

**Development of a methodology for a long-term strategy
on the Continuing Vocational Training Survey (CVTS)
CVTS3 M**

**Work-package 5:
Survey guidelines**

Bundesinstitut für Berufsbildung (BIBB)

in cooperation with

Statistics Finland
FÁS Training and Employment Authority
3s Research Laboratory
Statistics Sweden

22 July 2005

Introduction

In this work-package a refinement of the survey guidelines is elaborated. The work package is organised in three papers covering the main issues of data availability in enterprises, mode of data collection and the organisation of the fieldwork.

A main source of information for the issues in WP5 is the expertise from infas (in the annex). infas –an renowned German institute in social research – contributes their experience in the field of data collection in enterprises. In addition we rely on information in the quality reports, data from a German extra survey that was implemented together with CVTS2 and the expertise of Statistics Finland, who have considerable experience in enterprise surveys and with web based surveys in particular.

**Development of a methodology for a long-term strategy
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Paper 1: Data availability in enterprises

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1. General discussion

Data availability is one of the key factors for CVTS3 data quality. Enterprise surveys, because of the nature of the information required and data availability, are often more difficult than surveys of individuals. Some information on all the variables included in the CVTS3 questionnaire is usually at hand, but the information is not always recorded in the enterprises accounting systems in a way that it can be easily extracted when answering the questionnaire. This can have an impact, for example, on the basic structural information of enterprises concerning the number of employees broken down by occupational group and age.¹

The size of the enterprise is very influential on the data availability. In small enterprises (less than 50 employees) both structural background data and core quantitative variables on participation in initial and continuing vocational training are rather easy to record even when figures are not based on explicit data bases. The personal is usually well known which makes the collection of data easier than in bigger enterprises. It is also rather easy to collect data by post-inquiries of the respondent to the questionnaire in the enterprises.

Bigger problems occur often in medium-sized and larger enterprises regardless whether they have regularly used accounting systems for structural information about their employees and data on their initial and continuing vocational training activities. For internationally active enterprises, who often make international (and not national) balance sheets, it can be very difficult to extract the for CVTS3 required national data (see also page 8 of the *infas-paper* in the annex).

Difficulties especially with quantitative variables can derive from several sources:

- A) there are no recorded information on the subject in question
- B) the information is personified in silent (un-documented) knowledge and vulnerable by addressing the questionnaire to the wrong person in the enterprise
- C) the information in the enterprise's data base is not conceptually consistent with the definitions in the CVTS3 questionnaire
- D) the information in the enterprise's data base is not detailed enough for the needs of CVTS variable specifications (e.g. age distribution of employees is not available, the field and/or provider of training is not recorded)
- E) the recorded information is consistent and specific enough but the utilisation of existing records is difficult and burdensome for the respondent

Additional attention must be paid to the motivation of the enterprises and respondents. The legal basis of the survey, the policy importance of the survey in general and the possible utilisation of the national and international results with respect to the enterprise's own training strategies must be highlighted in the survey introduction and during the process of contacting enterprises. The investigation in the accounting system and/or in different departments of an enterprise can be very time consuming. Thus it is likely that many respondents in the enterprises tend to avoid this additional work load.

From the experience of CVTS2, qualitative questions seemed to be more easy for the enterprises to respond to than quantitative questions. Qualitative questions can be difficult in terms of concepts and definitions, but nevertheless respondents are quite accustomed to fill in questionnaires and also, on average, better-educated than respondents in an individual survey focused on the general population. Most of the qualitative questions in the outline questionnaire are rather easy both technically and in terms of definitions and concepts.

¹ See also: Eurostat Working Papers. Population and social conditions 3/2004D/No28. Methods report (final) of the project: "Assessment of the second vocational training survey. Comparative analysis of continuing vocational training on the basis of CVTS2 results". EUROSTAT - Education, Training and Culture

Qualitative questions are, however, more vulnerable to misinterpretations and subjective judgements than quantitative questions.

Some qualitative questions are based on tacit knowledge, there are no facts on which answers could be based, and there are no written documents that can be referred to. In terms of perceived response burden and consistency, it would be desirable that only one person would be responsible for answering the questionnaire in the enterprise - perhaps consulting other experts if necessary. This is not, however, always the case and the process of filling in the questionnaire can not be totally monitored.

As discussed above, answering qualitative questions is often based on subjective judgements. Because of inadequate or insufficient information or a lack of data records, quantitative variables must also often be based on estimation instead of documented data. This reality must be acknowledged and has been taken into account in the design process for the CVTS3 questionnaire (Final, 30.06.05), as well as in evaluating the quality of the data.

Clarity and unambiguity of core variables, concepts and definitions are also matters of importance concerning the data. There was evidence in CVTS2 that some variables were misinterpreted due to ambiguous wording or confusing technical structure. Inadequate wording and poor structure of questions can lead to problems with data availability, taken from the respondents' point of view.

The mode of data collection and different types of interviewers during the survey process must also be taken into account when evaluating the availability of different data, especially in the context of data quality. These issues are discussed in another document.

2. Data availability in enterprises – experience from CVTS2

2.1 Structural data (A)

There were some problems in reporting structural background data in CVTS2. Background variables should, however, be defined so that missing data will not be an issue in terms of analysis.

- NACE classification can be difficult in multi-branch enterprises. There is usually a clear rule to define the main industry of the enterprise (according to the turnover) but changes in the company structure can have an impact on the NACE code also. The data was imported in many countries from other sources (i.e. Structural Business Survey etc.).
- The number of employees broken down by gender should be an obligatory variable without missing data. Information from registers can be used to fill in gaps. Also estimates should be used if no other information is available. Recording absolute figures on employees broken down by three occupational groups and age classes causes additional burden for enterprises. Missing information will evidently occur, concerning larger enterprises, when these figures are not recorded in enterprises' accounting systems. Distribution by percentage would be easier, but not as accurate. Distribution into occupational groups will cause some conceptual difficulties and inaccuracy because this classification is not often used in enterprises. Age distribution could be regarded as an additional burden for respondents when figures are not at hand. Often, also, these absolute figures are based on estimation – which eases the burden but reduces the reliability.

- Total number of hours worked was reported to be quite difficult. In large companies the figures are enormously high and vulnerable to magnitude errors (too few or too many zeros). In some countries the yearly working time is recorded in enterprises only as man-year figures. Converting man-years to hours (based on the average number of working days and hours per working day) could be an option for some countries but it does have shortcomings (in taking into account paid overtime, part-time working etc.). In this regard the exclusion of apprentices/trainees from the statistics in CVTS1 and CVTS2 caused problems for some respondents. Where companies had a record of total hours and total labour costs, such records included all employees, including apprentices/trainees. Such companies had to estimate the hours and labour costs of apprentices and subtract them from their total recorded figures. This increased the burden of response and may have led to less reliable data.
- Total labour costs caused a lot of confusion for respondents, especially concerning indirect costs. Indirect labour costs seemed to be a rather 'blur concept' in some countries. An option to ask only total (gross) costs (direct and indirect costs summed up) can make responding easier (in some countries) and the results more reliable. However, there is also a danger that different respondents may take different approaches to the inclusion or otherwise of indirect costs if they are not explicitly defined and recorded. Some enterprises were not willing to answer, because they felt that data in labour costs was a too sensitive issue for the enterprise.

2.2 *Quantitative core variables*

A set of quantitative variables could be regarded as core variables that can not be bypassed on the questionnaire. Furthermore, some variables concerning participation in continuing vocational training are fundamental in order to be able to impute properly (if necessary) item non-response for other quantitative variables. Decisions could be made to introduce two different sets of variables, according to the level of importance, which serve as guidelines to focus efforts during the fieldwork and in respect of re-contacting. The first set could be questions that are obligatory for an enterprise in order to be regarded as a respondent. The second set would be important core variables that are necessary for further processing and improvement of the data.

Common problems for enterprises in answering key quantitative variables are that

- participation in CVT courses and in some other training forms (self learning, conferences and workshops) are not separated in enterprises recording systems
- enterprises have often their own home-made classifications for coding the field of training (if any coding), this variety of home-made classifications does not correspond to the classification used in CVTS3
- estimations are used when absolute figures are not available or they do not match the requirements of the CVTS3 definitions of concepts
- some respondents found it too hard to look for the requested data or were unable to find it in their enterprises. However, it is often not possible to determine whether item non-response is due to a refusal to answer the question (i.e. enterprises identify the data as too sensitive) or to the absence of such data in the enterprise

The number of participants (broken down by gender and occupational group) in CVT courses is the most important single variable in the CVTS2 data. It could be taken as one of the minimum requirement variables for a unit response. This decision would have, however, some consequences concerning the response rate, if item response can not be increased with

other measures in CVTS3. According to the quality reports the proportion of item non-response varied from zero to more than 20 percent in CVTS2. Missing information for the distribution of participants by gender was more general than item non-response for total number of participants. Enterprises have different practices in recording their training activities and the availability of precise figures on participant information can not be taken as self-evident.

- Small enterprises may not have formal recording systems but the extent of training may be quite small and the employees are well-known. Hence, in many cases, the respondent may be able to respond reasonably easily using his/her personal memory and/or making post-inquiries within the enterprise.
- Medium-sized enterprises could offer a substantial amount of training activities which one person can not recall out of his/her memory without a recording system. Unfortunately, it can be the case that such a system does not exist or that CVT belongs to the personal department, but there is no single person responsible solely for CVT.
- The amount of training activities can be quite high in large enterprises and the recording systems are not usually built for recording participants and hours by gender, occupation and age. It is probable that many enterprises have to give educated guesses (proxies) to these specifications, instead of accurate absolute figures. But it is also possible that one or more persons are solely responsible for CVT in the enterprises. Such a “professional” structure should raise the response rate.
- The concept of “participant” must be presented clearly in the questionnaire and during re-contacts. Any speculation about the quality and reliability of this variable in the final data should be avoided by implementing the common aim of this question properly in national questionnaires. An instrument for converting participant events into participants and training hours can be an additional tool for countries that find it useful and valuable.

The number of training hours is difficult in (large) enterprises with a lot of training activities. Training events are often recorded as training days in the sense of absence from the workplace. It means that records do not separate actual time attending training courses from a normal length of a working day (e.g. a normal training event of six hours is recorded as a 7½ hours working day in the enterprise’s accounting system). The explanatory text "the individual was actually in attendance on the training course" does not have much implications on these cases. Some countries asked the number of training days in their national questionnaires in CVTS2, mostly due to national enterprise practices. Measuring units in the questionnaire should refer to the enterprise’s practices in recording training activities. If training is mostly recorded in full training days, then, in terms of response burden, the variables should also use the same units. At least a formula how to convert days into hours should be offered.

The fields of training and training providers cause problems for enterprises mainly because the information is not available and classifications used in enterprises do not match fully the classification used in the CVTS questionnaire. The number of field categories is very high and makes using the classification burdensome.

Different costs items of CVT were generally the most difficult questions in the CVTS2 questionnaire, a conclusion that can be drawn from the comments in the quality reports. Not-available and item non-response figures for all cost items were quite high and varied considerably from country to country. Only a few countries had the possibility to use existing register information concerning costs. Nonetheless, it is difficult to know if the non-response was a result of missing data within the enterprises, too difficult questions/wording or if the

enterprises were just not willing to answer, because they felt that data on costs is a too sensitive issue for the enterprise.

2.3 Qualitative variables

Qualitative variables in the CVTS3 questionnaire (final version of the consortium from 30th of June 2005) are mainly simple in structure and the wording is usually quite easy to understand. Nonetheless, some difficult to avoid problems could occur:

- Conceptions and evaluations about the situation and possible changes concerning the training policy and practices are quite subjective to the person answering the questionnaire. Understanding of concepts may vary depending on the person answering the questionnaire.
- Both wording and answering categories of qualitative questions in enterprise surveys should be simple and as far as possible linked to concrete facts and practices.
- Some questions concerning training policy may be regarded as annoying in terms of data security and privacy protection of the enterprise. (This factor applies also to some quantitative variables like costs)

Overall, the data availability concerning the qualitative variables will not constitute a big problem.

3. Availability of data in CVTS2 - Results of the German CVTS2 extra survey of 474 training enterprises

3.1. Introduction

The BIBB conducted in 2000/2001 in Germany an extra survey supplementing the main survey of CVTS2.² Therefore Statistics Germany contacted the 2500 training enterprises of the German sample and asked, if they would participate in an extra telephone survey organised by the BIBB. 474 enterprises with CVT activities agreed to participate in the survey. The 474 participating enterprises were characterised by a size bias which means that big enterprises were over-represented and SME were under-represented. Thus the figures in the tables on data availability (see below) are too high. A better inclusion of the SME would have reduced figures significantly (see. Grünewald, U./Moraal, D./Schönfeld, G. (Ed.): *Betriebliche Weiterbildung in Deutschland und Europa*, Bielefeld 2003, pp. 168-171).

As in the German CVTS1 extra survey in 1994 the questions covered the data availability of some of the key quantitative variables (training participants, training hours, training costs) in training enterprises. Firstly, questions were asked concerning the data collection in the enterprises (dimensions: data is available, data can be made available without greater efforts, data can be made available only with greater efforts). Secondly, questions were asked concerning missing data (dimensions: possible to estimate the data, estimation of data is very inexact). Furthermore, there was one single question about the expected future use of electronic data processing for the collection of training data in the enterprises.

² For further information see *Ergebnisse der Zusatzerhebung zur zweiten europäischen Weiterbildungserhebung in Deutschland*. In: Grünewald, U./Moraal, D./Schönfeld, G. (Ed.): *Betriebliche Weiterbildung in Deutschland und Europa*, Bielefeld 2003, pp. 99 – 171.

3.2 Data on training participants

As already said, it is important to note that these figures are too high, because in the sample of the extra survey were too much big enterprises represented. An inclusion of SME would have resulted in lower figures in the following tables.

Most enterprises collected the total number of training participants in CVT courses (80 %), while personal characteristics of training participants were less often collected (gender (69 %), occupational status (67 %) and age (64 %)):

Table 1: Collection and availability of data on training-participants in training enterprises

Number of participants	Data is collected	Data is not collected	Data is available / data can be made available without greater efforts
Total	80%	21%	74%
Gender	69%	31%	53%
Occupational status	67%	33%	50%
Age	64%	36%	48%

Source: Grünewald, U./Moraal, D./Schönfeld, G. (Ed.): Betriebliche Weiterbildung in Deutschland und Europa, Bielefeld 2003, p. 164.

The last column shows that even in enterprises which do collect data it is not easy to make data available. Reasons therefore could be that data is spread over different departments in the enterprise or the data access for the respondent in the enterprise is rather limited. Especially data on personal characteristics (gender, occupational status, age) is not easily available. Only approximately 50% of the enterprises say that this data is available without greater efforts, while in 74% of the enterprises the data about the total number of participants is easily available.

3.3 Data on training hours

Even more problematic than the collection of data on participants and their personal characteristics is the availability of data on training hours in the training enterprises. Training enterprises obviously collect this data less often (see table 2 below). Only 56% of the training enterprises collect the total number of training hours (50% can make it available without greater efforts). Data on training subjects is in 52% of the enterprises available, while data on personal characteristics in relation to training hours constitutes the most problematic data. Especially the process of making this data available is for approximately two thirds of the enterprises (see last column) only possible with greater efforts.

Table 2: Collection and availability of data on training hours in training enterprises

Training hours	Data is collected	Data is not collected	Data is available / data can be made available without greater efforts
Total number of training hours	56%	44%	50%
Training subjects	52%	48%	39%

Gender	48%	52%	35%
Occupational status	48%	53%	32%
Age	46%	54%	31%

Source: Grünewald, U./Moraal, D./Schönfeld, G. (Ed.): Betriebliche Weiterbildung in Deutschland und Europa, Bielefeld 2003, pp. 164-165.

3.4 Data on training costs

The following table 3 shows, that training enterprises do not very often collect data on the costs of premises. Only 37% collect data on the costs of premises or on personnel absence costs. Costs for fees and payments are very often collected (82%), while costs for training staff (56%) are clearly less often collected.

Table 3: Collection and availability of data on training costs in training enterprises

Training costs	Data is collected	Data is not collected	Data is available / data can be made available without greater efforts
Fees and payments	82%	18%	77%
Costs of training staff	56%	44%	50%
Costs of premises	37%	63%	33%
Personnel absence costs	37%	63%	28%

Source: Grünewald, U./Moraal, D./Schönfeld, G. (Ed.): Betriebliche Weiterbildung in Deutschland und Europa, Bielefeld 2003, pp. 165-166.

When looking at the third column it becomes obvious that data on costs for premises and for personnel absence costs are in most enterprises only available with great efforts or they are solely based on estimates. Only 33% say that costs for premises and only 28% say that personnel absence costs can be made available without greater efforts. Costs for training staff (50%) and especially fees and payments (77%) are much easier available than other sub costs in enterprises.

3.5 Future availability of training data

The extra survey also covered a question about the future use of electronic data processing for the data collection of CVT in enterprises (see Grünewald, U./Moraal, D./Schönfeld, G. (Ed.): Betriebliche Weiterbildung in Deutschland und Europa, Bielefeld 2003, p. 168). 43% of the training enterprises confirmed, that the future use of electronic data processing would increase the availability of training data. These conceived improvements seem to be especially likely in bigger enterprises (60%), while they are less likely in middle-sized enterprises (40%) as well as in small enterprises (33%). These likely future technological improvements would mean a better availability and transparency of the data, which could improve the data quality in CVTS3.

4. Availability of data – Results of a methodological experiment by infas

The results of a methodological experiment are quoted in the annex B of the *infas*-paper. *infas* comes to the following conclusions (see pp 9-10 of the *infas*-paper in the annex):

- “**Questions about general enterprise data** are predominantly answered well. The answering of questions about “hard” economic data and balance sheets (profit/loss) causes problems in all three survey methods. A quarter up to a third of respondents is not able or willing to answer questions concerning turnover and export proportion of turnover. Questions about the proportion of investment of added value are also difficult. Internationally-active enterprises in particular often draw up international balance sheets only. Figures about the German enterprises are frequently not on-hand anymore or available with extraordinary expenditure only.
- The questions about **personnel structure** also cause problems. Problematic are exact figures about outflow and inflow of staff as well as differentiated statements concerning the employees’ qualification structure. The face-to-face survey scored best. By phone, a fifth of the enterprises could not answer that question. With a self-administered questionnaire, the item nonresponses can be reduced a little but not completely. Even with the self-administered questionnaire that allows for completing unhurriedly, these fact questions are answered worse than other question types. Obviously, these questions touch a sore spot of the enterprises’ available data. Even in the face-to-face survey “Costs and Benefits of Vocational Education and Training” 6.3 percent of the enterprises could not answer this question. Statements about the staff qualification structure are not required in enterprises by routine. The statements mainly base upon the respondents’ estimations. Therefore, they are just rough indicators, tending to reflect the qualification structure.
- The questions about **change within the enterprise concerning effects on qualification requirements** and **new demands for skilled labour and employees** are mostly being answered well.
- The questions concerning **personnel development** show very few item non responses, independent from the mode of data collection. The questions about initial and continuing vocational training can be answered without significant problems. Remarkably complete are also the answers to the partly standardised questions about the two most important continuing vocational training activities. However, in the case of a telephone survey the statements concerning the number of participants of vocational training activities were problematic. Interviewed by telephone, only 80 percent of the enterprises involved could provide answers compared to the face-to-face survey with 92 percent. Only the mail survey’s answers were complete.”

