

WORKING AT SECTORAL LEVEL

GUIDE TO ANTICIPATING AND MATCHING SKILLS AND JOBS VOLUME 3



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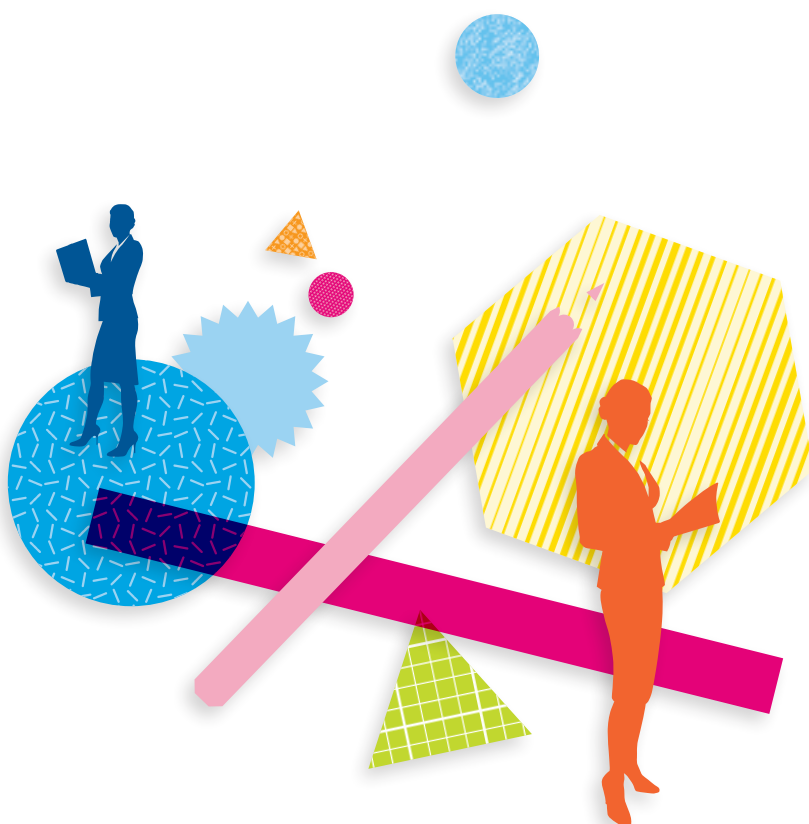
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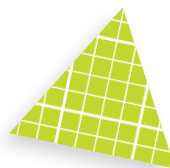
WORKING AT SECTORAL LEVEL

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Robert A. Wilson, Hajnalka Tarjáni and Hana Rihova



FOREWORD



In a context of dynamic and complex labour markets, gathering intelligence on current and future skill needs can support better matching of training and jobs, which is of paramount importance for every country in the world. In recent years, better understanding of labour market needs and skills matching have featured high on the policy agenda of many countries, driven by both rapid technological advances and global competition. Skills matching can also help reduce unemployment, particularly among young people. It helps build a better life for individuals by improving employability, social mobility and inclusion.

The European Union (EU) places great emphasis on skills anticipation and better matching. The Europe 2020 strategy and, in particular, the Agenda for new skills and jobs, recognise that anticipation and matching approaches and methods can help develop a skilled workforce with the right mix of skills in response to labour market needs, in a way that promotes job quality and lifelong learning. The EU Skills Panorama, launched in 2012, supports the effort to provide better data and intelligence on skill needs in the labour market.

The tripartite representation of International Labour Organization (ILO) Member States agreed that countries that have succeeded in linking skills to gains in productivity, employment and development have targeted skills development policy towards three main objectives:

- matching supply to current demand for skills;
- helping workers and enterprises adjust to change;
- building and sustaining competencies ⁽¹⁾ for future labour market needs.

Skills matching is a complex and dynamic process involving multiple stakeholders making multiple decisions at different times: individuals and their families, as they make decisions regarding their own education and training; education, training and labour market policy makers, as they decide on the configuration of education and training systems, employment policies and investments; training institutions, as they make decisions on the type and content of the training courses to be delivered; and employers, as they take decisions on how to train workers and utilise skills.

Jobs are changing rapidly and individuals are also changing their skill sets, either through education and

training or through their work and life experience. Education and training systems, in particular, have a key role to play in ensuring that opportunities are provided for all individuals to develop their skills continually in a lifelong learning perspective, enabling them to adapt to rapidly changing labour market requirements and conditions.

