

Designing an Employer Skills Survey

Notes on how to develop a survey to meet a range of policy issues relating to the demand for, and the supply of, skills

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Labor Markets and Social
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Designing an Employer Skills Survey: notes on how to develop a survey to meet a range of policy issues relating to the demand for, and the supply of, skills

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Abstract

Increasingly, skills are seen as a key component of competitiveness. Employer Skill Surveys (ESS) have an important role to play in: (i) demonstrating the skills that are in most demand and where shortages are evident; and, (ii) understanding the rationale employers provide for investing or not investing in the skills of their workforce. This paper reviews evidence from the UK and other countries and regions that have long experience in developing ESS with the aim of helping countries in Latin America and the Caribbean to design a suitable and effective survey.

Keywords: employer skills survey, skills gaps

JEL Codes: J23, J24

1. Introduction

1.1 Why conduct an Employer Skills Survey?

Increasingly, skills are seen as a key component of competitiveness. At a time in the global economy when many countries have access to the same technologies, the relative quality of their human capital largely determines, other things being equal, competitiveness (Jorgenson and Fraumeni, 1992). There are many other factors – such as exchange rates, macroeconomic stability, etc. - that will have a much larger bearing on overall economic performance. However, the evidence unequivocally points to skills being important in promoting economic growth. It is notable in Europe, for instance, that the demand for, and the supply of, skills is out of balance and this is a source of increased concern for policy makers (Cedefop, 2010 and 2015). In short, there is an insufficient demand for people with skills, often at a high level; whilst, at the same time, there are persistent shortages for people with intermediate and higher level skills, typically in science technology engineering and

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mathematics (STEM) subjects. Although it is acknowledged that over the long run, wage signals may even-out skill imbalances (Bosworth, 1993), over the short- to medium-term, imbalances may have adverse consequences for individuals, employers, and in the aggregate, the State.

If there is an interest in measuring the extent, causes, and implications of skill mismatches in an economy, there are various data that are of interest, including:

- administrative data sets that collate information about, amongst other things, the employment status, wage levels, and educational attainment of individuals. This sometimes requires separate databases to be matched and linked (e.g. wage data from tax records and qualification levels from educational/ school records).
- individual/household surveys that collect information about the current and past employment of individuals alongside detailed information about socio-demographic characteristics.

Most working people will have an employer. The employer has a key role in determining the content of jobs, the skills required of the incumbents in those jobs, levels of remuneration, the training to be provided to employees, etc. It is important, therefore, to collect data about employer demand for skills and how it is satisfied.

From a human capital perspective, imbalances occur as a consequence of market failures. Typically these relate to individuals and firms having a lack of access to capital to fund training, information asymmetries between firms and jobseekers, and a lack of information about the returns associated with investments in skills (Brunello and de Paola). By being able to, amongst other things, increase information flows about the demand for skills in the labour market, some inroads can be made in to reducing the levels of skill imbalance.

Employer Skill Surveys (ESS) have an important role to play in demonstrating the skills that are in most demand and where shortages, however defined, are evident. However, improving information about the demand for skills is not the only function of ESS. There is also the supply side to consider and the propensity of the employer to invest in training of different types. The standard form of human capital theory indicates the types of training employers will be willing to pay for – i.e. organisation specific skills that are not transferable to other organisations and from which the employer can wholly appropriate the benefits. Skills that are transferable – general skills - will need to be paid for by individual workers, typically by accepting a wage lower than their marginal productivity whilst training, thereby overcoming any credit constraint (Becker, 1964). There is, however, a wide range of evidence that demonstrates the way in which employers are able, in apparent contradiction to the human capital model, to obtain a rent from the general training they invest in. This is generally explained with reference to various labour market imperfections that in some way inhibit the mobility of workers after they have been trained (Acemoglu and Pischke, 1998). In Germany, employers appear to be willing to make substantial investments in providing general training to their apprentices and, in so doing, accumulate a net cost at the end of the formal training period. Employers in Germany are confident that they will be able to

appropriate the returns of that training over the longer-term because, in a relatively less flexible labour market compared with say the USA or the UK, the quit rates of former apprentices are relatively low.

ESS can play a useful role in understanding the rationale employers provide for investing or not investing in the skills of their workforce. Given that few labour markets are perfectly competitive, there are likely to be a number of ways in which employers find ways to appropriate the returns of the training they fund. Understanding the ways in which employers are able to increase skills supply is important, especially as in practice, nearly all skills are general rather than organisation specific (Lazear, 2009). Again, ESS can provide valuable insights here.

Given the various ESS that have been undertaken over the past decade or so, what has been learned to date with respect to what might be considered relatively good practice? This paper looks at evidence mainly from the UK, which has invested perhaps more than many other countries in developing a suite of ESS, as well as from selected countries in the Europe Union (EU) such as Germany and the Netherlands, and the USA. There are also comparative cross-country surveys to consider, such as the EU-wide pilot employers skills survey undertaken by Cedefop/ European Commission.

First, it is important to define the purpose(s) of any survey. This is important in two respects:

- i. by identifying the primary purpose of the survey, it is possible to identify the dependent variables of interest and the various factors that are likely to explain any variation in them. In this way, the design of the survey will allow theoretically robust analyses to be undertaken; and
- ii. since there are limits to the amount of data that can be collected in any survey, identifying the survey's priorities ensures that all essential data are collected.

Once the purpose of the survey has been agreed upon, it is possible to consider the content and structure of surveys in more detail.

1.2 Types of Employer Skills Survey

The need to commission an ESS can often derive from multifarious data requirements. A cursory examination of various ESS indicates that they address a wide, though inter-related, set of issues:

Skill demand:

- identifying the characteristics of skill demand in the workplace (typically using occupation as a proxy measure of skill);²
- identifying the generic skill needs of occupations in which people are employed in the workplace;

² The various skill measures used in ESS, such as occupation and qualification, are addressed in the next section.

Skill supply:

- measuring the extent to which employers are investing in training (however training is defined) – including the recruitment of people to training positions (e.g. apprentices);
- identifying rationales/ mechanisms that allow employers to appropriate the returns on their training investments;
- identifying the barriers to employers investing in training of various types

Skill mismatch:

- capturing the extent to which employers experience difficulties recruiting certain types of skill to the workplace;
- estimating the extent to which employer consider their employees to be fully competent or proficient at the jobs they are currently undertaking or might be expected to undertake over the short- to medium-term;
- identifying the factors that give rise to external skill shortages or internal skill gaps;
- assessing the impact of skill shortages and skill gaps and how they have been addressed by employers.

In practice, some ESS tend to contain a mix of all the above. Regardless, they demonstrate the need to clarify the purpose, or at least the primary purpose, of the ESS in order to ensure that the requisite questions are included in the questionnaire. It also is important that the design of the survey – given its purpose – sits within an appropriate conceptual or theoretical framework derived from labour economics. A failure to do this runs the risk of any analysis ultimately being incomplete and, consequently, being unable to fulfil the expectations of those who commissioned the survey.

1.3 The scope of Employer Skills Surveys

ESS do not need to be economy wide. They can have a sectorial, occupation, and/ or regional focus. However, there are a number of considerations that cannot be ignored:

- the survey needs to be representative – as far as is feasible – of a given population. There need to be some rules of thumb about what constitutes “representative”;
- key indicators need to be identified a priori. Social science research is futile if it is not about comparisons (e.g. across countries, over time within a country, between regions, etc.). The comparisons and appropriate benchmarks need to be identified;
- the target audience needs to be identified, whether it be government policy makers, employers and their representatives, employees, job seekers, etc.; and
- are alternative data already available and, if so, what is added by conducting the new survey.

All of the above need to be addressed if an ESS is, ultimately, to meet its overarching objectives.

1.4 Encompassing Employer Skill Surveys within a wider strategic data plan

ESS provide a single perspective to understanding skill issues: those provided by the employer. The employer perspective is an important one. Employers are typically best placed to provide an overall perspective on activities within the workplace or enterprise. For instance, with respect to how:

- work is organised and the resulting way in which skills are utilised in the workplace;
- skills are developed internally in the workplace;
- skills extant in the workforce are matched to the needs of the workplace (i.e. whether the workforce is over - or under-skilled, however defined);
- decisions are made regarding the external recruitment of skills versus their development within the organisation (i.e. to recruit or train?);
- skills are recruited from the external labour market (including the recruitment of those to entry level positions and more experienced workers); and
- skills are retained in the workplace.

It remains, however, one perspective and there may well be others to consider as well, depending upon the nature of the issue being addressed. ESS need not necessarily be stand-alone data collections. Increasingly, ESS are seen within a wider context of filling a gap in the overall data requirement of a country or region. Data from ESS can be combined with that from other sources to provide a more comprehensive analysis of the demand for, and supply of, skills. It is important therefore, not consider ESS in isolation, but to consider how they add value to other data collections. In the USA, O*NET, is able to draw together data from a number of sources to provide perhaps the most comprehensive coverage of the demand for, and supply of, skills in the world.³ In other countries too, there are moves to integrate various databases in order to add-value to existing data collections. To fully achieve this objective, there needs to be a guiding hand that can corral the various agencies responsible for data collection.

1.5 Structure of the report

This report is structured as follows. Chapter 2 provides a summary of the types of ESS that are conducted principally in Europe and North America. This is followed by a chapter that outlines the types of analytical framework that need to be in place if an ESS is to successfully address a range of issues relating to the demand for, and supply of skills, and resulting imbalances. Chapter 4 provides a checklist of the indicators to be included in an ESS and, finally, Chapter 5 provides a conclusion.

³ See: <https://www.onetonline.org/>.

2. Employer Skill Surveys around the world

2.1 Introduction

This section provides an overview of different approaches to measuring skill using ESS. It starts by providing a brief summary of how skill is defined and measured in employer surveys before going on to look at how different aspects of skill demand, supply, and mismatch are addressed. In the previous chapter, a typology of skill surveys was defined along the following lines.

Skill demand:

- the characteristics of skill demand within the workplace and how it arises

Skill supply:

- the extent to which employers are investing in training of existing or new employees and their rationales for doing so or not doing so

Skill mismatch:

- the extent to which employer skill needs are not satisfied and the extent to which skill imbalances affect organisational performance.

These are revisited in the remainder of this section alongside consideration of the general structure of ESS. Data can be collected on (i) how employers manage skill supply and demand internally (endogenous factors), and (ii) how employer behaviour is influenced by the external environment, such as the operation of the external vocational education and training system or labour regulations, etc. (exogenous factors).