This results are overall rather similar to our expectations and experiences concerning data availability. It becomes obvious that some data is available, but the enterprises do not want to answer, because they consider the data as too sensitive. Different types of data collection can increase or decrease the problem (see our paper 2 on data collection).

5. Data availability in CVTS3 – Summary of the column “data availability” in WP3/Part 2

We will divide the proposed questions for CVTS3 (see CVTS3 questionnaire Final – 30 June 2005) into three groups: *a) data which is easy to collect in enterprises b) data collection with some problems c) data which is difficult to collect* (see also summary table of 31st of May 2005). Especially group C) requires special attention when making the survey.

Many of the questions will be relatively easy to answer – especially many questions in part D (Training policy of the enterprise). Some problems can be foreseen – as in CVTS2 – with the division by gender (A2/C1/C4). Furthermore the exclusion of apprentices will not be easy for every enterprise, particularly if the definition is not clear and the enterprises are not used to it (A4/E2).

To collect correct data will be more difficult for the questions about occupational and age groups (A5/A6/C2/C3). The enterprises are not used to collect data on these special groups of employees – presumably they have to re-calculate them or to use rough estimates. Also data about fields and providers are very often not collected in enterprises (C6/C7).

CVTS2 showed that the costs questions are the most difficult to answer. In order to achieve a high data quality re-contacts should be budgeted beforehand. There are often only slight changes in wording, so that presumably the same problems as in CVTS2 will occur (especially with dividing the costs into the different items). The same difficulties are to be expected for E3 (costs of CVT courses for apprentices). The following list classifies the questions proposed for CVTS3 in three groups of data availability:

Data which is easy to collect in enterprises	Data collection with some problems in enterprises	Data which is difficult to collect
<p>A1 - principal economic activity of the enterprise – pre-filled (taken from SBS) C10 - specific CVT courses aimed at different groups of persons employed – easy for companies which have specific measures, for other enterprises the question is not relevant D1 - training centre, although only a minority of enterprises will have a centre D3 - evaluate the future skill needs – easy, but vulnerable to subjective interpretations D2 - external advisory service, easy but vulnerable to subjective interpretations D4 - structured interviews D5 – enterprise provided CVT during the two preceding years – easy after the introduction of CVT concept D6 – enterprise will provide CVT in 2006 / 2007 – easy after the introduction of CVT concept D7 – Development of percentage of persons employed participating in CVT courses / other forms - easy after the introduction of CVT concept D 8 - written training plan or programme, easy but vulnerable to subjective interpretations D9 - training budget D10 - written criteria for the selection of training providers - easy, but vulnerable to subjective interpretations D11 - measures to foster the transfer and application of newly acquired skills to the working place D12 - procedures for evaluating the outcomes of CVT activities D13 - formal structure involving employee representatives D16 - reasons not to provide more CVT – easy, but perhaps socially expected answers D17 – reasons not to provide CVT - easy, but perhaps socially expected answers</p>	<p>A2 – total number of persons employed - in general easy, but problems with division by gender and excluding apprentices A4 - labour costs of persons employed – data reported in many annual reports - problems in excluding apprentices – in CVTS2 problems especially with indirect costs B1 - Internal and external CVT courses (conceptual and comparability problems) C1 - Number of participants in courses – problems especially by gender – data will often be based on estimates C4 - total paid working time spent on CVT courses - problems especially by gender – data will often be based on estimates C5 - paid working time spent by participants on internal / external CVT courses – presumably there will be some enterprises which did not distinguish between internal and external courses in their accounting system D14 - agreements between the social partners – in principle easy if the respondent has the knowledge D15 – Impact of government/public body – easy if the respondent has knowledge about this.</p>	<p>A3 - total number of hours worked by the persons employed – not part of the accounting system in every enterprise – problems in excluding apprentices A5 - occupational classifications – the data has to be estimated or newly calculated, because most enterprises do not use the ISCO-classification A6 - age groups – enterprises have to count the data head by head or calculate based on the staff register B2 - “Other forms” of CVT – a clear cut definition of the “other” forms is not possible, they are regarded in some organisations as an element of ordinary work – many enterprises will have to estimate and to distinguish the share of the different “other” forms C2 – Occupational groups of participants in CVT courses in 2005 in absolute numbers - the data has to be estimated or newly calculated, because most enterprises do not use the ISCO-classification C3 – Age groups of participants in CVT courses in 2005 in absolute numbers – usually the distribution by age groups is not available C6 - Field (subject) of training – these data is very rarely collected by enterprises – enterprises might distinguish in other fields – data will be based on rough estimates C7 - Type of CVT -provider – these data is sometimes not collected by enterprises in the CVT categories – data often based on estimates C8 - Costs of CVT courses – training costs are usually reported in annual reports, but there are conceptual differences in calculating different cost items – different training costs are often not recorded separately C9 – contributions / receipts –</p>

<p>D18 - Cooperation with vocational training organisations or schools and universities</p> <p>F1 – persons filling in the parts of questionnaire</p> <p>Annex 1 – New products / technologies / organisational changes - easy, but vulnerable to subjective interpretations</p> <p>Annex 2 – Work organisation</p> <p>Annex 3 – person responsible for organisation of training - easy, but vulnerable to subjective interpretations</p> <p>Annex 4 – Reasons to evaluate courses – easy, but difficult to distinguish clearly the answer options</p> <p>Annex 5 – Involvement of social partners</p> <p>Annex 6 – Performance of enterprise in comparison to 2004 - easy, but vulnerable to subjective interpretations</p> <p>Annex 7 – Contribution of training on business performance - easy, but vulnerable to subjective interpretations</p>		<p>problematic, especially share of IVT in some countries with a large IVT -system</p> <p>E1 - Total number of apprentices – difficult if the definition of IVT is not clear – enterprises are not sure which persons should be included</p> <p>E2 - labour costs of apprentices – difficult if enterprises do not differently account IVT and CVT</p> <p>E3 - Costs of CVT courses for apprentices – difficult if enterprises do not differently account IVT and CVT</p> <p>E4 – Contributions / receipts for apprentices – difficult, especially to separate between IVT and CVT</p>
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6. Summary

Two general trends concerning data availability can be summarized out of this paper:

a) Data availability is influenced by the size of the enterprise

Small enterprises	
+ Likely advantages	+ Low number of employees, rather high level of personal contacts + it is rather easy for the respondent to make personnel inquiries about participation in CVT + rather little amount of data to deliver
- Likely disadvantages	- No specialised (professional) employees for CVT in the enterprise - no elaborated accounting system - respondent is not familiar with CVT concepts

Medium-sized enterprises	
+ Likely advantages	+ amount of data can be still rather limited + personnel inquiries are still possible
- Likely disadvantages	- low likelihood of specialised (professional) employees in charge for CVT in the enterprise - mostly no elaborated accounting system - number of employees can be already rather big - amount of data can be already rather big

Big enterprises	
+ Likely advantages	+ High likelihood of specialised (professional) employees in charge for CVT in the enterprise + elaborated accounting system
- Likely disadvantages	- High amount of data to be delivered - high likelihood of incomparability of accounting system and required form of data for CVTS3 - information from different departments is needed - limited access to data on CVT for the respondent, because of complex organisational structures and hierarchies

The tables give some general overview of the differently shaped situation in enterprises of different sizes concerning data availability. Especially in medium-sized enterprises many problems can be expected, because the amount of data might be already rather big, while one might expect that the level of professionalisation concerning CVT expertise is mostly rather low and personal inquiries are already difficult. In big enterprises the amount of data is even bigger, but it can be compensated by a professional CVT expert within the enterprise, although the accounting system might be incompatible with the required data for CVTS3. Small enterprises have mostly the least-well developed expertise on CVT, while re-contacts to employees are rather easy to make.

Different problems of data availability will occur depending on the size of the enterprise. The different nature of the problems has to be kept in mind when making the survey in the different enterprises. Additional attention must be paid to the motivation of the enterprises and the respondents in big and medium-sized enterprises, because of the likelihood of bigger problems in these enterprises. The contact to these enterprises has to be even more sensitive.

b) The data availability of qualitative data is better than of quantitative data

The availability of data on some quantitative questions is rather limited. This holds true for data on:

- detailed and differentiated data on participants (age, gender, occupational status)
- total amount of training hours
- amount of training hours in relation to subject of training and provider
- training costs in general and especially the different cost items (training staff, premises)

Many enterprises do not collect this data or they collect it by different accounting systems which are not easily adaptable to the CVTS3 questions.

Qualitative data is easier available in the enterprises, because it requires no big amount of data or additional calculations. Problems with the qualitative questions are less connected to data availability but more connected to the understanding of the questions and their wording.

7. Recommendations

1. Especially the problems with quantitative data require a sensitive choice and implementation of methods of data collection. Answering problems will probably occur with every method, but telephone and face-to-face interviews are problematic, if the answers are supposed to be provided ad hoc (see also pp 21-22 of the *infas*-paper in the annex). Re-calculations and inquiries by the respondent within the enterprises need time. This time should be provided by contacting the enterprise more than once (this has to be acknowledge in the budget). We recommend to provide the respondent prior to the interview with the neuralgic questions (drop off) because they need to be prepared. Online questionnaires should offer the possibility to complete the questionnaire in more than one session.
2. In order to get a feedback for making CVTS4 and following surveys, part of the respondents could also be asked to fill in a short questionnaire about the main difficulties in answering the CVTS3 questionnaire and obtaining the data requested. Even a sample of 10 percent of the responding enterprises could be useful for further analyses. National experiences should be reported in the national quality reports. We recommend also to make a separate non-response study in order to know more about the source of problems and – even more important – to have the chance to control sample bias by having additional information for the weighting of responses.
3. Additional attention must be paid to the motivation of the enterprises and respondents. The legal basis of the survey, the policy importance of the survey in general and the

possible utilisation of the national and international results with respect to the enterprise's own training strategies must be highlighted in the survey introduction and during the process of contacting enterprises. The investigation in the accounting system and/or in different departments of an enterprise can be very time consuming. Thus it is likely that many respondents in the enterprises tend to avoid this additional work load.

4. The provision of a well-informed national phone hotline would certainly be helpful for the enterprises. Not only for questions on the wording and the concepts, but also to get some hints where and how to find the required data within the enterprise. It is likely that similar questions are raised by respondents despite different organisational structures.
5. One option for improving the ability of enterprises to meet the requirements of CVTS questionnaire and variables is to inform enterprises in advance, that is: Just before the reference year. Advance information could consist of a presentation of the core quantitative issues that are measured in CVTS.

The focus of an advance letter is to give enterprises guidelines to record their training activities according to the CVTS questionnaire measures, the core issues that are vital in order to get high quality data from enterprises:

- the number of participants and hours in courses broken down by gender
- training hours broken down by field and provider
- costs of CVT broken down by different cost items

This probably can't be done in CVTS3, because of now already fixed national time tables for making the survey. Nonetheless, this should be kept in mind for CVTS4 and following surveys

**Development of a methodology for a long-term strategy
on the Continuing Vocational Training Survey (CVTS)
CVTS3 M**

**Work-package 5:
Survey guidelines**

Paper 2: Mode of data collection

Bundesinstitut für Berufsbildung (BIBB)

in cooperation with

Statistics Finland
FÁS Training and Employment Authority
3s Research Laboratory
Statistics Sweden

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1 Introduction

The choice of the method of data collection is a far-reaching decision in the process of researching. Basically the following approaches are possible:

- Personally administered questionnaires,
- Telephone surveys and
- Self-administered mail or web questionnaires.

The objective of this paper is to give methodological background and advice for the choice of data collection methods for CVTS3. Each of the above mentioned methods has been used in CVTS2 and each may have advantages as well as disadvantages, regarding effects e.g. on unit response rate, item non-response, costs etc. Recommendations therefore allow no simple preference of one method. In fact, several points have to be taken into account, originalities of the countries as well as characteristics of the methods.

Advice in this paper will first of all be backed by a methodological expertise of infas, a German survey institute (see Annex 1). This expertise explores the possibilities and the effects of the different data collection approaches, especially the use of the electronic instruments of data collection CATI, CAPI, and internet technologies. Another important source of information is the experience of the countries with the data collection in CVTS2. In CVTS2 countries implemented very different approaches with varying results. In addition Statistics Finland report about their experiences with the implementation of web based instruments in enterprise surveys. Expertise from the different sources will be summarised to the main points of concern for each method of data collection for CVTS3.

2 infas expertise

In order to attain more information on the use of different data collection approaches the consortium commissioned infas- a well-experienced German survey institute - to compile a methodological expertise of the use of different data collection approaches. infas compared in an experimental approach pros and cons of different methods, especially whether the modern electronic instruments of data collection CATI, CAPI and online survey are recommendable and applicable for business surveys. infas evaluated:

- which survey method will probably lead to the best results for the purposes of CVTS3
- what kind of instrument effects are connected to the implementation of survey methods
- if the effects differ by the sizes of the enterprises and
- if the necessary requirements for the implementation of modern electronic survey methods are available in the enterprises.

infas stresses that from a conceptual point of view field decisions are often compromises between standards of methodology, usual practices and the available financial input. In order to reason the choice of a survey method, it is necessary to make the criteria of the decision transparent. infas uses conclusions from sampling theory, measurement theory and practical field experiences as criteria for the evaluation of methods. The valuations and results in the expertise are based upon several selected surveys carried out by infas on behalf of scientific institutions. In methodological experiments infas compared the results of the same survey obtained with different methods of data collection. The three chosen surveys are qualified for comparative analysis, because questions as well as survey conditions are to a larger extent the same and in follow-up studies unchanged over time.

The main results of the comparative analysis can be summarized as follows:

2.1 *Requirements arising from sampling theory*

Main requirement according to sampling theory is that the sample should map an unbiased image of the population. To reach this, every element of the population should have the same assignable selection probability. In this context telephone surveys have to solve the problem that not all telephone numbers of the enterprises can be researched. Mail and online surveys have to face the difficulty that in-house selection processes can only be controlled with a preliminary contact including the pre-selection of the contact person. Online surveys depend on high distribution with computers and internet access within the enterprises. However, this is not yet the case in all EU-countries. The two last mentioned – mail and online surveys - share the problem, that internal selection processes are more difficult to control. Preliminary contacts via telephone are therefore recommended.

2.2 *Requirements arising from the measurement theory*

The expertise of infas takes up the requirements of measurement theory, especially concerning reliability, and discusses the consequences of different modes of data collection on it. Reliability as a quality demand is a measure of consistency and depends to a high extent on the tool and its administration. infas concludes that certain features of the survey instrument challenge reliability to a different extent and that the challenge varies between different modes of data collection. The control of filter questions for example is presumably more problematic in a self-administered questionnaire than in an electronically assisted survey. In table 2 on page 9 infas summarises the demands of measurement theory and their fulfilment for the different approaches of data collection. The main results are as follows:

- Filter questions are more error-prone in mail surveys than in online surveys. Filters in face-to-face or telephone interviews are only unproblematic in their computer assisted versions that automatically control the flow of the questionnaire.
- For matrix questions the automatic filtering in computer assisted interviews is more suitable. In self-administered surveys the risk of misunderstandings is much higher.
- All computer assisted modes of data collection (online, CATI, CAPI) allow consistency and completeness check routines, whereas self-administered mail surveys can only be checked ex post.
- Visual support of the interviews is easier in self-completion questionnaires. Especially concerning differentiated quantitative questions additional self-administered questionnaires are recommended to supplement telephone and face-to-face surveys.

2.3 *Field implementation requirements*

infas states, that besides the requirements of the sample, the parameters of the field implementation are of particular interest for the consideration of an adequate survey method. The unit response is an indicator for the quality of the survey. In a methodological experiment, infas checked in 1998 on the basis of comparable samples and a comparable survey instrument the field implementation via telephone, face-to-face and mail. Telephone survey and face-to-face survey realised with about 61 res. 52 percent the highest unit response rates. The postal survey, carried out without a reminder, resulted in mere 16 percent. Even taking into account that a reminder would have raised the unit response rate approx. 8-percentage point, the unit response rate of telephone and face-to-face survey was more than double. These findings are confirmed by unit response rates for the different data collection

approaches used in CVTS2.

For the practical realisation of the survey infas recommends an optimum treatment of the sample addresses for all kinds of data collection.

Concerning the field monitoring and documentation telephone and face-to-face surveys have the advantage of a much better field monitoring. Non-response surveys are obligatory anyway in order to control the probability of sample biases.

A special question is the future use of enterprise-oriented online surveys. infas reported, technical access of the enterprises to data processing is important here. According to their findings the proportion of EU-enterprises with access to the internet in 2003 ranged between 60 and 95 percent. For example in Finland and Denmark almost all enterprises, 98 percent, provided the technical requirements for a web based survey. In Spain, Italy, UK and the Netherlands the distribution ranged in 2003 between 80 and 90 percent (EUROSTAT yearbook 2004: p. 193). In Germany, 92 percent of all enterprises had access to the internet in 2003. Even more than 90 percent of the smaller enterprises with less than 20 employees were online, in the size category with more than 50 employees; almost all enterprises provided internet access (Federal Statistical Office Germany 2004: p. 18f). infas reported, that to there experiences with enterprise-oriented surveys approx. 53 percent of the contacted enterprises agreed to participate. Yet, only 42 percent actually completed the online questionnaire. According to the entire sample, the unit response was only 24 percent and this is comparable to a well-covered mail survey. infas concluded, that compared to telephone and face-to-face surveys, the online survey as well as a two-stage mail survey underachieved the expectations.

3 Data collection in CVTS2

3.1 Recommendations in the CVTS2 EU-Manual

The EU Manual for CVTS2 mentioned three possible data collection methods for CVTS2:

- telephone surveys, using e.g. CATI
- postal or self-administered mail questionnaires and
- face-to-face interviews, using e.g. CAPI

Because the CVTS2 questionnaire was seen as a complex mix of quantitative and qualitative questions, the CVTS2 working group concluded

- not to recommend a “pure” telephone interview for CVTS2, because the outline questionnaire was seen as too long and complex to be suitable for “pure” telephone interviewing.
- not to recommend a “pure” postal survey due to the same reasons, especially not for large enterprises.
- that the face-to-face data collection method was expected to produce better data than other data collection methods, especially for some questions. However, in most countries the number of face-to face interviews was limited for financial reasons and there seemed to be no point to try to cover all strata.

The CVTS2 working group stated that telephone interviews and postal surveys have the advantage of being less expensive than face-to-face interviews. However, it was also agreed that most of the information of the questionnaire would need a self-completion questionnaire for respondents, because answering required time and often information from employers' records or accounting systems. But, in addition, it was argued that telephone and face-to-face interviews were needed to secure commitment, explain the definitions, raise unit response

rates and supplement the data. Therefore they concluded, that it is obvious that for **financial reasons a mixed mode of data collection** should be used in CVTS2. They recommended to use a postal approach for smaller enterprises and a face-to-face approach for larger enterprises, which needed to be supplemented by telephone contacts to set up meetings, remind, check the data etc. The final decision for the precise methods of data collection had to be determined nationally. Only fixed requirement was the obligation to conduct face-to-face interviews with at least 15% of the sample. It was argued that face-to-face interviews give better quality and so it can be also a sensible allocation of resources.

The CVTS2 working group recommended that the face-to-face interviews should be used mainly for large size enterprises. **This means different data collection methods for different size classes.** The following model for allocating the face-to-face interviews was chosen:

- All enterprises in the sample with 500 or more employees had to be seen face-to-face and interviewed, unless it was clear that the enterprise was able to complete the questionnaire satisfactorily and return it by post.
- On the whole at least 15% of the total sample had to be interviewed face-to-face.
- So if the percentage of enterprises with 500 or more employees interviewed face-to-face was less than 15% of the total sample, countries had to take additional “face-to-face sample” from other size classes.
- Additional coverage of face-to-face interviews were seen as a national option.

