized groups, the stopping rule removed relatively few of the sample: 10% for 5 to 9 employees and 16.4% for 10 to 49 employees; for the larger sizes though (50 or more) the stopping rule removed over 30% of the sample. We can simulate what the profile for this sub-group would have been if no stopping rule had been applied – this is in the final column of table 11. Comparing this with the profile actually achieved (with the stopping rule in place) shows that it has had an impact on the survey sample.

Table 11: Impact of stopping rule on profile of sector group 3 (NACE C) in France

Size group	Extent of stopping rule (%)	Profile with stopping rule	Profile without stopping rule
5-9	10.0%	21.2%	17.9%
10-49	16.4%	31.5%	29.0%
50-249	32.3%	23.2%	25.4%
250+	33.0%	24.2%	27.7%

The reason why this is a concern is that the establishments that jump cells will have different characteristics to those that do not. In order to show this, we tested for differences between the establishments that changed strata to those that did not using the 53 survey variables. This was done by fitting regression models with a dummy variable to identify any establishment that jumped to a larger size stratum and a second dummy variable for those that jumped to a smaller size stratum (for the sake of simplicity we only considered jumping between the size strata, not the NACE sector strata). The models controlled for country, and included indicators for the analysis size and sector cells categories. To allow for the difference between the two sampling approaches, we ran separate regression models

¹⁸ Note: this table shows the original sampling cells (i.e. based on the sample frame classification) for the 74 cases that ended up in the specified cell for analyses (i.e. they all reported belonging to NACE C and size 50-249 in the interview). The target for this cell was 68 interviews, however 74 interviews were achieved before the cell was closed.

for the countries with sampling frames that were lists of establishments and for those that were lists of enterprises.

These analyses confirmed the difference between these groups. For the countries with establishment lists, there were significant differences at the 5% level for 16 variables (30%) for establishments that moved to a larger size stratum and for 42 variables (81%) for establishments that moved to a smaller size stratum – much higher than we would expect by chance. For the countries with lists of enterprises (for which there will be some confounding for the survey being at the establishment-level) there were significant differences for 25 (47%) and 26 (49%) survey variables respectively. The differences were fairly substantial – for the establishment frame countries those that moved to a smaller size stratum had an average difference of 4.2 percentage points in their responses.

The impact of stratum jumpers can be reduced using an appropriate weighting strategy, which we describe later in this report. Note that the weighting strategy used for ESENER-2 did not take account of stratum jumpers and so the estimates would have been influenced by the original sampling design and inconsistency of the stopping rule across strata. However, even with the appropriate weighting, it is not good practice to remove cases once the fieldwork has started – the sampling should be designed in advance to take account of stratum jumpers and varying response rates, rather than making adjustments once in field.

In order to achieve the target numbers, some element of adjustment of the sample will be required. However, this is better done at the sampling design stage rather than once the fieldwork has started using a stopping rule. In order to control the sampling, information about the relationship between the sampling frame and reported information and on likely response rates are required. Therefore, it is only feasible once a survey has been run previously. Looking forward, it would be possible to use the information collected from ESENER-2 to improve the sampling design for future waves.

3.3.3 Improving the sampling design

As discussed in the previous section, the approach of setting targets and then applying stopping rules influences the profile of the achieved sample and will have some impact on the estimates achieved. Every time a stopping rule is employed, the sample deviates from a true random probability sample. This is because the stopping rule removes cases that were disproportionately harder to contact; also if the stopping rule is applied differently across the original sampling strata then it will have an impact on the profile of the final achieved sample. Given the mismatch between the sampling frames and population estimates, some element of adjustment will always be required for the design in each country once the survey has started. However, it should be feasible to design the sampling so that stopping rules are either not required at all, or they are employed less frequently.

This would require estimating a sampling matrix for each country between the information in the sampling frame and the actual reported NACE sectors and establishment size. Combining that with the corresponding estimated response rates within the sampling strata would allow the issued sample to be designed so as to approximately achieve the required target numbers. This takes advantage of the information collected for ESENER-2 and should reduce the need for the complexity of closing cells. It does depend on the same sampling frame being used in each country at the subsequent wave of the survey and for consistency of quality over time. (Although data from a comparable survey such as the European Company Survey could also be used.) A less complex version of this sampling approach is used for the English Housing Survey to control the tenure profile of the sample based on a fairly imprecise measure of predicted tenure¹⁹; the sampling matrix being built up over each wave of the survey.

As an example, we will consider a hypothetical design based on just the size of the establishment for Switzerland. This is a simplified example – in practice one would need to take account of sector as well as the differential response rates across the categories. However, it gives an example of how one would

¹⁹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/552532/201415_EHS_Technical_Report_all_chapters_and_annexes.pdf

design the sampling based on expected achieved interviews rather than just the sampling frame information.

Table 12 shows the relationship between the reported sample size category from the sampling frame against the reported category for Switzerland. So, of the establishments identified to be of size 5-9 in the sampling frame, 66% were reported to be in that category, but 29% were in 10-49 category, 3% in the 50-249 category and 2% in the 250+ category.

Table 12: Matrix of sampling frame indicator establishment size against reported (Switzerland)

Sampling frame size group:	Reported size group:			
	5-9	10-49	50-249	250+
5-9	66%	29%	3%	2%
10-49	8%	78%	10%	4%
50-249	1%	11%	77%	11%
250+	1%	1%	11%	87%

If we were to issue the sample to aim to achieve samples of 500 in each category assuming that the information in the sampling frame was correct then, based on the above matrix, the actual split of cases would be as shown in Table 13. As can be seen, with such an approach the achieved sample actually ranges from 379 to 599 in each size cell. This is equivalent to the approach used for the sampling for ESENER. The sampling is designed based on the sampling frame information, but is not controlled for the known miss-match between the sampling frame and reported information. Rather than being included in the design, it is controlled using the stopping rules.

Table 13: Achieved split by establishment size (Switzerland)

Sampling frame size group:	Reported size group:				TOTAL
	5-9	10-49	50-249	250+	
5-9	331	145	13	12	500
10-49	39	392	48	21	500
50-249	6	56	384	53	500
250+	3	6	54	437	500
TOTAL	379	599	499	523	2,000

By adjusting the predicted sample sizes in each category, we can re-design the sampling to expect to achieve 500 in each category by changing the split based on the sampling frame information to: 705,

295, 525 and 475. Table 14 shows with this design we would expect to achieve about 500 in each reported sector category.

Table 14: Achieved split by establishment size with re-designed sample approach (Switzerland)

Sampling frame size group:	Reported size group:				TOTAL
	5-9	10-49	50-249	250+	
5-9	466	204	18	17	705
10-49	23	232	28	12	295
50-249	7	59	403	56	525
250+	3	6	52	415	475
TOTAL	499	500	501	500	2000

In practice the samples achieved will deviate from those in Table 14. However, by designing the sampling taking account of the inconsistency between the sampling frame and reported information, the sample will be a lot closer to the target numbers. This should greatly reduce the need for applying stopping rules, without making the survey any less cost-efficient, and hence lead to a more representative sample.

In addition to this, the sample could be managed more effectively to reduce the need to remove sample after it has been dialled. The ESENER-2 technical report says that sample was initially issued at a ratio of 5:1 (i.e. if this sample was fully worked it would deliver a yield rate of 20%, interviews out of issued cases). Given that over half the countries finished with a yield rate of better than 20% it was inevitable that the stopping rule would be required rather extensively, and so the initial issued sample ratio could be reduced. This could be set at a country level, factoring in yield rates from the previous survey.

3.3.4 Conclusions and recommendations

This review has not identified particular sampling methodological issues in relation to the extension of the survey universe. We find that the inclusion of NACE A establishments has no impact on the survey estimates, in part as they make up a very small proportion of the overall sample. The extension to micro establishments is different in this sense, as it is one of the larger size groups in the sample (largest when the sample is establishment-proportional weighted), and so can be expected to impact on the overall survey estimates. We have not looked at the extent of this specifically – as understand that micro establishments were included in the sample as a distinct analysis sub-group in their own right.

The review did identify methodological issues with the ESENER-2 sampling procedures in two areas: the procedures for selecting establishments from multi-establishment enterprises in the screening countries; and the application of a stopping rule during fieldwork. Solutions have been proposed to deal with these issues, which we recommend are considered for ESENER-3. These are general issues that apply across the sample and not just to the extended universe, but we have noted that the first is less of a problem for micro and NACE A establishments.

3.4 Assessment of non-response bias and response maximisation procedures

The objectives of this workstream were (i) to assess the extent to which ESENER-2 was at risk of incurring significant levels of non-response bias, (ii) to assess whether this was a particular problem for Section A establishments, establishments employing 5-9 employees and public sector establishments, and (iii) to develop recommendations for modifying procedures with a view to reducing these errors.

3.4.1 ESENER-2 survey response

In this section of the report we look at the ESENER-2 survey outcomes to further understand the potential for non-response bias in the extended survey universe, and to provide pointers on the quality of the sample frames used.

▪ Establishments with 5 to 9 Employees

Table 15 below shows the survey outcomes across establishments of different size (based on the information provided on the sample frame). It is informative to compare the eligibility, response, cooperation and contact rates, as these provide different information that is helpful to understand the quality of the achieved sample and of the sample frames used. The first column gives the issued sample size. For ESENER-2 a total of 358,637 cases were issued for fieldwork, of which 66,686 (19%) contained no information on the size of the establishment. We have counted these cases separately as they have different survey outcome characteristics to the others, but note they are distributed across a small number of countries (Albania, Bulgaria, Greece, Hungary, Montenegro, FYROM, Romania, Serbia and Turkey). The remaining columns provide the eligibility rate, two versions of the response rate, two versions of the cooperation rate, and the contact rate. The response and cooperation rates use the AAPOR methods of calculation²⁰. Further detail on the calculations is provided Appendix B.

Table 15: Survey outcomes by establishment size from sample

Sample stratum	Issued ²¹ (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
No info on size	66,686	53%	6%	11%	11%	23%	55%
Micro (5-9 empl)	118,037	46%	12%	23%	15%	26%	80%
10+ empl	173,914	80%	20%	24%	24%	44%	84%
Total	358,637	65%	15%	21%	19%	35%	77%

The **eligibility rate** is based on (i) cases where ineligibility could be ascertained because it was obvious the contact was not a business or a business that was actively trading, and (ii) those that reached the interview screening stage, which meant first agreeing to an interview, given the screener questions were included in the main questionnaire. The main reason for ineligibility was the number of employees in the

²⁰ <http://www.aapor.org/Education-Resources/For-Researchers/Poll-Survey-FAQ/Response-Rates-An-Overview.aspx>

²¹ The total volume of cases sampled and dialled in the fieldwork for ESENER-2. Source: ESENER-2 gross data (survey para-data)

establishment (i.e. less than five), which accounted for half of all ineligible cases. It is therefore not surprising that the micro category has a lower eligibility rate as small inaccuracies or changes in the number of employees could mean an establishment fell below the five employee threshold.

A low eligibility rate is primarily a problem for fieldwork efficiency, given these cases need to be screened out *after* they have agreed to an interview. At this stage, the time it takes to identify a suitable person and agree on an appointment has already been spent. So a low eligibility rate increases the interviewer hours required per interview. However, an especially low eligibility rate can also indicate poor sample quality, as here it would be reasonable to expect that a sizeable number of establishments classified as 0-4 employees on the sample frame would have been eligible for the survey had they been included in the sample. If there were sufficient of these cases and they had different characteristics to covered establishments this would result in coverage bias.

There are few examples of surveys conducted across the EU that also include the micro size category that might act as a comparator for the ESENER-2 micro eligibility rates. One such example is the European Investment Bank's Group Survey on Investment Finance (EIBGS), conducted in 2016. The eligibility rate amongst micro establishments on this survey was 55%, compared with 75% for establishments of over ten employees. Like ESENER-2, the survey covered the EU-28 and establishments from five employees upwards, but in other respects it was different, using Bureau van Dijk's ORBIS as a sample frame and covering NACE sectors C-J only. The differences in eligibility between micro and larger establishments are smaller on the EIBGS than on ESENER-2 but demonstrate that a sizeable difference is to be expected.

The **first response rate is based on the AAPOR1** method of calculation²². That is, full interviews out of the issued sample minus confirmed ineligible cases. This is the basis for the response rate reported in the ESENER-2 technical report and so we present it here (small differences to the technical report figures are due to the application of an outcome hierarchy²³). The AAPOR1 response rate suggests that the 'no information' and micro categories had substantially lower response rates than the larger establishments.

The **second response rate is based on the AAPOR3** method of calculation. That is, full interviews out of eligible or assumed to be eligible cases. The difference to the AAPOR1 rate is that it is assumed that the sample that did not reach the screener questions, and so could not be classified as eligible or ineligible (the sample that is of "unknown eligibility"), is eligible at the same rate as the classified sample. It is widely accepted that this is a conservative estimate of the response rate²⁴, as the actual rate of eligibility can be expected to be lower in the unclassified sample. This is because it includes establishments that were not contacted, including those with bad numbers, which are in general less likely to be eligible (see commentary below on the contact rate). As such, we can expect that the actual response rate would be a bit higher than the AAPOR3 rate. In the context of considering the level of risk that there was non-response bias in the sample the AAPOR3 response rate is to be preferred over the AAPOR1 rate as it gives a more realistic estimate of the proportion of the eligible survey population that responded to the survey.

The overall AAPOR3 ESENER-2 response rate was 21%. While, as mentioned above, this is almost certainly an under-estimate, even if the response rate was a bit higher it is clear there was a considerable risk that the survey suffered non-trivial levels of non-response bias. The response rates of micro and larger establishments were very similar (the gap is closed in comparison with the AAPOR1 response

²² <http://www.aapor.org/Education-Resources/For-Researchers/Poll-Survey-FAQ/Response-Rates-An-Overview.aspx>

²³ Best practice dictates that the final outcome of a survey should be based on the outcomes across all call attempts and not just the last call. It is common to report on the last call in CATI business surveys, as was done in the ESENER-2 technical report, but for the purpose of this analysis there is value in reporting the final outcomes accurately. This involves classifying the full set of outcomes based on a hierarchy and reporting the outcome of the most highest-level category for cases where different outcomes resulted across the calls (the hierarchy applied here is: full or partial interviews, confirmed ineligible cases, refusals, other non-response and lastly non-contact). The final outcomes reported in this section are based on the last five contacts, which are those available in the gross sample file, and fully cover 67% of all cases which had five or fewer calls. The biggest change, compared with a last-call based approach, is seen in the proportion of non-contact cases: 16% of the cases given this outcome in the ESENER-2 technical report were actually contacted at one of the calls that preceded the last call.

²⁴ http://www.aapor.org/AAPOR_Main/media/MainSiteFiles/ERATE09.pdf

rate as it is reasonable to assume that a greater proportion of micro establishments should be counted as ineligible and so are removed from the denominator of the calculation). We can therefore conclude that micro establishments had a similar risk of non-response bias to larger establishments. While this is encouraging, it does not mean that the actual levels of non-response bias were comparable.

The **cooperation rate** gives the proportion of full interviews out of establishments that were successfully contacted less those confirmed ineligible. The **AAPOR1 cooperation rate** follows the same method as the cooperation rate quoted in the ESENER-2 technical report. Non-cooperation here comes from refusals and 'other reasons' for non-response. However, at ESENER-2, cases that were abandoned as their stratum was full make up the majority of the other non-response category, and as larger establishments were more likely to result in this outcome their cooperation rates are depressed. It is hence also informative to look at the **AAPOR3 cooperation rate**, where non-cooperation is based on refusals only. This shows that refusal was substantially more of an issue for micro than larger establishments, which suggests the survey was a harder 'sell' for this group. This provides a clue that non-response bias may have been worse for micro establishments, given a lack of interest in a survey topic can be associated with this form of error.

Finally, the **contact rate** gives the proportion of the sample that could be contacted at some stage during the survey fieldwork. When this is based on final outcomes that have been classified across the outcomes of previous contact attempts, as has been done here, we can be confident that a sizeable proportion of these cases are probably ineligible (most active businesses would have an up-to-date phone number and would answer the phone at some point across multiple call attempts). Therefore, the contact rate provides a further measure of the quality of the sample frame, in terms of how up-to-date it is. This suggests that the 'no information' establishments were of a much lower quality, while the micro and larger establishments are reasonably comparable.

▪ Comparisons on the country level

While on average across the sample the survey outcomes look reasonable for micro establishments, and generally do not point to major issues with their inclusion in the survey, at a country level there are some areas that are more problematic (see table 16 below).

Micro sample stratum eligibility rates are very low for Cyprus (7%) and Malta (19%), being under a quarter of the eligibility of the larger establishments in these countries, and low in Switzerland (28%), Germany (27%) and Poland (29%), under half the rate of the larger establishments. This may be indicative of sample quality issues in these countries and would also have required additional fieldwork resources. Further information in the ESENER-2 technical report explains the situation in Cyprus and Malta: in Cyprus the frame had not been updated since 2011, and in Malta the frame covered 1-9 size establishments in a single category.

In terms of response rates, and favouring AAPOR3 as a more accurate measure, the Czech Republic, Italy, Norway and Sweden have response rates for the micro sample stratum of between half and three quarters of the rates of the larger establishments. There is greater risk of relatively higher levels of non-response bias amongst micro establishments compared with larger establishments in these countries. Cooperation rates were also substantially lower for the micro sample in a majority of countries: half (18) ranging between half and three-quarters of the cooperation rates of the larger establishments in their countries, and a further five under half (Switzerland, Cyprus, Norway, Poland and United Kingdom). This illustrates the difficulty in persuading micro establishments of the value of taking part in the survey across the board.

Finally, the contact rates across most of the countries are in line between micro and larger establishments. The exceptions are Cyprus and FYROM, with rates of under three-quarters of larger establishments, suggesting actual eligibility rates are probably even lower than what is suggested from the screened sample eligibility rate. The 'no information' categories in Greece and Hungary also had low contact and eligibility rates, in Hungary in particular there appears limited value in including this sample stratum given how few interviews it would yield (25 interviews were achieved out of 769 cases issued in the 'no information' stratum in Hungary, a yield rate of 3%).