It is important that employer skill surveys are cognisant of the wider economic and organisational context in which skills are being developed. Hence the emphasis in some employer skill surveys on assessing firms' perceptions of their external product market environment and their strategic response to it. This is turned to next, before looking at skills in detail.

2.2 Product markets and organisational responses

Skill is often referred to as a derived demand. From the perspective of the workplace, this will reflect a workplace's understanding of the external product environment in which it operates and how it has responded to it (along with expected future changes). From an economic perspective, the aim is to understand an organisation's production function. In a survey, this is difficult to achieve given the difficulty of collecting information that would allow the production function to be estimated. It is possible, however, to collect information about how employers have situated themselves in a market with reference to the extent to which there is an emphasis on driving forward efficiency gains, capturing new markets, capturing export markets, etc. In this way, it is possible to gauge the extent to which strategic choice at the level of the workplace affects the demand for skills. Without this type of information, it will be difficult to understand why two organisations that otherwise have the same characteristics

- with respect to size, sector, etc. – have differing demands for skills or make differing investments in skills.

The way in which employer skill surveys have sought to tackle this issue includes asking questions about:

- capturing information about trends in the volume of output and gross operating surpluses (i.e. the surplus resulting when all production costs have been subtracted from the value of goods/ services sold before tax);
- capacity utilisation – the extent to which the resources within the organisation are being fully used; and
- product market position – defined with reference to the extent to which relatively high value-added markets are being pursued, whether new markets are being captured, etc.

These issues reflect the art of what is possible within a survey.

2.3 The traditional definition of skill in surveys

Employer Skill Surveys need to collect information about skills. In order for this to be achieved, there needs to be a conceptualisation of skill in the surveys (Attewell, 1990). Typically, skill is measured by:

1. occupation;
2. qualification;
3. duration of education;
4. skill tests;
5. self-assessment;
6. job requirements

Occupation provides an indication of the types of work undertaken by those in employment and thereby the skills they will be using in their jobs. The International Standard Classification of Occupations (ISCO-08) provides a means of classifying jobs as occupations. The highest level of qualification held by an individual provides an indication of the skills that an individual may possess, though strictly qualification is not a measure of skills per se, but the potential productive capacity of an individual (c.f. human capital theory). The International Standard Classification of Education (ISCED) provides a means of measuring educational attainment. The duration of education provides a further measure of educational attainment.

Skill levels can be determined by conducting skills tests, such as those used by the OECD's International Adult Literacy Surveys (PIAAC). While the use of skills tests provides measures of skill use, in practice, skills tests tend to provide information on a relatively narrow range of specific skills (e.g. numeracy and literacy) and are expensive to conduct. The self-assessment approach, where individuals report on their own competence can cover

a wide range of skills but for reasons of self-esteem, individuals may over report – and in some circumstances may under-report - their skill levels.

The job requirement approach attempts to measure the generic skills used in jobs. The approach is based around identifying a narrow range of skills (e.g. literacy, communication, influencing skills, etc.), and then identifying, on a job-by-job basis, the extent to which they are encompassed within jobs. Both employers and employees can provide information using a job-requirement approach, though to date, it has been principally applied in surveys of employees.

In an Employer Skills Survey, it is possible to incorporate all of the above approaches. Employers can be asked about the occupational and educational structure of their workforces - this is relatively straightforward to conduct. It is also possible to test the skills of employees within the workforce, though in practice there may be practical problems in carrying this out (e.g. ensuring that a representative cross-section of employees are tested or persuading employers to have their employees tested). Employers can also be asked to assess the skills of different groups of employees in their workforce. It is relatively simple to ask employers to rate the competency levels of different occupational groups in the workplace. Finally, employers could be asked to identify the extent to which their employees use different skills in their day-to-day jobs using a job requirements approach.

Ultimately, the approach to be adopted is one that is able to provide the most comprehensive information about employers' demand for skills and which, at the same time, provides policy makers with data that will improve the demand for, and supply of, skills. In the approach outlined below, an occupational approach is suggested that also requests employers to make an assessment of their workforce's skills and the educational level expected of people working in different occupations. The reason for adopting this approach is that it is comprehensive (it provides information on all employees and all skills in the workplace) and is relatively easy and cost-effective to implement. And because it is based on occupation – using ISCO-08 – any data collected are potentially comparable with data collected in other countries.

Before specifying in detail the structure and content of an ESS that could be applied in Latin-American and the Caribbean, a review of different approaches to measuring demand, supply, and mismatch in employer surveys is provided.

2.4 Measuring and classifying employer demand for skills

There are a number of surveys around the world that offer insights into the level of skill demand. It is possible to distinguish three broad approaches, those which look to:

1. use traditional measures of skill (occupation and qualification);
2. develop an understanding of the skills that comprise a job (job requirement approaches [JRA] / occupational skill profiles [OSP]); and
3. understand the factors which may give rise to particular configurations of skill demand in the workplace (work organisation and skill utilisation).

These approaches are, to some extent, addressing different types of information need. Traditional measures of skill will provide an assessment of the skill structure in a country. The benefit of having an employer provide this information – rather than the individual via a labour force survey – is that the employer will be able to provide information on the number of people employed in different jobs (as defined in the enterprise and coded according to a standard occupational classification) and the typical qualification requirements in that job. In a labour force survey, individuals may provide a biased description of their occupation (i.e. exaggerate the seniority of their job).

In the second case, the rationale for the survey is that of understanding the skills that are extant within a job so that people (e.g. school leavers and job-seekers) can better understand how their skills match to those demand in various jobs or how they may be advised about making appropriate training investments if they want access to a particular job. In the third case, the interest is more about understanding the effective utilisation and retention of skills within the workplace and their association with overall organisational performance (and in aggregate with national economic performance). There is of course a degree of overlap between the surveys.

Occupation and qualification based approaches to measuring employer skill demand

The traditional approach used in employer skills surveys to measure employer demand for skills is to inquire about the occupational characteristics of employment in the establishment and the occupational characteristics of any vacancies that are unfilled. The issue of vacancies is turned when the issue of skill mismatches is considered in. For now, the focus is on the structure of employment of those currently working in the establishment.

Table 2.1: Occupation by qualification matrix from ESS

Occupation (ISCO)	Qualification profile	
	Typical qualification required to enter occupation by new entrants (coded according to ISCED)	Typical qualification level currently held by workforce (coded according to ISCED)
01. Managers		
02. Professionals		
03. Technicians and associate professionals		
04. Clerks		
05. Service workers and shop and market sales workers		
06. Skilled agricultural and fishery workers		
07. Craft and related trades workers		
08. Plant and machine operators and assemblers		
09. Elementary occupations		

Using traditional measures of skill demand, it is possible to develop an occupation by qualification matrix that could, potentially, be disaggregated by sector or region or both. Essentially, a matrix might have the following configuration (see Table 2.1). This can be further elaborated upon to provide additional information about field of study required or orientation (general versus vocational).

Employer surveys can often provide estimates of employment by occupation or qualification which are different from those produced from labour force surveys because they are providing the employers' view about the skills they need (demand) as opposed to individuals describing their own skills (which is more a measure of supply).

Job requirements/ occupational skill profile approaches

The job requirement approach looks to assess the specific skills that are encompassed in particular jobs (Cappelli, 1993). An innovative front runner in this domain was the Skills at Work series of surveys conducted in the UK between 1986 and 2012 (Felstead et al., 2007). These surveys sought to capture the extent to which employees utilised various types of skill or competence in their day to day jobs. The aim is very much oriented towards measuring the skills that people use in their everyday jobs with supplementary questions about whether the person has skills that are not being fully used in their job, or does not fully possess the skills required. This provides a measure of mismatch. The approach does assume that individuals are well placed to comment on the skills required in their job and provide unbiased assessments of the skills they possess versus the jobs required in the job. Using this approach it is possible to develop, in aggregate, a picture of the skills profile of jobs. This has been undertaken in the USA in O*NET⁴ with embryonic work being undertaken in the European Union.⁵

In the Skills at Work series of surveys, information is collected about:

- the qualifications required to get the job;
- the length of training required to become a fully skilled worker; and
- the time taken to learn to do the job well.

In order to look at the skills deployed in jobs, questions are asked about whether the job requires a set of specific generic skills to be used and the importance of these skills to the job (based on a seven-point scale). In the reporting, a series of skill indices were derived using factor analysis. These are:

- literacy skills;
- physical skills – use of stamina in job
- number skills – being able to add, subtract, divide, etc.;

⁴ See: <http://www.onetonline.org/>.

⁵ See: http://www.strediskovzdelavacipolitiky.info/download/2012_Occupational%20Skills%20Profiles_Methodology%20and%20application_Europe.pdf.

- technical know-how – knowing how to use tools and machinery, knowing about products and service;
- influencing skills – being able to influence people, training, etc.;
- planning skills – organising one’s own time, planning ahead;
- client communication – dealing with customers, etc.;
- horizontal communication – being able to work and communicate in a team;
- problem-solving: detecting, diagnosing, analysing and resolving problems;
- checking skills: noticing and checking for errors;
- aesthetic skills: looking and sounding the part;
- emotional skills: managing own and handling others’ feelings.

The approach undertaken above influenced the employer survey undertaken by Cedefop which also adopted a job requirement approach.⁶ Here questions were asked from the human resources managers in the establishment about various skills sets, whether they were used in the job, how well prepared the incumbents of jobs were to use those skills, whether the skills were important in undertaking the job, and whether their importance was increased, staying the same, or decreasing (Cedefop, 2012). Questions were asked on an occupation by occupation basis.⁷ The skill sets of interest were:

1. use a word processor and/or create a spread sheet;
2. search for, collect and process information using ICT;
3. communicate through ICT such as email, social media, Skype/ video calls;
4. use software for design, calculation or simulation;
5. work as a member of a group or team ;
6. persuade or influence others, including co-workers, clients or customers;
7. instruct, train or teach others;
8. use data and evidence to evaluate alternatives and to reach conclusions;
9. generate new ideas and creative solutions;
10. turn new ideas into actual products or services;
11. learn and apply new methods and techniques;
12. adapt to new technology, equipment or materials;
13. reduce the use of energy and raw materials in their day-to-day job;

⁶ See: <http://www.cedefop.europa.eu/node/11966>.

⁷ The interest is in the skill requirement to work in a job. In practice, occupation is used as a proxy measure for job. At a detailed disaggregated level, say ISCO-08 4-digit level, job and occupation are nearly synonymous. If data are to be analysed at this level of disaggregation then the sample size will need to be large. So in practice, one is often left looking at the job requirement in an occupation at the 1- or 2-digit level.