3.2 *Methods of data collection in CVTS2: Experiences of the countries*

To examine the relationship between different data collection procedures and the unit response, it would be necessary to undertake detailed analysis of the micro-data from the CVTS2 survey, but access to that data has not been granted at time of writing. However, some information, mainly of a qualitative nature, can be gleaned from the national quality reports.

Table 1 shows the data collection methods used in CVTS2 by countries and the unit response rates reported in the national quality reports. A more detailed table with exact information about the used data collection approaches by CVTS2 countries can be found at the end of this paper.

Table 1: Data collection methods used and unit response rates by CVTS2 countries

Data collection method used	CVTS2-countries	Unit response rate
<i>Postal survey</i>	Austria	38
	Germany	32
<i>Face-to-face interviews</i>	Belgium	28
	Bulgaria	89
	Luxembourg	62
	Netherlands	80
	Romania	92
<i>Postal survey and face-to-face interviews</i>	Czech Republic	63
	Greece	59
	Ireland	19

	Estonia	³
	Lithuania	71
	Norway	39
	Poland	64
	Portugal	63
	Slovenia	83
	Spain	85
	Sweden	52
<i>Telephone survey and face-to-face interviews</i>	Denmark	11
	France	56
<i>Postal survey, face-to-face interviews and telephone survey</i>	Finland	55
	Italy	⁴
	Latvia	96
	Hungary	⁵
	United Kingdom	⁶

Remarks:

- The national quality reports of the Eastern European countries (Bulgaria, Romania, Czech Republic, Lithuania, Poland, Slovenia, Latvia) show exceptionally high unit response rates. Apart for countries where there is a legal obligation for enterprises to answer national surveys of the national statistical offices, this will probably be based on the “candidate countries-effect” and can’t be ascribed solely to the method of data collection. For CVTS3 unit response rates of these countries will probably decrease.
- The low unit response rates of Belgium, Denmark and Ireland are due to general problems in implementing the questionnaire and do not totally depend on the chosen data collection approach and the implementation in these countries (see below).

The CVTS2 data collection approaches realised in the 25 countries cover the whole spectra of data collection methods.

The table shows that two countries used a pure postal survey and 5 countries a pure face-to-face approach. However, most countries (18 countries) used mainly for financial reasons a - by the EU-manual - recommended mixed data collection approach. It is obvious, that the use of different data collection methods for different populations of enterprises (for smaller enterprises e.g. postal survey or telephone survey and for larger enterprises face-to-face interviews) the unit response rates and also the quality of results will be different.

There were three main groups of countries:

1. Countries with data collection based entirely on a postal questionnaire
2. Countries with data collection based entirely on face-to-face interviews
3. Countries using a mixed approach of interviews and postal/drop-off questionnaires.

3.2.1 Countries with data collection based entirely on a postal questionnaire

The results of CVTS2 confirmed once again that a “pure” postal questionnaire generates

³ The national quality report of Estonia is missing.

⁴ The quality report of Italy does not include information about the mode of data collection. Preliminary unit response rates in Annex 1.

⁵ The quality reports from Hungary does not include unit response rates. Preliminary unit response rates in Annex 1.

⁶ The quality reports from United Kingdom does not include unit response rates. Preliminary unit response rates in Annex 1.

lower unit response rates than other data collection methods. Apart from the countries with more or less severe survey implementation problems, Belgium, Denmark and Ireland as mentioned above, Germany and Austria, countries that implemented a “pure” postal survey, had the lowest unit response rates with 32 % res. 38 %.

The national quality reports of Germany and Austria show, that a “pure” postal survey will generate much lower unit response rates, if enterprises are not intensively contacted in the acquisition phase and re-contacted after receiving the filled-in questionnaires. After two subsequent postal reminders, **Germany** contacted a certain number of enterprises by phone, which did not answer the reminders. Not all the enterprises were contacted. Germany contacted those enterprises in stratum with a low unit response rate and those enterprises, which had promised to send the questionnaire. Germany reported that the success of the telephone contacts was very limited. The re-contacting after receiving the questionnaires were necessary in about 90% of the cases and these contacts were very time-consuming. Thus, Germany is a country initially implementing a “pure” postal survey, but at the end it was necessary to have intensive re-contacts with enterprises to reach a reasonable unit response rate for a “postal” survey.

An important feature of the **Austrian** implementation of the survey was the staging and the modularisation of the questionnaire (for further information see work package 3/4, paper 7, annex 1). Austria implemented a two-stage approach. Stage one entailed a letter with a short questionnaire. The second stage was a customised questionnaire, based on the answers to the first short questionnaire, which included the minimum number of necessary questions. In contrast to Germany, Austria initiated a supporting structure for the data collection from the beginning of the survey. Austria mentions that probably the most important measure was the running of a permanent “call centre”, which gave telephone support to the field work. During the screening phase the call centre’s function was on the one hand conducting telephone interviews whenever enterprises had not sent the short questionnaire themselves, on the other hand to establish a certain kind of relationship with the enterprise. During the second phase of field work the exclusive task of the call centre was the motivation of the respondents to fill in the nevertheless voluminous and mostly difficult questionnaire. Often those telephone contacts were connected with the resending of the questionnaire per fax or email.

In comparison to the German approach the unit response rate in Austria was higher. The results of Germany and Austria show, that at least the organisation of the field work by permanent telephone support, e.g. a permanent “call centre”, is a prerequisite for a more successful implementation of an enterprise-oriented postal survey.

3.2.2 Countries with data collection based entirely on face-to-face interviews

The CVTS2 working group expected that the face-to-face data collection method would produce better data than other data collection methods, especially for the quantitative questions like the cost questions. The table 1 above shows that apart from Belgium, countries with a pure face-to-face data collection method reached rather high unit response rates. Nevertheless the experience from Belgium shows that quality of face-to-face interviews depends on certain prerequisites and can not at all be taken for granted. A general prerequisite seems to be a good staff of interviewers which are experienced in interviewing enterprises. Countries with a good interviewer staff, as in the case of Bulgaria, Luxembourg, Netherlands and Romania showed clearly better unit response rates.

In **Belgium** the infrastructure of such an experienced staff of interviewers did not exist and they had to train the interviewers intensively. Belgium reported, that it was extremely difficult to find and to train interviewers, which can cope with such a complicated enterprise-oriented questionnaire. In spite of intensive training efforts, the trained interviewers showed some lack of qualifications to interview enterprises. The problem is, that interviewers should have a very good knowledge of the subject and of the enterprises, in order to support the respondents in filling in the questionnaires.

A good example of the organisation of the field work is the proceeding in the **Netherlands**. Statistics Netherlands reported that they used their regular staff of interviewers. This interviewer-staff is spread all over the country and familiar with interviewing enterprises. For CVTS2 a letter was sent out to the enterprises announcing the survey before setting a date for an interview. This letter was addressed to the person involved in training issues. Finding the right contact person for the interview was one of the biggest problems, especially in the larger enterprises. The interviewers often had to contact the enterprises several times. The interviewers were all instructed about the questionnaire before the start of the survey. The goal of the survey was explained, as well as most of the definitions used in the questionnaire. Interviewers could also exercise with the electronic version of the questionnaire. They were advised to start the field work with the smaller enterprises, because data collection seemed to be easier in smaller enterprises. Also a helpdesk was set up where the interviewers could leave their questions and problems. An FAQ (Frequently Asked Questions) was introduced and updated periodically, trying to cover most of the questions in the field.

During the field work interviewers used CAPI with an electronic version of the questionnaire on their mobile computers and had to enter the answers in the electronic questionnaire. This could be done during the interview or soon after the interview. Inherent checks in the software warned them for outliers or errors. The interviewers had to send the response to a central computer at the office (using a protected line). Once every week the new responses were collected and checked by the project team. Checks were performed in order to establish errors and outliers. These were then communicated to the interviewers to see whether corrections were necessary. All together the data collection in the Netherlands worked well and resulted in a high unit response rate of 80%.

Statistics **Romania** reported that the face-to-face interview method was used in all enterprises irrespective of their size (small, medium, large). In that way, good data concerning the largest proportion of employees was collected. As they did not have a permanent interviewer staff, an intensive training of the interviewers was necessary. Each interviewer collected the information from about 20 units. Before the data collection started interviewers made a first visit to the enterprises and hand out a presentation letter. The main objective of this letter was informing the units' manager or management board about expectations of the survey, the objectives and the importance of participation to the survey. Field survey personnel was composed of 300 interviewers, 65 controllers and 42 survey co-ordinators. Each controller was responsible for about 5 interviewers in helping them to organise their field work, to make the necessary calculations when it was the case, to check these calculations and the relation between different questions. The interviewers were recruited by a contractor-firm and trained together with the other categories of field staff. The training had been organised in several steps and levels:

- the first one addressed to survey co-ordinators and controllers;
- additional 8 training periods in the 8 regions of Romania were addressed to the interviewers and organised by personnel already trained (co-ordinators and controllers) under the supervision and with the support of the CVTS team from the National Institute for Statistics.

Survey questionnaire and handbooks were released in advance in order to offer the possibility to the participants to prepare before training. In several sessions instructions on how and when to organise the field work for each category of field staff (co-ordinators, controllers and interviewers) and the use of the survey tools were discussed, the knowledge and practical qualifications of interviewers were intensively tested.

3.2.3 Countries using a mixed approach of interviews and postal/drop-off questionnaires

Combination of postal survey and face-to-face interviews

In CVTS2 eleven countries implemented the proposed mixed mode of postal survey and face-to-face interviews (see table 1). This data collection approach generated fairly high unit response rates in most countries.

However, especially **Ireland** reported problems with the implementation of CVTS2. In this country mixed data collection strategy had been used with FAS being responsible for the postal survey and various external (training) bodies doing the face-to-face interviews in their own area. The unit response rate for the postal survey was very low. Ireland reports that companies in Ireland are faced with a very large number of surveys on an on-going basis. "Survey fatigue" is a common complaint, and all survey research organisations report increasing difficulty in obtaining co-operation in completing surveys. This situation has worsened during the last few years and partly explains the much worse response in Ireland to CVTS2 than to CVTS1. Ireland reported that especially the changed methodology used in Ireland became a problem. In CVTS1 all enterprises were approached personally by FAS training advisors whose normal work involved dealing with enterprises on training issues. Indeed, in many cases, the training advisor was known to the enterprise already. Due to restructuring within FAS, these members of staff were no longer available for interviewing. Therefore it was decided for CVTS2 to contract out the personal interviews to a market research company. By contrast to CVTS1, only one quarter of the interviews were conducted face-to-face, in most cases by interviewers with no particular knowledge of training in enterprises.

Enterprises were first contacted to make an appointment for the interview, but many enterprises just refused. Due to the poor unit response rate to the postal survey, and the problems with the face-to-face interviews it was decided at the end to sub-contract further survey work. Additional postal surveying and subsequent intensively telephone follow-up calls were required in order to reach a unit response rate of 19 %, which is clearly lower than the unit response rate in the other countries - eight of the ten countries reached an unit non-response rate of more than 60%.

As already mentioned, postal surveys generate clearly lower unit response rates than face-to-face interviews. This of course is also the case if using a mixed data collection approach (postal survey and face-to-face interviews). In all the countries using the mixed data collection approach this pattern can be observed. Norway and Sweden e.g. reported in their national quality reports unit response rates for the postal survey: in Norway the unit response rate was 36% while for Sweden 49%. For the face-to-face interviews four countries (Czech Republic, Lithuania, Norway and Sweden) reported in their national quality reports, that they use a permanent interviewer staff of the statistical offices. Also Norway and Sweden e.g. reported in their national quality reports unit response rates for the face-to-face interviews: in Norway the unit response rate was 60% while for Sweden 67%.

Combination of telephone survey and face-to-face interviews

Two countries (Denmark and France) used a telephone survey and face-to-face interviews for different populations of enterprises. According to the unit response rates only France had a good result.

Denmark reported severe problems with the implementation of CVTS2. As already mentioned, also Denmark opted out the survey to a private institute. Denmark encountered more problems than expected. In Denmark data collection was planned in three phases:

- 1) contacting the enterprise to arrange a face-to-face interview or phone interview,
- 2) forwarding of questionnaire guide comprising some of the questions from the survey, and
- 3) completion of the interview.

However, approximately 65 per cent of the contacted enterprises refused to participate immediately when approached and many enterprises, moreover, refused participation when they saw the rather time-consuming questionnaire guide (survey fatigue). As a consequence data had to be collected from among a second population, since the first population yielded too little response. A more direct approach for making appointments for the interviews was used. The low unit response rate in Denmark was caused by the field work problems in this country.

In **France** CVTS1 was carried out by mail and received a low unit response rate, so this collection method was abandoned for CVTS2. For CVTS2 two types of methods were used: a telephone survey using CATI and face-to-face interviews. France reported, that although the CATI telephone survey was more efficient in terms of the number of respondents, there is a risk that the speed of interviewing may affect the quality of quantitative data collected. In total, 4384 enterprises were surveyed by telephone. France did not report extensively of the use of CATI in the context of enterprise-oriented surveys. The face-to-face interviews were conducted in enterprises with more than 1000 employees, as well as “the less satisfactory respondents” in the 500 to 999 size category. France reported however about some difficulties inherent to the face-to-face survey:

- it is more difficult to obtain an appointment for a face-to-face interview than for a telephone survey,
- this collection method is less flexible than the telephone survey to the extent that it is more difficult to break off the interview and resume it at a later date,
- the face-to-face interview is more time consuming and more difficult to perform, since the interviewer must continually go back and check if the answers are consistent, something that the CATI system does automatically during a telephone interview.

Postal survey, face-to-face interviews and telephone survey

Five countries (Finland, Hungary, Italy, Latvia and the United Kingdom) used a mix of postal, telephone survey and face-to-face interviews. The unit response rates for these countries were also relatively high.

The five countries realised two different ways of combining the postal, telephone survey and the face-to-face interviews. **Finland** initially started with a postal survey and used the telephone survey and face-to-face interviews for the upgrading of the unit response. Statistics Finland stated in their national quality report, that from the Finish perspective a telephone

survey or face-to-face interviews are not particularly suitable for enterprise surveys. The data quality, especially considering the number of missing items, is better in a mail survey. For CVTS2 the respondents had to prepare themselves before filling in the questionnaire. The information needed is not at hand and probably needs consulting other experts in the enterprise. If the respondents already have the information at hand, they are likely to prefer to fill in the questionnaire by themselves and are not fond of giving the same information by phone or face-to-face to an outsider (interviewer). Also it could be noted that the interviewers cannot be experts on difficult issues concerning the concept and measuring of training (even though they had a one day training on CVTS2 issues for this project).

Before sending out the questionnaires Finland used their own field organisation (interviewers) in order to find out the right person in the enterprise. Nearly 60 percent of the questionnaires could so be directed to the right person in the enterprise. In the following period interviewers started to take contacts to enterprises in order to

- remind the respondents about the survey or
- ask them to give the answers on the telephone or
- make an appointment for a face-to-face interview.

The other four countries (Hungary, Italy, Latvia and the United Kingdom) started parallel a postal survey and face-to-face interviews. They used a telephone survey for the upgrading of the unit response rate. **United Kingdom** used a pilot survey to test all aspects of the methodology. A separate pre-recruitment questionnaire was used for initial contact via telephone. Its purpose was to verify appropriateness of the potential respondent and verify contact details for follow-up via personal interview and / or postal methodology. A common format was applied for each of the means of administering the survey, i.e. the questionnaires used for the pilot, postal and telephone stages were closely comparable with each other. In order to boost the overall number of enterprises covered in the survey, an additional telephone interview was undertaken.

4 Conclusions for the data collection in CVTS3: Pros and cons of different data collection approaches

4.1 *Face-to-face data collection*

The CVTS2 working group expected that the face-to-face data collection method would produce better data than other data collection methods, especially for the quantitative questions, like the cost questions. The results show that, apart from Belgium, the highest unit response rates were mostly reached in countries with a face-to-face data collection method. Experiences from CVTS2 are nevertheless somewhat contradictory. In some countries the compulsory quota of face-to-face interviews was not regarded as suitable or efficient for extensive and complex enterprise surveys. The role of the interviewer differs a lot in an enterprise survey from that in an individual survey. Also the competence of the interviewers, regarding complex training issues and the ad hoc availability of different CVTS data in enterprises has been questioned. A general prerequisite, however, is the availability of a good organisation of the fieldwork and a good and experienced staff of interviewers, which are well experienced in interviewing enterprises and - if possible - familiar with training issues.

Following the infas expertise face-to-face interviews have the advantage of comparably high acceptance. In addition they allow the selection of the enterprises as well as the enterprises' respondents and therefore fulfil requirements of sampling theory. A good field control and field documentation are further advantages of face-to-face interviews. To make them more

independent from subjective biases of the interviewers computer assisted versions like CAPI are recommended. They also have the advantages of automatic filtering and data checking during the interview.

The expertise of infas nevertheless supports the above mentioned doubt, if fact questions requiring precise answers and often checking the enterprise's recording systems are really suitable for pure face-to-face interviews. This problem could be solved by additional drop-off questionnaires covering the more complicated quantitative questions. Nevertheless face-to-face interviews constitute a rather expensive alternative. If face-to face interviews are chosen as method of data collection we refer to the outstanding importance of the choice of suitable interviewers and the necessity of interviewer training (see also paper 3 of this work package).

4.2 Telephone interviews

In CVTS2 only a few countries implemented telephone interviews as method of data collection. Two countries (Denmark and France) used a telephone survey and face-to-face interviews for different populations of enterprises. Denmark reported general problems with the organisation and implementation of the survey. Thus the very low unit response in this country does not allow any conclusions regarding the use of the telephone survey approach. However, France had a good unit response rate of 45 % using mainly the "telephone survey" CATI approach.

Using telephone interviews for getting contact information about the respondent in advance, motivating the respondents and reminding the enterprises to fill in the questionnaire has proven to be both suitable for the interviewers and successful in terms of unit response rate in CVTS2.

According to the infas expertise telephone interviews as data collection instrument are like all the other methods characterised by a mixture of advantages and disadvantages. As for face-to face- interviews a strong argument for the implementation of telephone interviews is their higher acceptance leading to higher unit response rates. This argument has to be balanced with the problem already mentioned for face-to face-surveys: some kinds of information are hard to collect in a pure telephone interview, especially those requiring time to look into accounting systems or to discuss with colleagues. This problem could be faced with an additional postal or mail drop-off questionnaire for the critical questions. Though raising costs of the survey this measure seems to be justified by the gain of quality in the data. infas assesses telephone interviews with CATI as a compromise between methodological standards and survey costs.

Another problem raised in the infas expertise – not all enterprises are listed in telephone accounts – should be controlled to exclude selectivity. In this context mail questionnaires asking for the main characteristics of the enterprise could help to compare listed and not listed enterprises. But this is more a problem of sampling than of the data collection method.

If telephone interviews are conducted for CVTS3 we recommend the choice of the computer assisted version (CATI) to allow some possible advantages to act: programming of filters and matrix questions and automatic check routines. Both of them lead to better quality of the data and higher reliability.