Table 16: Survey outcomes by establishment size and country from sample

Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
AL - no info	2473	73%	25%	32%	35%	54%	72%
AL - Micro (5-9)	104	85%	34%	37%	46%	52%	73%
AL - 10+ empl	461	93%	33%	35%	49%	57%	68%
AT - Micro (5-9)	3,554	49%	15%*	26%	16%*	29%*	92%
AT - 10+ empl	4,711	86%	23%	26%	24%	43%	96%
BE - Micro (5-9)	1,479	72%	19%*	24%	25%*	41%*	76%
BE - 10+ empl	5,019	83%	26%	30%	34%	59%	77%
BG - no info	748	40%	13%	27%	21%	40%	60%
BG - Micro (5-9)	1,191	70%	16%*	22%	24%	39%*	67%
BG - 10+ empl	2,119	92%	24%	25%	32%	55%	74%
CH - Micro (5-9)	5,163	28%*	12%*	33%	13%*	20%**	95%
CH - 10+ empl	4,717	71%	24%	31%	25%	41%	96%
CY - Micro (5-9)	3,882	7%**	4%**	36%	8%**	14%**	49%*
CY - 10+ empl	3,354	78%	21%	25%	25%	43%	82%
CZ - Micro (5-9)	4,171	71%	6%*	9%*	9%*	17%*	71%
CZ - 10+ empl	10,474	85%	12%	14%	16%	29%	75%
DE - Micro (5-9)	10,591	27%*	7%*	22%	8%*	16%*	87%

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Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
DE - 10+ empl	13,040	70%	13%	18%	15%	27%	90%
DK - Micro (5-9)	2,318	65%	23%*	32%	29%	71%	81%
DK - 10+ empl	3,344	90%	32%	34%	38%	87%	85%
EE - Micro (5-9)	821	63%	26%*	36%	30%	67%	85%
EE - 10+ empl	1,685	93%	35%	36%	39%	76%	89%
EL - no info	1,154	69%	11%	16%	25%	74%	45%
EL - Micro (5-9)	2,298	75%	26%	32%	29%	70%	88%
EL - 10+ empl	2,917	92%	29%	31%	32%	78%	91%
ES - Micro (5-9)	10,912	42%	12%	24%	15%	24%*	78%
ES - 10+ empl	16,064	51%	15%	25%	20%	33%	72%
FI - Micro (5-9)	1,919	50%	23%*	37%	24%*	46%*	95%
FI - 10+ empl	3,568	88%	34%	37%	35%	71%	98%
FR - Micro (5-9)	3,484	87%	19%	20%	23%	35%	81%
FR - 10+ empl	7,590	96%	22%	23%	26%	43%	86%
HR - Micro (5-9)	1,164	74%	17%*	21%	19%*	40%*	89%
HR - 10+ empl	2,296	96%	25%	26%	27%	61%	92%
HU - no info	769	12%	4%	24%	6%	9%	63%

Technical assessment of the expansion of the ESENER II

Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
HU - Micro (5-9)	6,654	39%	7%*	15%	8%*	13%*	78%
HU - 10+ empl	11,745	63%	10%	15%	13%	21%	77%
IE - Micro (5-9)	1,664	61%	11%*	16%	11%*	16%*	95%
IE - 10+ empl	3,247	91%	18%	20%	19%	30%	96%
IS - Micro (5-9)	1,164	48%	20%*	34%	24%*	34%*	84%
IS - 10+ empl	1,661	80%	36%	41%	41%	59%	87%
IT - Micro (5-9)	5,889	60%	11%*	17%*	14%*	28%*	76%
IT - 10+ empl	7,939	91%	21%	23%	26%	50%	83%
LT - Micro (5-9)	942	61%	24%	34%	26%	46%	92%
LT - 10+ empl	2,080	88%	29%	32%	31%	58%	94%
LU - Micro (5-9)	810	70%	24%	31%	27%	42%	90%
LU - 10+ empl	2,582	76%	24%	29%	26%	55%	91%
LV - Micro (5-9)	1,089	45%	22%	39%	29%	59%	77%
LV - 10+ empl	2,239	78%	27%	32%	31%	74%	87%
ME - no info	6,150	52%	6%	10%	11%	19%	51%
ME - Micro (5-9)	438	67%	11%	15%	27%	40%	39%
ME - 10+ empl	773	78%	11%	14%	24%	38%	46%

Technical assessment of the expansion of the ESENER II

Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
MK - no info	1,256	57%	18%	28%	25%	90%	72%
MK - Micro (5-9)	454	47%	32%	50%	69%	90%	46%*
MK - 10+ empl	1,469	78%	34%	39%	50%	94%	68%
MT - Micro (5-9)	315	19%**	34%*	73%	35%*	54%	98%
MT - 10+ empl	934	80%	49%	55%	50%	67%	98%
NL - Micro (5-9)	3,945	62%	13%*	19%	15%*	24%*	89%
NL - 10+ empl	4,868	91%	22%	24%	26%	42%	85%
NO - Micro (5-9)	1,815	57%	7%**	12%*	10%**	18%**	71%
NO - 10+ empl	8,230	90%	17%	19%	22%	39%	78%
PL - Micro (5-9)	19,768	29%*	4%**	13%	6%**	9%**	73%
PL - 10+ empl	12,310	75%	13%	16%	16%	26%	79%
PT - Micro (5-9)	1,867	80%	28%*	32%	32%	62%	88%
PT - 10+ empl	2,805	93%	38%	39%	40%	76%	95%
RO - no info	2,028	34%	11%	27%	15%	39%	76%
RO - Micro (5-9)	2,553	28%	9%*	26%	13%*	24%*	66%
RO - 10+ empl	3,048	56%	14%	23%	21%	33%	68%

Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
RS - no info	773	89%	13%	15%	15%	41%	88%
RS - Micro (5-9)	1,008	76%	23%	28%	29%	44%*	78%
RS - 10+ empl	1,605	93%	28%	29%	34%	63%	83%
SE - Micro (5-9)	1,710	68%	15%*	21%	18%*	32%*	86%
SE - 10+ empl	5,436	84%	25%	28%	27%	49%	90%
SI - Micro (5-9)	1,519	84%	24%	27%	24%	46%*	99%
SI - 10+ empl	2,472	94%	29%	30%	29%	70%	99%
SK - Micro (5-9)	2,616	74%	9%*	11%*	17%	24%*	52%
SK - 10+ empl	3,892	91%	14%	15%	22%	36%	63%
TR - no info	51,242	53%	5%	8%	9%	18%	53%
UK - Micro (5-9)	8,766	41%	21%	38%	22%	35%**	97%
UK - 10+ empl	13,220	80%	23%	27%	23%	77%	98%

* Low rate compared with larger establishments (eligibility: <0.5 of 10+ firms, other rates: <0.75 of 10+ firms)

** Very low rate compared with larger establishments (eligibility: <0.33 of 10+ firms, other rates: <0.5 of 10+ firms)

▪ Establishments in NACE section A and the public sector

Table 17 below provides the survey outcomes across different sample sectors. Overall, the ESENER-2 issued sample included 8,402 cases identified on the sample frames as belonging to NACE section A (2% of the total) and 54,307 cases from one of the public sector categories, NACE O-Q (15% of the total). We consider these cases separately as they are of interest to this review. They also warrant separate examination as they were selected from a different sample frame to the other categories in about a third of the countries. Finally, a further 53,704 cases (15% of the total) had no information on the sector on the sample frame; these cases are shown separately due to their differing characteristics, but are almost exclusively from Montenegro and Turkey.

Table 17: Survey outcomes by sector from sample

Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
No info	53,704	50%	4%	8%	8%	17%	51%
NACE A	8,402	46%	15%	28%	19%	36%	80%
NACE O-Q (public sector)	54,307	75%	21%	26%	25%	51%	84%
NACE B-M & R-S (other)	242,224	65%	16%	23%	20%	34%	81%
Total	358,637	65%	15%	21%	19%	35%	77%

The survey outcomes suggest the following about the quality of the ESENER-2 samples:

- NACE A establishments were eligible for the survey in significantly lower proportions than other types of establishments. Public sector establishments had higher eligibility. This is in part driven by the relative size of the establishments in each category; a majority of the NACE A establishments on the sample frames are micro sized (59%), whereas this is the case for relatively few public-sector establishments (23%). As shown in the previous section, micro establishments are much less likely to be eligible, as they are more likely to be screened out as too small. However, even amongst micro establishments NACE A has lower eligibility than the other categories (33% compared with 56% of public sector micro establishments and 46% of other category micro establishments), demonstrating that difficulties finding this group were more acute.
- NACE A establishments perform slightly better on key survey outcome characteristics than do micro establishments. They do have a lower minimum response rate (AAPOR1), but this is recovered and is slightly higher than the other categories when eligibility is taken into account (the AAPOR3 response rate). Their cooperation rates are also in line with other types of establishments, as are their contact rates.
- Public sector establishments (NACE O-Q) perform better than the other grouped sectors on all survey outcome measures (response, cooperation and contact rates). By all accounts this suggests that these establishments were relatively well engaged with the survey and the quality of the information on the sample frames covering these establishments was good. Their AAPOR3 cooperation rate is particularly high, suggesting a low level of refusals compared with the other categories.

At a country level (see table 18 below) some of the countries performed worse than the others, potentially indicative of lower sample frame quality or increased potential for non-response bias compared with other sectors.

- Among NACE A cases eligibility was very low in Malta and low in FYROM. AAPOR3 NACE A response rates were low, compared with other sectors, in Greece, France, Croatia and the Netherlands. AAPOR3 NACE A cooperation rates were relatively low in Austria, Belgium and the Netherlands. Finally, the contact rate was relatively low in FYROM. Of these countries, only FYROM used a supplementary frame (the Yellow Pages) to boost numbers of NACE A

establishments in the sample, while three other countries that did this (Albania, Cyprus and Romania) did not have particular issues with the NACE A sample during the survey. Looking at the public sector (NACE O-Q) eligibility rates were often higher than for the other sectors. Bulgaria's was somewhat low. AAPOR3 response rates were very low in Montenegro and low in Greece, FYROM and Serbia. Cooperation rates were generally better than they were for the other sectors, and none of the countries stand out as very low on the AAPOR3 cooperation rate. Contact rates were relatively low in Greece and FYROM. Of these countries, supplementary sample frames were required to cover the public sector in Bulgaria, Montenegro, FYROM and Serbia, which may have exacerbated these issues. However, they were also required in several other countries (Albania, Cyprus, Estonia, Croatia, Hungary, Italy, Luxembourg and Romania) where the survey outcomes generally look fine.

Table 18: Survey outcomes by establishment sector and country from sample

Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
AL - NACE A	46	81%	30%	35%	46%	62%	65%
AL - NACE O-Q	929	61%	19%*	28%	26%*	49%	72%
AL - NACE Other	2,063	82%	30%	34%	42%	56%	71%
AT - NACE A	110	43%	13%*	25%	14%*	24%*	91%
AT - NACE O-Q	1,358	79%	28%	33%	30%	52%	95%
AT - NACE Other	6,797	68%	18%	25%	19%	35%	94%
BE - NACE A	93	48%	15%*	27%	22%*	31%*	69%
BE - NACE O-Q	1,315	84%	34%	38%	39%	76%	87%
BE - NACE Other	5,090	81%	22%	26%	30%	50%	74%
BG - NACE A	116	76%	20%	25%	29%	50%	71%
BG - NACE O-Q	1,026	51%	16%	28%	26%	45%	64%
BG - NACE Other	2,916	85%	21%	24%	29%	49%	72%
CH - NACE A	35	64%	23%	31%	24%	33%	94%
CH - NACE O-Q	2,083	43%	20%	37%	21%	36%	93%

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Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
CH - NACE Other	7,762	49%	18%	31%	19%	30%	96%
CY - NACE A	68	48%	22%	37%	39%	48%	57%
CY - NACE O-Q	655	37%	20%	39%	29%	41%	69%
CY - NACE Other	6,513	33%	13%	30%	19%	32%	68%
CZ - NACE A	294	82%	14%	17%	19%	35%	73%
CZ - NACE O-Q	1,755	89%	20%	22%	24%	44%	82%
CZ - NACE Other	12,596	80%	9%	11%	13%	23%	73%
DE - NACE A	355	36%	9%	22%	11%	21%	85%
DE - NACE O-Q	3,957	73%	13%	17%	14%	31%	91%
DE - NACE Other	19,319	44%	10%	20%	12%	21%	88%
DK - NACE A	286	47%	16%*	29%	21%*	71%	75%
DK - NACE O-Q	1,244	92%	33%	34%	43%	94%	75%
DK - NACE Other	4,132	78%	28%	33%	32%	77%	87%
EE - NACE A	67	80%	32%	37%	36%	69%	89%
EE - NACE O-Q	547	90%	28%	31%	31%	78%	92%
EE - NACE Other	1,892	82%	33%	37%	38%	73%	86%
EL - NACE A	91	95%	22%	23%*	26%	80%	86%
EL - NACE O-Q	1,721	77%	16%*	20%*	27%	75%	61%*
EL - NACE Other	4,557	84%	28%	32%	32%	74%	89%
ES - NACE A	1,031	40%	15%	31%	22%	32%	69%

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Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
ES - NACE O-Q	5,209	56%	13%	21%	17%	29%	77%
ES - NACE Other	20,736	46%	14%	25%	19%	29%	74%
FI - NACE A	111	64%	26%	35%	28%	56%	91%
FI - NACE O-Q	851	83%	39%	44%	40%	82%	98%
FI - NACE Other	4,525	72%	29%	36%	30%	59%	97%
FR - NACE A	181	83%	12%*	14%*	16%*	30%	76%
FR - NACE O-Q	2,370	92%	27%	28%	31%	61%	87%
FR - NACE Other	8,523	94%	19%	20%	23%	36%	84%
HR - NACE A	121	86%	16%*	18%*	18%*	42%	88%
HR - NACE O-Q	655	88%	21%	23%	22%	60%	96%
HR - NACE Other	2,684	90%	23%	25%	26%	54%	90%
HU - NACE A	429	55%	10%	17%	12%	21%	81%
HU - NACE O-Q	2,449	47%	11%	20%	14%	22%	75%
HU - NACE Other	16,290	52%	8%	15%	11%	17%	77%
IE - NACE A	66	91%	14%	15%	15%	26%	92%
IE - NACE O-Q	1,055	88%	20%	22%	20%	38%	97%
IE - NACE Other	3,790	80%	15%	18%	15%	22%	95%
IS - NACE A	151	56%	24%	36%	31%	38%	78%
IS - NACE O-Q	407	78%	43%	49%	48%	65%	89%

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Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
IS - NACE Other	2,332	67%	28%	37%	33%	48%	86%
IT - NACE A	211	54%	17%	27%	27%	51%	62%
IT - NACE O-Q	2,477	91%	23%	25%	30%	62%	78%
IT - NACE Other	11,140	77%	16%	19%	19%	37%	81%
LT - NACE A	36	85%	32%	36%	33%	73%	97%
LT - NACE O-Q	412	92%	36%	38%	37%	73%	96%
LT - NACE Other	2,574	77%	26%	31%	28%	51%	93%
LU - NACE A	7	75%	50%	57%	50%	75%	100%
LU - NACE O-Q	349	84%	32%	36%	35%	69%	92%
LU - NACE Other	3,051	73%	23%	29%	25%	49%	91%
LV - NACE A	74	85%	31%	35%	35%	88%	89%
LV - NACE O-Q	623	90%	31%	33%	34%	86%	91%
LV - NACE Other	2,631	60%	24%	35%	29%	65%	83%
ME - no information	5,267	52%	5%**	9%**	10%**	17%**	53%
ME - NACE A	26	60%	13%	19%	38%	75%	33%
ME - NACE O-Q	148	67%	4%**	6%**	19%	43%	22%*
ME - NACE Other	1,920	64%	10%	15%	24%	38%	44%
MK - NACE A	160	29%*	13%**	35%	42%	89%	32%*
MK - NACE O-Q	1,039	62%	17%*	25%*	22%**	92%	79%

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Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
MK - NACE Other	1,980	69%	33%	42%	53%	93%	62%
MT - NACE A	47	10%**	44%	89%	44%	57%	100%
MT - NACE O-Q	205	57%	51%	65%	52%	72%	99%
MT - NACE Other	997	67%	46%	56%	47%	64%	98%
NL - NACE A	252	62%	9%**	14%*	10%*	16%*	85%
NL - NACE O-Q	1,586	88%	19%	21%	27%	51%	69%
NL - NACE Other	6,975	78%	18%	22%	20%	32%	91%
NO - NACE A	144	68%	11%	15%	19%	25%	59%
NO - NACE O-Q	1,699	95%	27%	28%	32%	71%	86%
NO - NACE Other	8,202	82%	13%	16%	17%	29%	75%
PL - NACE A	803	34%	8%	20%	12%	20%	67%
PL - NACE O-Q	3,173	81%	17%	20%	20%	37%	85%
PL - NACE Other	28,102	43%	7%	14%	9%	14%	75%
PT - NACE A	96	88%	27%	30%	30%	57%	90%
PT - NACE O-Q	876	91%	36%	38%	37%	72%	96%
PT - NACE Other	3,710	88%	34%	37%	37%	71%	92%
RO - NACE A	266	47%	13%	25%	15%	33%	87%
RO - NACE O-Q	2,476	34%	11%	26%	14%	33%	75%
RO - NACE Other	4,887	43%	12%	24%	18%	30%	66%

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Sample stratum	Issued (N)	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
RS - NACE O-Q	988	88%	16%*	18%*	19%*	44%	86%
RS - NACE Other	2,398	87%	26%	29%	32%	56%	81%
SE - NACE A	90	65%	18%	26%	25%	36%	73%
SE - NACE O-Q	1,410	94%	34%	35%	38%	77%	88%
SE - NACE Other	5,646	76%	20%	24%	22%	38%	89%
SI - NACE A	106	83%	28%	32%	28%	56%	99%
SI - NACE O-Q	580	97%	29%	29%	29%	73%	100%
SI - NACE Other	3,305	90%	27%	29%	27%	58%	99%
SK - NACE A	194	96%	12%	12%	22%	40%	54%
SK - NACE O-Q	857	88%	21%	24%	30%	46%	72%
SK - NACE Other	5,457	83%	10%	12%	18%	28%	57%
TR - no information	48,434	50%	4%**	8%**	8%**	17%*	51%*
TR - NACE A	111	76%	14%	18%	17%	32%	83%
TR - NACE Other	2,697	80%	13%	16%	17%	28%	81%
UK - NACE A	2,128	32%	18%	39%	18%	40%	98%
UK - NACE O-Q	5,823	78%	24%	28%	24%	68%	98%
UK - NACE Other	14,035	60%	22%	32%	23%	53%	98%

* Low rate compared with NACE Other establishments (eligibility: <0.5 of other firms, other rates: <0.75 of other firms)

** Very low rate compared with NACE Other establishments (eligibility: <0.33 of other firms, other rates: <0.5 of other firms)

3.4.2 Comparisons with response rates and response maximisation procedures from other surveys

Table 19 below provides the response rates of ESENER-2 and three other CATI business surveys conducted across EU member states: Eurofound's third European Company Survey (ECS), the European Investment Bank's Group Survey on Investment Finance (EIBGS) and the European Central Bank's Survey on the Access to Finance of Enterprises (SAFE). The calculations are based on the AAPOR3 response rate as far as possible (SAFE is based on AAPOR4, which also counts partial interviews in the numerator). To provide a more direct comparison the ESENER-2 response rate presented includes establishments listed on the sample frame as having 10 or more employees only, in line with the population (and response rate calculations) of the 3rd ECS. Given they are also very similar surveys in terms of methodology and interview duration they provide a good comparison. The EIBGS and SAFE surveys used a quota sampling methodology, under which efforts to maximise the response rate are not required (most cases were called once or twice), meaning these response rates are expected to be much lower, as is seen.