14. implement practices at the workplace to limit environmental damage and pollution;
15. determine their own tasks, method and speed of work without consulting managers or supervisors.

In addition, the Cedefop survey contained data about the product market strategies of firms and whether they were experiencing hard-to-fill vacancies as a consequence of a demand for certain skills, experiences, or qualifications. It is never clear, however, whether the JRA approach provides a comprehensive assessment of the skills that comprise a particular job. One is left with detailed information on skills that are, *a priori*, considered important and because of this it provides a partial assessment of skill demand. That said, there is an interest in knowing about the importance of particular skills associated with particular jobs. PIAAC has demonstrated the importance of literacy, numeracy, and ICT skills to individuals and questions about these types of skill can be readily incorporated within a survey. For example, the OECD has recently drawn attention to the importance of non-cognitive skills, especially those related to social and emotional skills (OECD, 2015).

The main difficulty the JRA type of surveys encounter is only being able to disaggregate data to a level where one is analysing the skills in a job rather than an occupation. People work in jobs, not occupations. For example, a person may work in a job such as 'labour market researcher' which may require a fairly unique set of skills – from an OSP perspective – whereas in practice, data may be collected and analysed with respect to 'professional workers', the aggregate occupational group into which 'labour market researcher' is grouped alongside many other professional occupations. Unless there is the possibility of being able to collect data at a highly disaggregated occupational level, so that one is able to analyse jobs rather than occupations, such an approach may be limited in the useful information it can provide. Techniques have been developed to make the most of data that is captured and allow a level of disaggregation that may, in the first instance, be seen as not possible. These include the use of small area estimation techniques that potentially afford some potential to disaggregate data.

The JRA approach is often used in employee surveys where employees are asked to provide information about the skills used in their jobs (c.f. PIAAC and Skills in Britain series of surveys in the UK). It is perhaps less commonly developed in employer surveys, though the Cedefop pilot employer survey used this type of approach. In the USA, there is the Occupational Requirements Survey (ORS) conducted by the Bureau of Labor Statistics' (BLS). The ORS seeks to provide job characteristics data primarily to assist the US Social Security Administration in their disability determination process. The ORS gathers job-related information regarding physical demands, environmental conditions, mental and cognitive demands, and vocational preparation requirements. The Careerbuilder survey in the USA concentrates more on the qualification levels associated with occupations/ jobs in the workplace.

The O*NET approach has further elaborated the OSP approach by building in the characteristics of employees that fill various jobs so that one is beginning to shift towards understanding the degree of fit between an individual and the job, by comparing the work

style preferences of individuals to the extent to which specific jobs will be able to satisfy those preferences.⁸ Employer surveys are potentially able to collect this type of information.

Work organisation and skill utilisation

Skill demand is in many respects a derived demand, so there is an interest in being able to identify how it emerges in the first instance. In the first instance, skill demand is likely to derive from product market strategies. At its simplest level, high performance/ high productivity organisations are likely, other things being equal, to have a higher demand for skills. In practice, there is likely to be a degree of simultaneity – high performance establishments are likely to have highly skilled managers responsible for developing, devising, and implementing those strategies.

Skill demand is also analysed with respect to the organisation of work on the shopfloor (Bosworth et al., 2001). This tends to place skill demand within the wider context of the human resource management practices that are in place (Ichniowski and Shaw, 1990). Examples of such an approach include the following.

1. The Workplace Industrial/ Employee Relations Survey in the UK that has run periodically since 1980. It is a relatively small survey of around 2,500 establishments employing 10 or more employees.
2. In Germany, the IAB Establishment Panel is a representative employer survey of employment parameters at individual establishments. Nearly 16,000 establishments from all branches of the economy and of all sizes are surveyed annually and nationwide from the end of June until October. The IAB Establishment Panel has been in existence in western Germany since 1993 and in the East since 1996. As a comprehensive longitudinal data set, it forms the basis for research into the demand side of the labour market.
3. In the Netherlands, there is the Werkgevers Enquête Arbeid (Netherlands Employers Work Survey) that systematically collects data on work and employment in establishments of profit as well as non-profit organisations.
4. At the pan-European level, the EU Establishment Survey – run by the European Foundation for the Improvement of Living and Working Conditions (Eurofound) – collects comparative data on human resource and skills policy in the workplace. It is limited to around 1,000 to 1,500 workplaces in each European country. The survey was first conducted in 1995 and has been conducted every five or so years since then. The most recent data are available for 2010, though the most recent survey was carried out in 2015.

Typically these surveys include information about:

- workplace characteristics;
- working conditions;

⁸ See: https://www.onetcenter.org/dl_files/ContentModel_Detailed.pdf.

- employment and industrial relations;
- organisational developments (patterns of work organisation);
- personnel / HR-policy;
- performance and output (productivity, turnover/profit, sickness absence);
- occupational structure of the workforce.

2.5 Surveys of skill supply

Measuring training supply within the workplace

Employer skills surveys typically capture information on the supply of skills. This can relate to: (i) the training and development that the employer provides in-house; and (ii) engagement with the external training system such as participating in apprenticeship programmes. The aim is typically to understand what types of investment are being made in the workplace to train existing or new recruits. The most comprehensive survey in this regard is Cedefop's Continuing Vocational Training Survey (CVTS).⁹ The reason the interest is in continuing vocational education is because continuing as opposed to initial vocational educational training is, in most parts of the EU, considered to be a private matter. That is, it is regarded as largely an investment decision for the employer and individual with the exception of those active labour market policies aimed at helping unemployed people find work. There is, thereby, a need to identify the extent to which employers are investing in CVT. The European Labour Force Survey collects some of this information from individual employees (Have you participated in training provided by your employer in the last 3 / 4 weeks?), but there is also an interest in collecting data from the employer side too given that the employer will have more knowledge about the purpose, content, structure, and cost of the training they provide.

CVTS collects, amongst other things, information about:

- the characteristics of the workplace (e.g. size, sector)
- the occupational structure of the workforce;
- the amount of training activities (including formal and informal training) in which employees participate (a measure of incidence);
- the amount of time spent in those training activities (intensity);
- employer investments in a wide variety of training activities (including formal and informal training);
- the certification of training.

With CVTS and other surveys of this type, a distinction is made between training that is in some way unavoidable because it is statutorily required (e.g. health and safety) or results

⁹ See: <http://www.cedefop.europa.eu/en/news-and-press/news/continuing-vocational-training-survey>.

from recurrent recruitment (i.e. induction training). In this way, it is possible to identify the extent to which employers are voluntarily training their workforces.

In defining training, a wide variety of training activities are included that go beyond the simple one-the-job versus off-the-job distinction that is made in various surveys. For example, information is also sought in relation to (Cedefop, 2014):

- **Formal learning:** learning that occurs in an organised and structured environment (e.g. in an education or training institution or on the job) and is explicitly designated as learning (in terms of objectives, time or resources). Formal learning is intentional from the learner's point of view. It typically leads to validation and certification.
- **Informal learning:** learning resulting from daily activities related to work, family, or leisure. It is not organised or structured in terms of objectives, time, or learning support. Informal learning is in most cases unintentional from the learner's perspective.
- **Non-formal learning:** learning embedded in planned activities not explicitly designated as learning in terms of learning objectives, learning time, or learning support. Non-formal learning is intentional from the learner's point of view. Non-formal learning outcomes may be validated and lead to certification; non-formal learning is sometimes described as semi-structured learning.

Important in the CVTS is the distinction between the incidence of training and its intensity. For example, the CVTS demonstrates that in countries such as the UK, there is a relatively high incidence of training – the UK is one of the countries in the EU where employees have a relatively high probability of being trained - but much of this is of short duration (often on-the-job). One cannot necessarily infer that the training is of lower quality from such a statistic, but it does reveal much about the overall volume of training delivered by employers (i.e. incidence multiplied by intensity).

Engagement with the external training system

Besides looking at the investments employers are making in their own employees, there is also an interest in understanding how employers engage with the external training market. This typically relates to using nationally recognised programmes to deliver either initial or continuing vocational education and training, training that makes use of nationally recognised qualifications, and relationships with external training providers.

In the UK, surveys that have addressed the supply-side have placed an emphasis on collecting information about the following:

- Participation in national programmes. There is a particular emphasis on identifying whether employers are participating in apprenticeships. In the UK, apprenticeship is increasingly becoming the primary vocational pathway into employment and in Europe more generally, against a backdrop of relatively high youth unemployment, policy makers are increasingly interested in the role of apprenticeships in assisting young people make the transition from school to work. Clearly, in order for

apprenticeship programmes – and other forms of work-based training – to succeed, employers need to be willing to participate in this form of training. Accordingly, there is an interest in understanding the characteristics of employers that participate/ do not participate in this type of training.

- The extent to which employer provided training has led to a nationally recognised qualification given the strong emphasis until relatively recently on targets whereby a certain percentage of the population would be qualified to different levels according to the National Qualifications framework. This also reflected successive governments' willingness to fund continuing training so long as it led to a qualification at a level above that for which the individual was already qualified.
- The relationship between the employer and the training provider. The interest here is primarily that of understanding the extent to which local training providers are meeting the training needs of local employers. This was and continues to be a long-standing goal of training policy – to ensure that the external training system is able to respond in a timely fashion to employer demand for skills.

Understanding the employer rationale for investing in skills and training

Employer skill surveys provide an opportunity to capture information about firm investments in training of one kind or another. Typically, such approaches include questions about:

- whether the employer has a training plan or training budget;
- the number of employees trained on-the-job and off-the-job;
- measures of the extent to which employees engage in non-formal training (e.g. participating in seminars, quality circles, etc.);
- the number of trainees, such as apprentices or graduate trainees;
- the value of employer investments in trainees (typically expressed as a percentage of sales turnover) where the denominator is either the total number of employees or the total number of trainees (however defined);
- the extent to which employer investments are dependent upon various incentives to train provided by, for instance, public sector agencies.

The above provides a list of indicators about the extent to which employers invest in training, but provides little information about why employers may not invest in training. It is often this last issue that is of most interest to policy makers concerned that employers may be making sub-optimal investments in training. In considering how employer surveys may tackle this issue, it is perhaps worth taking a step back to determine how “sub-optimal” might be defined.

Employers will typically report that they do not invest in training because they have no demand for skills. This can be tested, to some degree, with respect to whether they report skill shortages or skill gaps. If there are shortages or gaps, then enquiries can be made about the extent to which the provision of training has been used to address these, and if

not, why not. It is likely that where employers choose not to invest in training to meet their skill needs will reflect:

- concerns about being able to appropriate the benefits of any training (because trained employees might leave after training);¹⁰ or
- a lack of training supply either internally or externally that will meet the employer's demand for training (such as a lack of trainers internal to the company or a lack of supply from local training providers);
- dissatisfaction with the quality of training supply available.