4.3 Postal questionnaire

The results of CVTS2 confirmed once again that a "pure" postal questionnaire generates lower unit response rates than the other data collection methods. Apart from the countries

with more or less severe survey implementation problems, Germany and Austria, countries that implemented a “pure” postal survey, had the lowest unit response rates with 32 % res. 38 %. The results of Germany and Austria show, that at least the organisation of the field work by permanent telephone support, e.g. a permanent “call centre”, is a prerequisite for a more successful implementation of an enterprise-oriented postal survey. In those countries that combined postal surveys with other methods of data collection the mail part reached lower unit response rates in all cases (see last column of annex 1).

The results of the infas paper back the hypotheses of much lower unit response rates in mail surveys than in face-to-face or telephone surveys. Conclusion in the infas expertise is the advise to conduct at least preliminary telephone contacts. This measure is at the same time suitable to solve the problem that otherwise the selection process within the enterprise is beyond control. A further argument against mail surveys is the lack of a field control.

Concerning the coverage of complicated quantitative data (like e.g. participants in training, hours, fields of training, costs) self-administered questionnaires seem to support a better quality of the data. For this kind of information the respondents often have to look up the accounting systems, or exchange with other colleagues is necessary. Self-administration of the interview makes time management more convenient and may therefore lead to better answers. But quality gains on the one side have to be balanced with quality risks on the other side: filter questions are more error-prone in self-administered questionnaires. In addition checking of the data can only happen ex post and may necessitate re-contacts with the enterprises. The later may severely influence the costs of the method, moving it from a cheap method to at least a medium expensive one.

If mail surveys are chosen as method of data collection for CVTS3 we strongly recommend the implementation of a service centre for the respondents. This centre should be available by phone and by email. To raise unit response rates multiple contacts and reminders should be envisaged. In addition we support infas’ proposal to use incentives like sector reports to motivate enterprises to participate.

4.4 Data collection with web based instruments

The appraisal of online instruments as method of data collection for CVTS3 is mainly based on experiences of Statistics Finland who already introduced web instruments in enterprise surveys several times. According to their experience a web questionnaire can be a good addition for CVTS3 data collection along with traditional paper questionnaires and possible telephone or face-to-face interviews.

Compared to paper questionnaires a web instrument has the following advantages: First of all it enables the routing of questions and modules according to different choices enterprises make during the flow of the questionnaire. In addition the use of different background information as auxiliary variables to pre-fill certain information concerning an individual enterprise is possible. The checking of the internal consistency of given answers by summing up figures or comparing figures from different questions concerning the same piece of information (e.g. comparing the number of participants and total hours of participants)⁷ will probably decrease the possibility of unintentional recording errors. Another advantage is the decreased effort in data entry and data editing, reducing mistakes in this phase of the processing and thus contributing to higher reliability.

Compared to a computer assisted telephone or face-to-face interviews a web questionnaire

⁷ Checks and signals must be used with caution. It has been experienced, especially in computer assisted interviews, that absolute checks that can not be passed by, complicate the natural flow of the questionnaire and may also cause non-response.

- gives the respondent the freedom to fill in the questionnaire at any convenient moment suiting for the respondent
- gives the possibility to read additional information (definitions and explanatory text) at his/her own pace when needed
- gives the possibility to return to earlier questions in the questionnaire for ascertaining previous entries or making corrections.

Though a web instrument decreases a lot of work in later phases during the survey process it also requires a lot of work in designing the questionnaire. In addition to programming and routing that are used in a computer assisted electronic questionnaire as well there is a clear need to put a lot of effort in designing the layout of the web questionnaire attractive and functional. Also the user interface is important because it is the main factor in the decision process whether to participate in a web questionnaire or not.

In a single survey (like CVTS) the benefits of a web questionnaire probably won't be gained in reduced costs but in terms of improved data quality and decreased response burden (as experienced in Finnish enterprise surveys). Only if a web questionnaire is used in sequential surveys (the same questionnaire is used several times) the financial benefits become evident.

Important factors in designing and using a web questionnaire are:

- Data security and privacy protection of the respondent (enterprise). Enterprises are even more concerned about data security than persons in individual surveys because enterprise surveys often include items that are regarded sensitive in terms of publicity or commercial confidences. Technical solutions for data security and transferring are available and encrypting, user IDs and passwords are necessary but also familiar to respondents in enterprise surveys.
- The user interface must be easy and functional. It is the most important threshold for starting to fill in a web questionnaire.
- The questionnaire must be fluent and illustrative. An electronic questionnaire can not simulate perfectly a paper questionnaire concerning the possibility of getting a clear overview of the entity of the questionnaire and the flow of modules and questions. Efforts should be put, however, to make the appearance of the questionnaire both informing and appealing in terms of functionality and layout.
- The respondent must have a possibility to save the questionnaire when breaking up the filling and returning to continue data entry another time.
- The respondent should have a possibility to print the questionnaire (or save the given data to his/her own computer) for the respondent's need for checking and also as a record.

In Statistics Finland, web questionnaires have been used for some in-house and outside data collections during the last few years. About 50 applications are under construction or being planned. Experiences have been mainly positive. Financial savings can be gained through less need of printed material, postal charges and manual work in data editing. The average response time in monthly surveys has reduced somewhat. The received data has been considered to be of better quality and a reduction of recording errors has been identified. Users of web questionnaires have been quite satisfied and experiences of decreased response burden have also been found.

The infas expertise backs the hypothesis that for some kind of questions in the CVTS3 questionnaire a pure telephone or face-to face survey is not recommendable. Especially for the problematic questions like those concerning participants, hours of participation, costs and fields of training and training providers a method without time pressure like mail or web

surveys seem to be more suitable. Respondents have the possibility to search for the requested information or to forward the questionnaire to other persons.

In this context web surveys seem to be a quite good alternative to complement other survey methods but only in countries with a wide enough elaborated internet access of the enterprises. If web surveys are chosen for the collection of data for CVTS3 this point has to be proved in advance. Because of the problem of missing control of internal

Annex 1: Data collection approach in CVTS2

Country	Postal survey	Face-to-face interviews	Telephone survey	Additional information	Preliminary unit response rate*	Final unit response rate**
Austria	Mail E-Mail (if enterprises asked for) Call-Centre for re-contact Reminder			Two-stage procedure: a) screening questionnaire b) written made-to-measure main questionnaire		38
Belgium		Interviews (ask for participation by telephone – questionnaires sent before interview) Re-contacts		3 phases to collect data with different kind of interviewers (bad results in first phases)		28
Flanders	Mail (ask for participation by telephone before) Reminder by telephone	Face-to-face interview (with all large enterprises and enterprises which hesitated to fill in questionnaires)	Telephone interview by call centre (especially small enterprises)	3 phases to collect data with different kind of interviewers (bad results in first phases)	~ 80 (face-to-face) ~ 30 (mail)	
Bulgaria		Face-to-face-interviews Re-contact (telephone)			96	89
Czech Republic	Mail	Face-to-face-interviews (10,3 % of sample)		Face-to-face with better results but influenced by interviewers		63
Denmark		Contacting enterprise to arrange face-to-face or phone interview Sending out questionnaire guide Completion of interview	Contacting enterprise to arrange face-to-face or phone interview Sending out questionnaire guide Completion of interview			11
Estonia	Mail	Face-to-face interviews			75 ~ 70 (mail) ~ 81 (face-to-face)	
Finland	Mail Task of interviewers: a) Find out right person to send questionnaire b) Reminder	Only a fairly small number	Only a fairly small number	Better results by mail – respondents had to prepare themselves before filling in the questionnaire	60%	55

	c) Help d) Follow up- interviews to complete questionnaires					
France		Face-to-face- interviews (220 in total)	CATI telephone (4384 enterprises) Initial contact with letter before	Face-to-face more difficult to implement than telephone survey	~ 45 (telephone)	56 ~ 45 (telephone)
Germany	Mail 2 reminders after reminders telephone contact with enterprises which did not answer (stratums with low unit response rates – success limited) Follow-up contacts to complete questionnaires				32	32
Greece	Mail (only 59)	Interview (2.500)			55 ~ 95 (face- to-face) ~ 40 (mail)	59
Hungary	Mail Reminder by telephone Follow-up contacts to complete questionnaires	Face-to-face- interviews Follow-up contacts to complete questionnaires	Telephone interviews Follow-up contacts to complete questionnaires		~ 70 (face- to-face) ~ 34 (mail)	
Ireland	Postal Reminder Follow-up non- respondents by telephone	Face-to-face- interviews (ca. 25 %)		Production of a shortened questionnaire to get more answers followed by telephone calls		19 ~ 16 (mail) ~ 28 (face- to-face)
Italy	Mail	Face-to-face interviews	Telephone interviews (additional to boost unit response rate)			
Latvia	Mail (3050 enterprises) Re-contact by telephone to complete questionnaires	Face-to-face- Interview (450 enterprises with 250 and more employees)	Telephone interviews with enterprises that had not answered after reminder	Enterprises are obliged to participate		96
Lithuania	Mail (3501 enterprises)	Face-to-face- interviews		Legal obligation		71 ~ 100

	First reminder by phone Second reminder by mail	(650 – large enterprise with 250 or more employees and 249 from 50-249 size group): a) hand-out questionnaire and first information b) second visit for interview				(face-to-face)
Luxembourg		Face-to-face-interviews (after pre-contact by letter or telephone)		Help-desk by telephone, fax or e-mail	Range 65 - 75%	62
Netherlands		Interviews (electronic questionnaire used by interviewers)		Helpdesk for interviewers	76	80
Norway	Mail (enterprises with less than 250 employees) Mail reminder followed by telephone reminder	Face-to-face interviews (enterprises with more than 250 employees) Questionnaire sent before	On special request of enterprises (only some cases)		~ 40 (mail) ~ 60 (face-to-face)	39 ~ 36 (mail) ~ 60 (face-to-face)
Poland	Mail Reminder by telephone	Face-to-face interviews (enterprises with 50 and more employees which did not respond after follow-up telephone calls)				64
Portugal	Mail	Face-to-face interviews (enterprises with more than 85 employees)			61	63
Romania		Face-to-face interviews				92
Slovenia	Mail Reminder	Face-to-face interviews (large enterprises)				83
Spain	First stage: Sending questionnaire – telephone contact to all enterprises to decide about	Face-to-face interview if wished by enterprise				85

	method (fax, mail or agent) and other basic information Second stage: Mailing questionnaire to “training” and “non-training” enterprises – telephone contact during the following week – visit by agent if needed					
Sweden	Mail 2 Reminders – then telephone reminder Re-contact by telephone to complete questionnaires	Face-to-face interviews (enterprises with more than 250 employees) Questionnaire was sent before	On special request of enterprises (only some cases)	Contact numbers for questions by enterprises		52 ~ 49 (mail) ~ 67 (face-to-face)
United Kingdom	Mail Pre-recruitment via telephone Reminder by telephone	Face-to-face interviews (enterprises with more than 500 employees) Pre-recruitment via telephone	Telephone (additional – to get more answers)		~ 20 (mail) ~ 50 (face-to-face)	

* Minutes. Summary of the main discussion. Working group Continuing Vocational Training Survey (CVTS2). 2000

** National quality reports

**Development of a methodology for a long-term strategy
on the Continuing Vocational Training Survey (CVTS)
CVTS3 M**

**Work-package 5:
Survey guidelines**

Paper 3: Organisation of the field work

Bundesinstitut für Berufsbildung (BiBB)

in cooperation with

Statistics Finland
FÁS Training and Employment Authority
3s Research Laboratory
Statistics Sweden

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1 Organisation of the field work

In an international survey like CVTS it is usual to stress that the comparability of results demands harmonising the survey and sample design and the questionnaire and data processing. Not that much has been discussed about the importance of harmonising also the fieldwork procedures, at least to some level. Even if we accept that there can be different survey practices and cultures, the aim should always be to avoid unnecessary variation in fieldwork procedures and to stimulate an improvement of procedures.

Here we try to describe the importance of qualified interviewers and how this can be established and maintained. It has been even argued that one of the major factors influencing survey quality is the attitude of interviewers towards their work and their role in respect to the respondents.

The basic rule for choosing the institute that will be responsible for CVTS3 interviews is that it should have a good reputation and substantial experience of different data collection methods, and especially of enterprise surveys. The survey organisation should be aware of the non-response problem in the country, know how to handle this and be able to evaluate the 'survey climate'. The interviewers should be experienced and have facilities and capacities to use different modes of data collection (e.g. CATI, CAPI). Organisations must also be able to document their experiences in order to show that they can master all aspects of survey operations.

There is some evidence that, at least in household surveys, public organisations (and mostly statistical organisations) have better results than private organisations in terms of response rate and data quality. Partly this has been explained by the mandatory character of surveys, how the survey organisation is sponsored and also by the assumption that people are more willing to participate in governmental surveys than in commercial surveys.

Most professional behaviour of interviewers must be learned in the field in order to gain experience with respect to all important aspects of the fieldwork. If interviewers are involved regularly and their workload is reasonable they probably are more willing to invest in it, and on the other hand they have enough time to carry out all the procedures that are needed to obtain optimal response rates.

The way interviewers are paid can also have an impact on the quality of data collection and response rate. If interviewers are paid per interview they tend to get the interviews done as quickly as possible and not spend enough time trying to convince reluctant respondents or keep up high standard concerning the data quality.

2 Respondents in enterprises

Focusing surveys to the right respondents in enterprises is always a problem, even when the subject of the questionnaire is quite limited - training activities in CVTS3.

In small enterprises there are not often dedicated professionals for training and accounting matters. The general manager is often responsible of all enquires to the enterprise.

In larger enterprises training issues can be handled and training activities are recorded in special training units, in personal administration departments and sometimes even in financial

departments. In order to make the first contacts efficient it is useful to have pre-information about who is the right person to contact in the enterprise, i.e., the person responsible of training matters.

National business registers may have some information about contact persons in the enterprises (e.g. in Finland), but usually this information is gathered for other statistical purposes - statistics concerning economic activities, products and services and finances. Therefore, the contact person(s) is (are) not often the one(s) that could be used in a survey dealing with training activities.

Pre-contacts

Advance contacts before sending out the questionnaires have been proven to be a good solution in focusing the survey to the right person(s) in the enterprises and in preparing the data collection within the enterprises. In a short telephone call focused to at least medium-sized and large enterprises the name of the person responsible for training issues could be asked in order to address the mail/letter correctly. Experience from other enterprise surveys has shown that without these measures a lot (even 20-30 percent) of the questionnaires never reach the right person in the enterprise. This can be a major factor for unit non-response in CVTS3. Using interviewers for this kind of operation is, of course, an additional survey cost, but consequently savings can be reached in further stages of the survey.

If no pre-contacts are made, then questionnaires could be addressed to enterprises by the occupational position to 'Head of training division' or 'Chief of personnel' in large enterprises and to the general manager in small enterprises. Countries know best the boundaries in terms of enterprise size, whether the mail could be addressed with or without specifications.

Respondent information in the questionnaire

We proposed to have information about the person who filled in the questionnaire (question F1). The use of the information has not, however, been much discussed. The primary use of this kind of information is the need to re-contact enterprises when deficiencies or inconsistencies in the questionnaire are found. Another use could be to analyse the structure of respondents in different enterprises (NACE and size class) in order to be able to focus the questionnaire better in the future.

The use of respondent information is of minor value for international analysis. Coding occupational position causes additional work that should be avoided. Without some classification this information is, on the other hand, quite useless. If this information is regarded as obligatory in the EU-data, then a simple classification for one respondent (he/she mainly responsible for filling in the questionnaire) could be used:

Person mainly responsible for the questionnaire:

- 1 Head of the enterprise
- 2 Training unit
- 3 Personnel/HRD unit
- 4 Someone else

Literal wording of the occupational position of the respondent can be used for national purposes in re-contacting but it is useless in the EU-data.

In addition to the name, occupational position and telephone number, the e-mail address of the respondent has proven to be useful for re-contacting.

3 Training of interviewers

Using interviews in getting contact information about the respondent in advance, motivating the respondents and reminding the enterprises to fill in the questionnaire has proven to be both suitable for the interviewers and successful in terms of response rate.

When using interviewers in making telephone and face-to-face interviews in CVTS3, some factors must be taken into account:

- The interviewers are unlikely to be professionally trained in complex training issues.
- The interviewers may not be familiar with the difficulties in data availability in enterprises.
- On the basis of one or two days training the interviewers can not act as expert survey advisors concerning the enterprises' training accounting systems, problem with data availability, definitions and concepts. If the training data of enterprises is not directly suitable for CVTS3 variables, problems with converting the data are often too difficult for interviewers.
- Enterprises do not always have the data available at the beginning of the interview. Breaking up and postponing the interviews is inefficient and frustrating.
- Face-to-face interviews often turn out to be only collecting drop-off questionnaires. If enterprises have all the information needed already, there is no need to use face-to-face interviews. If the information is not readily available, then considerable costs occur from unnecessary waiting time.
- Telephone interviews may be efficient (in terms of data entry) when enterprises have all the information at hand. The question remains, however, whether there is a real need for interviewing when the already completed questionnaire could just be sent back..

Using telephone and face-to-face interviews should be considered in the context of these problems. We do not recommend that all countries have to use interviewers for the implementation of the survey. Online surveys with pre-contacts by interviewers could be one of the alternative options. If a country wants to use solely face-to-face interviews, the training of interviewers is very important.

The form, length and depth of the training of interviewers express what the survey organisation expects from their interviewers and gives the interviewers opportunities to learn the necessary skills. The training should not only focus on the questionnaire and the interview, but also on the contact and persuasion strategy.

The interviewers should have **enough time to get to know the survey**, its material and questionnaire. Taking into account the various needs and practices of interviewer training, whether it is face-to-face or literal, the main objective of the training is to **introduce the purpose, aims and use of the survey and explain the purpose** of certain key questions. Again strong emphasis will be given to issues that are related to problems of **motivating and prompting the respondents**. After the training interviewers should know **what kind of role they have** in the data collection procedure, which actions are possible, permitted and subject to interviewer's discretion in the course of an interview and in what situations the quality requirements call for a strict observance of precisely worded instructions.

The interview organisation must instruct the interviewers on how to convince reluctant respondents. In addition, it is known that refusal can be caused by temporary reasons and it could be possible to try to convert refusals to responses at some other time.

In an international survey like CVTS the ideal case would be to have a **centralised approach** to the training and monitoring of interviewers. However, in practice, the training of all interviewers for all participating countries by a central agency, such as Eurostat is not feasible because of cost and organisational considerations. But in any case improvements should be made towards centralised guides and management of the training and monitoring the interviewers. It would be good to have **guidelines** for interviewer training and **interviewer manuals**.

4 Supervising and monitoring the field work

A well-designed and formulated contact strategy is very important in CVTS3 in order to improve response rates. The number of contact attempts an interviewer must or is allowed to undertake must not be too limited; limiting the number of attempts might give interviewers the wrong signal, i.e. they might think that finishing contacts is more important than good response results.

The survey organisation must know what happens in the field, not only to make sure that interviewers do their job as expected, but also to get a view of the quality of the data that are gathered in the field. Therefore, support of interviewers and supervision, as well as monitoring of how things are going, is very important. It is also important to register what has happened in order to be able to evaluate the results later.

We recommend to form national groups of advisors who are involved in the training of interviewers and who are later on also engaged in re-contacting enterprises in cases that need corrections, elimination of missings or further information. These groups could form an active help desk for interviewers and respondents. They advice and guide, observe and mentor the fieldwork. They are ready to send additional instructions or other feedback material to interviewers during the fieldwork period if needed. They also try to help in finding methods of diminishing non-response.

Follow-up of the fieldwork

As the last step of fieldwork, interviewers should be asked to give feedback with a special feedback questionnaire. The aim is to obtain information for the analyses and for quality assessment and suggestions for the possible future development of the survey and its instruments. This feedback should be used by the person who is later on in charge of writing the national quality report.