The comparisons suggest that the ESENER-2 and 3rd ECS response rates are quite similar overall (24% and 26% respectively), with variation more marked between the countries. The ESENER-2 response rates were relatively low in Bulgaria, Croatia, Czech Republic, Germany, Hungary, Luxembourg, Montenegro, Poland, Romania and Slovakia (in these countries the ESENER-2 response rate is less than two-thirds of the 3rd ECS rate). While the 3rd ECS rates were relatively low in Austria, Denmark, Finland and Sweden (3rd ECS less than two-thirds of the ESENER-2 rates).

Table 19: Response rates of business surveys for countries covered by both ESENER-2 and 3rd ECS²⁵

Country	ESENER-2 (2014) – establishments 10+ (RRR3)	3 rd ECS (2013) (RRR3)	EIBGS (2016) (RRR3)	SAFE (2014) (RRR4)
Total (EU36/EU32/EU2 8/EU11)*	24%	26%	7%	15%
Austria	26%	16%	12%	15%
Belgium	30%	24%	5%	15%
Bulgaria	25%	38%	12%	NA
Croatia	26%	46%	11%	NA
Cyprus	25%	37%	14%	NA
Czech Republic	14%	23%	3%	NA
Denmark	34%	17%	11%	NA
Estonia	36%	46%	9%	NA
Finland	37%	25%	15%	23%

²⁵ Note: Turkey is not presented in the table, although covered by both surveys, as there was no information on the size of the establishments on the ESENER-2 sample frame and so by applying a 10+ size definition for the ESENER-2 response rate the country is excluded.

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Country	ESENER-2 (2014) – establishments 10+ (RRR3)	3 rd ECS (2013) (RRR3)	EIBGS (2016) (RRR3)	SAFE (2014) (RRR4)
France	23%	16%	5%	21%
Germany	18%	29%	10%	14%
Greece	31%	39%	17%	50%
Hungary	15%	41%	10%	NA
Iceland	41%	46%	NA	NA
Ireland	20%	29%	12%	26%
Italy	23%	19%	7%	15%
Latvia	32%	41%	10%	NA
Lithuania	32%	33%	14%	NA
Luxembourg	29%	44%	8%	NA
Macedonia (FYROM)	39%	53%	NA	NA
Malta	55%	39%	22%	NA
Montenegro	14%	58%	NA	NA
Netherlands	24%	16%	5%	14%
Poland	16%	36%	4%	NA
Portugal	39%	31%	13%	25%
Romania	23%	40%	5%	NA
Slovakia	15%	23%	3%	NA
Slovenia	30%	38%	13%	NA
Spain	25%	24%	8%	7%
Sweden	28%	17%	8%	NA
United Kingdom	27%	25%	6%	NA

* Total response rate covers 36, 32, 28 and 11 European countries for ESENER, ECS, EIBGS and SAFE survey respectively.

Of these comparator surveys, none covered NACE section A and only the EIBGS covered micro establishments. This survey had a lower response and cooperation rate amongst micro establishments (5% and 7% for AAPOR3 response and cooperation rates respectively) than larger establishments of

10 or more employees (9% and 12%). This shows that ESENER-2 was not alone in having difficulties with convincing micro-level establishments to participate. Obviously, this is heavily related to the topic and whether establishments see it as relevant.

▪ Contact rates and fieldwork effort

The contact rates of ESENER-2 and the 3rd ECS were also very similar, with the 3rd ECS again very slightly ahead (table 20, first two columns). Contact rates are generally associated with the level of fieldwork effort, in particular the timing and number of calls, as a more extensive effort should result in getting in contact with more of the sample. However, this is a crude measure of fieldwork effort on a business survey as the contact rate is also heavily influenced by the quality of the sample and contact information, which differs between sample frames. Therefore, we can also look at the actual numbers of contact attempts made. Columns three and four of Table 20 show that fewer calls were made per issued case on average in ESENER-2 than the 3rd ECS (4.9 vs 6.2). Therefore, overall more calls were made on the 3rd ECS for roughly the same contact rate, suggesting that fieldwork resources were used more efficiently on ESENER-2. However, it may also suggest that it was less straightforward to identify the correct person to speak to on the 3rd ECS than on ESENER-2, and so required additional contacts for this reason. The 3rd ECS targeted “a senior decision maker responsible for staff”, a definition that would typically encompass a wider group of people than the “person who knows best about health and safety in this establishment” of ESENER-2.

Given the influence of the sample frame on the contact rate the fifth column of the table indicates whether the same frame was used on the surveys. Looking at the countries, there are isolated examples where a low effort on ESENER-2 is associated with a low contact rate and where a better result was achieved at the 3rd ECS with more effort. FYROM and Montenegro provide the best examples of this, and given FYROM used the same sample frame this suggests the contact rate could be improved there. More common, however, are the examples where an apparently much heavier effort on the 3rd ECS was met with little benefit (Ireland, Italy, Greece – all using the same frames) or indeed a worse result (Portugal, Slovenia, United Kingdom – using the same frames).

Table 20: Contact rates and mean number of calls per issued case, ESENER-2 and 3rd ECS

Country	Contact rates		Mean calls per issued cases		Were the same frames used?
	ESENER-2 (2014) – establishments 10+	3 rd ECS (2013)	ESENER-2 (2014) – establishments 10+	3 rd ECS (2013)	
Total (EU36/EU32)	84%	86%	4.9	6.2	-
Austria	96%	99%	4.4	5.8	No
Belgium	77%	83%	4.5	4.0	No
Bulgaria	74%	82%	4.2	4.1	No
Croatia	92%	92%	4.7	5.5	No
Cyprus	82%	90%	4.7	6.2	Yes
Czech Republic	75%	82%	4.9	5.2	Yes
Denmark	85%	84%	5.2	6.1	No

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Country	Contact rates		Mean calls per issued cases		Were the same frames used?
	ESENER-2 (2014) – establishments 10+	3 rd ECS (2013)	ESENER-2 (2014) – establishments 10+	3 rd ECS (2013)	
Estonia	89%	97%	3.1	4.6	No
Finland	98%	96%	5.2	6.1	Yes
France	86%	72%	6.6	6.4	No
Germany	90%	94%	5.4	5.1	No
Greece	91%	92%	6.5	9.5	Yes
Hungary	77%	70%	3.7	4.6	Yes
Iceland	87%	87%	4.3	5.9	No
Ireland	96%	97%	6.6	12.4	Yes
Italy	83%	82%	5.6	7.4	Yes
Latvia	87%	84%	3.7	3.5	Yes
Lithuania	94%	87%	4.9	8.4	Yes
Luxembourg	91%	89%	4.9	3.2	Yes
Macedonia (FYROM)	68%	89%	2.3	5.8	Yes
Malta	98%	78%	6.6	5.9	No
Montenegro	46%	81%	2.7	6.7	No
Netherlands	85%	93%	4.4	4.7	No
Poland	79%	86%	6.3	6.8	No
Portugal	95%	85%	5.4	8.3	Yes
Romania	68%	95%	5.6	6.1	No
Slovakia	63%	76%	4.3	5.0	No
Slovenia	99%	91%	3.5	7.3	Yes
Spain	72%	81%	6.2	6.0	Yes
Sweden	90%	94%	5.9	7.6	Yes
United Kingdom	98%	93%	6.6	7.9	Yes

As noted above, the contact rate is heavily dependent on sample frame quality particularly the contact details. The ESENER-2 technical report (section 6.1.5, Table 13) gives the level of inoperative phone numbers across the survey countries, concluding that Montenegro, Turkey, Slovakia and FYROM were the countries that were most affected by this issue, followed by Albania, Romania and Norway (all countries where 25% or more of the issued sample resulted in an outcome of 'wrong telephone number' or 'information tone – fax – modem'). Accordingly, Table 20 shows that – of the countries just listed that are presented – the contact rates were the lowest on ESENER-2 (these are the only countries with contact rates of below 70%). Both surveys made efforts to rectify this situation via consulting external phone number sources. For ESENER-2 this involved looking up cases with an outcome of 'wrong telephone number' once during fieldwork²⁶, whereas the 3rd ECS technical report describes "intense efforts" including both non-answered numbers and those that were wrong numbers "of some kind"²⁷. This may explain why overall the 3rd ECS had a lower level of inoperative phone number final outcomes out of the issued sample (10%) than ESENER-2 (18%; out of establishments with 10+ employees to aid comparability).

▪ Other response maximisation procedures

There are a range of additional response maximisation procedures that can be deployed on business surveys, beyond those measures discussed above involving fieldwork effort. Some of these are listed in Table 21 below, along with stating whether they were used on ESENER-2 and the 3rd ECS.

Table 21: Additional response maximisation procedures

Procedure	ESENER-2 (2014)	3 rd ECS (2013)
Advance letters/emails (sent <i>before</i> contact)	Not included	30,854 advance letters/emails sent, 20% of issued sample
Motivation letters/emails (sent <i>after</i> contact)	25,151 emails sent, c.9% of <i>contacted</i> sample	29,287 emails sent, c.22% of <i>contacted</i> sample
Offering an alternative interview mode	CAWI ²⁸ offered to CATI refusals, 1,289 interviews considered of sufficient quality to retain in data, +0.4 % points on AAPOR3 response rate	CAWI initially considered but dropped due to comparability/quality concerns
Incentives (financial, or offering a report of the findings)	Not provided to our knowledge	Not provided to our knowledge

Advance letters or emails are sometimes sent to the issued sample prior to the initial contact attempts. This was done selectively on the 3rd ECS, to 20% of the total issued sample, as it was targeted at the sample initially issued at the start of fieldwork, and not the full sample that was required when the initial sample proved to be inadequate to reach the target number of interviews. As the initial sample was constrained to a ratio of 2:1, sample to interviews, this made the strategy more affordable. The problem with sending advance letters to the full issued sample is the quantities required, over 300,000 cases were issued for ESENER-2, and the majority of these cases would require postal contact due to lack of

²⁶ ESENER-2 Technical Report, page 64

²⁷ 3rd ECS technical report, page 31

²⁸ Computer Assisted Web Interview

emails, meaning the strategy is very expensive. A targeted strategy can be considered, but ideally this would be targeted at a group of lower-responding establishments rather than simply the cases issued first, as was done on the 3rd ECS. This strategy, assuming the advance letters were effective, would have pushed up the response rate even further for the cases that also had the longest period in field, and so the strategy could exacerbate non-response bias.

On ESENER-2 the smaller establishments generally had lower response and particularly cooperation rates²⁹. However, we would not recommend sending advance letters to micro establishments for two reasons. (i) These firms had a lower eligibility rate and so more of the letters would not reach a viable establishment for the survey, increasing costs. And (ii) we view it as sensible to de-emphasise rather than emphasise the survey subject matter with these establishments, given the findings from this and other research that suggest the micro sample tends to include establishments at the 'better end' of the OSH spectrum (see section 3.5.4). This is because it has been shown that in surveys where response propensity – i.e. interest in the subject matter – is related to the survey measures non-response bias can be increased if the survey topic is made prominent³⁰. A benefit of interviewer-led surveys is that the survey can be presented in different ways, both prominently and more subtly, to appeal to different groups and counter their objections to taking part. Some of this benefit could be lost if the survey content is presented in detail before contact.

Motivation letters or emails that are used during the survey are a common strategy for getting past gatekeepers who are often initially reluctant to pass on the call to the target person. This strategy was used on both surveys, and more extensively on the 3rd ECS. This may have been due to the way it was used, on ESENER-2 the emails were sent 'on request', whereas in the 3rd ECS it appears interviewers referenced the advance notification during their negotiations and so it was sent more often to those who said they had not received it. Given the point above about the potential for non-response bias when the survey subject is emphasised, the ESENER-2 strategy appears appropriate.

Offering an alternative mode is a further approach, sometimes used as a refusal conversion strategy, as was done on ESENER-2 with the offer of an online interview. However, the strategy had only marginal benefits, with an improvement in the ESENER-2 AAPOR3 response rate of 0.4 percentage points when adding online interviews of sufficient quality, which calls into question whether it was worth it. In the context of the impact on the extended universe, it is worth noting that the benefit was the same for micro establishments compared with the 10+ employees sample, i.e. the proportion of the interviews that were collected online was the same (2.8%), even though take-up was lower for micro establishments (as take-up of the CATI interviews was also lower).

Table 22 below provides the outcomes of the online interviews on ESENER-2. It should be possible to increase this benefit for the next ESENER, as internet take-up increases over time and people become accustomed to doing surveys in this mode. Further, response could be increased by offering the online interview to more of the sample³¹ and with a more intensive reminder strategy³² and by designing the questionnaire so that it works on all types of devices including smartphones (although the questionnaire would require re-design to work on smartphones, which may not be worth it unless the online response can be pushed up).

²⁹ AAPOR3 response rates by size: Micro (5-9) 23%, Small (10-49) 22%, Medium (50-249) 25% and Large (250+) 30%

AAPOR3 cooperation rates by size: Micro (5-9) 26%, Small (10-49) 40%, Medium (50-249) 48% and Large (250+) 54%

³⁰ Groves, R., Couper, M., Presser, P., Singer, E., Tourangeau, R., Piani Acosta, G. and Nelson, L. (2006). Experiments in producing nonresponse bias. *Public Opinion Quarterly*, 70:720-736

³¹ As shown in Table 22 only 38% of all refusals were offered the online interview. A sizeable group not offered the online interview -those with an outcome of 'refusal by target person' (55% of all refusals)- could also be attempted.

³² On ESENER-2 this involved one reminder email to non-responders one week after the initial link was sent by email

Table 22: ESENER-2 outcomes for the online interview module

Outcome	Micro (5-9 employees)	Small (10-49 employees)	Medium (50-249 employees)	Large (250+ employees)	Total (including 'no info')
All refusals	34,552	25,072	10,308	4,887	87,068
Refusals where online interview offered	12,981	11,292	5,190	2,616	32,952
Offer rate (% of refusals offered online interview)	38%	45%	50%	54%	38%
Online interview accepted and email link sent	6,870	7,513	3,583	1,765	20,432
Conversion rate, offer (% accepted out of offered)	53%	67%	69%	67%	62%
Full online interview completed	344	520	254	157	1,289
Conversion rate, interview completed out of accepted	5%	7%	7%	9%	6%

However, if a greater proportion of the interviews are done online this would give rise to the concern that there may be measurement differences due to mode effects, which could compromise quality. Giving full consideration to whether this is likely to be a problem for ESENER is beyond the scope of this review, however based on the short review below there are reasons to believe the CAWI mode would be less prone to measurement issues than CATI. Firstly, the survey literature suggests mode differences are most likely when mixing modes that use interviewers and aural presentation with those that are self-administered and so visually presented. Most notably, there is considerable evidence showing that socially desirable responses are more common in interviewer-administered than self-completion modes³³. The ESENER-2 Quality Report suggests this may have been the case, with CAWI respondents less likely to report some OSH good practices (whether OSH training is provided for employees and whether an action plan on work-related stress is in place³⁴). This would appear to suggest that, in relation to social desirability bias, CAWI would provide *better quality* data on ESENER. There is also evidence in the survey literature indicating that subjective questions are more prone to mode effects than factual questions³⁵ and that scalar questions are sometimes answered differently

³³ For example, Tourangeau R. and Yan, T. (2007). Sensitive Questions in Surveys, *Psychological Bulletin*; 133(5): 859-883; Kreuter, F., Presser, S. and Tourangeau, R. (2008). Social Desirability Bias in CATI, IVR, and Web Surveys: The Effects of Mode and Question Sensitivity. *Public Opinion Quarterly*; 72:847–65.

³⁴ ESENER-2 Quality Report, section 4.2.5 page 34

³⁵ Lozar Manfreda, K. and Vehovar, V. (2002). "Mode effect in web surveys", In the *proceedings from The American Association for Public Opinion Research (AAPOR) 57th Annual Conference, 2002*; Schonlau, M., Zapert, K., Simon, L., Sanstad, K., Marcus, S., Adams, J., Spranca, M., Kan, H., Turner, R. and Berry, S. (2003). A comparison between responses from a propensity-weighted web survey and an identical RDD survey. *Social Science Computer Review*; 22(1): 128-138.

when asked by telephone as opposed to visual modes³⁶; in particular telephone respondents give more extreme positive answers. These areas are of less concern for ESENER given the questionnaire consists of factual questions and uses few rating scales (Q451 is an exception).

Finally, some surveys provide some form of incentive, either financial or the offer of a report of the findings or league table so that establishments can compare themselves to their peers. It is not clear that this sort of strategy would be effective on ESENER, without incurring significant cost by offering financial incentives. A report on OSH is unlikely to promote interest amongst the establishments that lack interest in the survey topic, which are those of greatest concern for non-response bias, and similarly a league table would clearly be counter-productive for the same reasons.

3.4.3 Comparisons with survey estimates from other surveys

Estimating levels of non-response bias is notoriously difficult because we usually have very little idea of how non-responders would have answered survey questions had they cooperated. Assessments of levels of non-response bias therefore usually rely on indirect evidence, ideally via comparisons with other surveys of the establishment population that include similar questions to ESENER-2. Both the Labour Force Survey and the European Working Conditions Survey have included questions on work-related OSH issues, and were recently used with ESENER-2 in a joint analysis³⁷. However, they are general public surveys which cover the employee perspective and so are not comparable to ESENER-2 in a way that is useful to this review.

While not cross-European, the Workplace Employment Relations Survey (WERS) is an establishment survey that covers Micro establishments in the United Kingdom and includes some questions that are similar to those on ESENER-2. However, even the questions which cover common ground tend to be worded differently, making comparisons difficult. For example, both surveys include questions on consultation between management and employees on OSH issues, however, the ESENER-2 question (Q350) asks for the *frequency* of discussions on OSH, while WERS (ICONSULT) asks *what steps* are taken to inform and consult with employees *when OSH issues arise*. Both surveys report low levels of firms who do not consult workers at all on these issues (ESENER-2: 'not at all' – 4.6% of United Kingdom Micro establishments; WERS: 'no steps' – 4.3% of Micro establishments) but more substantively there is no common ground.