An interesting issue to pursue is the extent to which employers, when faced with recruitment difficulties, are willing to recruit someone who has the potential to fill the role, and provide training so that they eventually acquire the skills required in the job to which they have been recruited. In addition, to what extent do the various publicly funded programmes they most likely use, meet their skill needs.

More pressing is the issue of how to tackle employer investments where they report no skill shortages or skill gaps. This may reflect information failures of one kind or another, including a lack of knowledge of the training available to the company, the costs of engaging in training and the benefits that the company might derive from doing so. This suggests that indicators need to be obtained that capture information about:

- knowledge of training provision such as national programmes that an employer might make use of;
- perceptions about the costs of participating in training; and
- understanding the benefits training might confer on the business.

More analytically, one might want to gauge the extent to which establishments are located in a low-skill equilibrium where relatively low value product market strategies and low demand for skills training mutually reinforce one another (Finegold and Soskice, 1988). This is where analysing employer demand for training – and other forms of human capital investment – with respect to wider labour and product market considerations can prove useful.

2.6 Surveys of skill mismatches

Often a critical policy issue is addressing skill mismatches – whether skill shortages or skill surpluses. As indicated in the introduction, there are several ways skill mismatches can be measured in employer surveys. Skill mismatches are typically measured with reference to:

1. wage differentiation;
2. relative wage growth;

¹⁰ This is the standard human capital type argument. Employers will be unwilling to invest in training unless they are guaranteed being able to recoup their training investment – Becker, G. (1964) Human Capital. Chicago: University of Chicago.

3. surveys of employers recruitment practices (the processes used to recruit people and the difficulties they have in hiring people with the skills required); and
4. surveys of employers' internal skill mismatches.

Wage based approaches

Wages are an important indicator of skill shortages (and to a lesser extent, skill surpluses). If there is excess dynamic demand for a skill then one would expect this to be reflected in wage differentiation (more scarce skills attract higher wages) and in relative wage growth (if there is excess demand this should be reflected in wage levels increasing over time for those skills). In practice, there are many reasons why wage rates may not always accurately reflect skill imbalances. There are a number of factors to bear in mind here:

- collective bargaining may result in wage rates not reflecting labour market conditions at least over the short run;
- national wage restraint, where applicable, might result in wages not reflecting skill demand;
- there is likely to be a lagged impact of wages on skill demand (i.e. wage changes will reflect past, rather than current demand).

As will be described below, wage data can be difficult to collect, even though they can be obtained from a number of different sources. Administrative records will contain information on individual employees' wages but will in many instances not contain data about their occupation or qualifications. So there is no way of linking their wages to their skill levels. Employee and labour force surveys also collect information about wage levels, but there is always a concern that employees may misreport their wage levels (e.g. exaggerating their wage levels) or tend to report net wages once taxes and other social security contributions have been deducted. A comparison of net wages can make analysis difficult for comparative purposes because each individual's off-takes will vary – and for different reasons - and comparisons across time are difficult because tax and social security policies may change.

Employers too can provide wage information but this may be inaccurate too. Employers may wish to misreport gross wages too (for example, they may not wish to divulge information about how much they pay certain grades of staff where this may breach collective agreements or minimum wage legislation). An alternative approach is that used in surveys exemplified by the Annual Survey Hours and Earnings (ASHE)¹¹ in the UK or the EU Structure of Earnings Survey.¹² ASHE is an annual survey that asks employers to provide information about the hours and earnings on a specific individual along with their occupation and the industrial sector of employment of the employer. It is a statutory requirement for employers to provide information for the employee which the Office of National Statistics

¹¹ See: <http://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/bulletins/annualsurveyofhoursandearnings/2015provisionalresults>.

¹² See: <http://ec.europa.eu/eurostat/web/microdata/structure-of-earnings-survey>.

identifies from its sampling of national insurance numbers (i.e. the social security number that is provided to each individual in the population). In this way it is possible to obtain a reliable estimate of wage levels by occupation and sector on an hourly and annual basis. The data can be disaggregated to the four-digit occupational level, so that one is looking at something akin to a job rather than an occupation qualification, which can be analysed over time. These wage data thereby potentially provide a valuable source of information on skill shortages. In the USA, the Current Employment Statistics captures data on earnings and hours worked, from employers, but the amount of occupational data are limited.

Because relative wage growth can reflect many factors other than the relative demand for, and supply of, skills, there is a need, ideally, to look at other data as well on skill imbalances. The key issue is that there is a need to use a variety of indicators – that includes data on wages – in looking at skill imbalances (Gambin et al., 2016).

Employer reports of skill imbalances

There are two elements to employer reports of skill imbalances:

- i. surveys that concentrate on employers' recruitment practices; and
- ii. those that look at the extent to which employers' current workforces are competent to meet their business goals.

With respect to recruitment activity, the starting point is vacancies. There are a wide variety of surveys – some of which are run by national and multi-national employment agencies – that provide information on vacancies and whether employers are able to fill those vacancies. The general approach of these surveys is to ask about vacancies, then ask employers if these vacancies are proving hard-to-fill, and then ask if some vacancies are hard-to-fill because applicants lack the skills required by the employer.

This broad approach is applied in the IAB Stellenerhebung Vacancy Survey. This is an annual survey of 12.000 establishments undertaken by the IAB. The survey contains information on vacancies (by occupation/ qualification), recruitment difficulties, last case of hiring, and other special topics.¹³ A similar approach is adopted by the National Employers Skills Survey in England. This is a survey of 96,000 establishments with one or more employees. It adopts the following approach:

Measure of vacancies

- Does the establishment currently have any vacancies (yes/ no)
- In what occupations does the establishment have vacancies (the respondent can name up to six occupations)

Measure of hard-to-fill vacancies

- How many vacancies are there in [occupation 1 to 6]

¹³ See: <http://www.iab.de/de/befragungen/stellenangebot.aspx>.

- Are any of those vacancies in [occupation 1- 6] proving hard-to-fill (yes/ no for each occupation mentioned]

Measure of skill-shortage vacancies

- Why are the vacancies in [occupations 1 – 6] proving hard-to-fill?

The last question asks whether a vacancy is proving hard-to-fill because applicants lack the skill, qualifications, or experience the employer requires. Where applicants are considered to lack the skill, qualifications, or experience the employer requires, these are deemed to be skill shortage vacancies.

Supplementary questions ask about the skills that applicants lack but these are generally framed with reference to a range of generic skills, such as communication, leadership, customer handling skills, etc. However, most employers report that shortages occur as a result of applicants not possessing the specific technical skills that are required in a particular job. There is a well-established literature which suggests that employers are often unwilling to recruit people who do not possess both the technical and generic skills they require (i.e. hybrid skills). At the same time, it is clear that employers would consider recruiting someone with the technical skills but not the generic ones. Surveys, in general, tend to provide relatively little, if any, information on the precise technical skills that make it difficult to recruit.

There is a choice to be made about the period over which recruitment difficulties are measured: either a point estimate (i.e. now) or over a given period of time (e.g. over the last three months or last 12 months, etc.). It is apparent that little attempt is made to seasonally adjust estimates given that in some sectors, there is a seasonal demand for labour (e.g. agriculture) that result in an under- or over-reporting of skill shortages.

Explicit in the above approach is that vacancies can prove hard-to-fill for a variety of reasons, such as the employer not paying the going wage of the job, the location of the workplace (e.g. in a rural location that is hard to reach), or some form of cyclical effect (e.g. from rapid expansion of the workforce).

There is always a worry, in this type of approach, that it is in the interest of the employer to report their vacancies are proving hard-to-fill because of skill shortages. In this way, the problem relating to skill shortages can be transferred from being a private problem to a public one where the State needs to intervene to solve the problem. This is perhaps why a high degree of caution is required when relying solely on employer reports of skill shortages.

So far, skill imbalances have been discussed solely with reference to skill shortages. Skill surpluses are of increasing interest to policy makers. There is a general interest in understanding the extent to which there are vertical imbalances (too many people qualified at too high a level) and horizontal imbalances (people are skilled at the right level, but in the wrong subjects) – see Table 2.2.

Employer skill surveys have, as a general rule, struggled to capture the extent of skill surpluses. Some of these surveys have also sought to capture the extent to which employees may be over-skilled for their current job. They tend to ask questions along the

lines of: do your employees fully utilise their skills in their current job? It remains difficult for surveys to capture much useful evidence on skill surpluses. In some cases, it is difficult to know whether the employer is fully cognisant of the skills actually possessed by the individual. The employer, at the point of recruitment, tends to be interested in whether the applicant has the skills required to undertake the job offered. If the applicant has additional skills they might use in the job, then to some extent, this may be regarded as a free gift to the employer. Other evidence indicates that employers are sometimes reluctant to recruit people who are too over-qualified or experienced for a job because they are worried that they will leave quickly after appointment to take up a job commensurate with their skills. In practice, employers when recruiting to jobs where there is a routine high level of labour turnover (e.g. retail sales) tend to be less concerned about the extent to which people may be over-qualified, but are much more sensitive to the applicant's desire to remain in post at least over the medium-term.

Table 2.2: Classification of imbalances

Horizontal imbalances	Vertical imbalances	
	High	Low
High	Too many people skilled at too high a level and in the wrong subjects	People tend to be qualified at the right level but in the wrong subjects
Low	Too many people skilled at too high a level, but they are skilled in the right subjects	People tend to be qualified at the appropriate level and in the right subjects

Source: Derived from Cedefop (2010) *The Skill Matching Challenge: Analysing skill mismatch and policy implications*. Luxembourg: Publication Office of the European Union.

In general, however, employer skills surveys have struggled to capture much analytically useful information about skill surpluses to date.

The foregoing has been about recruitment from the external labour market. There is also an interest in understanding internal recruitment problems. In some respects, this deals with the issue of skill obsolescence. In the UK, the Skill Needs in Britain Survey (1989 – 1998) asked a question along the following lines:

- Are the skills of your current workforce sufficient to meet your business strategy?

In the National Employers Skills Survey (1999 – current day) the question was rephrased to:

- What percentage of your workforce is not fully competent in their current job?
- Where not fully competent: how competent would you say they were?