5 Use of BLAISE in CVTS2 and CVTS3

5.1 Use of BLAISE in CVTS2

When discussing the usage of BLAISE it is useful to look into the history of CVTS. One of the areas where CVTS2 was seeking for considerable improvement in comparison to CVTS1 was the area of informatics. In CVTS1 major problems occurred in the coding, data error

detection and correction and the compatibility of software. These problems caused for CVTS1 a major delay in the processing of the data and the production of the (first) results. In order to prevent similar problems in conducting CVTS2 the working group of CVTS2 recommended the usage of the survey-software BLAISE.

BLAISE is a combined computer-assisted interviewing system and survey-processing tool for the Windows operating system. Statistics Netherlands developed the system and is still improving it. BLAISE is a flexible system for computer assisted survey processing. It can perform Computer Assisted Telephone Interviewing (CATI), Computer Assisted Personal Interviewing (CAPI), Computer Assisted Self-Interviewing (CASI), interactive editing, high speed data entry and data manipulation and has full survey management capabilities. BLAISE includes many capabilities that meet the demands of surveys, e.g.:

- Support for multi-mode surveys (CATI, CAPI, etc.) and survey processes like interactive data review and editing, batch data processing, weighting, etc.;
- Proven interviewer interface with screen layouts that can be customized;
- Powerful but simple questionnaire definition language.

Statistics Netherlands described in their quality report for CVTS2 (see pp 6-7), how they made use of BLAISE during the fieldwork and during the editing process:

“Data editing is done in two stages of the process. The first is done during the fieldwork. As soon as an observation was entered in the data entry tool (Blaise), some checks were performed; mostly relational and boundary checks for which information of CVTS1 was used for establishing boundaries.

A large part of the editing process was spent on the observations with data that corresponded with more than one enterprise. These combined observations first had to be detected. This was possible with a variable that the interviewers could use for identifying enterprises that were observed combined with others. This led to complex cases where combined data had to be divided over several enterprises that were spread over different sample cells. After identifying the cases, a system was built by using Blaise software (manipula) that divided the cases over the corresponding units. The quantitative variables were divided by using the number of employees. The qualitative questions were copied into all units.”

Norway reported in their quality report (see p. 27) about a more extensive use of the BLAISE Assisted Interviewing (CAI) in the face-to-face part of the survey. Interviewers could correct wrong or inconsistent answers directly during the interview:

“BLAISE was the software used for Computer Assisted Interviewing (CAI) in the faceto-face part of the survey, and hence different kinds of controls were programmed into the electronic questionnaire which made it possible for the interviewers to correct wrong or inconsistent answers directly during the interview with the respondent.”

However, the common BLAISE electronic questionnaire can be used for CAPI/CATI interviewing but also for pure data entry. Other national quality reports deliver additional information about the diverse usage of BLAISE in CVTS2:

Belgium	<p>Les données ont été encodées par le biais d'un logiciel d'encodage spécifiquement conçu à cette fin sous "BLAISE" par Nicolas Heerschap. Ceci a permis d'éviter beaucoup d'erreurs d'encodage. Ce programme vérifie en effet la cohérence entre les différentes variables du questionnaire, que ce soit par un contrôle des valeurs ou des totaux ou par un contrôle logique entre les questions.</p> <p>Cependant, nous avons été confrontées à quelques problèmes, notamment pour les questions composées de sous-questions et les questions pour lesquelles aucune réponse n'avait été encodée.</p> <p>En effet, lors de l'encodage d'une "NR" (non réponse) aux questions composées de sous-questions ("oui, non, pourquoi"), le logiciel conçu sous BLAISE considérait cette "NR" comme "non" et passaient à la question suivante, encodant par défaut "NA" (non</p>
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	<p>applicable) comme réponse aux sous-questions correspondant à la réponse "oui", ainsi qu'à la réponse "non".</p> <p>Ex : Question C7 Réponse non : 0 Réponse oui : 1 Si la réponse : 9 (NR), alors Cya à Cyf et Cna à Cnf étaient par défaut sous BLAISE : "8" (NA). Or si la réponse à C7 est "9" ("NR"), seul le "9" ("NR") est accepté par le DPS Checking tool pour les sous-questions y correspondant.</p> <p>Le deuxième problème rencontré lors du traitement des données est le suivant : pour certaines variables, l'outil d'encodage conçu sous BLAISE permettait de ne rien encoder et encodait par défaut "NA" ou "vide" alors que le DPS checking tool n'acceptait que la "NR". Tel est le cas pour les variables A2AAm, A2AAf, A2AAtot et pour les questions C6.</p> <p>Ce sont les deux seuls problèmes que nous ayons rencontrés lors de l'utilisation du logiciel d'encodage conçu sous BLAISE et nous avons donc tout simplement remplacé les codes de "NA" par les codes de "NR".</p>
Bulgaria	<p>The data input, checking and correction were carried out by regions in our 28 regional statistical offices. They used for this purpose our own Data Entry Tool (on Blaise 2.5) and Checking tool (on Manipula 1.61), developed on the base of the common Code Book and Checking rules, received from Eurostat.</p>
Finland	<p>The data were recorded with BLAISE data entry program. There were a lot of logical checks in the program, so that rough recording errors in the questionnaires were detected and corrected either by concluding from the questionnaire or by contacting the respondent. A lot of mistakes (too small or too big figures) could be concluded and corrected on the bases of other variables in the questionnaire.</p>
Germany	<p>Editing should have been done by the common Eurostat tool. As this tool was not finished we had to develop our own solution for data editing and controls. We chose a BLAISE application which was based on a similar tool by the Netherlands and on the checks included in the checking rules with quite some additions which were deemed to be necessary.</p> <p>Our own BLAISE application for data editing and checking was finished beginning of November 2000. On 16 November we had a seminar for our colleagues from the Länder Statistical Offices who also worked with it. After that seminar data entry and checking started immediately. We also developed some small programmes for data imputation, for the calculation of participants for enterprises which only entered participant cases and for calculation of EURO values. All the things mentioned in the last sentence only ran in our office after reception of the Länder data.</p> <p>The fact that we had to develop the BLAISE application ourselves cost us a lot of time and knocked over our time-table completely. The development of our own BLAISE tool was neither calculated nor included in our time-table because we had planned to work with the common tool.</p>
Hungary	<p>Tools used in data processing are Blaise (data entry) and SAS (further validation and for table analysis) in Hungary.</p>
Luxembourg	<p>En mars 2000, la réalisation d'un programme d'encodage avait été commencée à l'aide du logiciel " Data entry " sous SPSS. Ce travail était réalisé sur base du questionnaire, des tables de codifications (EUROSTAT/E3/99/CVTS34) et des checking rules (EUROSTAT/E3/99/CVTS35) distribués par Eurostat.</p> <p>Mais, différents contacts avec les responsables de l'enquête CVTS2 d'autres Etats Membres ont permis la création d'un logiciel commun d'encodage des données sur la base du travail réalisé par les collègues hollandais. Nicolas Heerschap a conçu sous BLAISE un programme d'encodage qui vérifie les données et permet des contrôles entre les différentes questions du questionnaire.</p> <p>La Belgique et l'Allemagne ont également décidé d'utiliser le plan de codage réalisé par les Pays-Bas. Il y a donc harmonisation de l'outil d'encodage pour ces quatre pays.</p> <p>Suite à une réunion à Eurostat, le Luxembourg a été en charge de tester ce programme. Quelques modifications spécifiques ont été apportées au travail original. Les différents changements ont été soumis pour correction à Nicolas Heerschap qui a remis un plan de</p>

	<p>codage corrigé et ainsi adapté au questionnaire luxembourgeois. Ce travail de validation du plan d'encodage s'est révélé aussi être une aide précieuse pour la Hollande, puisque cela a permis au créateur de ce logiciel de l'améliorer et de l'harmoniser en augmentant par là la comparabilité européenne du format des données.</p> <p>Puisque ce programme répondait aux attentes et exigences de l'enquête, le programme de codage initialement développé sous SPSS a été abandonné. L'ensemble des questionnaires ont été encodés à l'aide du logiciel Blaise et les analyses des données ainsi obtenues correspondent aux attentes finales d'Eurostat.</p>
Portugal	<p>The processing system used was the "BLAISE" software, with two computers for the editing process. Was made a manual with rules to observe in questionnaire checking, in order to prevent errors and anomalies. After data editing, all the detected questionnaires with costs per hour or per participant very high or with anomalous training hours, by example, were corrected. Certain questionnaires present some problems because data related to costs were processed in units PT Escudos and the requested data was in thousands PT Escudos</p>
Slovenia	<p>Data entry was done in BLAISE, while for checking and correcting we used COBOL. All deficiencies and errors detected at checking and correcting were corrected by calling the reporting units.</p>

Some countries report, that they used BLAISE only for data entry and data error checking. Finland, Luxembourg, Portugal used the BLAISE data entry and data error checking program. Belgium used this module as well, but reports about some problems with the definition of non-response in the program. Hungary used the BLAISE data entry software and SAS for further checking of the data. Also Slovenia used the BLAISE data entry software, while for checking and correcting they used COBOL. Bulgaria used the BLAISE data entry and checking tool as well as MANIPULA. Statistics Germany used a BLAISE application with quite some additions, which became necessary. The fact that Statistics Germany had to develop a BLAISE application by themselves did cost a lot of time. So data transmitting to EUROSTAT took longer than expected.

5.2 Use of BLAISE in CVTS3

Originally it was planned by the consortium to propose a common use of the support software BLAISE by all countries in CVTS3. The consortium planned to approach Statistics Netherlands for an expertise regarding the experiences with BLAISE in CVTS2 and the possible use of BLAISE for CVTS3. However, it appeared that the majority of the national statistical offices are not in favour to make the use of BLAISE obligatory. Most of them are used to their own systems and support software for statistical data entry, data error checking and data manipulation. The experience of CVTS2 shows that many of the statistical offices use BLAISE already and combine it with other tools. Others have made good experiences with other tools. Making the use of BLAISE obligatory would mean to impose an unnecessary burden for the statistical offices. Thus the consortium recommends that the use of BLAISE can be useful in some cases, but we see no longer a need for making the use obligatory.

6 Recommendations for the organisation of the field work

The survey organisation that will be responsible for data collection at national level should be carefully chosen using the following criteria (if that organisation is not the statistical office itself):

- good reputation

- experienced interviewers, preferably permanent and full-day involved
- interviewers are paid for the working time
- organisation takes good care of interviewers' continuous training and arranges special training for the survey
- organisation has well established procedures for all survey operations, including guiding, monitoring and reporting field-work operations.
- The ideal case would be that interviewers would have conducted enterprise surveys previously. However, it should be clearly agreed that professional interviewers can not be used as advisors on training matters. An optional role for interviews in an enterprise survey is to use them in contacting, motivating and persuading respondents.
- The number of contact attempts an interviewer is allowed to undertake to the enterprise must not be too limited.
- Every participating country should form a survey special help-desk to handle respondents' and interviewers' questions and problems. This guidance work should be administered by researchers and their assistants.
- For CVTS3 there should be common recommendations or outlines for interviewer training and field-work manuals.
- Eurostat should make an outline for a questionnaire that should be used in collecting feedback from data collection and interviewers. This should be available before data collection starts.

**Development of a methodology for a long-term strategy
on the Continuing Vocational Training Survey (CVTS)
CVTS3 M**

**Work-package 5:
Survey guidelines**

**Annex:
infas methodological expertise**

22 July 2005



infas

**Development of a methodology
for a long-term strategy on the
CONTINUING VOCATIONAL TRAINING SURVEY
(CVTS 3 M)**

- A methodological expertise -

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1. Preview

Although the EU manual recommended a mixed mode of mail survey and face-to-face interviews, the 2000 Continuing Vocational Training Survey (CVTS 2) was administered in different ways. The field evaluation report documents a lot of methodological variations in the involved countries. The national field designs and administration surely based on the different resources and the logistics of the national commissions. So the survey methods of the CVTS 2 vary from a single method approach of a mail survey (independent on the size of the enterprises) up to high tech surveys on CATI/CAPI on the other extreme.

The EU Commission intends to advance the method's manual for the CVTS 3 so as to reduce the probability of instrument effects as well as to improve the comparability of the data across countries. There has to be checked, whether the modern electronic instruments of data collection CATI, CAPI and online survey are recommendable and applicable for business surveys, in order to fathom development potentialities.

The authors want to back up the decisions about the implementation of survey methods and field conditions with empirical results and practical field experiences documented in the present expertise. Thus, the following aspects have to be evaluated:

- Which survey method will probably lead to the best results for the purposes of the CVTS 3?
- What kind of instrument effects are connected to the use of survey methods?
- Do the effects differ by the sizes of the enterprises?
- Are the necessary requirements for the use of modern electronic survey methods available in the enterprises? Which questions are a burden for the enterprises?

2. Concept

Field decisions are often compromises between standards of methodology, usual practices and the available financial input. In order to reason the choice of a survey method, it is necessary to lay the foundations for transparency about the decision criteria. The methodological standards are based on sampling theory, measurement theory and on practical field experiences. We are going to reflect the standards and demands in a puristical way. We would like to discuss four survey methods (mail survey, face-to-face survey, telephone survey and online survey) concerning these standards and the possible effects on sampling, measuring and realisation.

The discussion will be substantiated by empirical results, as far as they are available or accessible. The field experiences described base on German studies. Each national Committee has to clarify, whether the discussed conditions are given in their national scope.

Finally, the expertise tries to resume the assets and drawbacks of the four survey methods, and to provide an indication of the methodological decision about the realisation of CVTS 3.

3. Data Base

The valuations and results are based upon several selected surveys carried out by infas on behalf of scientific institutions. According to the interpretation and valuation of the described field experiences and response rates, we request taking into account that the enterprises' participation in the surveys was voluntary. The participation was no legal obligation, nor were the surveys of official nature like the surveys of Statistical Offices. These surveys are either set as experiment or feature the character of natural experiments due to their set as a panel:

Feasibility Study 1998/99. In a methodological comparison, enterprises were questioned face-to-face, by phone and by mail survey about their internal development of the vocational demands and qualifications, using an experimental approach. Even sophisticated statements about the advanced on-the-job trainings were recorded. The sample coverage, the response sets and especially the item nonresponses were thoroughly checked¹. The experiment was expanded in 1999, when the same questionnaire was administrated as web based online survey.

Innovation Survey - Innovation Activities in the German Economy (since 1993). Annually, infas has been carrying out this mail survey of 12,000 enterprises, and every second year of 24,000 enterprises, about the innovative behaviour of the German economy². These research projects are always accompanied by a nonresponse study by phone. Every two years the sample is refreshed by a supplementary sample in order to integrate business start-ups and to compensate for panel mortality. For nearly 80 percent of the sample, there is a contact person available due to the previous surveys, to whom the letter with the questionnaire can be addressed. The questionnaire has been largely unchanged during many years. The questionnaire's short and long version has alternately been in use within the last years.

The approach was modified in 2004 in order to clarify in a preliminary contact by phone the willingness to complete a short questionnaire, which was sent to the contact person via fax directly.

ICT Panel – Business Survey in the German ICT-Intensive Services Sector (2000, 2004). This business panel is being carried out as telephone survey. 4,500 enterprises were questioned in 2000 for the first time. The sample of the 2004 survey

¹ The survey was carried out on behalf of the Federal Institute for Vocational Education and Training and the Federal Ministry of Education and Research. See Bardeleben et al. 1999.

² The survey has been carried out on behalf of the Centre for European Economic Research (ZEW). We thank the ZEW for their friendly authorisation to make use of the field data for this expertise. For more information look up <http://www.zew.de/en/publikationen/umfrageergebnisse.php3#branchenreportinnovation> in the internet.

substituted for panel mortalities. The design of the survey is largely identical to the first-time survey in 2000³.

The three surveys mentioned above allow for comparative analyses, because the questions as well as the survey conditions are unchanged to a large extent. Additionally, a face-to-face survey will be consulted. In 2001/2002 2,500 enterprises have been interviewed about the **costs and benefits of initial vocational education**. This survey on behalf of the Federal Institute for Vocational Education and Training collected in a very differentiated manner all relevant business economics accounting figures for a cost analysis. For example the number of participants and differentiated training costs (personnel and material costs) are determined for several recognised occupations in a sophisticated way (see Beicht et al. 2004).

4. Sample Requirements

In the following chapters we are going to check, how the four survey methods are suited for questioning enterprises about their available vocational training and vocational training investments as well as about the in-house conditions of staff and skill deployment. The first step checks to what extent the four survey methods meet the standards of sampling theory and what methods might cause problems.

Initially, we would like to explicitly point out a matter of course. The following deals with representative surveys, which raise the claim to be a minimised, yet representative image of selected characteristics of social reality. The survey's results should be projectable to all elements of the population.

Thus, it is a prerequisite that the population is well-defined. The selection leads to a minimised image of the population. According to sampling theory, this can only be ensured by random selection, independent from the fact, whether the selection is carried out one-stage or multi-stage. Each element of the population has the same assignable selection probability and there are no elements of the population, which cannot be obtained via the sampling process. Ideally, the realised sample depicts an unbiased image of the population, i.e. the measured results of the sample are representative for the population (s. Annex Table A-1).

How far can the different survey methods meet these standards? The sampling population consists at any rate of enterprises or companies, which, as a rule, will be drawn by means of list sampling resp. data file sampling⁴. In mail and face-to-face surveys the obtained address suffices to realise the survey. If there are no telephone numbers available in the lists/data files, the telephone numbers of the drawn addresses have to be obtained for the telephone surveys, too. With intensive research, 60-80 percent of the telephone numbers can be obtained from the telephone registry, yet according to the German sample's mode. Selectivity analyses show that the missing elements resulting from telephone numbers that could not

³ The survey has been carried out on behalf of the Centre for European Economic Research (ZEW). We thank the ZEW for their friendly authorisation to make use of the field data for this expertise. For more information look up <http://www.zew.de/en/publikationen/umfrageergebnisse.php3?mi=PUB&si=UMF> in the internet.

⁴ Here, we would just like to point out the problem of defining the selection unit enterprise or company as place of employment, without discussing the problem.

be obtained, do not lead to a systematic sampling bias. The non-locating of telephone numbers in the telephone registry is rather technically conditional than through significant differences of the enterprises' characteristics⁵.

For online surveys, another unintentional sampling step comes along: only enterprises with corresponding technical access to the internet can take part in such a survey. This is by no means understood. In 2003 the proportion of EU-enterprises with access to the internet ranged between 60 and 95 percent. For example in Finland and Denmark almost all enterprises, 98 percent, provided the technical requirements for a web based survey. In Spain, Italy, UK and the Netherlands the distribution ranged in 2003 between 80 and 90 percent (EUROSTAT yearbook 2004: p. 193). In Germany 92 percent of all enterprises had access to the internet in 2003. Even more than 90 percent of the smaller enterprises with less than 20 employees were online, in the size category with more than 50 employees, almost all enterprises provided internet access (Statistisches Bundesamt - Federal Statistical Office Germany - 2004: p. 18f).

Sampling unit and survey unit are not always identical in enterprise surveys. Often, it is necessary to contact certain functional office bearers in the enterprise, who are especially competent concerning the survey topic. In case of the CVTS 3, these would be persons, who are able to provide competent information about the vocational training behaviour. Depending on the size of the enterprise, competent contact persons could be owner-operators (small business), training managers or training staff (small and medium-sized business) or human resources managers (large-scale enterprises), occasionally persons from the financial department, too.