Another example of a somewhat comparable question concerns union representation. ESENER-2 asked "Which of the following forms of employee representation do you have in this establishment?" (Q166), and 10.4% of Micro establishments say they have "A recognised trade union representation". WERS (2011) asked "How many employees at this workplace are members of a trade union or independent staff association - whether recognised by management or not?" (ZUNIMEM), and 12.3% of Micro establishments answered one or more.

3.4.4 Conclusions and recommendations

Analysis of the survey outcomes for micro and NACE sector A establishments shows similar response rates to the other parts of the sample. For micro establishments, the AAPOR3 response rate is comparable due to the lower eligibility rate, meaning it is reasonable to assume that a greater proportion should not be counted in the base. Micro establishments did however have lower cooperation rates, which may be indicative of the presence of non-response bias. Contact rates were similar across the extended survey universe and rest of the sample, suggesting the sample frames used were of comparable quality in terms of accuracy of contact details.

³⁶ Dillman, D., Phelps, G., Tortora, R., Swift, K., Kohrell, J., Berck, J., and Messer, B. (2009). Response rate and measurement differences in mixed-mode surveys using mail, telephone, interactive voice response and the internet. *Social Science Research*, 39: 1-18.

³⁷ <https://osha.europa.eu/en/tools-and-publications/publications/health-and-safety-risks-workplace-joint-analysis-three-major/view>

It has not been possible to uncover direct evidence of non-response bias via comparison with other surveys. Indeed, on the small number of measures where we could compare the United Kingdom ESENER-2 sample with the Workplace Employment Relations Survey (WERS) we find similar results.

We also find that the response rates of ESENER-2 were similar to the 3rd European Company Survey (ECS), the closest survey to ESENER in terms of methodology and country coverage. One area where the ESENER-2 contact (and hence response) rates might be improved is in the level of inoperative phone numbers. This was higher in ESENER-2 than in the 3rd ECS, which the technical reports suggest may have been related to the (more substantial) efforts made in the 3rd ECS to improve the quality of the contact information. We have also compared the response maximisation procedures of the two surveys, including the number of calls to each case, use of advance and motivation letters, offering an alternative interview mode, and a strategy that could be considered – incentives – and conclude the ESENER-2 procedures are broadly appropriate but more could be made of the online mode (see below).

In conclusion, while we do not find direct evidence of non-response bias, there is undoubtedly a high risk that it is present given the overall ESENER-2 response rates. There are also suggestions that it may be a problem for micro establishments, given the lower cooperation rate, and findings from the qualitative work, see next section. Given this, if micro establishments are included in ESENER-3, we recommend considering putting in place a more intensive refusal conversion strategy or non-response investigation of these establishments. These strategies could be applied across the survey or focused on the micro establishments, and could take a number of forms. We note that all of these options have their implementation challenges, and none could provide a definitive answer on the presence or not of non-response bias, but they are worth considering.

1. Put more effort into the online interviews with consideration given to (i) inviting more of the refusals to participate online; (ii) more intensive efforts to convert those who agree to receive the online survey link into interviews, including additional emails and potentially phone-call reminders; and (iii) developing the questionnaire so that it works on mobile devices (smartphones and tablets), increasing its reach. The first two of these changes could be implemented relatively easily, without substantial change to the current ESENER approach. We see two potential benefits to this exercise. The first is to give a slight increase to the response rate. The second is that the CAWI mode may be less prone to social desirability bias and so may elicit slightly more accurate answers around OSH behaviours than the CATI mode. We do not suggest that the CAWI mode could (or indeed should) replace CATI, but that there is reason to believe that increasing the proportion of CAWI interviews would not be detrimental to data quality.
2. Make efforts to collect information from non-responders during the screening stage, which could be used to detect evidence of non-response bias and potentially in the weighting strategy. This would involve having a short, separate screener questionnaire which is used to establish eligibility and collect basic information about the establishment, usually attempted before asking to be put through to an appropriate person to complete the interview, but it could also be asked of the target respondent (necessary if the questions concern OSH practices directly). To be effective, it would be necessary to identify a small number of questions that correlate with key survey estimates. Potentially the economic situation of the establishment (Q451) or a new question on the supply chain position (see next section) would be candidates (the former could be investigated formally). The benefit of this approach is that it allows one to compare the responding and non-responding samples on the information collected, to provide some diagnosis on the presence of non-response bias. The information can also be used for weighting corrections if differences are found. In terms of disadvantages, it will still not be possible to complete the screener with substantial numbers of establishments, meaning the data does not represent all non-responders, which reduces confidence in its use in the weighting. This is also likely to be more of an issue in some countries than others, depending particularly on how well different interviewer teams implement it, and similarly the approach will be less effective for multi-site establishments in company-level frame countries (as the screening for establishments will need to be done first).
3. Conduct a non-response follow-up study, either as part of ESENER-3, or more selectively in a smaller number of countries afterwards. This would involve targeting more intensive efforts at a random sample of non-responders. To be effective such efforts would likely involve a

combination of interviewer-focused (i.e. using the most experienced interviewers, better-incentivising such interviewers) and respondent-focused (i.e. incentivisation) strategies. The data collected in such an exercise could either be used as a diagnosis for non-response bias, or could be incorporated into the main survey data, suitably weighted (i.e. the inverse of its probability of selection into the follow-up sample), as in a two-phase design³⁸. The disadvantage of course is that it is not clear that a more intensive strategy could achieve very much more on the response rate.

3.5 Assessment of measurement error

The objectives of this workstream were: (i) to assess whether the survey questions/constructs are applicable to establishments in the expanded survey universe, (ii) whether appropriate survey informants are selected to provide the information, and (iii) whether the CATI (Computer Assisted Telephone Interviewing) data collection methodology is effective in collecting the required data.

These objectives were addressed through three main tasks. First, a review of the ESENER-1 and -2 questionnaires was carried out. The aim was to identify gaps and questions that may cause problems for respondents in the expanded survey universe and through the use of the CATI mode. Second, an initial assessment of the capability of micro and NACE A firms to provide the requested data was made. This involved drawing comparisons between micro and larger firms, and between NACE A establishments and those from other sectors, in terms of their levels of missing and/or don't know responses to various policy and procedural questions in the ESENER-2 dataset. Third, in-depth qualitative interviews were used to seek the views of respondents from establishments within the expanded survey universe. In this case, the aim was to assess their response capability and the suitability of the CATI mode of data collection.

These three tasks were inter-dependent, with the findings of tasks 1 and 2 both contributing to the development of the topic guide used in the qualitative exploration carried out in task 3 – which formed the main tranche of the assessment of measurement error. The approaches taken in carrying out each of these tasks and their results are presented below. A final section then draws the findings together, presenting our conclusions and recommendations for ESENER-3. First, however, we briefly consider the background to this assessment by outlining current understandings of OSH in the expanded survey universe.

3.5.1 OSH in the expanded sample

Micro enterprises, and those operating in the agriculture, forestry and fishing sector, have played a significant role in society and the economy for hundreds of years. Moreover, it is widely acknowledged that they continue to play a major role in the EU economy. Micro enterprises represent over 90% of EU firms and employ almost a third of EU workers (EC 2016); while the agriculture, forestry and fishing sector accounted for the equivalent of 10.3 million people working full-time across the EU-28 in 2012 (Eurostat 2013).

It is perhaps not surprising, therefore, that there is a substantial body of literature devoted to OSH in smaller enterprises. Although there is rather less focused specifically on the agriculture sector, it too is dominated by micro organisations. For example, in the UK over 96% of enterprises in the agriculture sector are micro businesses (ONS data as at March 2017³⁹). Further, the sector generally shares many of the characteristics that are associated with micro establishments and have been linked to their OSH arrangements and outcomes, such as, for example in terms of employment types (use of casual and short-term labour, employment of family members etc.). It is, therefore, not unreasonable to suggest

³⁸ Hansen, M. and Hurwitz, W. (1946) The problem of non-response in sample surveys. *Journal of the American statistical association*, 41:,517-529.

Groves, R., Benson G., Mosher W., et al. *Plan and operation of cycle 6 of the. National Survey of Family Growth*. National Center for Health Statistics.

³⁹ <https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation>

that the findings of the literature focused on smaller enterprises are, at least to some extent, applicable to both these areas of the expanded ESENER-2 sample.

Most studies indicate that, in comparison with their larger counterparts, smaller organisations have both higher injury and fatality rates (for a review see Sørensen et al 2007) and, importantly for our purposes, less well developed procedural arrangements in relation to health and safety (see, for example, Hasle et al 2009, Walters 2001, 2002). The evidence suggests that the latter is the case for arrangements such as: OSH plans and policies; workplace risk assessment and control; accessing and using competent advice; providing information on safe work; and engaging workers and their representatives in these matters (Hasle and Limborg 2006, Sørensen et al 2007, Micheli and Cagno 2010, Hasle et al 2012, Legg et al 2015). These arrangements, of course, are the basis of the current process-based regulatory requirements, but there is evidence to suggest that owner-managers in micro establishments often lack both awareness of these requirements, and the resources and competencies to deliver them (Walters 2008, Olsen et al 2010).

Relatedly, the literature indicates that engagement and compliance practices within these establishments are often weak and limited (see, for example, Vickers et al 2006, Fairman and Yapp 2005), and in some cases even represent subversion of the requirements of regulatory policies, often at the expense of workers' OSH (see Eakin et al 2003). In fact, the findings of research in the United Kingdom on OSH in small establishments show quite clearly that although many owner-managers and their organisations find regulation burdensome and claim that the possibility of inspection is a significant determinant of their compliance behaviour, in fact knowledge of regulatory requirements is often scant and the likelihood of inspection is very low indeed for the vast majority of small establishments (Davis, 2004; Wright et al, 2004, 2005; Fairman and Yapp 2005; Baldock et al, 2006; Levine et al, 2012). Nevertheless, their relatively lower levels of engagement and compliance in relation to OSH are not necessarily a reflection of a lack of willingness on the part of the duty-holders within these firms. Rather, they can be seen, in many instances, as a consequence of the multi-faceted lack of resources within a substantial proportion of these enterprises. This lack of financial, but also temporal, knowledge, skills, capacity and other resources, in effect oblige such firms to follow 'low road' strategies in relation to their economic and business survival (EU-OSHA 2016). These are combinations of organisational and business strategies that include, for example, those focused on work organisation (including human resources management, hiring practices and industrial relations strategies), investment in skills, job quality, wages, social dialogue, innovation and so on, as well as those related to market position (such as low market entry, low value added and operation at the lower end of the value chain⁴⁰). Firms in this position, which include a very substantial proportion of micro organisations, are less likely than their better positioned peers to be able to prioritise or invest in identifying and solving health and safety problems (Nichols 1997, Hasle and Limborg 2006, MacEachen et al 2008 and, for a review, EU-OSHA 2016). As Hasle and Limborg (2006:8) put it:

....most small enterprises can be described as organisations which have to fight for survival with the owner as the responsible person who, like an octopus, has to handle many different issues at the same time and consequently, to no surprise, health and safety is not always high on the agenda.

Whilst it is important to bear in mind that micro establishments are by no means homogeneous, all of this suggests that, in the main, such establishments struggle to recognise and implement the legal requirements which are applicable to all European enterprises, regardless of size. As a recent review (EU-OSHA 2016) put it:

The shift from prescriptive OSH regulation to the current process-based approach, which has occurred throughout the EU, arguably assumes capacities for its delivery that are derived mainly from a knowledge base of experience within large organisations. Importantly, in this respect, forms of OSH management emphasised by process regulation require access to, and understanding of, a 'knowledge infrastructure', in which matters such as workplace risk assessment, prevention plans and policies, worker engagement, auditing and evaluation are situated and explained. However, a key finding of

⁴⁰ 'Value chain' is a term that is often used interchangeably with 'supply chain' but, strictly defined, it refers to the activities companies adopt within supply chains to create value exceeding the costs of the provision of goods.

qualitative research on health and safety in small and micro firms is that such knowledge and the access required to it are found far less often in smaller firms (Micheli and Cagno, 2010; Masi and Cagno, 2015).

In summary, therefore, micro enterprises are a heterogeneous group in many senses, including in relation to their occupational safety and health knowledge, awareness and management approaches (EU-OSHA 2016). In addition, in comparison with larger firms, micro enterprises generally continue to struggle to address the proportionally higher risks of their workplaces. Further, they are much more likely to suffer a multifaceted absence of the necessary means with which to address these risks, including not only material resources but also those of knowledge, skills, attitudes, education and training. As a result, the decision-makers in these enterprises are often themselves largely unaware of the problem of elevated risks in their undertaking and the contexts in which it operates. They are also frequently remote from, and unresponsive to conventional regulatory influences, while at the same time lacking both the motivation and knowledge necessary to initiate reforms. The majority, therefore, are at best reactive rather than actively seeking support or guidance to improve their OSH arrangements (EU-OSHA 2016). Thus improving OSH arrangements represents not only a challenge to the will and capacities of those responsible in these firms to deliver, but also one for regulators and other stakeholders. It is clear, therefore, that a solid evidence base from which to develop more effective policies and supports at the national and EU levels is important. However, it is further evident that the combination of factors summarised above also means that micro firms are a much harder group to reach, and successfully recruit to, OSH-related (or indeed other) research. In particular, such research frequently struggles to reach beyond those establishments that the owner-manager, rightly or wrongly, sees as successful in a business and an OSH sense – which the literature suggests is likely to be the tip of the iceberg (EU-OSHA 2016).

The expansion of the sample in ESENER-2 to include micro enterprises, as well as those in NACE sector A (agriculture, forestry and fishing), was an important step towards contributing to the evidence base. The evaluation of this expansion and determination to learn from its findings and develop ESENER-3 in their light, however, perhaps represents even more significant progress in this regard.

3.5.2 The ESENER-1 and ESENER-2 surveys

The ESENER-1 and ESENER-2 surveys look at how European workplaces manage safety and health risks in practice. Both questionnaires focus on:

- General health and safety risks in the workplace and how they are managed
- Psychosocial risks (stress, bullying and harassment)
- Worker participation in health and safety practices
- Drivers of and barriers to OHS management

ESENER-2, though, builds on and extends ESENER-1 in a number of ways – including, of course, those that are the primary focus of this project. In comparison with the 2009 survey, the 2014 survey:

- Has a larger sample size, and also includes additionally boosted samples in 3 Member States
- Extends to 5 new countries
- Includes micro establishments
- Includes establishments operating in the agriculture, forestry and fishing sector

Both surveys used the same methodological approach, collecting data through CATI. However, for ESENER-1, in each establishment surveyed, “the highest-ranking manager responsible for health and safety at work” was interviewed. In addition, an interview with the workers’ health and safety representative was carried out in those establishments where: a management interview was completed; there was a formally designated representative with specific responsibility for the safety and health of workers; and permission for the interview was granted by the management respondent. In ESENER-2, only a single interview was sought in each establishment, and this was with “the person who knows best about the way safety and health risks are managed at their workplace”. This change was made primarily to try to ensure the survey was completed by the person with the most knowledge about all aspects of

health and safety, though it was also expected that widening the inclusion criteria for respondents would decrease non-response rates.⁴¹

Although ESENER-1 and ESENER-2 covered the same core topics, collecting respondents' experiences in relation to risks, day-to-day health and safety management practice and policy, worker participation and supports and barriers, there were some differences in the detail between the 2 surveys. Specifically, ESENER-2 collected information about:

- The survey respondent (Q100, Q101, Q164)
- Home workers (Q111)
- OHS budget (Q156)
- Health promotion (Q158)
- OHS management training for team leaders (Q163)
- Risks for which information or prevention tools are lacking (Q202)
- Various specifics of risk assessment (see Q253 to Q259)
- Checks other than risk assessment (Q262, Q263)
- Reasons for taking measures to prevent psychosocial risks (Q304)
- Possession of sufficient information on including psychosocial risks in risk assessments (Q307)
- Preventive measures for MSDs (Q308)
- Discussion of health and safety between employee representatives and management (Q350) and areas of controversy arising in those discussions (Q351, Q352)⁴²
- Health and safety training for representatives (Q354)⁴³
- Health and safety training in other languages (Q357)

The increase in both detail and, importantly, specificity (in relation to terms, definitions, response options and so on) between ESENER-1 and ESENER-2 reflects what was learned from the experience of carrying out ESENER-1. As well as the various secondary analyses, this included a detailed qualitative post-test evaluation (EU-OSHA 2013). Given this substantial analysis of the content and methodology of ESENER-1 and its impact on ESENER-2, the intention for this task was not to carry out a detailed review of the full content of ESENER-2. Rather, the focus was on a broader consideration of the constructs covered in ESENER-2 in the light of what the literature suggests about how they might be interpreted by those in the expanded survey sample.

The ESENER-2 survey is, broadly and for good reason, framed around the legal requirements and so designed to measure the presence of the kinds of procedures necessary for compliance. However, the literature outlined above suggests that micro establishments, and those responding on their behalf, may have difficulty with some aspects of the policies, procedures and practices it is intended to capture. That is, it is clear from the literature that no aspect of business is managed within micro enterprises as it is in larger organisations. This, of course, includes the management of OSH, where regulatory emphasis is now on process rather than prescription, which means it focuses on OSH management. Those representing micro firms, therefore, are very likely to have some conceptual difficulties with questions that address OSH management in ways that are more familiar to those in larger enterprises. For example, OHS knowledge and understanding on which some areas of the questionnaire are predicated may not necessarily be present in micro enterprises. In this respect, Section E of ESENER-2, on risk assessments, is perhaps the clearest example. The section opens by asking if the establishment regularly carries out workplace risk assessments (Q250). Although there is an instruction to the interviewer to add some further information if needed⁴⁴, the literature and indeed our own fieldwork experience in a number of projects focused on smaller workplaces (such as, for example, the ongoing

⁴¹ See: https://oshwiki.eu/wiki/ESENER-2_Methodology

⁴² These areas relating to workers' representatives were covered in the worker representative survey of ESENER-1, but have been included here as they are now asked of all respondents from establishments with workers' representatives, not just those where the second survey was carried out.

⁴³ See previous footnote.

⁴⁴ Specifically: A risk assessment is a structured review of what, in your work, could harm people, and how these risks will be controlled.

EU-OSHA funded SESAME project⁴⁵), would suggest that respondents, particularly those from the smallest establishments, may not fully understand the term ‘risk assessment’ or its relevance to the requirements. In addition, such respondents may not connect the term and its explanation to what, if anything, is done within their establishments to meet this requirement. Information about what happens in practice within an establishment, therefore, may not be captured, not least since Q250 serves as a filter question for much of the rest of Section E.