Where there are internal skill imbalances these tend to be referred to as skill gaps. The number of gaps reported by employers tends to be much larger than the number of shortages. When employers are asked why there are gaps, they tend to respond that employees have not completed their induction training or some other training course that the employer has placed them in. Skill gaps that relate more to the obsolescence of skills due to

organisational and technical change tend to be reported on a lower scale. It is suspected that employers will have made redundant those employees where the gap between the skills required in the job and those the employee possesses has become substantial.

2.7 The internal and external environment

Conceptually, skill shortages are difficult to define. It is not necessarily the case that employers who report recruitment difficulties are necessarily experiencing skill shortages (Green, 1998). Recruitment difficulties could arise because of many reasons other than the supply of suitable skills:

- asymmetric information about job vacancies;
- geographic imbalances;
- inefficient firm recruitment strategies (see Section 2.2 above) (Cappelli, 2012);
- relatively poor terms and conditions of employment;

The key issue is identifying whether employer reports of recruitment difficulties truly reflects a shortage of skills in the external market. This suggests that exploration is required to determine the extent to which:

- employers offer wages that reflect the going rate for particular skills;
- the wider terms, conditions, quality of the working environment; and
- the location of the business (i.e. is it remote from centres of occupation).

There is also a need to gauge how employers have responded to shortages. Arguably, if employers had a 'real' shortage, in the sense that it inhibited critical functions being undertaken in the workplace, then one would expect the employer to respond in some way. For example, the employer might:

- review terms and conditions of employment;
- be prepared to recruit people with skills less than those required in the job and train recruits to the required level;
- explore whether there are new pools of skills that people could be recruited from.

The above refer to the way in which the employer might respond to recruitment difficulties, but it assumes that there is sufficient flexibility in the labour market that will allow jobseekers to respond to the signals sent by employers. In practice, there may be a number of labour market rigidities that results in skill supply being inelastic, including amongst other things:

- collectively agreed wage rates (where wage rises are above inflation and not linked to productivity);
- occupational licensing;
- poor matching processes through the public employment service or recruitment agencies;

- dominant players at the industry level that effectively soak up skills supply;
- policies that inhibit the recruitment of certain groups in the labour market (e.g. the absence of part-time employment may particularly affect female skills supply or that of older workers).

The impact of these external factors can be such that skill shortages are difficult to measure and remain latent (Hogarth and Wilson, 2003). In other words, recruitment difficulties or skill shortages fail to emerge because employers, knowing that they will be unable to acquire the skills they would ideally want, recognise the futility of trying to recruit someone with those skills. In which case, employers find work-arounds such as more overtime from existing employees, outsourcing work, withdrawal from certain product market segments, or reluctance to develop new product markets. The matching process can also be an important inhibitor of skills acquisition by the firm that effectively exacerbates information asymmetries in the recruitment market. The foregoing suggests that indicators are required to reflect the extent to which there may be latent skill shortages, including: whether the going wage rate for the job has meant that the employer has not sought to recruit certain skills or whether occupational licensing constrains the capacity of the firm to recruit skills, etc. It also highlights the need to focus on how employers communicate their skill needs and the effectiveness of the various intermediaries they use (de Koning and Gravesteijn, 2012).

2.8 Technical considerations

There is a range of complex sampling problems to be addressed in designing and implementing an employer skills survey to ensure that they are representative of whatever population they are addressing. These are not explicitly considered here, other than to point out that a survey needs to be representative of its population. How this can be achieved is largely dependent upon information regarding the population. In the surveys outlined above, registers of establishments (both private and official registers)¹⁴ are used and a sampling frame is designed that ensures a representative spread by establishment size and sector. Usually, some form of stratified sampling is used to ensure that the overall achieved sample is representative of the population of establishment by size and sector, but not necessarily by size band within sector. The reason for this relates to the costs and complexity of conducting the surveys. Population estimates can then be used to weight the data so that it represents the population and, if need be, be grossed up to population estimates.

The unit of analysis tends to be the establishment rather than the enterprise. This is because within multi-site companies, the experience of skill problems is encountered at the establishment level. So it is the respondent at the establishment level who is best able to answer questions about skills. The respondent is usually the person responsible for human resource and training issues where more than 100 are employed, and the manager/ managing director where there are 100 or less employees. It is sometimes the case that in a sector such as retail, where there tends to be a large number of small establishments

¹⁴ Private registers include Yellow Page telephone directories.

belonging to a single company, that the interview will be directed to a respondent at the regional or national office.

The size of establishment to be included tends to result from achieving a balance between:

- a representative sample of establishments and employees. If a large percentage of the workforce is employed in larger establishments, there may be less need to sample smaller establishments;
- the resources available. If there are ample resources available then the capacity to survey smaller establishments is improved. As funding increased in the UK, for example, the size of establishment was reduced from 25 or more employees, to one or more employees. This tended to reflect the increased interest in the capacity of SMEs to stimulate employment and output growth in the economy.

In the UK, the National Employers Skills Survey currently surveys all establishments with one or more employees (there are around 94,000 respondents), so there is evidence that surveys can be administered to micro-enterprises/ establishments. Whether or not an ESS can work with employers in the informal economy – presumably many of which are micro- or small enterprises - is a moot point. The types of issue and the questions they give rise to assumes that employers are in the formal economy insofar as they are expected to have the capacity, if required, to engage with the formal education and training system in order to obtain the skills they require.

The surveys tend to be telephone surveys. This tends to be for reasons of economy and timeliness (i.e. they can be conducted relatively quickly). Interview length in telephone surveys is around 20 to 25 minutes which allows around 50 questions to be asked. There tends to be wide variation around this average with interviews with large employers that results in few questions being skipped taking nearer to 50 minutes. Interview length is important because beyond the 20 to 25 minute mark in a telephone interview, there is an increasing risk that the interview will be terminated before questions are asked. If the interview is face-to-face then the length of interview can be longer.

NORC in the USA, which tends to lead the way in survey design, tends to recommend the use of mixed methods in order to maximise response rates. Different types of respondent will be more likely to respond to a mail or online survey, and there may be some groups that are relatively difficult to reach so that a face-to-face interview is required. In general, online surveys, unless they have a relatively captive audience produce low response rates. So low in fact, that weighting the data to reflect population estimates results in great prominence being placed on the response on relatively few observations.

Many of the surveys are cross-sectional and the longitudinal or panel approach is largely under-developed. This may well be a lost opportunity given that there is a huge potential to look at how, over time, employers respond to the various skill problems they face. Longitudinal analysis, for example, has been used with the WERS series to look at the extent to which training is related to enterprise survival (the results show that it is) (Collier et al., 2007).

Finally, there is a need to think about how the data are presented. Ideally, the data need to reflect the overall population employed. So, if there are 100,000 skill shortage vacancies, what percentage of employment does this represent? And if 75 per cent of SMEs report skill shortages or account for the volume of skill shortages, what percentage of the overall population of establishments is made up of SMEs and what percentage of employment is in SMEs? Simply reporting the number or percentage of establishments will produce relatively uninteresting results.

2.9 Conclusion

The above has provided a tour d'horizon of how employer skill surveys have measured the demand for, and the supply of skills, and any resulting imbalances. These all tend to be volume based measures – along with some limited use of price measures in the case of wage data – but offer relatively few insights into the importance one might infer from the various volume measures. If, for example, four per cent of employers, report that they have skill shortages or that the volume of skill shortages represents 0.6 per cent of total employment, how does one interpret these findings? The data do not in themselves indicate that shortages are important or not. If the data are captured in time series, then a sense of their importance from a policy perspective can be gauged from whether or not they are increasing or decreasing. There is also an issue about the extent to which the data are a true reflection of what is actually going on in the labour market. Attention has been drawn to the fact that employers may exaggerate the true level of skill shortages because they want the State to intervene and provide them with the skills they want at the price they are willing to pay (which may be below the current market price). Similarly, the number of internal skill gaps may be under-estimated because the principal management respondents may be unwilling to report skill gaps amongst the occupational group to which they belong (e.g. managers and professionals). The above points to the need to see employer skills surveys as: (a) requiring an analytical or theoretical perspective to be brought to their design; and (b) for them to be regarded as one part of the overall jigsaw puzzle that might provide answers about the extent to which the skill needs of the economy are being met. These issues are addressed in the next chapter.

3. A Generic Approach to Employer Skill Surveys

3.1 Introduction

Employer skill surveys can develop in an ad hoc fashion as a consequence of their use by policy makers to address pressing issues of the day. There is nothing wrong with such an approach as it is inevitable that large-scale publicly funded surveys will be used to capture information urgently sought for policy purposes. At the same time – as indicated in the previous chapter – there is a need maintain a time series of data that can be used to fulfil a variety of labour market information and analysis requirements.

In this chapter, an example is provided of the way in which the employer skill surveys have developed in the UK – reflecting policy needs at particular points in time – that can result in surveys having an ad hoc feel to them. It is advisable therefore to take a step back

and consider in a more abstract sense the type of data that ESS are ideally placed to meet. This reflects upon the information provided in Chapter 2. Having decided what purpose an ESS might serve, there is a need to have in place an analytical framework that will aid the design of any survey.

3.2 Why conduct an Employers Skill Survey? An Example from the UK

In order to understand how the primary purpose of ESS is determined by policy concerns and how the design of any survey needs to be flexible to meet the changing needs of policy, it is salutary to provide an example. This is drawn from the UK where employer skills surveys first commenced in earnest at the end of the 1980s.

The principal policy concern in the UK during much of the 1960s and 1970s was that the education and training system was not delivering the skills the economy needed if it were to compete with countries such as Germany, France, the Netherlands, Japan and the USA, where labour productivity levels were higher and growing at a faster rate. In summary, the discussion became focused on the level of skills deficiencies which was measured with respect to: the extent to which employers were unable to recruit employees with the skills they wanted from the external labour market.

At the time, employer surveys - limited to the manufacturing sector - tended to show that the extent of external recruitment problems (skill shortages) tended to be at relatively modest levels, suggesting that there was not much of a skill problem. This was critiqued from a number of quarters in relation to the fact that the measure of skill shortage was not a true reflection of the extent of skill deficiencies in the economy. The optimal level of demand for skilled labour might be regarded as that which would result from the take up of technologies and forms of work organisation common to relatively successful performers. The level of skill deficiency is, thereby, the extent to which the current demand for skills differs from the optimum level (however defined) (Green and Ashton, 1992). Employers' actual demand for skill, as recorded by their difficulties recruiting skilled worker, may not be a true reflection of the extent of skill deficiencies because employers:

- have a tendency to muddle through/get-by and thereby not fully report skill shortages that may be extant in the workplace;
- may move out of markets where they cannot obtain the skills to retain sustain a position in that market;
- may not to choose to enter new markets because they feel they cannot obtain the skills that would be required to enter that market;
- define skills somewhat loosely and often with respect to the generic skills and personal attributes rather than the technical skills required to do the job.