The enterprises will be selected on the basis of lists. Yet, the functional office bearers can only be determined with the collaboration of the enterprise. In this regard, the possibilities and limits of the four survey methods become obvious. In face-to-face surveys and in telephone surveys, this is completely unproblematic, because even relatively complex selections of functional office bearers can be carried out in a preliminary talk. Yet, many contact attempts are often necessary until the precise target person can be contacted.

In a mail survey without a precise contact person in the enterprise, the enterprise itself is responsible for forwarding the questionnaire in-house to the competent and/or responsible informant. The mail survey has no means to influence or control this in-house selection. Also the basic decision, whether the enterprise is going to participate in the survey at all, can hardly be influenced. This decision is often made from unrelated disciplines e.g. in the management or executive board's office, without even informing the responsible office. If one wants to gain transparency and influence capability in a mail survey, a preliminary contact by phone is necessary in order to preselect the contact person. Staging can be used in mail surveys in order to increase the response rate. Yet, we have to point out here that such measures hold the risk of an increasing bias of the net sample, when it is beyond control,

⁵ Using a successful search method about 80 percent of telephone numbers will be found in telephone listings. Under these circumstances no systematic bias between gross sample and realised sample with regard to the characteristics size category, industrial sector or region exists (infas-internal working paper about data weighting 02/2005 – WSI Survey of Works and Staff Councils 2005 based on a Federal Employment Agency's enterprises' sample).

which groups were better available on the respective levels. Controlling these potential selectivities, e.g. by a nonresponse study, is essential (see Chapter 6.2).

Online surveys bear a comparable selection problem. As a rule, the online survey's questionnaire will be installed onto a high-performance server within the research institute. In order to prevent unauthorised persons accessing the questionnaire, each enterprise gets an individual access code⁶. With this code only, the questionnaire can be completed in one or several sessions. Access expires after the completion of the questionnaire, so that multiple completions will be avoided.

In the beginning of an online survey, the access code has to be communicated to the enterprise, either via letter or email. The probability that such a letter is being ignored or that the informant does not receive it, is even bigger than in mail surveys. Therefore, it is more urgent in an online survey than in a mail survey to control the in-house selection process by preselecting the contact person with a preliminary phone call.

Our comments can be summarised as follows:

- Mail and online surveys have to face the difficulty that in-house selection processes can only be controlled with a preliminary contact including the preselection of the contact person.
- Telephone surveys have to solve the problem that not all telephone numbers of the enterprises can be researched.
- Online surveys depend on high distribution with computers and internet access within the enterprises. However, this is not yet the case in all EU-countries.

⁶ Meeting the demands of a random sample, on-site recruiting is no alternative sampling procedure.

Table 1: Meeting the Demands of Sampling Theory

	Mail Survey	Face-to-Face Survey (PAPI, CAPI)	Telephone Survey (CATI)	Online Survey
Survey Population	a) enterprises b) functional office bearers	a) enterprises b) functional office bearers	a) enterprises b) functional office bearers	a) enterprises b) functional office bearers with internet access!!
Selection Process	a) list sample b) control via enterprise	a) list sample b) multi stage selection by interviewer multi stage sampling	a) list sample b) multi stage selection by interviewer	a) list sample b) control via enterprise
Problem	b) no control of internal selection process			b) no control of internal selection process
Solution	b) pre-selection: preliminary contact by phone			b) offline recruitment: preliminary contact by phone/mail

PAPI: paper-and-pencil (face-to-face) interview; CAPI: computer assisted personal interview; CATI: computer assisted telephone interview

5. Requirements of Measurement / Survey Instrument

The second dimension for deciding on the survey method is given by the requirements of measurement theory. Validity and reliability are required for the survey instrument. Validity refers to operationalisation and has to be answered independent from the survey method. Validity means that the instrument measures what it is supposed to measure. This validity check has to be answered for CVTS 3 by the researchers and teams involved.

The criterion of reliability in contrast is closely connected to the choice of the survey method. The claim is that a once measured result has to be reproducible any-time. In other words, there are no or just insignificant measurement errors, which may lead to deviating results. The assessment of reliability can precisely be aimed at

- how the filtering is carried out in different survey methods,
- whether matrix questions can be asked,
- whether an accompanying data check can take place,
- whether visual help can be provided e.g. list presentation and
- whether the answers' quality is on par in all survey methods.

The use of filter questions and skips is basically possible in all survey methods. Yet, the possibilities of control differ immensely. In electronically assisted surveys (telephone, online questionnaire and CAPI), the substantial advantages are based on the automatic control within the questionnaire, whereas the mail survey on the other hand shows the greatest weaknesses concerning this aspect. According to the data check of self-administered questionnaires, there will always be a lot of wrong filter skips. Face-to-face surveys also show a corresponding error caused by the interviewers, yet distinctly more infrequent compared to a mail survey. This problem however can be solved for personal interviews by using a laptop (CAPI).

Matrix questions serve the purpose of enquiring in case of a given circumstance, before proceeding to the next items of the battery. They function to a certain extent like several filters one after another. Also for matrix questions the automated filtering in telephone, online and face-to-face surveys leads to obvious advantages compared to the manual, error prone filtering in self-administered questionnaires. The possibility of using a matrix question in a mail survey is considerably limited compared to the other survey methods.

The electronic questionnaires possess the possibility of an accompanying data check via corresponding programmed check routines. Even complicated life history events or the sum of costs, training hours or number of participants can be checked electronically according to completeness or consistency. This check cannot be implemented in a self-administered questionnaire. The data check takes place ex post and is comparatively time-consuming.

The visual support of an interview is possible for all self-completion questionnaires (mail survey, online survey). For a face-to-face survey, corresponding list presentations support the interviewing process by providing the respondent with possible answers or measurement figures. Telephone surveys indeed rely completely on the auditory channel. Questions and scales have to be phrased in a way that the respondents' imagination suffices. A previous dispatch of lists for the visual support throughout the interview is no common practice.

The proportion of item nonresponses is the criterion for checking the answer quality. This proportion indicates, whether a question was understood resp. whether it could be answered with the medium. The feasibility study with its comparative methodological experiment in 1998 checked exactly this aspect (see Chapter 3). The survey dealt with the enterprises' general economic data, number of employees differentiated by level of qualification, questions about innovations and personnel development as well as education and vocational training, future labour requirements and vocational training programmes.

All methods, telephone, mail and face-to-face survey, have been analysed. Each half of the telephone and face-to-face sample received a self-administered questionnaire by mail with several neuralgic questions in order to support the survey at optimum. The test was to show, whether the support of a self completion questionnaire is reasonable for certain types of questions. The results of the methodological experiment are quoted in Annex B. They can be resumed as follows:

- **Questions about general enterprise data** are predominantly answered well. The answering of questions about “hard” economic data and balance sheets (profit/loss) causes problems in all three survey methods. A quarter up to a third of respondents is not able or willing to answer questions concerning turnover and export proportion of turnover. Questions about the proportion of investment of added value are also difficult. Internationally-active enterprises in particular often draw up international balance sheets only. Figures about the German enterprises are frequently not on-hand anymore or available with extraordinary expenditure only.
- The questions about **personnel structure** also cause problems. Problematic are exact figures about outflow and inflow of staff as well as differentiated statements concerning the employees’ qualification structure. The face-to-face survey scored best. By phone, a fifth of the enterprises could not answer that question. With a self-administered questionnaire, the item nonresponses can be reduced a little but not completely. Even with the self-administered questionnaire that allows for completing unhurriedly, these fact questions are answered worse than other question types. Obviously, these questions touch a sore spot of the enterprises’ available data. Even in the face-to-face survey “Costs and Benefits of Vocational Education and Training” 6.3 percent of the enterprises could not answer this question. Statements about the staff qualification structure are not required in enterprises by routine. The statements mainly base upon the respondents’ estimations. Therefore, they are just rough indicators, tending to reflect the qualification structure.
- The questions about **change within the enterprise concerning effects on qualification requirements and new demands for skilled labour and employees** are mostly being answered well.
- The questions concerning **personnel development** show very few item nonresponses, independent from the mode of data collection. The questions about initial and continuing vocational training can be answered without significant problems. Remarkably complete are also the answers to the partly standardised questions about the two most important continuing vocational training activities. However, in the case of a telephone survey the statements concerning the number of participants of vocational training activities were problematic. Interviewed by telephone, only 80 percent of the enterprises involved could provide answers compared to the face-to-face survey with 92 percent. Only the mail survey’s answers were complete.

Moreover, the survey “Costs and Benefits of Vocational Training” shows that even a face-to-face survey holds substantial difficulties to collect reliable data about training costs. For example 11 percent of all enterprises were unacquainted with the fees, and 6 to 8 percent did not know the amount of costs for educational books and software. Besides, the experiences from this project show that it is hard to assess the plausibility of differentiated statements concerning costs, participants, training supervisors and resources. The field institute has recommended for the next survey the use of an electronic questionnaire (CATI, CAPI) in order to minimise the sources of error.

If the amount of item nonresponses is interpreted as indicator for the data quality, only a few significant differences between the survey methods can be detected.

Questions about quantified economic operating figures and exact statements concerning the qualification structure cause various problems for the enterprises. Differentiated business economics statements are limited concerning answerability and reliability. In order to minimise these sources of error, the implementation of a self-administered questionnaire ought to be considered. They could increase the data quality, but still could not reduce it totally. The overall positive experiences with the additional self-administered questionnaire encourage implementing this instrument for telephone and face-to-face surveys for the really important questions.

Table 2: Meeting the Demands of Measurement Theory

	Mail Survey	Face-to-Face Survey (PAPI, CAPI)	Telephone Survey (CATI)	Online Survey
Filtering	possible, but error-prone; piled unsystematic respondent errors	unproblematic; unsystematic respondents or interviewer errors CAPI: automatic control	unproblematic automatic control; unsystematic respondent errors	meanwhile unproblematic; automatic control; unsystematic respondent errors
Matrix Questions	possible to a certain extent, depending on target group, because high cognitive performance	unproblematic; unsystematic respondents or interviewer errors CAPI: automatic control	unproblematic automatic control; unsystematic respondent or interviewer errors	meanwhile unproblematic; automatic control; unsystematic respondent errors
Data Check	consistency and completeness check ex post only	consistency and completeness check by interviewers and ex post	already within the course of the interview via check routines in the background	already within the course of the interview via check routines in the background
Show Card	self-report questionnaire including all codes	list presentation by interviewer	no list presentation; exception: preliminary dispatch	self-report questionnaire, including all codes, list presentation

PAPI: paper-and-pencil (face-to-face) interview; CAPI: computer assisted personal interview; CATI: computer assisted telephone interview

6. Field Implementation Requirements

Next to the requirements on the sample and the survey instrument, the parameters of the field implementation are of particular interest for the assessment of an adequate survey method. Here, it is also imperative to point out decision alternatives in order to enable considering the assets and drawbacks. Therefore, the field implementation focuses on the aspects coverage, field monitoring and documentation, practical implementation and costs. In the following, the thus connected requirements and parameters with regard to the alternative survey methods will be analysed separately and sourced with our own methodological results.

6.1 Sample Coverage

The sample coverage is considered in all disciplines as indicator for a survey’s quality. Often, a high coverage is equated with unbiased sampling. In this basic form, the assumption is not entirely correct. A high coverage rate is just a necessary, yet not a sufficient requirement for an unbiased sample. Even behind a high coverage rate selective missings can be hidden, which limit the survey’s validity⁷. Maximising the sample coverage and corresponding high response rates are necessary requirements to minimise the probability of a biased image of the population. The following deals therefore with the valuation of the survey methods.

In a methodological experiment, infas checked in 1998 on the basis of comparable samples and a comparable survey instrument the field implementation via telephone, face-to-face and mail. The realised field results tell their own tale. Telephone survey and face-to-face survey realised with about 61 resp. 52 percent the highest response rates. The mail survey, carried out without a reminder, resulted in mere 15 percent. Even taking into account that a reminder would have raised the responses approx. 8 percentage points, the response rate of telephone and face-to-face survey was more than double (see Table 3).

Table 3: Coverage Rates of a Comparative Methodological Experiment (Feasibility Study 1998)

	Survey					
	Mail Survey *)		Telephone Survey		Face-to-Face Survey	
	abs.	%	abs.	%	abs.	%
gross sample	120	100,0%	240	100,0%	222	100,0%
nonsample selection	13	10,8%	25	10,4%	35	15,8%
net sample	107	100,0%	215	100,0%	187	100,0%
refusals	1	0,9%	63	29,3%	74	39,6%
other sample selection	90	84,1%	21	9,8%	15	8,0%
realised interviews	16	15,0%	131	60,9%	98	52,4%

Source: Methodological Experiment, 1998

*) One shot, no Reminder

Since the methodological experiment enterprise surveys have become vastly more difficult. The following results of current surveys document these difficulties and the efforts to solve these problems. Even today, mail surveys are connected with low coverage and response rates, which is sourced by methodological analyses of a mail survey (Innovation Survey 2003) and a telephone survey (ICT Panel 2004). Both surveys have been carried out with an identical target group and similar survey scope (approx. 30 minutes phone call vs. 16 pages paper-and-pencil questionnaire). The telephone survey reached a response rate of almost 30 percent, the mail survey just 18 percent (see Table 4).

⁷ Only corresponding selectivity analyses provide information, whether systematic differences bias the results with regard to the measured characteristics between participants and non-participants.

Table 4: Sample Coverage CATI via Mail Survey

	<i>interview duration</i>		<i>30 minutes</i>		<i>16 pages</i>	
	CATI		Mail Survey			
	abs.	%	abs.	%		
gross sample	18.947	100,0%	26.202	100,0%		
nonsample selection defunct enterprise, in liquidation etc. removed, indeterminate, not target group etc.	3.401	18,0%	3.560	13,6%		
net sample	15.546	100,0%	22.642	100,0%		
refusals enterprise does not provide information contact person refused	9.968	64,1%	1.168	5,2%		
other sample selection no reply not available within field period, not kept appointments etc.	1.016	6,5%	17.343	76,6%		
realised interviews	4.562	29,3%	4.131	18,2%		

source: IKT Unternehmens-
panel 2004 (ICT Panel)

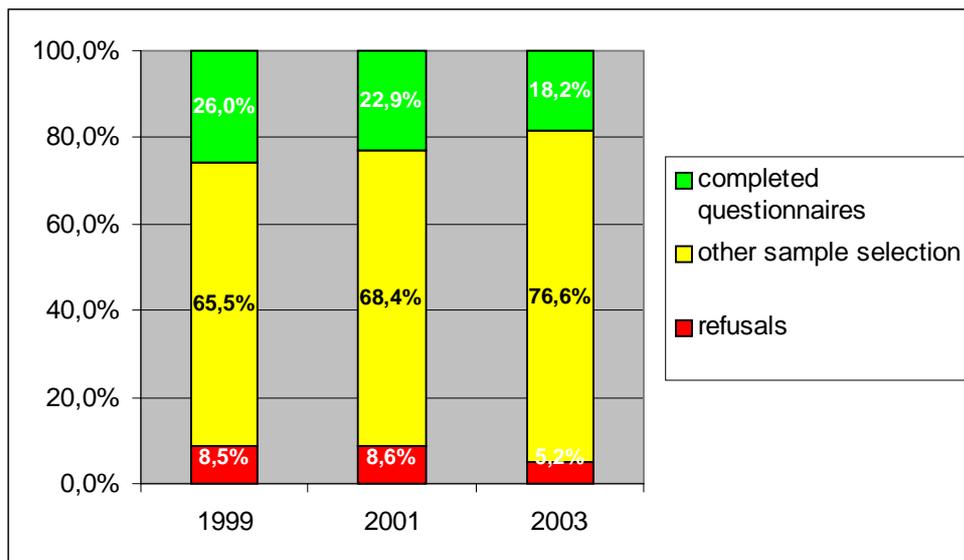
source: Innovationspanel 2003
(Innovation Survey)

Even taking into account that the mail survey’s nonrespondents include a part of nonsample selections (e.g. undeliverable mail, which was not returned to the sender), the telephone survey reaches a higher willingness with the enterprises to participate than the mail survey. The comparison with the results from 1998 clarifies that, meanwhile, the response rates have decreased significantly.

Especially the enterprises’ time and effort needed for participating in surveys seems to have been increasing within the last years. According to various personal feedback, the enterprises criticise the boosting influx of questionnaires. Many of them actually need an employee only to deal with nothing else than completing questionnaires. The enterprises show an increasing survey fatigue over the time elapsed for mail surveys as well as telephone surveys. Thus, it is not necessarily the questions’ degree of difficulty resulting in an extraordinary effort for responding to the questions. It is the questions’ level of detail, particularly complicating the answering to questions of large scale and international enterprises. The questioned categorisation cannot be deduced offhand by the enterprises’ figures from the available units resp. reporting periods.

In the Innovation Survey, the response rate decreased despite similar field strategy (dispatch of two reminders) from 26 percent in 1999 to 18 percent in 2003. Simultaneously, the proportion of enterprises without any reply increased (see Table 5).

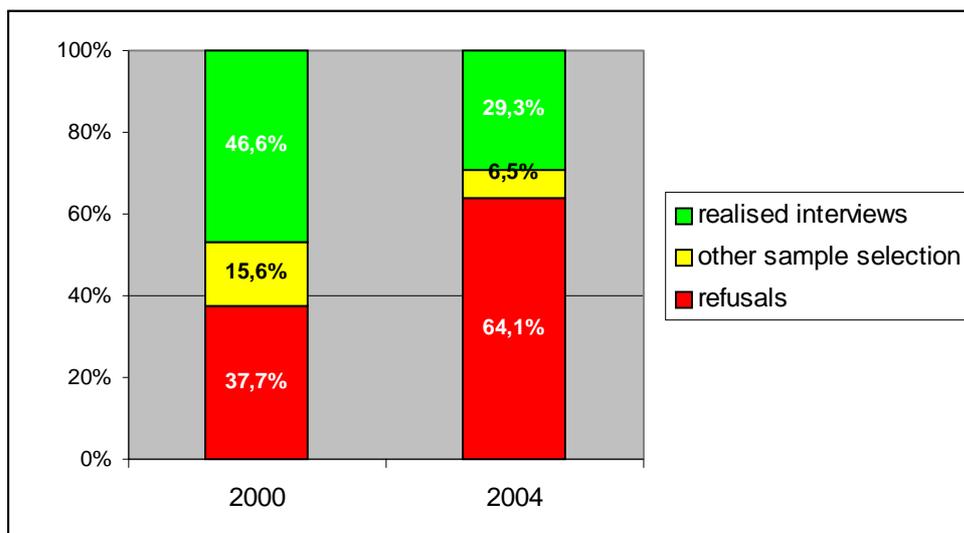
Table 5: Sample Coverage Mail Survey from 1999 to 2003 – Innovation Survey with Long Questionnaire Version



Source: Innovationspanel 1999, 2001, 2003 (Innovation Survey)

Also in the telephone survey ICT Panel a declining trend concerning the response rates can be recognised. Whereas in 2000 47 percent of the enterprises were still participating, in 2004 only less than 30 percent of the enterprises were available for a telephone survey (see Table 6). The effect is even more dramatic, if one focuses on the ICT Panel for 2004 on only such enterprises, which can be compared directly to those from the first measurement in 2000, i.e. first time participation.