Similarly, Q258b and Q305 ask about the involvement of employees in the design and implementation of measures taken following a risk assessment and measures to address psychosocial risks respectively. These are intended to capture worker participation, a key aspect of the requirements. However, the response options are limited to Yes, No, No answer (or That depends on the type of measures, in the case of risk assessment). As such, it is not clear what respondents would understand by ‘involvement’ in these instances, the extent to which this would constitute ‘participation’, or how this might vary by establishment size or sector.

In fact, the literature and previous experience suggest that these kinds of difficulties with understanding terms and their relevance may extend to documented approaches to OSH management more generally. A number of areas of the questionnaire focus on the documentation of procedures, policies and practices (for example, Q155 on a document detailing health and safety responsibilities and procedures, Q255 on the documentation of risk assessment, and Q160 on the routine analysis of sickness absences), and implicitly assume both understanding of the terms and requirements, and the presence of documentation. Again, these may be problematic for micro establishments both because of the level of relevant knowledge held by the respondent, and because of the less frequent use of a formalised approach within these establishments (though, of course, in some cases, their less formalised ways of dealing with these issues might be effective).

Similarly, there are a number of other instances where the available responses may not be sufficient to capture the realities of micro workplaces. For example, Q156 asks about the presence or absence of a specific budget set each year for health and safety measures and equipment. For many establishments, including those larger than micro establishments, such spending is likely to be, at least in part, reactive – something that is not captured by a yes or no response. In addition, Q358 asks about the regularity of discussion of health and safety issues in staff or team meetings. Within most of the smallest establishments, there are no scheduled meetings, but this is not necessarily to say that health and safety issues are not discussed.

There is a possibility, therefore, that the survey as it stands may not be able to probe sufficiently into workplace practice to adequately reflect what happens in micro establishments. This is the result of the survey’s structure around the formalised institutional presence of procedures such as documentation (in relation to policy and risk assessment) and proactivity (in relation to planned meetings and OHS spending) – which is related to the likelihood of a lack of, or lower infrastructure around, knowledge in relation to OHS among micro establishments.

Relatedly, ESENER-2 asks all respondents if they have been visited by the labour inspectorate to check on health and safety conditions within the last three years (Q165). Over half of respondents reported that their establishment had and, although the expected size and sector differences were present, proportions among micro and agriculture sector establishments were 46% and 62% respectively. This is remarkably high, particularly given the clear decline in the number of inspectors, inspections and enforcement actions in many Member States in recent years (Cardiff University et al 2011, Hazards Magazine 2010, quoted in Tombs and Whyte 2013, Tombs 2016). These indicate that in Sweden, for example, only 5% of workplaces (of all sizes) are likely to be inspected in any one year (Frick 2009, Walters et al 2011). Our recent experience (for example in the ongoing EU-OSHA funded SESAME project⁴⁶) suggests that smaller establishments often struggle to distinguish between labour inspectorate visits and those related to, for example, food hygiene or other sectoral requirements. One possible explanation of the high proportions reporting an inspection, therefore, is that this question is capturing a range of ‘inspection’ situations, rather than just labour inspectorate visits.

⁴⁵ See: <https://osha.europa.eu/en/themes/safety-and-health-micro-and-small-enterprises>

⁴⁶ See: <https://osha.europa.eu/en/themes/safety-and-health-micro-and-small-enterprises>

Lastly, there is a further area⁴⁷ that ESENER-2 does not cover but which the literature suggests may be closely linked to OSH management practice and its outcomes, particularly among micro enterprises. The survey does not collect information on the context of establishments and the environment in which they are operating. For example, no details are collected about supply chain position, but the literature indicates that workers in establishments at the ends of outsourced supply chains, many of which are micro enterprises, are often at significantly increased risk of poorer working conditions and OSH management arrangements and outcomes than their counterparts in establishments nearer the top of such supply chains (see, for example, Quinlan et al 2001, Quinlan and Bohle 2008, Di Nunzio et al 2009, Weil 2014). In addition, the nature of the supply chain an establishment is part of, as well as its position within that chain, may be influential over its workplace OSH arrangements themselves (see, for example, Walters et al 2012, Walters and James 2009).

3.5.3 Evidence of capability based on ESENER-2 data

This section covers the second area of investigation, considering whether the data provides any pointers as to the capability of micro and NACE A firms to provide the information requested. The questionnaire makes provision for respondents to give 'no answer' as a response to any of the questions⁴⁸. Based on the survey data, we do not find evidence that establishments in the extended survey universe were less able to provide answers to the substantive survey questions than other types of establishments. As Table 23 shows, overall, respondents from micro establishments gave fewer 'no answer' responses per interview (1.25 on average) than those in establishments with 10 or more employees (1.33, 1.51 and 1.61 for small, medium and large establishments respectively). However, as they are also asked to answer fewer questions due to the questionnaire routing (98 compared with 115 for the largest establishments) the percentage of 'no answer' responses per question answered is very similar.

Table 23: ESENER-2: 'no answer' responses by establishment size

	Micro (5-9)	Small (10-49)	Medium (50-249)	Large (250+)
N 'no answer' per interview	1.25	1.33	1.51	1.61
N questions presented to the respondent per interview	98	104	112	115
% 'no answer' per question answered	1.3%	1.3%	1.4%	1.4%

⁴⁷ We also note again here that the perspective of workers is not captured by ESENER-2 – an omission that is common in the wider literature on OSH among smaller establishments (EU-OSHA 2016) – and that no information is collected on either safety or health performance. These areas are beyond the scope and remit of the current project. They are, nevertheless, very significant in relation to understanding OSH experiences in firms of any size and operating in all sectors, and it is important that their absence from much of the research on smaller firms in particular, and its potential consequences for our understanding, is acknowledged.

⁴⁸ It is worth noting the 'no answer' category is not offered explicitly (it is not read out by the interviewer) and so we would expect very few respondents to take it up (the majority would not realise it is an option) and to rather pick an answer that seems most reasonable if they are unsure. As such, the numbers selecting the 'no answer' category are very low and not reflective of the true proportion of respondents that did not know the answer to each question.

For NACE section A (see Table 24) we see a similar pattern, with very little difference with the other sectors. The public sector categories (NACE O-Q) have slightly increased levels of ‘no answer’ responses than the others.

Table 24: ESENER-2: ‘no answer’ responses by establishment NACE section

	NACE A	NACE O-Q (public sector)	NACE Other (B-M, R-S)
N ‘no answer’ per interview	1.34	1.55	1.32
N questions presented to the respondent per interview	104	107	105
% ‘no answer’ per question answered	1.3%	1.5%	1.3%

It is also the case that the small differences that are observed may be explained by the type of respondent who provides the interview, rather than the size or category of the establishment. Interviews with micro and NACE A establishments are both more likely to be completed by the owner/manager (micro: 55%, 10+: 27%, NACE A: 47%, NACE B-S: 34%), and respondents in this role are least likely to provide ‘no answer’ responses (a rate of 1% per question compared with 1.5% across the other respondent types).

3.5.4 Evidence of capability based on in-depth qualitative interviews

In this section we present our approach to and findings from task 3, the in-depth qualitative interviews carried out among establishments from the expanded survey universe. We begin by describing where the data were collected and the reasons behind these selections.

In addition to their many unique characteristics, the EU Member States share various features. For comparative research focused on OSH (EU-OSHA 2013, EU-OSHA 2016), a number of these shared features have been used to group countries that have something in common in terms of:

- Their regulatory character and administration of OSH provisions and institutional arrangements for the surveillance of compliance.
- Their labour relations systems, including the historical development of these systems and the power of the actors within them.
- The nature of their economies, the spread of productive activities and services, as well as business types, the relative size of the public and private sectors, economic policies; and,
- Their systems and policies for social welfare.

On the basis these features, the current EU-28 Member States can be clustered into five groups:

1. Western Europe: Austria, Belgium, Germany, Luxembourg, Netherlands.
2. Northern Europe: Denmark, Finland, Sweden.
3. British Isles: Ireland, United Kingdom.
4. Southern/Latin Europe: Cyprus, France, Greece, Italy, Malta, Portugal, Spain.
5. Central and Eastern Europe: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia, Slovakia.

Previous analyses of the ESENER-1 and -2 data have identified differences between these groups in relation to the various practices and procedures measured by ESENER. In summary, these show that

levels of implementation of these measures are generally highest in the second and third of these groups – that is, in the British Isles and northern European countries (Walters et al 2012, 2013, Wadsworth and Walters in press). This suggests that establishments in countries with more embedded approaches towards the process-based participative approach to OSH management required by the Framework Directive 89/391/EEC⁴⁹ in their regulatory systems are more likely than those where these approaches are relatively newer to have high levels of implementation of ‘good’ OSH practices in their workplaces (Walters et al 2013).

Our aim in this task was to focus data collection in areas where implementation levels would be expected to be relatively low – that is, where any issues with the survey content may be more pronounced. We therefore chose to focus on groups 4 and 5, the southern/Latin European and central and eastern European countries, since these are the groups in which process-based participatory OSH management regulatory systems have been in place for a relatively shorter period. From these groups, we chose to collect data in Spain and Romania. While this in part reflected pragmatic factors, including our existing contacts and capabilities in these two Member States, this choice was also based on these countries’ approaches to the transposition of the Framework Directive 89/391/EEC. Spain used the opportunity of the Framework Directive to undertake a major reform of its regulatory system for OSH; while Romania, as a relatively new Member State but also one that has made the transition from its former Eastern Bloc membership, also had to make substantial changes in this regard.

All Member States have transposed the requirements of Framework Directive and its associated OSH Directives. However, there are differences between countries in how this has been done. From the point of view of this assessment, key differences include the extent to which exemptions are made for smaller enterprises and the wider systems within which the regulations are embedded. For Spain and Romania, these differences fall into two key areas: the use of external prevention services; and systems for worker participation.

In terms of the former, under the Framework Directive, employers have responsibility for OSH. However, the extent to which in-house resources and/or external prevention services are used to meet this responsibility varies by Member State. In Spain, establishments can choose to use their own internal services, collaborative prevention services (provided by associations of companies, usually operating in the same location and/or sector, which pool their financial and/or other resources), or to contract an external service provider. A similar situation exists in Romania (with the exception of the collaborative prevention services), where companies are required to use an external service if they do not have the capacity to fulfil their legal duties internally. In both Romania and Spain, using an external service is generally regarded as the most resource efficient way of meeting the legal requirements, in particular among the smallest establishments. This is in sharp contrast to other Member States, such as the United Kingdom, where the use of such services is much less common, particularly among smaller establishments (see the forthcoming SESAME project⁵⁰).

Turning to worker participation, the Framework Directive also requires a participatory approach to OSH management. Again, however, the ways in which this obligation is met can vary. In Spain, workers in companies with six or more employees can elect workers’ representatives to represent them on matters including OSH. And in both Spain and Romania, joint OSH committees, on which managers and workers’ representatives sit together, are only obligatory for establishments with 50 or more employees⁵¹.

These kinds of differences are influential over the approaches taken in the workplace to OSH management, and it is important to bear them in mind when considering the findings described below.

▪ Sampling and data collection

In both Spain and Romania, the aim was to carry out in-depth interviews with representatives of 20 establishments: 10 operating in the agriculture or forestry branches of NACE A; and 10 micro enterprises. For the latter, data collection was focused on three sectors each dominated by smaller firms, but with

⁴⁹ For more details see: <https://osha.europa.eu/en/legislation/directives/the-osh-framework-directive/1>.

⁵⁰ See: <https://osha.europa.eu/en/themes/safety-and-health-micro-and-small-enterprises>

⁵¹ In Romania, the labour inspectorate can require the formation of such a committee in smaller enterprises.

substantially different risk profiles: construction; hotels, restaurants and catering (HORECA); and retail. In each case, following the approach used in ESENER-2, interviews were sought with the ‘person who knows best about health and safety’. Contact details for the establishments were sourced from Dun & Bradstreet. Table 25 shows the matrix of establishments sought, as well as details of the final sample.

Table 25: Sampling matrix and resulting sample

Quota group:		Spain		Romania	
		Sought	Final sample	Sought	Final sample
Micro establishments (5-9 employees) ⁵²	Construction	4	4	4	4
	HORECA	3	3	3	3
	Retail	3	3	3	3
	Micro (5-9 employees)	5	4	5	4
NACE A or (agriculture forestry) establishments	Small (10–49 employees)	3	4	3	3
	Medium or larger (over 50 employees)	2	2	2	3

Findings

The review of the ESENER-1 and -2 questionnaires, and our previous experience of the analysis of their datasets, suggested four broad areas of concern on which the fieldwork findings might shed light. These included:

1. Participants and participating in OSH surveys
2. Knowledge and understanding of OSH requirements
3. Key areas and concepts
4. Supply chain position

These areas are covered in turn below. In each case, the focus is on micro establishments in particular. These establishments, which were included within the NACE A sample as well as in the sample focused specifically on them, made up the majority of our participants (see Table 3 above), and were of particular interest to EU-OSHA. However, where findings are specific to NACE A, this is noted.

Participants and participating in OSH surveys

Recruitment, in both Spain and Romania, was very challenging. This was the case for all sectors and, in particular, among the smallest establishments. Overall, the research teams in these two countries *each* needed the contact details of around 800 firms to achieve the 20 interviews. This was in part a result of the quality of the contact details provided but primarily due to refusals. Most refusals were on the grounds that the 45 minutes required for the telephone interview was too great a time for anyone from the establishment to be able to spare. However, some also refused after learning that the focus of the study was OSH. Those involved with the recruitment process felt that this may have reflected a perception that the interview would be ‘threatening’ – perhaps indicating a relative lack of confidence in

⁵² Small numbers of establishments included in the fieldwork for the Micro group had 3 or 4 employees due to seasonal downward fluctuations.

their OSH arrangements. In general, those who did agree to participate felt both that their establishments had OSH arrangements in place and that these were adequate and effective.

Both Spain and Romania have suffered substantial economic and labour market instability in recent years, and it was clear that the effects of these challenges were still being felt. However, among the participating establishments, and perhaps in particular those in Spain, there was a feeling of having 'turned the corner' in this respect. So although some respondents, particularly those in Romania, expressed difficulties in relation to, for example, recruiting and keeping appropriately qualified and reliable staff, there was a perception that things were generally 'moving in the right direction'. Overall, for the most part, the participating establishments were described to the researchers as being relatively well-established (i.e. not start-up firms) and economically stable, with many intending to, or in the process of, expanding – for example, describing plans to take on more employees and/or offer further development training to their existing staff.

Among those which did participate, some respondents explained that they were happy to do so because they hoped that, in the long-term, sharing their views would contribute to improvements in relation to the regulatory administration of OSH. Many felt that OSH practice had been improved by the introduction of requirements on, for example, risk assessment. However, as we explain in more detail below, there was also widespread concern about the level of bureaucracy and documentation that was seen as being required to achieve compliance with these requirements. Some respondents, therefore, hoped that their participation would help reduce these 'burdens', in particular for smaller firms. This was because they felt that the regulations had been developed to suit the needs and capacities of large companies and had not been adapted to the very different needs and resources of micro and small enterprises, especially those operating in what they saw as low risk sectors (such as retail).

With only one exception, the respondents themselves were managers or owner-managers, and among the micro establishments in particular, their businesses were often family owned and run. As this would imply, for most, therefore, OSH was not their main responsibility, but was something they dealt with alongside their core duties. In accordance with national norms and requirements (see above), virtually all of the participating establishments used an external service for support with OSH, so most respondents described their OSH responsibilities as, at least in the first place, primarily revolving around liaising with these organisations. In Spain, this usually meant two separate services, one supporting the establishment on safety prevention arrangements and the other on health; while in Romania it generally meant a single service. As is clear from the findings presented below, overall there was a strong tendency among the respondents to regard OSH as something dealt with by these services, as opposed to a matter for the establishment itself and the study respondents in particular:

I am not sure I will be able to help you with all your questions, because although health and safety at work, as I said... we have an outsourced person in charge with this ... it's his responsibility ... In terms of legislation, he is the one who comes and tells us what we need to do (Agriculture, 65 employees, Romania)

As this quote indicates, a number of those who took part were concerned that they would not be able to respond to the questions put to them during the interview. In fact, in one case the participating establishment arranged for an OSH specialist from their external service to participate in the interview on its behalf since its subject matter was 'their area'. It seems highly likely, therefore, that these kinds of concerns and considerations were also influential over the refusal of others invited to participate in the research.

Taken together, these findings raise concerns about which enterprises and respondents agree to participate in research of this nature and, more importantly, which do not. They confirm the suggestion made in previous analyses of the ESENER-1 and -2 datasets that such samples are likely to represent 'the best end of the spectrum' both in terms of workplace OSH practice and in relation to business viability, and as such to under-represent those operating 'low road' approaches to their survival. However, they also extend this concern by raising the possibility that this bias may be particularly acute among the smallest enterprises. This is also supported by the findings presented above, which highlight the lower cooperation rate at ESENER-2 amongst micro firms than firms of other sizes.

Knowledge and understanding of OSH requirements

On the whole, the interviews suggested some awareness and understanding of the OSH regulatory requirements among all of the respondents. However, as the previous section indicates, it was also clear that for many the task of ensuring that the relevant arrangements were in place for the participating establishment to be compliant was regarded as the duty of the external service provider. Similarly, interpretation of the OSH regulations was seen as the responsibility of such a provider. So although the person 'who knew best about health and safety' within the enterprise was often aware that s/he should, for example, at the very least read through the documentation provided by the external service, even this was sometimes seen as something of a challenge:

Interviewer: And what does this safety-at-work file include?

Participant: We have all the topics in there, our contract with them, the sheets... Honestly, it's a bad file, I don't know exactly... Laws, decisions, law no. 306... (Agriculture, 8 employees, Romania)

Respondents explained that 'assigning' OSH to an external service had a number of very substantial advantages. These included perceptions that it was:

- more cost effective than carrying out the tasks in-house
- ensured complete compliance and hence the avoidance of sanctions – which in many cases were seen as being punitive
- removed at least some of the 'bureaucratic burden' associated with compliance
- necessary because the regulations and requirements were so complex that only an expert could understand, and be certain of remaining up to date with, them
- ensured that responsibility for requirements in areas such as employee training and medical review were appropriately and promptly dealt with and met
- provided a quicker and more accurate way of finding answers to questions and solutions to problems than trying to address issues in-house
- and provided protection for the company should there be a serious incident

In addition, in one instance the respondent explained that the external service had been hired:

Because we wanted to improve safety and health to be honest. Because we were having too many accidents so to improve the company in that regard then we hired a prevention technician to advise us and work with us (Agriculture, 40-50 employees, Spain)

He went on to confirm that there had been fewer accidents since, suggesting a positive impact of the establishment's use of the external service.