A further criticism of the survey research at the time was that it centered exclusively on external recruitment problems and not the skills of the existing workforce.

Much of the debate in the 1990s was that Britain had settled into a low-skill equilibrium where employers sought relatively low levels of skill which the supply-side responded to

accordingly. Hence surveys tended to report relatively low levels of skill shortages as reported in the 1989 report from the Training in Britain inquiry commissioned by Government at the time. This led to improvements in the surveys which monitored skill deficiencies in the economy – i.e. the Skill Needs in Britain Survey (SNiB) which ran from 1989 to 1998, which began to collect data on internal skill deficiencies:

- the extent to which employers considered their existing workforces to be less than fully equipped with the skills required to fulfil their current jobs; and
- the extent to which employers invested in training their current employees.

There was still a concern that the surveys were not capturing what might be regarded as latent skill deficiencies – i.e. what would be the real level of skill deficiency if employers' skill demands reflected some optimal level. Following the recommendations of the National Skills Task Force - established by the British Government in 1999 to consider how the country's vocational education and training system should be reformed to improve competitiveness – a new employers skills survey was established (the National Employers Skills Survey, NESS, which has run since 1999 to the current day) to replace SNiB. This, initially at least, began to collect data on employers' product market positions and recent financial performance. In this way it was possible to identify the latent gap between firms that were relatively good performers, from those with relatively poor performance, other things being equal. This demonstrated for example a U-shaped relationship between the extent to which employers reported skill problems and their business performance. High performing companies reported skill deficiencies in their existing workforces because they were often at the cutting edge of technological developments and it was difficult for the skills system, either internally or externally, to keep pace with skills demand. Interestingly, firms with relatively poor performance also reported high levels of skill deficiency because, it was presumed, their skilled staff had left to take jobs in better performing companies where job security was better.

The example above demonstrates the way in which the development of a more rigorous analytical or theoretical framework can be used to develop a better questionnaire that will collect data that may be more appropriate to measure the phenomenon of interest. The NESS series of surveys also illustrate a number of other issues that can arise with a long-running survey:

- it creates a demand for certain indicators from particular groups, even though the indicator may not be revealing very much about the performance of the economy;
- with a regular survey there can be much demand for including new questions that reflect policy concerns at the time, but this inevitably means that other questions need to be dropped. In other words, there is a tension between retaining continuity with the past and collecting new data. It is important that the survey series is able to balance the tension between developing time-series and the inclusion of new topical issues;

- variables that provide headline findings are always valued much more highly than those that are included in a survey because they reveal more about the determinants of a particular headline indicator. However, it is often the explanation that may be of most value.

The above is not intended as a criticism of the NESS series. In many respects it is an outstanding survey of its type. Rather, the intention is to show how surveys develop and how decisions made early on in the life of a survey can have lasting effects.

3.3 What are the critical issues that Employer Skill Surveys can address?

In looking at the types of issues that ESS can address it is useful to make a distinction between:

1. the principal policy issues that need to be addressed;
2. the intended use for the data; and
3. the audiences that will be served by the data.

ESS can address a range of policy issues, but if consideration is given to those surveys that have been in place across the EU and North America, it is possible to identify a number of common themes that ESS can address. These include:

- understanding the current level of demand for skills at sectorial and regional levels using a range of proxy measures of skill;
- being able to understand what constitutes the skill content of particular jobs;
- identifying the extent of mismatches between the demand for, and supply of, skills;
- understanding the causes of mismatches, and in particular, the nature of any market failure that has resulted in the mismatch;
- identifying the responsibility for remedying any skill mismatch (is it a private or public issue?); and

The uses to which the data are used from a policy perspective include:

- a monitoring function to see how the demand for skills waxes and wanes in relation to the economic cycle and in relation to other economic events and the impact of this on key indicators such as wages (c.f. macroeconomic policy on wage-push inflation);
- a means to evaluate, over time, the extent to which various policy initiatives have some impact on key indicators of skill demand and supply;
- a planning role to ensure that local supply is matched to local demand;
- an information function in order that a range of institutions, labour market intermediaries, and individuals are provided with data that will better match skills to jobs.

Whereas the audience for data from ESS may have been originally Ministry of Labour economists, it is apparent the end user of ESS data is varied and includes those involved in:

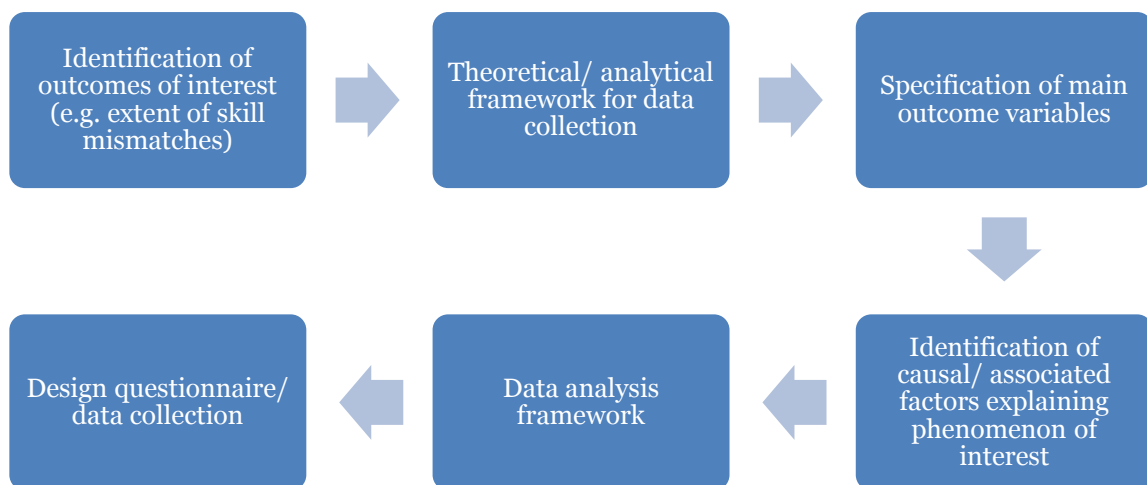
- the supply of skills (for example, further education/ community colleges, universities, etc.);
- potentially employers – and their representative bodies – so that they can see how the demand for skills is developing and the implication for their own business or sector;
- labour market intermediaries, often those involved in providing information advice and guidance to people, especially young people making the transition from school to work, so that they are able to: (a) make decisions about which skills and qualifications to invest in; and (b) match people’s skills to the jobs available; and
- individuals, especially job seekers, though the data often need to be mediated in a user-friendly way to individuals.

Understanding the flow of information from the need to tackle a particular policy issue, to the need for information that helps fulfil various policy functions and through to the end user, helps shape both the development of any survey and its questionnaire, but also the way in which any data collected will need to be processed and analysed, such that it meets the needs of a range of end users.

3.4 Developing an analytical framework

If the aim is to understand, as far as possible, cause and effect then there is a need to have in mind a suitable analytical framework to help structure the analysis and determine the data to be collected. Without knowing the particular subject to be addressed in the survey, it is difficult a priori to provide an all-encompassing analytical framework. An example is provided of a fairly standard case.

Figure 5.1: Analytical framework



Defining skills

Inevitably, if one is looking at skill there is a need to be able to define what is meant by skill. This is not straightforward and there is a large literature that seeks to define what skill means in practice. Typically, measures are used that rely upon occupation and qualification as proxy measures of skill. These are not ideal. People do not work in occupations, they work in jobs. Jobs and occupations tend to coincide only when looking at occupations at a detailed level of disaggregation. And qualifications are not a reflection of the jobs required within an actual job. Nevertheless, qualification and occupations can be readily classified using both national and international classificatory systems. At the international level, ISCO-08 and ISCED provide the means of classifying occupation and qualifications, respectively.

Understanding the determinants of skill demand

Skill is often regarded as a derived demand. Skill demand in the workplace is often seen as deriving from, amongst other things:

- technical change in products and processes;
- organisational change in the workplace;
- firms' product market strategies;
- competitive conditions in a firms' main markets.

Understanding skill demand in the workplace therefore depends on identifying the factors which result in the demand employers report for different levels of skill. The implication is that firms operating in more innovative markets that generate high levels of value-added are more likely to have higher level skill needs. This tends to be borne out if a comparison is made of the occupational structure of workplaces in relation to their product market positions.

Understanding the determinants of skill supply

There is large literature on who should pay for training. Most of this is associated with the human capital model of investments in training. In short, employers will not invest in training if they cannot appropriate a return sufficient to cover the costs of that training. In general, in a perfectly competitive market, employers will need to cover the costs of the training they provide over the formal training period, unless the training is firm specific. As pointed out by Lazear (2009), most if not all employer provided training is transferable. Employers, to some extent, can make it unique to their needs depending upon the way they bundle the skills together. This may give employers some scope to invest in training where the cost of the training can be recovered in the post-training period. The key question is understanding the way in which employers make the bundles of skills they need unique in some way that allows them to make the investment. Research also tends to suggest that questions need to be included about the practices that employers have in place to retain labour. It is often by providing a unique bundle of skills via employer provided training, alongside human resource practices that effectively retain skills in the workplace, which allows employers to make the

investment in the first instance. In relation to skill supply, consideration needs to be given to employer labour retention policies and practices.

Measuring skill imbalances

As noted above, a common aim of ESS is to measure the extent of skill mismatches in the economy. Typically this is measured with reference to:

- external skill problems – employers self-reporting whether they have encountered difficulties recruiting people to a given occupation (hard-to-fill vacancies) and whether the difficulty has arisen because applicants lacked the skills the employer sought (skill-shortage vacancies);
- internal skill problems – the extent to which the existing workforce possesses the skills required to meet companies' business objectives (skill gaps).

Data collected for these types of indicator provide a measure of employers' experiences and perceptions. However, if the definition of a skill deficiency – either a recruitment problem or a skill gap – is the gap between the notional optimal demand for skills that would arise if companies were using the latest technologies and their actual reported demand for labour, this may provide a different measure of skill deficiencies. Hence, there is often a desire to either segment the data so that the results from relatively well performing versus relatively poorly performing companies can be compared. There is often the risk that poorer performing employers under-report skill deficiencies because they either fail to acknowledge that they have deficiencies or have found ways to muddle-through albeit with sub-optimal performance.