Table 6: Sample Coverage Telephone Survey from 2000 and 2004 – ICT Panel



Source: IKT Unternehmenspanel 2000, 2004 (ICT Panel)

Table 7: Sample Coverage Telephone Survey for Panel and Non-Panel Enterprises – ICT 2004

	in 2004:					
	2004		panel enterprise		new enterprises	
	abs.	%	abs.	%	abs.	%
gross sample	18.947	100,0%	4.450	100,0%	11.445	100,0%
nonsample selection defunct enterprise, in liquidation etc. removed, indeterminate, not target group etc.	3.401	18,0%	482	10,8%	2.332	20,4%
net sample	15.546	100,0%	3.968	100,0%	9.113	100,0%
refusals enterprise does not provide information contact person refused	9.968	64,1%	1.878	47,3%	6.394	70,2%
other sample selection no reply not available within field period, not kept appointments etc.	1.016	6,5%	91	2,3%	792	8,7%
realised interviews	4.562	29,3%	1.999	50,4%	1.927	21,1%

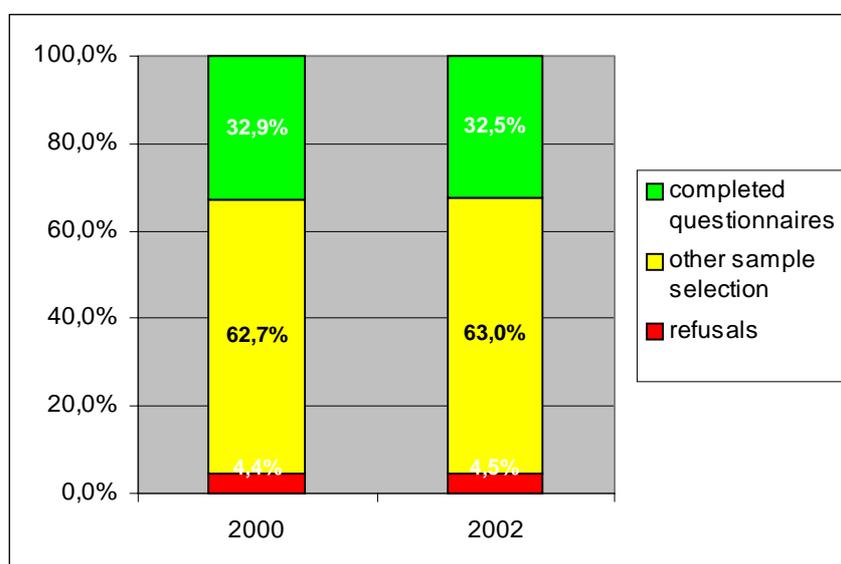
Source: IKT Unternehmenspanel 2004 (ICT Panel)

For this group of new enterprises, a response rate of merely 21 percent was obtained, whereas 50 percent of the panel enterprises participated again (see Table 7). Here, a certain obligation towards the survey seems to have developed during participation in its various waves. However, the nonresponse rate for enterprises having participated for the first time almost doubled from 2000 to 2004 (from 38

percent to 70 percent). This indicates a declining willingness to participate in voluntary surveys.

The current discussion of a possibility to improve the willingness to participate deals with the reduction of the interviews' length. In fact, the response willingness improves significantly in mail surveys using a shorter questionnaire. The alternately used short questionnaire of the Innovation Survey consisting of four pages leads to a 33 percent response rate, thus almost 14 percentage points higher than for the 16 page long version of the questionnaire (see Table 8). Obviously, the optical impression of a short questionnaire is taken into account by the selected enterprises concerning the "psychological cost" to spend time on completing the questionnaire

Table 8: Sample Coverage Mail Survey with Short Questionnaire Version – Innovation Survey 2000, 2002



Source: Innovationspanel 2002, 2002 (Innovation Survey)

6.2 Field Monitoring and Documentation

Field monitoring and documentation play a decisive role for the assessment of different coverage rates and the connected effects on the collected data. With decreasing sample coverage rates, which have begun to show in enterprise surveys within the last four years, a precise monitoring and documentation of the gross sample is more urgent than ever. Via phone or personal contact can be clarified on each level, whether the enterprise is still existent, belongs to the target group and possibly the reasons why it does not want to take part.

In mail surveys due to the enterprises' missing replies resp. missing reactions it is considerably more difficult to determine and understand the reasons for nonresponse. By default, the return of incorrect resp. undeliverable addresses is being arranged for a mail survey with the forwarding label, yet finally, the return of these

cases depends on the correct operation method within the mail distribution centre resp. the individual local postman⁸. It has to be assumed for mail surveys that a part of nonsample selection is hidden in the addresses without reply.

Only a nonresponse survey is able to provide clarity about the reasons for nonresponse and possible selectivities. For that purpose, the enterprises refusing to participate or without any reply in a mail survey, are asked to answer a few statistical questions. In a telephone survey, those questions can be asked immediately after the contact call, without having to contact the enterprises again. In a face-to-face survey, the interviewer tries to implement a short nonresponse questionnaire. In a mail survey, the nonresponse analysis can only be realised in a second step. Thus, all enterprises (or just a subsample) without reply will be contacted by phone. The enterprises' willingness to participate in such nonresponse surveys by phone is between 40 and 65 percent. Such a nonresponse survey results in details about nonsample selection as well as reasons for nonresponse. They are obligatory information in order to control selectivities by means of model based approaches (e.g. *Heckman estimator*⁹). According to the result of the selectivity analysis, *redressment weights* and/or *Mills' ratios* can be estimated.

With regard to the very differentiated quantitative data about the participants and costs of the vocational training, which have to be collected in the scope of CVTS 3, and the planned projection on the population, the realisation of a nonresponse survey and the estimation of selectivities has to be strongly recommended.

Decreasing participation rates and lacking clarification possibilities of the implemented sample, with regard to the field strategy, are not at all dispensable. By controlling e.g. the response willingness for the size of the enterprise, response rates significantly decrease lately for larger enterprises, independent from the choice of the survey method (see Table 9). This has to be taken into account for the planning of the sample as well as the survey implementation and, last but not least, for the realisation of the survey and even for the interpretation of the results.

⁸ In Germany, the return of mail is liable to charges.

⁹ infas has been testing next to the Heckman model (Probit approach) further selectivity models (e.g. Tobit model, Full Maximum Likelihood estimator and the like), because the estimation results of a mutual model for the selectivity process and the analysis variables react extremely sensitive to modifications.

Table 9: Sample Coverage CATI and Mail Survey on size of enterprise

CATI										
source: IKT Unternehmenspanel 2004 (enterprise panel)										
size category by number of employees	residual category		10-49 employees		50-199 employees		200 and more employees		in total	
	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%
gross sample	202	100,0%	5.347	100,0%	7.032	100,0%	6.366	100,0%	18.947	100,0%
nonsample selection	47	23,3%	950	17,8%	1.218	17,3%	1.186	18,6%	3.401	18,0%
net sample	155	100,0%	4.397	100,0%	5.814	100,0%	5.180	100,0%	15.546	100,0%
completed questionnaires	72	46,5%	1.552	35,3%	1.966	33,8%	972	18,8%	4.562	29,3%

Mail Survey										
Quelle: Innovationspanel 2004* (innovation survey)										
size category by number of employees	residual category		10-49 employees		50-199 employees		200 and more employees		in total	
	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%
gross sample	3.259	100,0%	6.250	100,0%	4.483	100,0%	5.497	100,0%	19.489	100,0%
nonsample selection	850	26,1%	1.305	20,9%	904	20,2%	1.030	18,7%	4.089	21,0%
net sample	2.409	100,0%	4.945	100,0%	3.579	100,0%	4.467	100,0%	15.400	100,0%
completed questionnaires	695	28,9%	1.300	26,3%	924	25,8%	972	21,8%	3.891	25,3%

6.3 Practical Realisation

For the practical realisation of enterprise surveys, various strategies and procedures have been implemented with different success against the background of the above described results and experiences.

Basically, in all survey methods an optimum treatment of sample addresses should be ensured. Thus, in telephone and face-to-face surveys, repeated, flexible and sufficient contact attempts are necessary, until the definite contact person can be contacted within the enterprise. In case of face-to-face surveys, this can only be realised with enormous expenditure of time and costs, and despite those large expenses for interviewers, supportive measures concerning the completing of the questionnaires have to be provided. In mail surveys, optimum treatment has to be aimed at via multiple correspondence resp. dispatching of reminders. Moreover, the rate of clarified addresses in mail surveys can be increased with e.g. a preliminary contact by phone in order to be able to address the questionnaire specifically to the correct contact person. The preliminary contact by phone also leads to a certain engagement, which ought to motivate the contact person to complete the questionnaire. This procedure has been implemented in the scope of the Innovation Survey 2004 by faxing the short questionnaire immediately after the phone call to the enterprise's contact person in order to ensure prompt cultivation of the contact.

Table 10: Coverage Mail and Online Survey after Preselection

	Mail Survey		Online Survey	
	abs.	%	abs.	%
I preliminary contact				
gross sample	19.488	100,0%	190	100,0%
nonsample selection	3.925	20,1%	17	8,9%
net sample I	15.563	100,0%	173	100,0%
sample selection	3.353	21,5%	73	42,2%
willigness to participate	12.210	78,5%	100	57,8%
II sample after preliminary contact	12.210	100,0%	100	100,0%
nonsample selection	161	1,3%		0,0%
net sample II	12.049	100,0%	100	100,0%
sample selection	8181	67,9%		0,0%
realised interviews	3.868	32,1%	42	42,0%
net coverage in total		24,9%		24,3%
net coverage by contact		32,1%		42,0%

Source:

Innovationspanel 2004
(Innovation Survey)

Methodological Experiment,
Feasibility Study 1999

The address clarification can certainly be increased by the preliminary phone calls. This at least show the significantly higher proportions of nonsample selections with 20 percent, which normally reach 14 percent in mere mail surveys. However, the desired success with regard to a higher response rate only exists at the first glance resp. at the first contact. Almost 80 percent of the enterprises agreed at the first phone contact to participate. Yet, only a third of the enterprises willing to participate actually completed the questionnaire. 68 percent of those enterprises do not give any feedback nor return the fax-questionnaire in the second step. This procedure leads all in all to a coverage of 25 percent only, and is thus not able to absorb the basic trend of decreasing response rates in enterprise surveys (see Table 10).

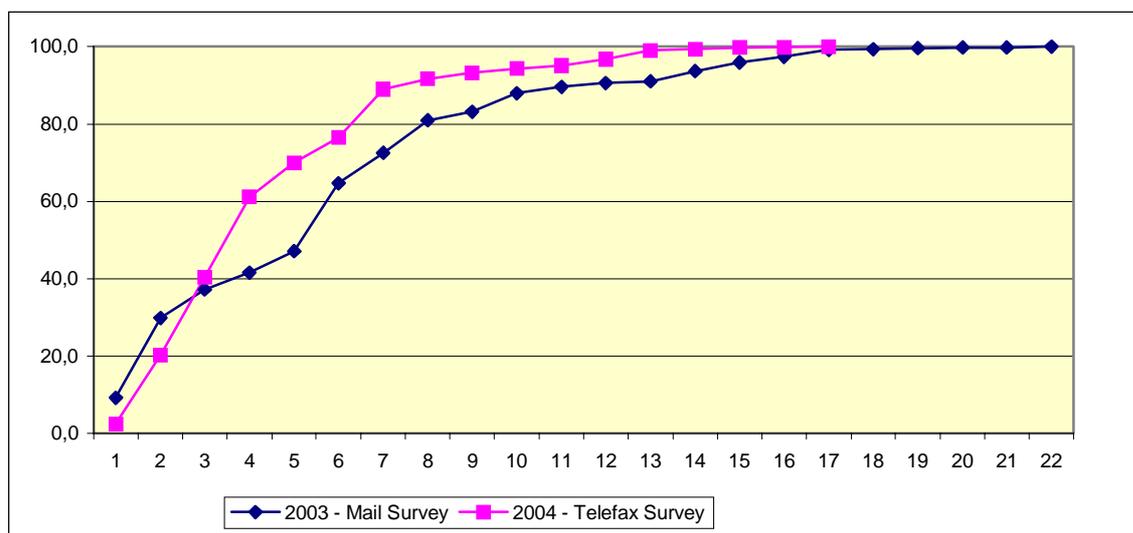
In online surveys with preliminary contact by phone the result is similar. In fact, approx. 58 percent of the contacted enterprises agreed to participate. Yet, only 42 percent actually completed the online questionnaire. According to the entire sample, the coverage amounted to only 24 percent and thus equated the dimension of a well covered mail survey. Compared to telephone and face-to-face surveys, the online survey as well as the two-stage mail survey underachieved the expectations.

The necessary logistics concerning the survey's processing ought to be taken into account before making the decision about the implementation of the survey method. Without extensive internal logistics no survey method can be realised. Therefore, an efficient dispatch department is obligatory for enterprise mail surveys, an area-wide interviewer network for face-to-face surveys and an adequately

qualified telephone studio for telephone surveys. Only the online survey can be realised with a small team, yet needs high-capacity software in the background and excellent server surroundings.

With regard to the survey schedule, optimising steps are possible and can be implemented differently according to the survey method's requirements. About eight to 12 weeks have to be scheduled for the address treatment of enterprise surveys at any rate. An enterprise mail survey with multiple reminders should rather schedule 20 weeks. The field period can be shortened by almost four weeks with preliminary contacts by phone and fax-questionnaires. The field period of the Innovation Survey 2004 showed that almost 80 percent of the questionnaires were already returned after six field weeks, whereas this rate could only be obtained after more than eight field weeks in a classical mail survey (see Table 11).

Table 11: Distribution of Returned Questionnaires by Field Weeks in a Classical Mail Survey with Preliminary Contact by Phone – Innovation Survey 2003 and 2004



Source: Innovationspanel 2003, 2004 (Innovation Survey)

6.4 Costs

Even the consideration of the survey costs does not show the “cheapest” method with regard to the different survey methods. At any rate, the different national cost structures have to be taken into account, in particular the telephone charges and postage expenses, e.g. voluminous questionnaires may lead to significantly higher telephone charges than postage expenses. On the other hand, for a short questionnaire with higher coverage the telephone interview may be cheaper than the postage of a mail survey. Often, the online survey is considered hastily as the cheapest alternative, yet, the number of realised cases should always be considered as well. Unless high coverage, the basic programming costs may quickly exceed the printing and postage expenses. Basically, the face-to-face survey remains

the “most expensive” alternative, independent from the questionnaire’s volume and the number of cases.

In either case, the cost consideration has to bear in mind that all survey levels must be regarded. Multiple reminders raise the costs as well as additional nonresponse surveys.

Table 12: Meeting the Methodological Demands of the Survey Realisation

	Mail Survey	Face-to-Face Survey (PAPI, CAPI)	Telephone Survey (CATI)	Online Survey
Sample Coverage, response rate	low insufficient	mean, problem: coverage max. 5 contact attempts	good, unlimited contact attempts, good coverage at reinterviewing of nonrespondents	compared to time and effort of pre-selection too low
Field Control	none	mean, problem: interviewer control	very high in telephone studio	accurate monitoring of server access
Field Documentation	none, merely respondents and few refusals	very good because of contact records	very good because of contact record file	very good because of server records
Data Protection to Third Parties	unproblematic	unproblematic	unproblematic	protection to access from third parties necessary
Logistics	high due to dispatch, reminders etc.	very high due to interviewer effort	mean to low	technical requirements high
Costs	only at first glance low, for return too high	high, particularly at intensive coverage	mean	mean to high

PAPI: paper-and-pencil (face-to-face) interview; CAPI: computer assisted personal interview
 CATI: computer assisted telephone interview

6.5 Conclusion

The requirements of field implementation result for the choice of an adequate survey method in an equally differentiated image like the sampling and selection requirements:

- Face-to-face and telephone surveys still outplay the mail resp. online survey according to the criterion of high coverage. However, even these methods for enterprise surveys lead to intensely decreasing response rates within the last years.

- The enterprises' effort for completing questionnaires is the crucial factor for their willingness to participate in surveys. The response rates for voluminous questionnaires resp. question programmes collapse dramatically.
- The field documentation for telephone and face-to-face surveys results in optimum field monitoring. Nonresponse surveys are obligatory anyway in order to control the probability of sample bias.

7. Recommendations

In the previous chapters we balanced in detail the assets and drawbacks of the classic survey methods (mail survey, face-to-face survey) as well as the more recent survey methods telephone and online survey. Finally, we have to draw the consequences for the realisation of the CVTS 3. The recommendations are based on the results of the methodological experiments and the field experiences of the surveys described above.

7.1 Mode of Data Collection and Sample

From the perspectives of sampling, the face-to-face method bears distinct advantages, allowing for a selection of the enterprises as well as the enterprises' respondents. In a mail survey especially the very last selection step within the enterprise is beyond control.

The telephone interview provides indeed good opportunities to identify the right respondent in even complex enterprises. Yet, it is problematic that not all telephone numbers of the enterprises are listed or cannot be obtained from the respective CD-ROMs. The selection of the enterprises has to be thoroughly checked according to representativeness and potential selectivities.

The realisation of an online survey requires internet access. As the level of diffusion reported by EUROSTAT shows, several countries cannot provide this essential requirement. Therefore, the online survey at present could only be recommended for some individual countries, because not all nations involved are able to meet the technical requirements.

The mentioned sampling deficiencies can be solved to some extent:

- In mail surveys the internal selection processes can be replaced by identifying the respondent within the enterprise through preselection and by contacting them later with a personally addressed letter.
- The missing representation of enterprises in telephone directories can be controlled with a method mix. Unlisted enterprises receive a questionnaire by mail. The comparison with the main field sheds light onto potential selectivities.
- Online surveys can be used additional to a mail survey. The enterprises receive along with the questionnaire an access code. So they can choose to complete either the paper or online questionnaire.

Table 13: Mode of Data Collection and Sample

	Mail Survey	Face-to-Face Survey (PAPI, CAPI)	Telephone Survey (CATI)	Online Survey
Selection enterprises	+	+	- not all telephone numbers listed; selectivity possible	-- internet access necessary
Selection functional office bearers	-- no control of internal selection process	++	++	-- no control of internal selection process
Solution	<i>preselection: preliminary contact by phone</i>		<i>method mix: dispatch of questionnaires to unlisted enterprises; check of representativeness</i>	<i>offline recruitment: preliminary contact by phone/mail</i> <i>method mix: on-line survey additional to mail surveys</i>

PAPI: paper-and-pencil (face-to-face) interview; CAPI: computer assisted personal interview
 CATI: computer assisted telephone interview

7.2 Mode of Data Collection and the Questionnaire

Transferring the discussion about the survey instrument (see Chapter 5) and the given results onto the planned CVTS 3, several hypotheses and conclusions can be extracted:

- The questionnaire intends to measure the precise number of participants in continuing vocational training courses broken down by gender, age and occupational classification (section C1-C3). No enterprise keeps this kind of data ready, as far as we know; the statements rest on more or less good estimations.
- Also for the variable "proportion of persons employed taking part in other forms of CVT" (section B2) is from our point of view no information readily available, but a rough estimation of the enterprise.
- The data collection concerning paid working time, broken down by gender and by the subject of training and kind of provider (section C6 and C7) will also be difficult. Particularly problematic is the totalling of different subjects and providers to exactly 100 percent. This type of question makes high demands on the respondent and, in our opinion, can be rather solved with an electronic questionnaire if anything.
- As we mentioned before, the questions about aggregated cost factors for the continuing and the initial vocational training (C8, E3) will be prone to validity problems.