However, this kind of direct link with OSH outcomes was not commonly made by the respondents. Rather, despite a general awareness of the need for compliance with the OSH requirements, for the most part the interviewees did not seem to have a clear understanding of what this meant in terms of workplace occupational health and safety. In many cases there was something of a 'disconnect' between the awareness of the need to put in place various arrangements for fulfilling legal obligations on the one hand, and how, or indeed if, such arrangements might make the workplace safer and healthier for workers on the other:

an investment and unnecessary work in certain businesses in which the level of risk is very low or not even existent (Retail, 5 employees, Spain)

a lot of work and a lot of investment for the company while in the worker does not always value the effort of the company (Agriculture, 150 employees, Spain)

This also raises the issue of 'paper compliance' – that is, firms being apparently compliant according to their documentation, but such paperwork having little or no correspondence with workplace practice. This is, of course, something that is particularly difficult to assess among establishments of all sizes and sectors. However, this potential mismatch between documentation and practice, and the difficulty of capturing it, is an area of concern for surveys such as ESENER. It is perhaps added to by the not unexpected finding that many of the respondents, despite generally recognising the need for regulations, often regarded the requirements as unnecessarily complex and burdensome. In particular, this seemed to apply to requirements around documentation, which were seen by many as frequently unnecessary and certainly not as a source of reference or information relevant to workplace practice.

As expected, some sector differences were also apparent in this area. The priority afforded to OSH increased with perceived level of risk. This was lowest in the retail sector, where risks were generally regarded as negligible, and highest in the agriculture and construction sectors, with HORECA falling somewhere in between. In fact, in the 'lower' risk sectors, measures to deal with fire (fire extinguishers etc.), and hygiene conditions, were regarded as being of greater priority to the business – the latter, of course, particularly so in HORECA.

These findings have important implications for surveys such as ESENER. They suggest that the ways in which survey questions are *understood* may vary with the circumstances of the participating establishment – in particular its size, sector of operation and the way in which it meets its OSH obligations (in-house or through an external service). This, of course, makes the *interpretation* of responses more complex.

Key areas and concepts

This section presents findings in relation to a number of areas identified by our review of the ESENER surveys and our previous experience as being of particular interest in the assessment of measurement error. These include: the presence of a written health and safety policy; risk assessment; worker participation; and the labour inspectorate. They are dealt with in turn below.

Health and safety policy

The production and regular updating of a written health and safety policy is seen as central to effective OSH management. Within our sample, most establishments reported that they had one. However, it was often regarded as the responsibility of the external service provider. In many such cases, it was clear that the resulting document did not always closely relate to practice, and in some cases there was uncertainty about its existence:

If it exists, the external advisor sends it to me once a year, renewed (HORECA, 3 employees, Spain)

Yes, we have it, honestly, I do not pay a lot of attention to it but they are available, hard to read but available. Too long and too cumbersome ... if I have doubts I call the advisor (Retail, 5 employees, Spain)

Typically, respondents explained that the document was 'filed in the office but never used', again raising concerns about 'paper compliance', and the associated danger of surveys over-representing 'practice' by capturing only 'documentation'.

Risk assessment

Similarly, the process of regular risk assessment is central to the requirements. For the most part, our respondents were aware of this – though not all reported that it was carried out (despite the involvement of an external service):

Forget about this... We didn't do any risk assessment (Forestry, 27 employees, Romania)

Respondent: No, we didn't need it [risk assessment] because... if it had been a large unit, it may have been required ... but in our case it wasn't required because we only work one shift and it's not needed. It's not a considerable risk.

Interviewer: But is there no obligation to make this risk assessment? I mean at first, when you're beginning... Is there no written document on risk assessment?

Respondent: We don't have such a thing. (HORECA, 6 employees, Romania)

However, in other instances it was clear that the term was simply not understood (again these firms used external services):

Interviewer: How are risks assessed, the risks associated to this activity that you're doing? How are risks assessed?

Respondent: Risks assessed... I don't know what you mean... (HORECA, 5 employees, Romania)

Interviewer: What does risk assessment mean to you? What do you associate it with?

Respondent: I'm not sure. (Retail, 5 employees, Spain)

In most cases, though, risk assessment was seen as the responsibility of the external service provider and was frequently carried out by those organisations, often seemingly at some distance from the respondent:

This man from the [external service] deals with it [risk assessment]. He tests the employees from time to time and evaluates each of them ... They [the risks] are the same. There are some clear rules and if you stick to them, you have no problems (Construction, 4 employees, Romania)

Risks are evaluated depending on the workplace, risk assessment is done for each employee. It's done by the outsourced company ... they have a tradition and this is what they do, they provide information (Agriculture, 80 employees, Romania)

However, as noted above, there was some indication of greater levels of awareness and involvement where the work being carried out was perceived as being riskier, as this quote from the respondent from an establishment which sometimes worked with asbestos indicates:

For us, it [risk assessment] is when we have a new job that we haven't evaluated before, at that moment, we call the prevention service and the prevention service along with our technician goes to the work site where that risk is going to be, it is evaluated, the documentation is created and is incorporated into the big book and the things are done according to the book (Construction, 8 employees, Spain)

More generally, there was a widespread lack of managerial involvement in the day-to-day processes of risk assessments and their documentation, which were not always seen as making a positive contribution, or as something 'owned' by those working in the establishment:

I don't see the added value. That we have to be careful with the ladders, well, that's obvious (Retail, 5 employees, Spain)

Interviewer: If I tell you risk assessment what words come to mind? What does that mean?

Respondent: I think to have everything in good condition. And people that help me out with the regulation, and that's what I have them for so I'm not worried (HORECA, 8 employees, Spain)

This again raises the issue of the extent of the connection between paper compliance and workplace practice, and so also quite what is being captured in some survey questions. In addition, however, there is a suggestion here of a tendency towards individualisation and responsabilisation in relation to risk – that is, a tendency to hold workers individually responsible for their own safety at work. This was further evident in the widely held view among the respondents – nearly all of whom were managers – that, on the whole, OSH problems (including incidents) arose as a result of workers not complying with procedures. Examples given tended to focus on failure to wear personal protective equipment, or use safety gear, usually because these were reported as being perceived by workers as uncomfortable or leading to having to work more slowly.

Worker participation

A participative approach to OSH management is also at the heart of the requirements. However, the majority of our respondents felt that workers were generally not interested in participating in OSH and were, for the most part, 'passive' in this regard. It is important to remember at this point that all but one of the respondents were owners and/or managers, so there is no workers' perspective here. In addition, it was evident that in some cases respondents did not know how to encourage worker participation, and that for some the distinction between worker 'participation' and worker 'compliance' with health and safety practices and procedures was blurred:

I would like my workers to be more aware of the risks they run, to use more and better security equipment, sometimes I feel powerless (Agriculture, 150 employees, Spain)

The workers comply with the required minimum, go to training courses and medical checks but there must always be a compliance officer even if they use the safety equipment they never see the risk until they have it before their eyes (Forestry, 5 employees, Spain)

Interviewer: Do they ask you any questions? The employees?

Respondent: No, they laugh at all this. They never ask any questions. We don't consider that there are risks in this company. There are risks as in any situation in life (Retail, 5 employees, Spain)

[Worker participation means] That they have to do things the way they are supposed to be done. But they are not small children, they are adults. They understand that if we do not follow the regulation and have everything in good condition that could have serious consequences, they know that. (HORECA, 8 employees, Spain)

There was also little to no evidence of regular meetings at which OSH was discussed. This, of course, is what would be expected in a sample of micro establishments, among which communication of all sorts, including that in relation to OSH, is almost invariably informal and ad hoc. However, it was clear that, in some instances, workers did make suggestions that were taken on board:

If there is anything they would need in their activity, to carry out their tasks along the day. If they have any proposals, that's no problem. The situation gets analysed ... There are cases when there have been proposals, and they have been taken into consideration (Forestry, 8 employees, Romania)

They give tons of ideas. And many that don't require a big investment. They think of ways to improve things even themselves, or with other workers. When we meet with them, that we try to give them support they have tons of ideas (Agriculture, 4,500 employees, Spain)

Despite this, from our interviews, there was no evidence of any involvement of workers in the processes of evaluating or documenting the main risks present in the workplaces. This is particularly important given that the ESENER-2 findings indicate that levels of involvement in measures taken following risk assessment and to address psychosocial risk among micro establishments are 84% and 64% respectively (with corresponding rates for all establishments, regardless of size, 81% and 63% respectively)⁵³. This is of concern, since it suggests that positive responses to these questions may not reflect 'involvement' in the sense that is intended by the survey. Rather, it may be a measure of, for example, the extent to which managers feel workers comply with workplace rules in these areas. In addition, as we have already noted, and also of concern, was the fact that, where companies used an external service (which, as we have made clear, was the majority of our participants), there was in fact little evidence of the involvement of *managers* in any meaningful way in the process of risk assessment and its documentation. As well as being likely related to the lack of involvement of workers, this too has significant implications for interpreting the responses to ESENER questions because it suggests that, as they stand they do not sufficiently probe the realities of worker participation in micro establishments. As we have already indicated, this reflects the differences between micro and larger firms in relation to their whole approach to business management generally, and in this instance specifically in terms of the institutionalised forms of worker participation that are present in larger organisations but absent in micro firms.

Labour inspection

The majority of the establishments reported having been visited by the labour inspectorate. This is something that is likely to reflect, at least in part, the sectors that were the focus of our fieldwork. However, it was also clear from the interviews that such inspections were one of many that establishments experienced, and that distinguishing those focused on OSH from those concerned with other areas might not always be clear-cut:

We have inspections all over. The machinery all has to pass inspection, we have control inspections, agricultural delegation to see if we meet some standards, we have security and hygiene inspections, there are a few. There are inspections for agricultural gasoline, but we always pass them. Until now we haven't had any problems ... I think they are good but we don't have enough time. I don't know if it's just for agriculture but we have a lot of inspections (Forestry, 5 employees, Spain)

It is also important to note here that both Romania and Spain have what are generally described as 'generalist' inspectorates (von Richthofen 2000). That is, in addition to OSH, these inspectorates have responsibility for inspection and enforcement in areas such as labour relations. So unlike in countries where there are, for example, specialist inspectorates which focus solely on health, safety and welfare

⁵³ These percentages refer to EU28 establishments, and are: proportions of those reporting that they carry out risk assessment, and of those reporting that they have used psychosocial risk prevention measures, respectively.

at work (such as the United Kingdom and Scandinavian countries), the OSH or other focus of any inspection might be less clear to those being inspected. While in some cases our respondents were clear that an inspection had been about labour relations and not OSH, this was not always the case:

*I had an inspection on labour regulations, I told you, the part on the employment contracts. Not so much on security and safety at work. Maybe if I had had an accident - God Forbid! - or if something had happened, the ambulance had come **(Retail, 3 employees, Romania)***

*When the ITM [labour relations] comes, the SSM [health & safety] comes too. They are always together. **(Construction, 7 employees, Romania)***

It was also clear from the interviews that the avoidance of sanctions was an important driver behind managers choosing to invest resources in ensuring compliance. This was apparent in both Spain and Romania and across the sectors. However, it was perhaps clearest in Romania where there was a view that following the regulations in order to protect workers or benefit the business (for example, in terms of its reputation), was secondary to doing so in order to avoid potentially very financially damaging penalties. This is consistent with the literature suggesting that the perceived possibility of inspection and sanction are important drivers, particularly among smaller establishments (see, for example, Fairman and Yapp 2005; Baldock et al, 2006; Levine et al, 2012). However, some caution may also need to be exercised, as again it may not always be clear whether the sanctions enterprises are concerned about specifically relate to OSH.

Bearing these caveats in mind, a sector difference was again apparent. In accordance with the sector differences described above, the level of priority afforded to the OSH regulations and complying with them increased with perceived risk level (from retail to agriculture and construction, with HORECA falling between these two). Relatedly, and particularly in Romania, the perception of pressure from the labour inspectorate (in terms of the regularity of visits and concerns about subsequent sanctions) also increased with perceived risk level. This likely reflects inspection priorities, but it is important for this study because it again implies that, in sectors where OSH has a 'lower profile', for example, than other factors seen as being central to the survival of the business – such as food hygiene in HORECA – there may be a higher possibility of confusion about which inspectorate respondents are referring to in their ESENER responses.

Supply chain position

All of the participating establishments were part of supply chains, though of course these varied in size and structure. Although some of the largest establishments (which were operating in the agriculture sector) were nearer the top of the supply chains they were involved in, for the most part the establishments were operating lower down. In general the supply chain relationships the participating establishments were involved in, particularly those in Spain, were described as being long-term and based on loyalty. However, it was evident that in some instances supply chain pressures, as well as seasonal and economic pressures, impacted on the arrangements for the organisation of work and employment made by some establishments:

Respondent: Being a services company we do not have permanent staff. If there is greater demand for services there are more employees. If there is less demand for services there are less employees. We could have 90 employees or 2, depending on the time of year because as you know in the field and the mountain there are seasons for example the summer when there is basically nothing to be done. When it begins to rain for example we begin planting eucalyptus as such, in the summer there is little to do.

Interviewer: So permanent employees are minimum?

*Respondent: I don't have any. They are all temporary. **(Forestry, 5 employees, Spain)***

In terms of suppliers or clients actively seeking to influence OSH, there was no evidence of this from our interviews in Romania. In Spain, on the other hand, contracting organisations are required by law to ask to see their sub-contractors' OSH documentation in relation to both their workers (training courses, medical check-ups etc.) and their equipment:

When you subcontract another company, they ask you for everything. They ask you for a ton of information. And all of the labour risks are there. And since I have it there, I just send it and that's it.

However, the papers, that the guys sign, I have to scan them, send them and it is more complicated. Everything that is computerized is much more convenient to send **(Forestry, 6 employees, Spain)**

We have a period of time in which to present all the documentation included in the prevention plan and work risks protocols signed, that verify the fact that we comply with the employee health and safety regulations **(Forestry, 30 employees, Spain)**

The companies we sub-contract we demand that they have all documentation up to date. That they have the prevention plan. That they are up to date with social security and tax revenue payments. The same as if we are sub-contracted ... You have to cover your back in case something happens. If there is an accident in a job site that you are managing and the company you sub-contracted you didn't ensure they have the prevention things up to date, the problem will be for you **(Construction, 3 employees, Spain)**

However, it was also evident that some clients and suppliers took this responsibility more seriously than others:

It depends on for whom ... For us, yes. And there are many clients that give a lot of importance to it and there are other clients where it is only an expense and a hassle **(Construction, 8 employees, Spain)**

In addition, respondents sometimes saw suppliers as a source of 'expert' information in relation to OSH concerns and queries. Where establishments were sub-contracted, therefore, compliance with OSH regulations was in some instances dependent on the standards of the contracting organisation – though it was clear that in some circumstances the external support an establishment received was also influential here:

Respondent: There are moments when we get asked to develop our own plan and moments when we have to adhere to their own plan.

Interviewer: So sometimes you have to do your own plan?

Respondent: Yes, there are companies that say we have to prepare our own plan.

Interviewer: And who does it?

Respondent: The mutua.

Interviewer: And then sometimes they want you to adhere to their own plan?

Respondent: Yes. So they send it to us and then our mutua reviews it and tells us if we can sign it or if there's something off and we can't sign it. And we need to ask for rectifications and then we sign it.

Interviewer: Sounds easy. Sounds like a good idea to have hired the mutua.

Respondent: Yes, when you don't understand anything about that... because we don't know how to do that or what to do. **(Construction, 5 employees, Spain)**

These findings suggest that knowing something of the supply chain position of establishments is important to understanding their OSH-related decisions and arrangements.

3.5.5 Conclusions and recommendations

On the basis of the findings of our interviews, there is little to suggest that the ESENER survey questions and constructs are any less appropriate for use with NACE sector A respondents than for respondents from any other sector. However, the findings do suggest that some consideration might be given in two areas, both of which relate to NACE sector A as much as they do elsewhere.

First, the use of external service providers in relation to OSH was widespread among our NACE A and micro establishment respondents. As noted above, this is reflective of national norms and requirements in our fieldwork countries – and as such is of relevance to a greater or lesser extent in the different Member States of the EU. In this study, it had clear implications both for responding to the initial approach and invitation to participate in the study, and also for the responses and information subsequently given at interview. In terms of the former, our aim, like that for recruitment to ESENER-2, was to speak to the person 'who knows best about health and safety' *within the establishment itself*. Several respondents began the interview by querying whether or not they were in fact the appropriate

participant and would be able to answer the questions. This reflected the general tendency among those using external services within our sample to regard OSH as the 'domain' of those services, rather than something they really dealt with directly within the establishment. It is possible that this kind of concern may have contributed in some instances to the very high refusal rate experienced in our study. This is an area that might be considered when planning the recruitment for ESENER-3, and something we return to later.

In terms of the implications for responses among those that did participate, one respondent was from an external service (responding on behalf of the organisation they were contracted by). In this interview, it was clear that, although the respondent was very knowledgeable about OSH regulation and management, they were less familiar with the internal, day-to-day workings of the company itself. Although less than half of one percent of EU28 respondents to ESENER-2 were external service consultants (as opposed to individuals working in the ESENER-2 establishments themselves), this does potentially have implications for the extent to which their responses might reflect the realities of what happens on a daily basis within the workplaces of those establishments they were, in effect, 'representing'. However, it is important to bear in mind here that our interviews did *not* seek to include those from the external services contracted by the participating firms (rather, as noted above, we sought to talk to those who 'knew best about health and safety' *within* each establishment), so caution must be exercised in interpreting and extrapolating from this interview.

In addition, however, among those respondents who worked within establishments using such services, there was what might best be described as a hesitancy in relation to some of the key areas and concepts. This reflected the belief that part of what the establishment was purchasing from the external service was freedom from some of the 'OSH burden' associated with compliance. In effect, they felt they were paying for peace of mind, and it was evident that for some this also equated to an erosion of ownership and involvement when it came to specific OSH arrangements, such as risk assessment. This suggests that, although it is impossible in any instance to be sure that 'yes' to Q250 means that risk assessments are carried out both regularly and *meaningfully*, it may be rather less certain where an external service is considered within the establishment to be responsible for such assessments. This also relates to the wider concern of compliance on paper and its relationship with workplace practice. There is a body of work, much of it concerned with psychosocial risk management, which suggests that quantitative surveys such as ESENER may mask a more complex picture in which the paper trail for risk management practice does not represent practical and effective practice in the workplace – the 'paper-tiger' effect (see for example Frick 2014). Again, this is an area that might be considered when planning ESENER-3.