The above may be rather subjective measures of skill deficiencies in that they rely upon data from the employers' views. These may be mistaken. It is possible to tackle this in a number of different ways:

- if the employer reports a shortage for a particular occupation are there other data, such as that on relative wage growth or wage differentiation that corroborates the employer's view; and
- is there any evidence that the employer has taken action to offset the shortage, such as offering wage increases, increasing training, etc.

3.5 Periodicity

Ideally the aim is to develop a time series. Looked at in isolation, a cross-sectional survey provides a static picture of the demand for skills. The aim is to address how the situation is changing so that it is potentially possible to gauge how various policy developments or changes in the economy are affecting the demand for, and supply of skills. A decision needs to be made about how often the survey should take place. In a relatively flat economy, it is likely that the demand for skills will not change much over time. In contrast, if the economy is entering a downturn or moving out of downturn then it is likely that there will be much change taking place. If one starts with a default position that the survey is conducted once every two

years – as is the case in the UK – then a decision can be taken locally whether this needs to be changed depending upon economic conditions.

There is also an issue of what should constitute the survey period. If the survey is to be repeated then the survey should take place at the same time in the year. In this way any seasonal factors will not affect the comparison over time. Depending upon the level of seasonality in the economy, introducing a seasonally corrected result depending upon the time of year when the survey is conducted could be considered.¹⁵

3.6 Integration with other databases

It has been noted at several points in this report that Employer Skill Surveys should not be considered in isolation. There is an opportunity to integrate the data obtained from the survey with other data sources – such as administrative data – to create a much richer data source. There are various ways in which an integrated database could be produced. The unit of observation in an integrated database could be:

- sector
- firm size
- region
- occupation

The various data sources that could be integrated could be other surveys and/ or administrative data.

3.7 Adding value

Any new survey should add value to what already exists. In this report, the aim has been to be as comprehensive as possible with respect to the type of data that might be collected through an employer survey. This has been based on a review various ESS carried out across the world. In developing a new survey tool for use by the IADB, the aim has been to provide an overview of different approaches that can be tailored to meet a variety of needs. It all depends upon what are the critical unanswered policy questions that need to be addressed.

3.8 Conclusion

The above has provided an overview of the factors that need to be addressed in designing an ESS. The approach is essentially that of identifying in the first instance the key policy issues and audiences that need to be served by an ESS, and then developing an analytical framework that will allow the identification of the key variables and associated questions to be included in any questionnaire. In this way, the analysis framework will dominate the survey design. In reality, there are likely a number of exigencies that will result in an immediate demand for information on a given subject that will necessitate the addition of

¹⁵ See: <http://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-001>

questions. If the analytical framework is sufficiently well established in the survey, the addition of questions on a particular subject should not prove a problem. The key independent variables will be in place that will allow a thorough analysis of the issue that led to the addition of new questions.

4. A checklist of factors to include in Employer Skill Surveys

4.1 A checklist of indicators

Based on the review of employer skill and related surveys provided in the previous chapters, it is possible to discern a common list of variables/ indicators as outlined in Table 4.1. These are not necessarily included in every survey.

Table 4.1: Core indicators to be collected in an employer skill survey

INDICATOR	NOTES
1. Characteristics of workplace	
Total number of employees (now) – including number of part-time/ full-time / permanent/ temporary workers	Needs to be in full-time equivalent to even out for part-time and full-time employment
Total number of employees (12 months ago)	
Sales turnover (now)	In national currency. If it is a public sector establishment it is possible to ask about budget of establishment.
Sales turnover (12 months ago)	
Sector of activity	Principal economic activity of establishment (coded according to standard industrial classification)
Whether part of a large organisation	In other words, one establishment amongst many
Type of organisation	Private sector, public sector, not for profit sector, co-operative, etc.
Percentage of output that is exported	
2. Skill Demand in workplace	
Number of employees by occupation	At a single digit of the standard occupational classification – such as ISCO-08 - ask how many people, or what percentage of the workforce are employed in each occupation
Qualification level	What is the typical qualification level of each occupation or what qualification level would be required if a person entering the job tomorrow (based on standard qualification framework such as ISCED)

Wage levels	Average wage level of each occupational group
Generic skills associated with each occupation	If the interest is in a JRA type of approach, then there is a need to ask about the generic skills in each occupation.
Vacancies	An important element of current skill demand is vacancies by occupation
3. Skill supply	
3.1 Training to existing employees	
Whether establishment has training plan or training budget	
Number of existing employees or percentage of workforce trained in past 12 months	Best to exclude induction training and statutory training such as health and safety
Average duration of training	
Whether training was mainly on-the-job or off-the-job	
Whether employees participated in informal training activities	There is a need to describe to the respondent what is meant here
Who supplied training	Was training delivered in-house, by external training provider, etc.
Why does establishment provide training	An open-ended question can be used at the pilot stage and then a set of closed options can be used at the main stage of the survey
Is establishment able to obtain the types of training it ideally wants for its staff	The aim here is to identify whether there is an deficiency either in the internal or external training market
3.2 Training to entry level positions	
Whether recruited anyone straight from school, college, university	
Total number of people recruited from school, college, university, respectively	
Type of programme with which people recruited	This might include apprenticeships, graduate trainee programmes, etc.
Why does employer recruit people straight from school, college, or university	An open-ended question can be used at the pilot stage and then a set of closed options can be used at the main stage of the survey
3.3 External training market	
Use of labour market intermediaries to supply training	Including PES
Use of local training providers	And if not, why not?

Engagement in public training programmes	For example, apprenticeships or using nationally recognised qualifications
3.4 Training costs	The amount of information collected here is really dependent upon how important it is to collect information on training expenditure by companies
How training is funded	For example, whether state funds are used
Expenditure disaggregated by types of training provided	For example, external training courses, costs of internal training centre, training materials, etc.
4. Skills imbalances	
4.1 External recruitment problems	This section can become long especially if establishment has vacancies in many occupations. There are ways of limiting the number of questions asked, such as focusing on, say, two occupations the employer feels are central to the establishment's activities
Total number of vacancies by occupation	
How vacancies are filled	Use of public employment services and related agencies to fill vacancies
Total number of vacancies proving hard-to-fill by occupation with vacancies	
Why vacancy in occupation is proving hard-to-fill	There a range of responses from various surveys that can be used here, but it is important to include something on wages. For example, whether the company pays the going wage or more for the occupation in which there is a shortage. Also a need to find out whether the shortage is a result of business growth or loss of staff in that skill group either because of retirement or voluntary quits
Check whether vacancy is hard-to-fill because of shortage of people with skills, experience, or qualifications required	
Impact of skill shortages on organisational performance	
4.2 Internal recruitment problems	
Number or percentage of staff that not fully competent by occupation	

Reason for staff not being fully competent	There are a range of reasons here relating to: (a) recent recruitment; (b) loss of experienced staff; (c) technical and organisational change; (d) product market shifts; (e) lack of training delivered to staff, etc.
Impact of internal skill imbalances on organisational performance	
Indicators of skill surpluses	Whether skills held by workforce are used in their day to day jobs
4.3 Responses to skill imbalances	
How have employers responded to skill shortages	This can be asked unprompted and then, depending upon the answers, whether they have increased training, required employees to work extra hours, looked into new recruitment pools, recruited from foreign labour markets, used migrant labour, etc.
Whether employer has sought to increase training of existing staff / take on more trainees	If training is not mentioned above, then there is a need to explore whether this has been considered and, if not, what deters the employer from investing more in initial and continuing training
(If no resort to training) Why has the employer not sought to increase training	Lack of supply either internally or externally
Whether employer has reviewed terms and conditions of employment	If not mentioned above, there is a need to explore this issue and the extent to which there are various barriers that prevent the employer responding to skill shortages
If not considered terms of employment – why not?	Wage rigidities, etc.
4.4 Impact of skill imbalances	
Impact on current workforce	Whether increased hours of work
Impact on current organisational performance	Whether lost orders, problems with customer service, etc.
Impact on future organisational performance	Whether employer has moved out of some markets, whether it has delayed technical/organisational change, delayed development of new products and services
5.Product market position and organisational performance	
Capacity utilisation of workplace	Whether currently working at overload, full capacity, just under full capacity, much below full capacity, etc.

Does the company have performance targets/ KPIs	
What are these targets/ KPIs	An open-ended question can be used at the pilot stage and then a set of closed options can be used at the main stage of the survey
Has the company met targets/ KPIs	
Product market strategy of company	Develop a range of scales where 1 is much below that of competitors and 10 is much ahead of competitors. This can then be asked about factors such as: developing new products, new processes, entering new markets, quality of products or services, use of IT, provision of training to staff, etc. The respondent is being asked to provide information relative to either that of all employers, their main competitors, or those in their sector
Whether principal markets are: local; regional; national; or international	
Whether faces low price competitors	
What is holding back performance more: access to capital or access to skills	
6.Miscellaneous questions	There are a range of miscellaneous questions that can be included depending upon the aim of the survey. Some suggestions have been included.
Whether unions recognised for bargaining	
Whether collective agreements in place for wages	
Employers' views on major factors affecting investment in skills in country	

4.2 Developing a variable list

Table 4.1 provides an overview of the indicators to be used in developing the questionnaire. A further stage is to assess whether the factors included will generate all of the indicators required for the anticipated analysis (which is largely dependent upon the purpose of the ESS). Outlined below are some of the key variables that will be required. This might be regarded as the minimum data set required.

Workplace characteristics

- Number of full-time equivalent employees
- % growth/ contraction in employment over last 12 months
- Sales turnover of workplace
- % growth/ contraction in sales turnover over last 12 months

Skills demand

- The number or percentage of people employed in each occupation (typically at the ISCO-08 1-digit level or something comparable)
- Vacancies by occupation
- The average wage of each occupational group (mean hourly wage)

Skills supply

- The percentage of the workforce trained over the past four or 12 weeks (a comparable period to that used in the European Labour Force Survey)
- Average duration of training delivered to all employees
- Average duration of training delivered to all trainees (i.e. the total number in receipt of training)
- Training expenditure as a % of sales turnover

Skills imbalances

- Total number of skill shortages
- Skill shortage as a percentage of total employment
- % of workplaces with skill shortages
- Total number of internal skill gaps
- Skill gap as a percentage of total employment
- % of workplaces with skill gaps

Product market strategies

- Composite measure of product market strategies questions converted into quartiles

The above is a provisional list, but indicates the type of variables that need to be collected. Where a comparison is being made with total employment, the total employment estimate should be consistent with other data – such as National Accounts data – that provide robust estimates. As noted in Chapter 3, data should be weighted to reflect known population totals.