Recapitulating, we expect difficulties with the differentiated statements concerning participants, hours of participation and vocational training costs. Even enterprises with a corresponding controlling system will have problems to provide adequately differentiated answers. Answering problems presumably occur in each survey method. In a mail survey the questionnaire can be forwarded to a more competent staff member to complete (or estimate) the answers if need be. Also an auxiliary phone hotline can be provided throughout the mail survey's field phase. In surveys realised by infas, this option is always used intensively from the enterprises. Lately, we also receive requests by email.

Particularly difficult are therefore the telephone and face-to-face survey, if the answers are supposed to be provided ad hoc. Fact questions requiring precise answers and often also checking files and records will lead to a lower quality of answers by phone than by other survey methods. In case of realising the CVTS 3 as a telephone survey, we recommend providing the respondent prior to the interview with the neuralgic questions (drop off) because they need to be prepared. In this case, a supportive model in form of a self-administered questionnaire (drop off) is strongly recommended, so that the respondent can collect the required data previous to the interview (telephone and face-to-face survey). Then the interviewer can directly retrieve the answers resp. collect or complete the questionnaire.

The strong point of the computer assisted survey methods (CATI, online and CAPI) is the automatic interview conduct. The programming of filters and matrix questions as well as plausibility checks in the course of the interview are essential advantages compared to the classic survey methods by means of paper-and-pencil. The minimisation of errors and the data quality are real assets of electronic questionnaires.

Table 14: Mode of Data Collection and the Questionnaire

	Mail Survey	Face-to-Face Survey (PAPI, CAPI)	Telephone Survey (CATI)	Online Survey
Filtering CVT Enterprises	- piled unsystematic respondent errors	PAPI: +/- interviewer control, but errors possible CAPI: ++ automatic control	++ automatic control	++ automatic control
Data Check	- ex post only	PAPI: - ex post only CAPI: ++ routines in the background	++ routines in the background	++ routines in the background
Show Cards	questionnaire	no list presentation possible	no list presentation possible	questionnaire
Questions about Costs, Participants etc.	++	-	--	++
<i>Solution</i>		<i>additional drop off</i>	<i>additional drop off</i>	

PAPI: paper-and-pencil (face-to-face) interview; CAPI: computer assisted personal interview
 CATI: computer assisted telephone interview

7.3 Recommendations on Survey Method and Field Design

The survey methods differ conceivably concerning field organisation and realisation possibilities. The mail survey suffers from considerably low acceptance. A maximum coverage strategy has to be exercised by all means (two reminders, if need be a reminder by phone as well). The acceptance of and willingness to participate in non-compulsory surveys in Germany, as shown before, has decreased significantly. Even if it can be expected that the enterprises pay attention to the compulsory surveys of the Statistical Offices, realisation of CVTS 3 might also be more difficult than CVTS 2.

Whether the staging strategy is the solution for increasing or at least stabilising the response rates, has to be scrutinised. According to infas' experiences, contacting

the sampled enterprises by phone and fax prior to the interview results in statements of willingness to participate. However, the actual response rate is eventually much lower than these announcements of participation. This also becomes apparent in the Austrian paper about staging (BiBB et al., 2005). It is striking that the Austrian response rate differs only marginally from the German. Austria and Germany both had mail surveys; but Austria (and not Germany) had implemented staging. But the sampling error increases in case of a two-stage selection; the Swedish Statistical Office pointed that out already. The advantage of staging is most notably due to the shortened field period and, what is more, to the fact that the detection of nonsample selection is much better.

A reasonable alternative of the two-stage survey could be to collect the answers to all questions by phone with the exception of questions asking for facts that need internal research within the enterprises. This part of the questionnaire could be a mail survey, with the respondent receiving a self-administered questionnaire additional to the telephone interview. This method mix will, on balance, lead to a significantly higher response and coverage rate.

The acceptance of face-to-face surveys is considerably higher compared to mail surveys. As in the case of telephone interviews, an additional drop off containing fact questions needing some internal enquiries could be advantageous. The method is still the silver bullet, but it entails a significant cost factor. Therefore, many enterprise surveys are realised today by means of CATI. Telephone surveys enjoy greater acceptance than mail surveys and the costs are also comparatively acceptable. CATI is often a good compromise between methodological standards and survey costs.

Online surveys require a substantial greater effort than commonly considered. The provision of corresponding hardware as well as the programming cause great efforts compared to the realised response rates. If also contacts by phone for the respondents' preselection are added, the effort is disproportionate to the result. It is worth a second thought to provide an online questionnaire additional to the paper-and-pencil questionnaire. Thus, the enterprises receive the access code to the internet questionnaire along with the paper-and-pencil questionnaire, and can then decide which questionnaire they want to complete.

Independent from the choice of the survey method we strongly recommend to connect the CVTS 3 with a nonresponse survey. A nonresponse survey and corresponding selectivity analyses have to be scheduled at any rate. Only then can be checked, whether the declining willingness to participate leads to biased results. If need be, the results can be adjusted by means of an estimator (e.g. Heckman, Rubin).

Independent from the choice of the survey method we also recommend the use of an incentive. According to our experiences reports have proved to be an interesting incentive for the respondents in enterprises.

If the survey is to be realised as a mail survey, we moreover recommend to provide a possibility for phone requests. The implementation of a phone hotline or a competent call centre throughout the field period has proven to be advantageous.

Table 15: Recommendations on Survey Method and Field Design

	Mail Survey	Face-to-Face Survey (PAPI, CAPI)	Telephone Survey (CATI)	Online Survey
Sample Coverage, response rate	- low, insufficient	++ coverage min. 5 contact attempts	++ good, unlimited contact attempts, good coverage at reinterviewing of nonrespondents	-- compared to time and effort of pre-selection too low
Field Control	-- none	+/- good, but problem of interviewer control	++ very high in telephone studio	++ accurate monitoring of server access
Field Documentation	-- none, merely respondents and few refusals	++ very good because of contact records	++ very good because of contact record file	++ very good because of server records
Logistics	+/- high due to dispatch, reminders etc.	-- very high due to interviewer effort	+ mean to low	- technical requirements high
Costs	+/- only at first glance low, for return too high	-- high, particularly at intensive coverage	+ mean	+/- mean to high
Solution	<i>incentives, telephone reminder, nonresponse study</i>	<i>additional drop off</i>	<i>additional drop off</i>	<i>incentives, telephone reminder, nonresponse study</i>

PAPI: paper-and-pencil (face-to-face) interview; CAPI: computer assisted personal interview
 CATI: computer assisted telephone interview

Annex A

A-1: Demands of Sample Theory

Gross Sample	Has to be well-defined. Precisely: delimitable by means of well-defined operational criteria.
Selection Process	Objective: creation of minimised image of population. Ideal: random sample: in theory , each element has the same selection probability (sampling probability) Different complexity possible: single-stage vs. multi-stage, proportional vs. stratified.
Sample	Each element has a definitely assignable selection probability. Inverse: the weight of each element corresponds to the inverse proportional relation of the selection probability.
Realised Interviews	Objective: unbiased image of population. No selectivity. ATTENTION: "representativeness" alludes to the characteristics to be measured!!! Structure characteristics of the sample are auxiliary variables only!!!

A-2: Demands of Measurement Theory Concerning the Survey Instrument

Validity	The instrument measures, what has to be measured. These requirements apply independent from the survey methodology.
Reliability	The instrument measures reliably, so that the same results are being reproduced, independent from location, time, interviewer or methodology.
Complex Demands	
Filtering	Control, whether questions, for which certain circumstances or certain characteristics are prerequisite, will be asked or not.
Matrix Questions	Purposeful enquiry, if certain circumstances of a multiple choice question (multi) apply (e.g. events, biographical stages (spells), ways, symptoms etc.).
Data Reliability, Data Check	Reliability check (consistency, completeness) of the answers.
List Presentation	Visual support of the respondents via presentation of the answering possibilities, field codes or items.

A-3: Methodological Demands of the Survey Realisation

Sample Coverage	Objective: maximisation of coverage. Avoidance of selectivities.
Field Control	Objective: every form of interference of the measurement has to be inhibited (e.g. third parties' interference, falsifications, failure to comply with respondents' and interviewers' instructions).
Documentation of Field Process	In terms of inter-subjective reliability's verifiability of field transparency by means of explicit documentation.
Assurance of Data Protection	Protection from third parties' access to completed questionnaires resp. personal data.
Logistics	Field organisation, despatch, return control, deployment of interviewers.
Costs	Expenses for personnel, technical requirements and third parties (e.g. mail, printing etc.).

Annex B Results of the feasibility study (1998): Comparing item nonresponses in several survey methods

B-1: Proportion of Missing Statements (Item Nonresponses) for Questions of Dimension 1: „General Enterprise Data“						
sub dimension	indicators	proportion "don't know"/"no answer" (%) for survey method				
		CATI	CATI with drop off	face to face	face to face with drop off	mail survey
A. enterprise structure	affiliation to a group of companies	1	3	-	2	-
	business unit, referring to	2	-	3	-	11
B. sector	open question; later post coding according to NARCE	-	2	-	2	-
C. products/services	the three most important products/services	8	5	2	-	-
	turnover share of different ways of production (manufacturing enterprises)	-	-	5	4	17
D. turnover trend	turnover 1996	40	35	28	33	17
	turnover 1997	39	34	16	27	25
E. export dependency	export share of turnover	20	9	20	11	25
F. economic development	retrospective (last three years)	1	2	-	-	-
	prospective (future three years)	3	-	-	-	-
	share of (net) investment of the enterprise's added value	9	14	6	18	8
G. business strategies	importance of...	3	-	2	-	-
	- product innovations	4	2	2	-	-
	- process innovations	2	-	-	-	-
	- continuous quality improvement	2	3	-	-	-
	- quality assurance	4	7	-	2	-
	- lean production	1	-	-	-	-
	- reduction of operating expenses	1	2	-	-	-
	- upgrading of employees' qualifications	1	-	-	-	-
	- on-the-job training	1	-	-	-	-
	- reduction of personnel costs	1	2	-	-	-
- shareholder value	4	4	-	-	-	
H. classification of respondent	capacity within enterprise/business unit	-	-	-	-	-

B-2: Proportion of Missing Statements (Item Nonresponses) for Questions of Dimension 2: "Personnel Structure"						
sub dimension	indicators	proportion "don't know"/"no answer" (%) for survey method				
		CATI	CATI with drop off	face to face	face to face with drop off	mail survey
A. employees	number of employees	-	-	-	-	8
	freelancers	4	6	4	7	8
B. employment trend	retrospective (last three years)	3	-	2	-	8
	development in abs. figures:					
	persons leaving	19	18	8	29	-
	increment	20	22	8	36	-
	prospective (future three years)	3	3	2	2	8
C. qualification structure	actual balance by groups in abs. figures/% of employees ("don't know")					
	- un- and semiskilled labour	18	15	2	11	8
	- skilled labour	21	15	2	7	8
	- skilled employees	22	15	2	9	8
	- master craftsmen, technicians	19	15	2	9	17
	- higher education graduates	22	17	2	7	17
	- university graduates	22	17	2	7	17
	- trainees	18	14	-	4	8
D. development of qualification structure	retrospective (development within the last three years) (fiver scale)					
	- un- and semiskilled labour	3	-	2	-	8
	- skilled labour	1	-	2	-	8
	- skilled employees	3	-	-	-	8
	- master craftsmen, technicians	3	-	-	-	8
	- higher education graduates	4	-	-	-	8
	- university graduates	4	-	-	-	8
	prospective (development within the three upcoming years)					
	- un- and semiskilled labour	7	14	6	7	8
	- skilled labour	10	11	8	7	17
	- skilled employees	3	3	-	2	8
	- master craftsmen, technicians	10	15	4	7	17
	- higher education graduates	9	8	6	9	8
	- university graduates	12	11	8	7	8
prospective for the groups						
- skilled labour/employees	3/8	-/6	4/6	-/9	-/8	
- master craftsmen, technicians	5/13	2/10	7/13	7/11	-/17	
- higher education/university graduates	3/12	2/4	4/11	2/14	-/8	
by 11 business units (min./max. for "no answer")						

B-3: Proportion of Missing Statements (Item Nonresponses) for Questions of Dimension 3: "Changes in the Enterprise and Effects on the Qualification Demands"						
sub dimension	indicators	proportion "don't know"/"no answer" (%) for survey method				
		CATI	CATI with drop off	face to face	face to face with drop off	mail survey
A. innovations/ changes within the enterprise / business unit	In case of changes, no answers were given about...					
	- product innovations	4	2	9	4	11
	- diversification of production	13	9	11	-	*)
	- process innovations	8	7	4	11	*)
	- change of vertical integration	13	13	12	-	*)
	- outsourcing of business units	4	-	(20)	13	*)
	- outsourcing of business areas	6	3	5	8	*)
	- combination of other enterprises	16	5	(10)	7	*)
	- change of organisation structure	7	4	6	6	*)
	- augmented use of un hired labour	-	7	13	11	*)
- new legal regulations and requirements	7	7	11	7	*)	
C. personnel policy measures due to changes/innovations	- new personnel hiring	2	2	8	6	-
	- staff rotation	-	2	5	-	8
	- staff reduction	-	6	8	-	8
	- training programmes	-	2	3	-	-
	- other continuing training	4	7	8	6	33
	- augmented use of highly qualified manpower	3	4	3	6	25
	- reduced demand for low-grade skilled labour/ administrative assistants	4	5	5	9	8

*) Not stated because of too little number of cases.

B-4: Proportion of Statements in Partially Standardised Questions of Dimension 3: „Changes in the Enterprise and Effects on the Qualification Demands“						
sub dimension	indicators	proportion of answers (%) for survey method				
		CATI	CATI with drop off	face to face	face to face with drop off	mail survey
B. effects of innovations/changes concerning qualification demands	the change with the most effect	82	83	84	76	92
	differentiated record of the effect on...					
	- employee groups	88	94	80	76	100
	- number of employees	88	85	80	85	50
	- manner of new demands	93	92	88	85	83
- effect on....						
- practical ability	95	95	92	88	75	
- technical knowledge	98	97	92	94	83	
- methodical competence	98	97	92	94	83	
- social skill and communicative competence	98	97	92	94	92	
	for a second employee group, answer the question	39	49	38	36	67
C. personnel policy measures due to changes/innovations	effects on initial education (open)	95	92	87	94	100

B-5: Proportion of Statements in Partially Standardised Questions of Dimension 4: "New Demands for Skilled Labour and Skilled Employees"						
sub dimension	indicators	proportion of answers (%) for survey method				
		CATI	CATI with drop off	face to face	face to face with drop off	mail survey
A. new qualification demands, which cannot be met satisfactorily by recognised trade or further on-the-job trainings	Are there any qualifications, which cannot be imparted satisfactorily by recognised trade or on-the-job trainings?	93	95	98	100	75
	qualification stated first	40	31	18	27	(17)
	qualification stated second	9	11	12	18	(17)
B. differentiated demands for each new qualification (partly open)	- occupations including these demands	42	31	20	24	25
	- description of new demands	40	29	18	27	17
	- training of the employees involved	40	31	18	27	8
	level of new demands	100	82	100	92	*)
	call for action of vocational training policy	87	73	100	85	*)
	development perspective of labour input in the areas involved	100	86	100	92	*)

*) Not stated because of too little number of cases.

B-6: Proportion of Missing Statements (Item Nonresponses) for Questions of Dimension 5: "Personnel Development"						
sub dimension	indicators	proportion "don't know"/"no answer" (%) for survey method				
		CATI	CATI with drop off	face to face	face to face with drop off	mail survey
A. initial education	number of traineeships	-	2	-	-	-
	supply of recognised occupations	-	-	-	-	17
	number of new traineeships within the ongoing vocational training year	1	2	-	-	-
	development of trainee completions - retrospective (last three years) - prospective (future three years)	6 3	12 6	2 2	4 9	- -
B. meeting the demands for skilled labour in the future	importance of...	-	-	-	-	-
	- own in-house training	1	-	-	-	-
	- vocational training and continuing training of employees	3	2	-	-	-
	- recruitment of higher education graduates	-	-	-	-	-
	- recruitment of in-house trainees from external market	-	-	-	-	-
	- recruitment of externally trainees - employment of freelancers	-	-	-	-	-
C. budget for further education	annual expenses for vocational training and continuing training measures	9	6	2	4	-
E. current questions concerning vocational training policy	opinion about context of training behaviour and missing, suitable recognised occupations	-	-	-	-	-
	opinion about the despecialisation of education	1	5	2	-	8

B-7: Proportion of Statements in Partially Standardised Questions of Dimension 5: "Personnel Development"						
sub dimension	indicators	proportion of answers (%) for survey method				
		CATI	CATI with drop off	face to face	face to face with drop off	mail survey
D. vocational training programme	vocational training programme carried out	99	100	98	100	100
	stated for the first vocational training programme					
	type of programme	98	83	100	87	100
	duration in hours	87	76	82	86	90
	share of paid working hours	91	74	90	86	80
D. vocational training programme	number of participants	80	78	92	86	100
	composition of participants by job function	96	79	98	87	91
	carrying out the programme as in-house training, on-the-job training, external training	100	83	100	86	100
	stated a second vocational training programme	67	56	63	57	64

Literature

Bardeleben, Richard, Gustav Höcke & Klaus Troltsch (1999): Unternehmensbefragung als Instrument zur Früherkennung von Qualifikationsentwicklungen. In: Laszlo Alex & Henning Bau (Hg.): Wandel beruflicher Anforderungen. Der Beitrag des BIBB zum Aufbau eines Früherkennungssystems Qualifikationsentwicklung. Berlin: Berlin – Bielefeld (W. Bertelsmann).

Beicht, Ursula, Hermann Herget & Günter Walden (2004): Costs and Benefits of In-Company Vocational Education and Training in Germany. Bielefeld (W. Bertelsmann).

Beicht, Ursula, Günter Walden & Hermann Herget (2004): Kosten und Nutzen der betrieblichen Berufsausbildung in Deutschland. Bonn (BiBB), Berichte zur beruflichen Bildung 264.

Bundesinstitut für Berufsbildung in cooperation with Statistics Sweden, FÁS Training and Employment Authority, 3s Research Laboratory, Statistics Finland (2005): Development of a methodology for a long term strategy on the Continuing Vocational Training Survey (CVTS), WP3/4, paper 7: Staging/modularisation approach. European Commission, Eurostat, Doc. ESTAT-D5-2005-CVTS3-TF2-20.

European Commission, Eurostat (2004): Jahrbuch 2004 (Eurostat yearbook 2004).

Frey, James H., Gerhard Kunz & Günter Lüschen (1990): Telefonumfragen in der Sozialforschung. Opladen (Westdeutscher Verlag).

Janz, Nobert, Günter Ebling, Sandra Gottschalk & Bettina Peters (2002): Die Mannheimer Innovationspanels. Allgemeines Statistisches Archiv 86 (2), pp. 189-201.

Kaczmirek, Lars (2005): Das Web Survey Methodology Portal (WEBSM.ORG). Ein Informationsportal zu internetbasierten Datenerhebungsverfahren. ZUMA-Nachrichten, 56, pp. 98-103.

Schröder, Helmut (1998): Früherkennungs- und Beobachtungssystem. Machbarkeitsstudie zur Unternehmensbefragung. Abschlussbericht. Bonn (infas) hkt. Ms.

Schröder, Helmut & Janina Belz (1999): Personaleinsatz und Qualifikationsanforderungen im IT-Bereich. Ergebnisse einer qualitativen und methodischen Pilotstudie. Bonn (infas) hkt. Ms.

Statistisches Bundesamt – Federal Statistical Office Germany (2004): Informationstechnologie in Unternehmen. Ergebnisse für das Jahr 2003. Tabellenband. Wiesbaden.