However, the 'paper-tiger' effect is by no means limited to establishments using external services, and it also interacts with a number of aspects of the *second* area raised by our findings. This relates to the inclusion of micro enterprises. Here our findings indicate some concerns about the applicability of the survey questions and constructs. For example, it was clear that some respondents simply did not understand the term when asked about risk assessment. However, where it was understood, in addition to regarding risk assessment as the responsibility of external providers where these were used, there was a tendency to see risk as something 'static' and, in some instances, something that was specific to individual employees. So, although many of the respondents had a broad understanding of the concept of risk assessment and, for the most part, reported that it was carried out in their workplaces, this did not necessarily correspond to an understanding of risk assessment as an on-going process central to the protection of workers' health, safety and wellbeing. That is, where it was understood, this was as a requirement rather than as a tool. In fact, among the establishments using external services, there was little evidence from our interviews of any meaningful involvement of the respondents (virtually all owner/managers) in the *processes* of risk assessment and its documentation within their workplaces. All of this raises concerns in relation to the design of ESENER-3.

In terms of the involvement of workers, respondents often saw workers as passive recipients rather than active participants, with this generally being regarded as reflecting the preference (i.e. disinterest and disinclination) of the workers themselves. This is perhaps not surprising given that, for the most part, the views gathered were those of the owner/manager – who themselves generally had a somewhat 'arm's-length' involvement with, for example, the processes of risk assessment. However, there was also a tendency to equate the 'involvement' of workers with their 'compliance' with workplace OSH rules, which is of further concern in this regard. In fact, there was no evidence from our interviews of the

involvement of workers in, for example, risk assessment or the design and set-up of measures taken as a result. Given the relatively high levels of worker involvement indicated by ESENER-2 (see above), this suggests a worrying level of mismatch between the intent of survey questions in this area and their interpretation by respondents from these kinds of enterprises.

In addition, the interviews indicated that establishments experienced visits from a number of different bodies and inspectorates, so distinguishing those related to OSH might not be straightforward. This is of particular concern in relation to countries, including the ones in which our data were collected, with generalist, as opposed to, for example, specialist OSH, inspectorates (von Richthofen 2002). Here, although an inspection may be from the inspectorate that has OSH within its remit, it may not always be clear whether the focus of that visit has in fact been OSH or something else (such as labour relations). There was also some evidence from the interviews that understanding and interpretation of questions in this area may vary according to the sector of operation of the establishment.

The point in relation to each of these areas that is of importance here, is that responses to the ESENER-2 questions covering areas such as risk assessment, worker participation and labour inspectorate visits, are difficult to interpret with confidence, and that this may be particularly the case among the smallest establishments. This is not so much a criticism of ESENER per se, but rather an underlining of something that EU-OSHA and the various researchers who have carried out analyses of the ESENER datasets have pointed out on a number of occasions. That is, all surveys of this nature are predicated on a set of shared understandings of the key concepts and constructs at their heart, and it is very difficult, using survey methodology, to check the extent to which such understandings are truly shared by all groups of respondents. However, with some awareness of any mismatch in this area, it may be possible to modify such surveys so that they go some way to mitigating this difference. This is something we turn to in the recommendations outlined below.

Before doing so, however, our findings shed light on one further area. In essence, this concerns the latitude firms, particularly smaller firms, have to make decisions in relation to various aspects of their operations. While this is in part dependent on their internal capacities and resources, as well as the sector and national norms and regulations applicable to their area of operation, it can also be strongly influenced by the position of the establishment in relation to other businesses that are influential over it. Outsourcing, and consequently supply chains, have become increasingly significant in business relations as a result of the economic restructuring that has taken place in the EU and beyond in recent decades, and recent evidence indicates that micro and small firms are more dependent on others for the operation of their primary functions than larger firms (Eurofound 2015). This external influence of clients and suppliers can extend to areas including workplace OSH management, and can have both positive and negative effects (see, for example, Walters and James 2009, 2011, Walters et al 2012).

From our interviews, it was clear that most of the participating establishments, particularly the micro companies, were involved in supply chain relationships, many of which were well-established. It was also evident that their supply chain situation was influential over their workplace OSH arrangements. There appeared to be some variation in this by country, with 'direct' influence in Spain substantially higher than that in Romania. That is, there was evidence of contracting organisations in Spain making OSH requirements on the establishments in our study; something that was not reported in Romania. This was, at least in part, a result of the differing legislations of these two countries in this regard (see above). However, evidence of 'indirect' supply chain influence of OSH – such as, for example, 'corner-cutting' to meet externally imposed deadlines on which future contracts depend – is of course, much harder to gather, but the wider literature would suggest that it is very likely to have been significant in at least some cases (EU-OSHA 2016). Nevertheless, what our findings make clear is that the local business contexts in which establishments are operating are influential in relation to their approach to OSH. This reflects the widely recognised increase in the porosity of companies' boundaries that has been the result of changes seen over recent decades to the ways in which work and employment are organised. That is, in addition to the traditional employer-worker relationship within organisations, there is a growing influence of a third dimension, external bodies (including buyers, clients, suppliers, regulators etc.), in particular on smaller and more vulnerable establishments (see, for example, Lopez 2010).

Overall, the findings from this workstream suggest that establishments that take part in ESENER are likely to be those at the 'better end' of the spectrum both in terms of their business sustainability and

continuity generally, and specifically in relation to their workplace OSH practice and the priority they afford to OSH. In short, they are most often businesses that, relative to their counterparts, could be described as more thriving and OSH-confident – and this is likely to be particularly the case among the smallest establishments. In addition, the findings indicate that factors including establishment size, sector, and regulatory and business contexts may be associated with differences in the understanding and interpretation of the ESENER questions and constructs by those responding to the survey on their behalf. As well as making further efforts to include a wider range of establishments in future surveys, we therefore recommend that consideration be given to:

- The possible influence of the use of external service providers on both recruitment and responses to ESENER-3 (regardless of establishment size or sector)
- The inclusion of micro enterprises in ESENER-3

For the former, we suggest that:

1. It is made clear during all recruitment contacts that the respondent should work in the establishment (rather than being an external consultant); and that the ESENER-3 questions are ones that such a respondent will understand and be able to answer without recourse to any such consultant
2. The ESENER-3 questionnaire be developed to collect details about the use of external services in such a way that these data can be included in, and controlled for, during multi-variate analyses

In relation to the latter, we suggest that if micro enterprises are to be included in future surveys:

1. The questionnaire is developed to collect details of the supply chain position of all establishments and the influences of their relationships within that chain on their OSH decisions and procedures
2. Some areas of the questionnaire (and/or its prompts to interviewers) are revised for clarity – for example, Q165 (visit by the labour inspectorate), Q258b and Q305 (employee involvement) and Q250 (risk assessment)
3. Consideration might also be given to including a qualitative element for a proportion of establishments (of all sizes, but with the emphasis on the smallest) that explores the relationships between, for example, reporting that risk assessments are and are not carried out, and the realities of workplace practice. The power of such an element would be substantially increased if it were further extended to include a brief interview with a worker as well as the owner/manager in each case. We recognise the challenges associated with this suggestion, not least in terms of cost, but raise it nevertheless because of its potential to increase the depth of detail currently provided by the survey approach.
4. Finally, more intensive efforts could be made to convert micro establishment refusals during or after the survey, to provide quantitative evidence on non-response bias and improve survey estimates where applicable, as discussed in section 3.4.4.

3.6 Assessment of adjustment error and weighting procedures

The objective of this workstream was to evaluate the ESENER-2 weighting approach.

3.6.1 Assessment of ESENER-2 procedures

In outline, the approach for weighting for ESENER-2 was to adjust the achieved sample size so that the distribution of establishments in the cells by NACE sector and size categories perfectly matched the population estimates for establishments. For the employee weights, the same approach was used, except the cells were for counts of employees. For the countries with sampling frames that listed enterprises, an adjustment was made first for the selection of the establishments.

▪ Stratum jumpers

Adjusting the achieved sample to match the best-available population estimates is a sound approach, however we would recommend adding a stage of weighting prior to that adjustment to take account of the original disproportionate sampling probabilities across the sampling cells. This is the standard approach for business surveys (e.g. Workplace Employment Relations Survey 2011⁵⁴).

The analyses of stratum jumpers described in Section 3.3.2 showed that there were systematic differences between the establishments that changed strata (stratum jumpers) and those that did not (stratum stayers). The mix of stratum jumpers and stayers within any analysis cell will vary across designs – hence the decisions made in the sampling design (and with closing cells once the fieldwork) change the profile of the sample and hence will impact on the actual survey estimates.

By applying selection weights based on the original sampling strata applied, the profile of the weighted issued sample (in terms of the original sampling strata) will be identical however it is selected. This will feed in to obtaining more consistent weighted achieved samples in terms of the original sampling strata; varying only due to disproportionate non-response.

Table 26 shows an example of the selection weights that could have been applied to the sample in Italy. (To generate these weights we assumed that the population estimates for establishments in Italy matched the sampling frame and that the issued sample was that used minus the cases in closed cells.) As can be seen there is a large range in the weights from 2.0 to 125.6. Because cases can jump across the strata it is usual to end up with an extreme range of weights within the analysis cells, which would impact on the efficiency for analyses of sub-groups. In order to reduce the impact of this, it is standard practice to trim the weights.

Table 26: Example selection weights for Italy

Sector group	5-9	10-49	50-249	250+
1 (NACE A)	12.3	17.0	12.4	n/a
2 (NACE B,D,E,F)	50.0	68.0	9.2	2.5
3 (NACE C)	59.0	71.4	29.5	4.6

54

http://doc.ukdataservice.ac.uk/doc/7226/mrdoc/pdf/7226_the_design_and_administration_of_the_2011_wers_5_august_2013.pdf

Sector group	5-9	10-49	50-249	250+
4 (NACE G,H,I,R)	78.8	70.7	17.0	2.0
5 (NACE J,K,L,M,N,S)	61.8	98.3	37.3	2.7
6 (NACE O)	122.5	53.3	20.7	3.2
7 (NACE P Q)	125.6	56.5	23.1	3.4

As an example, in the analysis dataset there were 118 interviews with establishments that reported being in NACE C with 50 to 249 employees. Of these, 81 were in the equivalent sampling cell (selection weight = 29.5); 7 were in the sampling stratum for 10-49 employees in sector group C (selection weight = 71.4) and 21 were in the stratum with the 250+ employees in sector group C (selection weight = 4.6). In addition, there were 9 cases that were sampled in other sector groups – the selection weights for those cases ranged from 2.0 to 50.0. The selection weights in that analysis cell (NACE C with 50 to 249 employees) therefore vary from 2.0 to 71.4 which is a large range. In order to reduce the variance of the selection weights in that cell, a rule could be imposed that, for example, the minimum weight is one half of the weight for stratum stayer and the maximum twice that of the stratum stayer. This would reduce the range of the weights to be 14.8 to 59.1. Trimming the weights in this way does slightly alter the weighted profile within each analysis cell, but is a price worth paying for increased efficiency, and leads to a more represented weighted sample than an approach which does not include the selection weight stage at all.

▪ Weights for subsidiary establishments from the enterprise-level frames

The current approach when a multi-site enterprise is identified in the screening countries (i.e. those with sampling frames of enterprises) is to sample at the address listed and then randomly sample a second enterprise. There is concern that this over-represents head offices in the achieved sample. Although this is technically the case, the issue is better phrased as being that the subsidiary establishments are under-represented. Relative to the single-site establishments, the main establishments for multi-site enterprises are actually in the correct proportion, everything else such as non-response being equal. Because the main establishments are selected with probability equal to 1, within any given sampling cell they will have the same full selection weight as a single-site enterprise. As discussed in Section 3.3.2, rather than developing a strategy to sub-sample these main establishments, we need to instead investigate ways of increasing the size of the sample of the subsidiary establishments.

With the current sampling approach, there were 3,151 multi-site organisations that had more than one establishment that had more than five employees and 376 interviews at a second establishment, a ratio of 1 to 8.4. However, the total number of establishments with more than 5 employees at those multi-site organisations is estimated to be about 16,500, which is a factor of 1 in 44. In other words, if we applied the correct weight to the second establishment with the current design then it would be 44 times greater on average than the weight for the main establishment (and for the single-site establishments). The weights for the secondary establishments would therefore require severe trimming if we were to calculate them accurately. The impact of this trimming would be to leave this group under-represented in the weighted sample. As discussed in the section on sampling, we therefore recommend selecting additional subsidiary establishments at multi-site organisations to reduce the size of the weights required to put them into their correct proportion. This number to select should increase with the number of establishments reported at the main establishment, as this will limit the size of the weights directly. This will be straightforward to implement as in the current survey information is already captured on the

number of subsidiary establishments. Extending the fieldwork to include additional establishments would therefore involve asking for the contact details for these additional establishments (instead of for one only, as the current practice). For practical reasons it may be advisable to cap this at a maximum number, for example five, to limit the burden on the respondent (and so limit nonresponse to this request).

The main benefit of this approach is that the sample will be more representative if there are more establishments selected from multi-site companies. This is because with the previous strategy the weights would have required trimming to prevent heavy loss of precision, and with more of these establishments it will be possible to represent them more accurately (for the same level of precision).

As noted in section 3.3, fewer micro and NACE A establishments were part of multi-site organisations and so the extended survey universe is less problematic in this respect.

3.7 Conclusion

Reflecting on the initial objectives of this work, in four out of five of the areas of the analysis framework⁵⁵ employed for the review we have found little to suggest that the expansion of ESENER-2 to cover micro establishments and those in NACE section A was detrimental to the quality of the survey. On the fifth, measurement, there is more reason for concern, but not to the extent that a change in the survey coverage is recommended. And the expansion has brought some challenges in other areas too, specifically:

- In relation to the sample frames used on ESENER-2, it was necessary to use supplementary frames in four countries to cover NACE section A, in addition to the necessity to use supplementary sources to cover the public sector (NACE P, O and Q) in some countries, and this will need to continue in the future.
- In relation to non-response, establishments in the extended survey universe achieved comparable response rates to other establishments in the sample. However, micro establishments achieved a lower cooperation rate, and it has not been possible to rule out non-response bias altogether, due to a lack of comparative statistics. Therefore, as explained in the relevant concluding section, it may be worth doing more to explore the potential for non-response bias on ESENER-3.
- In relation to sampling procedures and also to weighting, no issues were uncovered that were attributed to the inclusion of micro or NACE A establishments.
- In relation to measurement, there is some suggestion, based on the findings of the qualitative interviews conducted in Spain and Romania, that the micro establishments that take part in a survey such as ESENER are likely to be at the 'better end' of the spectrum in terms of OSH practices, and further, that there may be issues with the interpretation of some of the questions for some of these establishments. Solutions have been proposed in the relevant section to help overcome these potential areas of concern.

Finally, the review has also highlighted some areas, which apply generally to the survey as a whole rather than to micro and NACE A establishments specifically, where we feel the sampling procedures could be improved. These are the procedures for selecting establishments from multi-establishment enterprises in the screening countries; and the application of a stopping rule during fieldwork. The applicable section outlines the alternative procedures that could be considered.

⁵⁵ The five areas were: (i) sampling frames and non-coverage bias, (ii) sampling procedures and sampling error, (iii) non-response and non-response bias, (iv) measurement and measurement error, and (v) weighting and adjustment error.

4 Appendices

APPENDIX A. MEASURES USED IN ANALYSES

Q166 Which of the following forms of **employee representation** do you have in this establishment?

[4 Variables]

Q200 Depending on the type of work there are different **types of risks and hazards**. Please tell me for each of the following risk factors whether it is present or not in your establishment, regardless of whether it is currently under control and regardless of the number of employees it affects.

[9 Variables]

Q201 Besides these risks, there may also be **health risks** resulting from the way work is organised, from social relations at work or from the economic situation. Please tell me for each of the following risks whether or not it is present in the establishment?

[7 Variables]

Q250 Does your establishment regularly carry out **workplace risk assessments**?

Q251 Are workplace risk assessments mainly conducted by **internal staff** or are they contracted to **external** service providers?

Q258blf measures have to be taken following a risk assessment: Are the **employees** usually **involved** in their design and implementation?

Q261 Are there any particular reasons why **workplace risk assessments** are **not** regularly carried out? Please tell me for each of the following whether it applies to your establishment or not?

[4 Variables]

Q264 In your establishment, how important are the following **reasons** for addressing health and safety? For each reason, please tell me whether it is a major reason, a minor reason or not a reason at all.

[5 Variables]

Q265 What are the main **difficulties** in addressing health and safety in your establishment? Please tell me for each of the following options whether it is a major difficulty, a minor difficulty, or not a difficulty at all.

[7 Variables]

Q300 Does your establishment have an action plan to prevent **work-related stress**?

Q301 Is there a procedure in place to deal with possible cases of **bullying or harassment**? Bullying or harassment occurs when employees or managers are abused, humiliated or assaulted by colleagues or superiors.

Q302 And is there a procedure to deal with possible cases of **threats, abuse or assaults** by clients, patients, pupils or other external persons*?

Q305 Did the **employees** have a **role** in the design and set-up of measures to address psychosocial risks?

Q306a Considering the situation in your establishment: Do any of the following factors make addressing psychosocial risks more difficult than addressing other health risks?

[4 Variables]

Q307 Do you have sufficient information on how to include psychosocial risks in risk assessments?

Q400 Has your establishment used **health and safety information** from any of the following organisations?

[5 Variables]

APPENDIX B. SURVEY OUTCOME CALCULATIONS

The following table shows how the ESENER-2 outcomes were categorised for the survey outcome rates presented in this report. The first column shows sample eligibility, the eligibility rate was calculated as the outcomes marked 'eligible' divided by the 'eligible' plus 'not eligible' outcomes. The second column shows the AAPOR1 response rate, which was calculated as 'productive' divided by 'productive' plus 'unproductive'. The third column shows the AAPOR3 response rate, which was calculated as 'productive' divided by 'productive' plus 'unproductive' plus 'unknown' multiplied by the eligibility rate. The fourth and fifth columns show the AAPOR1 and AAPOR3 cooperation rates, both calculated as 'productive' divided by 'productive' plus 'unproductive'. The last column shows the contact rate, calculated as 'contact' divided by 'contact' plus 'no contact'.