5. Conclusion: moving towards an integrated LMI system

5.1 Moving towards an LMI System

Several countries recurrently undertake surveys of employers that capture information about their demand for skills and whether that demand is being satisfied. In general, these surveys provide valuable evidence about skill demand (as measured by job vacancies) and the ease of difficulty with which those vacancies are filled. Whilst these surveys are valued by policy makers, otherwise they would not be recurrently recommissioned, in isolation these surveys are necessarily limited in the evidence they can provide. However, if they are seen in the

context of providing a key set of data that can be combined with other labour market data, then their usefulness is increased manifold. In the USA, various data sources have been brought together under the auspices of O*NET, in the UK developments are gaining pace in producing a slimmed down version of O*NET under the LMI for All project, and at the European level, Cedefop is in the first stages of producing an integrated labour market information system through its Skills Panorama and skills forecasting programmes of work.

The limitations ESS face include the following:

- the capacity to capture a limited amount of data during a single interview;
- the difficulty of capturing non-biased information relating to wages;
- concerns about the reliability of training cost estimates;
- the limited information about the content of jobs;
- being nationally focused so there that there are no international benchmarks available which can be important when looking at relatively open economies.

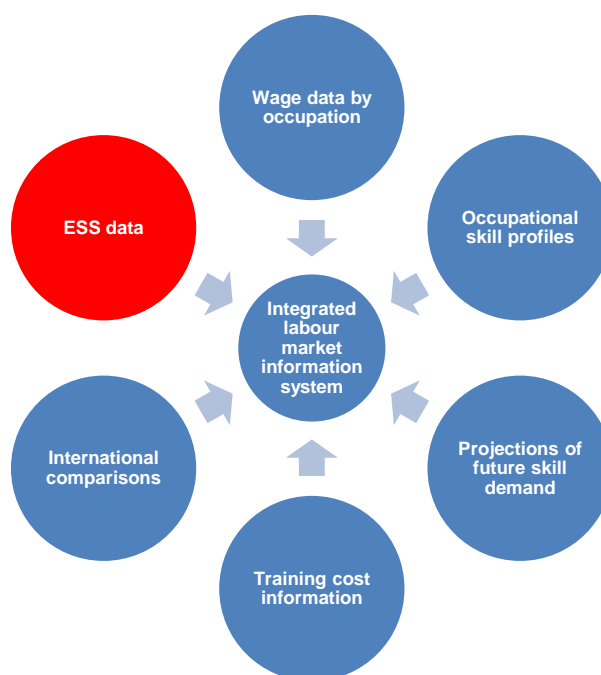
If, however, ESS are seen as one element of a labour market information jigsaw, then the limitations may be overcome. Wage data may be available for other sources, such as administrative data. Similarly, training cost data may be available for administrative sources too, or from other surveys. Information on occupational skill profiles may be available from a range of sources not necessarily from the particular country which has commissioned the ESS. There may be, for example, data available from similar countries where one would expect the skill content of jobs to be comparable. Ideally, there has to be an interest in international benchmarks. As noted in Chapter 3, in the UK, the debate about skill demand was very much determined by concerns that countries such as Germany, France, and the Netherlands – all countries with higher levels of productivity growth at the time – had more well developed VET systems in place. Simply concentrating information collection on a single country runs the risk of ignoring the fact that competitor countries may have more skills since employers invest more heavily in both initial and continuing VET. The foregoing emphasises the importance of having access to international benchmarks in any LMI system that addresses employer demand for skills.

Figure 5.2 shows how Employer Skill Surveys can be part of an integrated labour market information system where each element is complementary to the other. By regarding ESS in this way, it is possible to identify the way in which it can add value. Of course, not all elements might be in place at the outset, but if there is a strategic plan in place at the time an ESS is commissioned, then it is possible to design the survey such that it is future proofed to some degree.

A final consideration concerns the point of reference. Surveys are in many respects backward looking. They ask about information about what has happened in the past, whereas the interest of the audiences for ESS are often more focused on the future (i.e. what training should I invest in to get a high paid job in the future). This suggests the need to consider how future perspectives can either be incorporated within a survey, or supplementary data added to survey results from various skill projections or forecasts.

The above represents the ideal and there are few examples other than O*NET that have comprehensively brought together various data sources in an integrated manner. The point being made is that if a view about the future is made at the time an ESS is commissioned, then there is scope to be more realistic about what such a survey might deliver.

Figure 5.2: The position of employer skill surveys in an integrated labour market information system



In developing an example questionnaire, the emphasis has been very much upon understanding the extent to which employers are able to obtain the skills they need, and their willingness to invest in training. In this regard, it has more in common with the UK National Employers Skill Survey than the JRA approach described above, which was used by Cedefop in its pilot ESS for Europe.

The preference for the UK style approach is that it delivers readily analysable results that give a clear indication of the extent to which employers skill needs are being met and, if not, whether this relates more to external or internal conditions. If the JRA approach is to be adopted it requires asking a series of questions about selected generic skills along the following lines. The example in the box below provides the example of word processing skills.

If one were to take the job requirement approach it would necessitate asking a range of questions along the following lines.

Depending upon how many generic skills are of interest it can make for a repetitive questionnaire for the respondent to complete. More fundamentally, it requires data to be collected at least at the 2-digit occupational level. In many respects that data are most useful

when looking at specific jobs hence the need to collect data at a disaggregated occupational level. This can result in complex sampling problems and concomitant ones in grossing up to population estimates.

More fundamentally, there is an issue about the extent to which this information provides data that can inform policy or improve matching job applicants to jobs available since it is often technical rather than generic skills that employers report as being difficult to obtain. Hence the preference for a UK-style survey approach in developing a questionnaire for countries in Latin-America and the Caribbean along with some elements of finding the key skills associated with specific occupations (i.e. taking on board some of the ideas of the JRA type questionnaire in Box 1, including non-cognitive skills).

Box 1: Example of question style used in the JRA approach

Thinking about the [SPECIFIC OCCUPATION] in your workplace, how important, if at all, is it for them to:

- a. Use a word processor and/or create a spreadsheet?
- b. Search for, collect, and process information using ICT?
- c. Communicate through ICT such as email, social media, Skype/ video calls?
- d. Use software for design, calculation or simulation?

Please use a scale of 0 to 10 where 0 means not at all important, 5 means moderately important and 10 means essential.

SINGLE CODE ONLY

Not at all important				Moderately important						Essential
0	1	2	3	4	5	6	7	8	9	10
99 - DK										

Is it becoming more or less important for [SPECIFIC OCCUPATION] to:

- a. Use a word processor and/or create a spreadsheet?
- b. Search for, collect and process information using technology?
- c. Communicate through ICT such as email, social media, Skype/ video calls?
- d. Use software for design, calculation or simulation?

SINGLE CODE ONLY

- 1. More important
- 2. Less important
- 3. No change
- 4. Don't know

5.2 Skills required to implement an ESS

There is a range of skills required to implement an ESS. The following are considered to be important and, in several cases, essential.

1. Questionnaire drafting skills. There are rules to be followed in designing questions. These relate to the ease with which people can understand the question, wording, length of question, and ensuring that there is no ambiguity in the question. There are various guides to drafting questionnaires – such as Stanley le Baron Payne’s *The Art of Asking Questions Studies in Public Opinion*, 3. (Princeton University Press, 2014).

2. Specifying sample characteristics: The survey needs to be representative of a pre-defined population. There is a need to devise an efficient sampling strategy – whilst random samples are often preferable for reasons of efficiency and cost, there is often a need to use stratified/ quota samples. Statistical skills are required in being able to design the sample. Ideally, the survey design will reflect preferences for a certain confidence level and sampling error (e.g. 95 per cent of a response will be within ± 2 percentage points).
3. Undertaking the survey: a survey organisation is required that will have the requisite field force to undertake the interviewing either through CAPI or CATI. Important in conducting the survey is constantly updating the sample matrix to identify where quotas are being filled/ not filled so that action can be taken to ensure that the completed interviews closely resembles to requirement set out in the sample design.
4. The survey company will need to be able to analyse incoming data on an ongoing basis to ensure that unforeseen problems are not occurring in carrying out the survey – e.g. such as a question being misinterpreted. This should be solved at the pilot stage, but it is useful to have a safety net in place. The survey company should be able to provide the sponsor with ongoing counts of interviews conducted and the headline responses provided (e.g. frequency counts for each question).
5. Data cleaning skills. There needs to be competence in undertaking logic checks in the data to ensure that the routing has been adhered to, and that only values specified in the questionnaire are in the data set. This may require forced edits to be made to ensure that the data are consistent with the questionnaire.
6. Correcting for non-response and response bias. Statistical skills are required to develop a weighting matrix that corrects for non-response. Care needs to be taken to ensure that the weighting matrix is appropriate – i.e. that large weights are not used to correct for certain kinds of non-response as this will produce statistical artefacts. There may also be a requirement to check for item response biases.
7. Data analysis skills fall into two categories.
 - i. Firstly, there is a need to produce cross-tabular, descriptive analysis to allow a broad understanding of what is contained in the dataset to be appreciated. It will also reveal interesting areas of investigation for further analysis (e.g. where there is a particularly skewed distribution to a particular question). Typically, a survey company will provide a set of tabulations where each question is cross-tabulated by standard variables (e.g. industry, size, location, etc.).
 - ii. Second, skills typically associated with labour economists to explore in a theoretically coherent way a particular set of issues. This will require theoretical knowledge and multivariate statistical analysis skills.
8. Report writing skills. There are likely to be two specific skills sets in relation to report writing.

- i. Firstly, being able to draft a succinct summary report that can be widely distributed. This will need to avoid technical terms and include infographics. It is important, if the survey is to have key stakeholder engagement and support, that the findings are widely distributed across those groups in way that allows key messages to be readily digested.
 - ii. Second, drafting of technical reports that are able to inform, in a sophisticated way, the policy making process. This is likely to include econometric analysis targeted at particular policy issues.
9. There may be a wish to make the data widely available to potential users. Economists will be able to use the survey data files produced by the survey company, but there may also be a wish to make the data - or specific data requests - available on-line. For example, someone may want to know the percentage of firms, with a given set of characteristics in a particular city that report skill shortages. It may be possible to have a data system online that can provide this basic type of information to a range of end users (such as those in the PES). In which case there will be a need for IT skills to develop such as in data inquiry systems.

Alongside the specific skills outlined above, there needs to be strategic oversight of the survey. As mentioned elsewhere in the report, there is a need to consider how the survey fits with other data collections such that the potential data complementarities are realised.

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