<i>ESENER-2 outcome</i>	<i>Eligibility rate</i>	<i>Response rate (AAPOR1)</i>	<i>Response rate (AAPOR3)</i>	<i>Cooperation rate (AAPOR1)</i>	<i>Cooperation rate (AAPOR3)</i>	<i>Contact rate</i>
No answer	Unknown	Unproductive	Unknown	Not eligible	Not eligible	No contact
Answer device	Unknown	Unproductive	Unknown	Not eligible	Not eligible	No contact
Busy	Unknown	Unproductive	Unknown	Not eligible	Not eligible	No contact
Information tone - Fax – Modem	Unknown	Unproductive	Unknown	Not eligible	Not eligible	No contact
Wrong telephone number	Unknown	Unproductive	Unknown	Not eligible	Not eligible	No contact
general appointment	Unknown	Unproductive	Unknown	Unproductive	Not eligible	Contact
Definitive appointment with target person	Unknown	Unproductive	Unknown	Unproductive	Not eligible	Contact
Refusal by target person	Unknown	Unproductive	Unknown	Unproductive	Unproductive	Contact
Refusal by contact person/reception (upfront refusal)	Unknown	Unproductive	Unknown	Unproductive	Unproductive	Contact
No establishment at this address (private household etc.)	Not eligible	Not eligible	Not eligible	Not eligible	Not eligible	Contact
Inactive establishment, terminated	Not eligible	Not eligible	Not eligible	Not eligible	Not eligible	Contact

Technical assessment of the expansion of the ESENER II

ESENER-2 outcome	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
Already questioned (double address)	Not eligible	Not eligible	Not eligible	Not eligible	Not eligible	Contact
Complete telephone interview	Eligible	Productive	Productive	Productive	Productive	Contact
System error	Unknown	Unproductive	Unknown	Unproductive	Not eligible	Contact
Stratification maximum reached (cell full)	Unknown	Unproductive	Unknown	Unproductive	Not eligible	Contact
Refusal - add number to DO NOT CALL LIST	Unknown	Unproductive	Unknown	Unproductive	Unproductive	Contact
Partial interview, to be called back	Eligible	Unproductive	Unproductive	Unproductive	Unproductive	Contact
Partial interview, not to call back	Eligible	Unproductive	Unproductive	Unproductive	Unproductive	Contact
No appointment with target person possible during fieldwork time and period	Unknown	Unproductive	Unknown	Unproductive	Not eligible	Contact
Refusal also of online interview	Unknown	Unproductive	Unknown	Unproductive	Unproductive	Contact
Size out of target (less than 5 employees or NA in Q105)	Not eligible	Not eligible	Not eligible	Not eligible	Not eligible	Contact
No single establishment with 5 or more employees (Q051=0)	Not eligible	Not eligible	Not eligible	Not eligible	Not eligible	Contact
Size of first contact out of scope but interview possible at subsidiary (screening countries)	Not eligible	Not eligible	Not eligible	Not eligible	Not eligible	Contact

Technical assessment of the expansion of the ESENER II

<i>ESENER-2 outcome</i>	Eligibility rate	Response rate (AAPOR1)	Response rate (AAPOR3)	Cooperation rate (AAPOR1)	Cooperation rate (AAPOR3)	Contact rate
Refusal to provide information in the screening phase	Unknown	Unproductive	Unknown	Unproductive	Unproductive	Contact
Online questionnaire sent (still open)	Unknown	Unproductive	Unknown	Unproductive	Not eligible	Contact
Completed online interview received	Eligible	Productive	Productive	Productive	Productive	Contact
Incomplete online interview received	Eligible	Unproductive	Unproductive	Unproductive	Unproductive	Contact
No adequate target person at the establishment	Unknown	Unproductive	Unknown	Unproductive	Not eligible	Contact

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APPENDIX D. INTERVIEW GUIDE USED FOR THE INTERVIEWS IN SPAIN AND ROMANIA

▪ Background notes for researcher

This guidance relates to interviews to be carried out with ‘the person who knows best about health and safety’ in establishments in Spain and Romania. In each country, participating establishments will be:

1. micro establishments (with 5 to 9 employees) operating in the construction, retail and food (hotel, restaurant, catering - HORECA) sectors; and
2. establishments of a range of sizes operating in the agriculture sector.

Micro establishments and those in the agriculture sector were included in ESENER for the first time in the survey’s second wave, and the aim of these interviews is to contribute to assessing whether, within such establishments: (i) the survey questions/constructs are applicable; and (ii) appropriate survey informants are selected to provide the information.

The aim of each interview is to cover four broad topics – background, OSH knowledge, OSH practice and OSH surveys. Example questions and prompts to aid discussion of each topic are provided in this guidance. These should be used flexibly; they outline the areas the interviewer should aim to cover, but should be adapted to fit the context of the establishment and interviewee’s understanding of OSH terminology.

The guide outlines the areas the interviewer should aim to cover, but is not intended to be used prescriptively, exhaustively or exclusively. Rather, it is intended to help an experienced interviewer ensure that all the relevant topics are discussed with the interviewee. It is likely, and indeed expected, that some topics will prompt much more discussion than others, depending on the background and circumstances of the interviewee, and that where these are significant and relevant they will be pursued.

Please ensure you are **familiar with the contents of this guide** and also the **briefing note**, including the ‘**guide to OSH**’ at the end of the note, before you start your first interview.

Below, brief summaries of the information sought for each topic are given, to ensure you are clear about what is being sought.

Background

The aim here is to establish the relevant background of the interviewee and establishment. For the former, this includes their role and experience and, in particular, their OSH responsibilities and experience. The idea is to get a feel for their level of OSH responsibility, the proportion of time and the priority they devote to this, their relevant OSH experience and training, and how they regard their OSH duties. For the latter, this includes the establishment’s size, age, workforce composition (in terms of, for example, age, gender, skill level etc.) and employment arrangements, business situation and supply chain position. In this case, the aim is to understand how the establishment operates (is it just surviving or expanding, what kind of competition does it face and how does it compete) and whether it is heavily dependent on buyers, suppliers or both.

OSH knowledge

The aim of this section is to get an understanding of two areas – grasp of the regulatory requirements and the level of expertise within the establishment. For the former, we want to be clear about what the interviewee understands the OSH (as opposed to other) regulatory requirements to be and the source of their information in this regard, as well as their experience of regulatory enforcement. For the latter, we are trying to find out how and to what extent they understand key concepts (like risk assessment and worker participation) and their means of support (including external expertise, training etc.). It should be noted here that the use of some kinds of external services are mandatory in some circumstances in some Member States, and this will need to be taken into account by the interviewer.

OSH practice

In this section, the aim is to understand how the establishment meets the regulatory requirements and how things work in practice. Again, the idea is to get a feel for what is happening – a detailed description of all aspects of the OSH management system is not needed. Rather, we are looking for what is done in relation to key areas of the requirements, such as risk assessment and worker participation (for which it is important to establish whether representative or direct consultation methods are used), and who / what influences this.

OSH surveys

Here we are trying to understand how the interviewee and establishment react to the idea of a survey about OSH. The idea is to elicit information on what is understood by OSH, and by 'health' as opposed to 'safety', and related areas (such as the relationship between risk and safety management). In addition, we are looking for what might be barriers to or reasons for agreeing to take part in OSH research.

▪ **Interview guide**

Introduction

- Introduce self, Ipsos, Cardiff University
- Introduce EU-OSHA

The European Agency for Safety and Health at Work (EU-OSHA) is an agency of the European Union that collects, analysing and disseminating relevant information that can serve the needs of people involved in safety and health at work.

- Discuss confidentiality and ask permission to record the interview

These recordings will be shared with Ipsos and our partner at Cardiff University, and EU-OSHA, but will not be shared with anyone outside either organization. Your name, company and any other personal details will be kept separate and confidential and will not be passed to EU-OSHA.

Background

NOTE: The additions in blue are intended as supporting information for interviewers by providing some explanation of OSH terms.

Establishment

- Can you tell me a bit about this establishment please?

What does it do and how does it do this [what kind of processes, tools, machinery etc. are involved]?

When was it set up? Is it independent and has it always been so? If not, what is its position and status (franchise, subsidiary etc.) and when was the wider company set up?

How many people work for the establishment? Where do they work (on site, at home, on temporary worksites etc.)? What proportion are employed full-time? What proportion are directly employed (and, if not 100%, on what basis are others employed)? What proportion have a university degree? What proportion are women? How do these proportions vary with different roles within the establishment (e.g. 'office' and 'shop-floor' staff, those on site, at home, on temporary worksites etc.)? How are these workforce arrangements changing / expected to change (are numbers of worker increasing/decreasing or expected to do so)?

What kind of market is the establishment operating in? [Probe for: Competes on price, quality, provides a niche product or service, etc. Operates locally, regionally, nationally, internationally (EU and/or further afield) etc.]

And within that market, where does the establishment sit in the supply chain? [Is it mainly a supplier, mainly a buyer, both, etc.]

What kind of relationship does it have with suppliers / buyers? [What is the establishment's level of dependency on either or both?]

What are the establishment's future plans / prospects? [Is it economically stable, aiming to expand, just surviving, etc.]

Respondent

- Can you tell me a bit about yourself and what you do here please?

What is your job title / position here? How long have you worked in this role? How did you come to be in this role? [Previous experience within the establishment etc.] What is your background (education, previous positions etc.)? How old are you?

Can you describe the occupational health and safety duties / responsibilities your role involves? What do these entail? Have they always been part of this role? If not, what prompted the change? Approximately how much / what proportion of your time is spent on your the occupational health and safety duties? Has this changed (increased / decreased)? What prompted this change; do you expect (further) change in the future?

Have you previously had occupational health and safety duties / responsibilities before taking on this role? If so, please explain what and where these were.

Probe for: Any formal the occupational health and safety qualifications? [what are they, when did you take them, how useful are they, are you planning further qualifications etc.] Any (other) training to help you with your the occupational health and safety responsibilities? [how recent was it, who provided it, how useful was it, is any further training planned, etc.]

How is your occupational health and safety role seen by your colleagues? [Examples: Do they think the amount of time it takes up is about right, if so why, if not why not; is it seen as making a valuable contribution, if so how, if not why not, and by whom, etc.]

OSH knowledge

Expertise

- Thinking about your health and safety arrangements here, can you tell me if the establishment uses any kind of external the occupational health and safety services?
- [\[External services are services to help the establishment with its occupational health and safety arrangements that are provided by an external company or consultant. In some countries, and for some sizes of establishment, these services are mandatory and in others they are not, so these questions need to be phrased accordingly\]](#)

Does the establishment use an external company or consultant to help with the occupational health and safety? [If so, what prompted this initially, how long ago did it start, how frequently is advice received, what does it focus on, what proportion of the budget does it cost, etc.]

Does the establishment use an occupational health service provider? [If so, what prompted this initially, how long ago did it start, what services are provided and why, what proportion of the budget does it cost, etc.]

- If you are not sure about something to do with the occupational health and safety, where do you go for help or advice and why? [What sources of information do you use regularly, why these particular ones, etc.]

Regulatory requirements

- Thinking now about the (national, regional, local and sectoral) health and safety regulations your establishment has to comply with

What sorts of things does your establishment have to do to make sure it complies with these health and safety regulations?

How do you find out what must be done?

How would you find out if there were any changes in these requirements?

Where would you turn if you had a question about or wanted advice on the regulations and how to comply with them?

- Has the establishment ever been visited by the labour inspectorate? If so, when, who did they talk to, what did they do and ask about, and what was the outcome? Do you expect to be visited again? If so, when?
- [The labour inspectorate is the body responsible for inspection and enforcement in relation to occupational health and safety. Respondents are unlikely to recognise the term, so please use the name or acronym of the body here. Also, please note that establishments may be inspected by other bodies too (e.g. in relation to food hygiene) and interviewees may not realise that they are different to the labour inspectorate. Please try to check this by asking carefully about what the inspector wanted to see]
- Has the establishment ever received guidance directly from the labour inspectorate (i.e. through a visit or phone call with an inspector)? If so, who initiated it, why and when, was it useful, has it led to a change in the way things are done?
- Has the establishment ever been visited or received guidance directly from any other inspectors (e.g. related to food hygiene, the environment etc.)? [If so, gather details as for the labour inspectorate – see above – and establish if there was any the occupational health and safety ‘cross-over’ (i.e. whether the inspection also covered any aspects of occupational health and safety)]

OSH practice

- Turning now to what is done day-to-day in relation to health and safety, who else (apart from you) is involved in the occupational health and safety in the establishment and what do they do? [Are senior managers involved, are there arrangements for the management of health as well as safety, how do these relate to each other and to the workplace risks, etc.]

Is there a written the occupational health and safety policy document? [If so, how often is it updated, how can workers access it, what does it cover, etc.]

[A health and safety policy document describes how occupational health and safety is managed in the establishment]

What does ‘risk assessment’ mean for your business?

Probe for: Where does your information come from? Are risk assessments carried out? [If so, what do these involve, why are they carried out, how often, when are they revised, who is involved, what happens as a result, etc.] If not, do you make regular checks of another kind? [If so, what do these involve, why are they carried out, how often, when are they revised, who is involved, what happens as a result, etc.] [If no risk assessments or other checks are carried out, why not]

[Risk assessment is the identification of hazards in the workplace (e.g. chemicals, uneven floors) and the assessment of the risk that workers could be harmed by them in the course of their work. It should provide the basis for preventive arrangements]

Are there systems in place for recording incidents (accidents, near-misses etc.), and for specific procedures (use of certain equipment or carrying out particular processes)? Are these documented? [If so, why, who has access to them, when are they revised, who is involved, etc.]

Does the establishment provide any the occupational health and safety training for staff? [Induction training when new workers start, refresher training for existing workers, training for new equipment and/or procedures etc.] If so, does this include all staff? How is it provided? [Internal or external provision, within work time, etc.]

What does the ‘worker participation’ mean in your business?

Probe for: How do you know this? What is the role of workers in the occupational health and safety? [Are there workers’ representatives and/or a joint the occupational health and safety committee, do workers or their representatives discuss the occupational health and safety with managers, how do these arrangements work, do they lead to changes – if so, can you provide an example, etc. If there are no representatives or a joint the occupational health and safety committee, when and how are workers

consulted about the occupational health and safety, by whom, has this lead to changes – if so, can you provide an example, etc.]

[Worker participation is the involvement of workers in health and safety. This may be carried out directly – with managers talking to workers directly – or through workers' representatives – elected or appointed individuals who represent workers on health and safety. Different countries have different regulations about the kinds of participation and/or representatives that must be in place in establishments of various sizes, so these questions need to be phrased accordingly. Please try to find out whether any existing worker participation is 'two-way' – i.e. if both managers and workers contribute ideas and suggestions (rather than managers simply telling workers about OSH)]

Where do these practices (in relation to risk assessment, documentation, worker participation etc.) come from and have they changed in recent years? [Influences might include: the wider organisation / parent company, external advisors, suppliers and/or buyers, perceptions / concerns about enforcement, etc.]

OSH surveys

- What does the term 'occupational health and safety' mean in your business? What are the differences, if any, in how 'safety' and 'health' is managed? [Probe for: To what extent do these ideas reflect the occupational health and safety (rather than, for example, food hygiene or the environment) and are they reflecting the regulations, media portrayals, etc.]
- When you were asked to take part in this interview, what kinds of things did you expect it to cover?
- How did you feel about taking part? [Who agreed and why, and did the interviewee have any involvement in the decision, etc.]
- Did anything worry you about taking part? If so, please explain. [If relevant, did the person who agreed to the establishment taking part have any concerns, etc.]

If you were telephoned and asked to take part in an EU-wide phone survey on the occupational health and safety, what would your reaction be and why? [If relevant, what would the reaction of the person who agreed to the establishment taking part be, etc.]

APPENDIX E. POPULATION (UNIVERSE) FIGURES USED IN ANALYSIS IN SECTION 2.3.1

Switzerland

Establishments (absolute)

Sector \ size class	5-9	10-49	50-249	250+	Total	%
A	4,225	788	33	0	5,046	3%
B,D,E,F	7,987	8,244	1,070	61	17,362	10%
C	6,247	8,177	2,187	400	17,011	10%
G,H,I,R	29,778	22,750	2,861	237	55,626	33%
J,K,L,M,N,S	21,644	17,469	3,201	484	42,798	25%
O	1,994	2,812	708	85	5,599	3%
P,Q	11,625	11,073	3,039	369	26,106	15%
Total	83,500	71,313	13,099	1,636	169,548	100%
%	49%	42%	8%	1%	100%	

Employees (absolute)

Sector \ size class	5-9	10-49	50-249	250+	Total	%
A	24,762	12,942	2,480	0	40,184	1%
B,D,E,F	52,602	161,320	95,315	24,557	333,794	8%
C	41,682	166,891	225,044	217,002	650,619	16%
G,H,I,R	194,501	426,595	265,201	116,458	1,002,755	25%
J,K,L,M,N,S	140,546	339,248	318,392	243,623	1,041,809	25%
O	13,421	59,472	67,490	42,208	182,591	4%
P,Q	75,591	230,934	295,705	238,804	841,034	21%
Total	543,105	1,397,402	1,269,627	882,652	4,092,786	100%
%	13%	34%	31%	22%	100%	

Italy

Establishments (absolute)

Sector \ size class	5-9	10-49	50-249	250+	Total	%
A	1,643	1,072	87	1	2,803	0%
B,D,E,F	47,298	28,703	2,411	146	78,558	12%
C	68,316	67,014	9,921	1,098	146,349	22%
G,H,I,R	143,208	82,033	7,282	690	233,213	35%
J,K,L,M,N,S	64,992	38,831	5,862	965	110,650	16%
O	5,388	10,880	3,418	379	20,065	3%
P,Q	28,518	43,023	9,439	960	81,940	12%
Total	359,362	271,556	38,420	4,239	673,577	100%
%	53%	40%	6%	1%	100%	

Employees (absolute)

Sector \ size class	5-9	10-49	50-249	250+	Total	%
A	10,708	19,675	6,470	688	37,541	0%
B,D,E,F	311,154	497,998	213,687	67,783	1,090,622	8%
C	454,326	1,272,564	959,513	629,023	3,315,426	24%
G,H,I,R	939,529	1,438,827	680,033	356,106	3,414,495	25%
J,K,L,M,N,S	425,000	711,224	570,441	584,977	2,291,642	17%
O	36,243	245,572	332,016	188,366	802,197	6%
P,Q	191,244	906,251	842,008	724,026	2,663,529	20%
Total	2,368,205	5,092,111	3,604,168	2,550,969	13,615,453	100%
%	17%	37%	26%	19%	100%	

The European Agency for Safety and Health at Work (EU-OSHA) contributes to making Europe a safer, healthier and more productive place to work. The Agency researches, develops, and distributes reliable, balanced, and impartial safety and health information and organises pan-European awareness raising campaigns. Set up by the European Union in 1994 and based in Bilbao, Spain, the Agency brings together representatives from the European Commission, Member State governments, employers' and workers' organisations, as well as leading experts in each of the EU Member States and beyond.

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