Given the complexity and dynamics of the process, perfect matching between skills demand and supply is neither feasible (especially in rapidly changing labour markets and economies) nor necessary, given the fact that many people can do many different jobs and many jobs can be done by people with different skill sets. However, it is important for policy makers to be aware of the importance of reducing the risk of creating large skills gaps that undermine the employability of individuals and impede the productivity of enterprises and the growth of economies.

¹ The terms competency(ies) and competence(s), although slightly different in meaning, are used interchangeably throughout this publication.



International experience suggests that a comprehensive labour market information system is the backbone of any education and employment strategy, but no single methodology can generate sufficient knowledge of labour markets to avoid or minimise skills mismatch. The right mix and complementarity of different methods is essential for a reliable and comprehensive overview of skills demand and matching.

For developing and transition countries, skills matching and anticipation is becoming an even more complex task given their particular socio-economic conditions, weak institutions, capacities and governance systems. Many developing countries have limited labour market information and more effort and investment is needed to build robust information systems. At the same time, even limited evidence can be better and more efficiently used with proper methodological tools and analyses.

To respond to these challenges, the European Training Foundation (ETF), the European Centre for the Development of Vocational Training (Cedefop) and the International Labour Office have joined forces and combined expertise and geographic coverage to develop a compendium of methodological guides on anticipation and matching of skills supply and demand:

- [Volume 1: how to use labour market information](#)
- [Volume 2: how to develop skills foresights, scenarios and skills forecasts](#)
- [Volume 3: what works at sector level](#)
- [Volume 4: what is the role of employment service providers](#)
- [Volume 5: how to develop and run an establishment skills survey](#)
- [Volume 6: how to carry out tracer studies.](#)

The six guides complement each other. They include both qualitative and quantitative approaches, and advocate strong social dialogue and institutions conducive to better understanding the skills needs of

tomorrow. They target professionals, policy makers, researchers, social partners and experts who need an overview of how different anticipation and matching methodologies can generate reliable labour market information and how information and evidence can be analysed and used for the development of policy interventions or adjustments in education and employment strategies.

The compendium brings together state-of-the-art international good practice and experience worldwide. The most common approaches used for skills matching and anticipation in different economic and country contexts are reviewed, and their potential and methodological shortcomings for generating reliable data and information are examined. They serve as reference material for readers to explain the scope, added value and limitations of diverse methodologies. The guides also provide insight into how the results of different methodologies can be analysed to provide recommendations and policy formulations.

Any feedback from readers and users of the guides is very welcome, particularly regarding how the next editions could be improved or made relevant to their circumstances and policy dilemmas, how they are used in different countries and contexts, including especially in bringing stakeholders together, and which topics could be added in the future to complement the current compendium.

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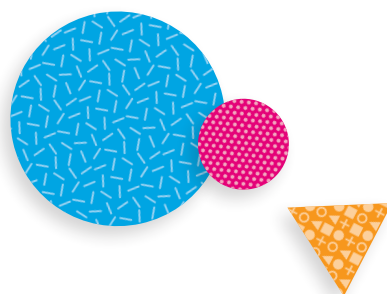
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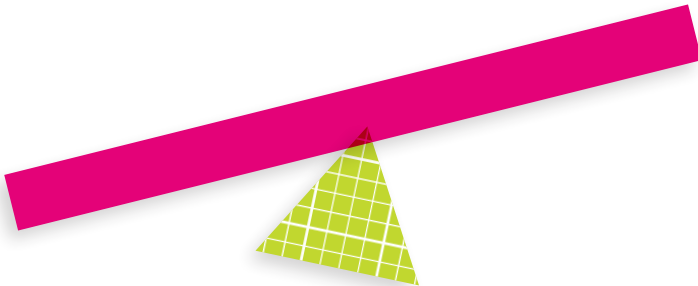
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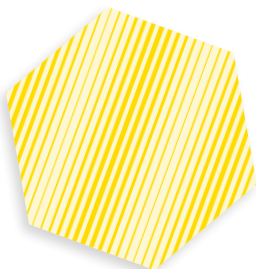
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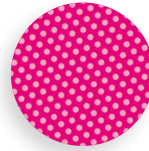




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Executive summary

Sectoral approaches to anticipating and matching skills and jobs

There are many different ways to assess the scale and nature of changing skills demand. Skills supply also has several facets. Analysis of skills demand and supply and possible mismatches can take many different forms.

A sectoral approach to such matters is defined as one which looks at changing skills needs from the perspective of a particular sector. The term sector is used here to define specific areas of economic activity, the subdivisions used for analysis and classification in an economic system.

Sectoral approaches encompass a range of different tools and methodologies, both quantitative and qualitative. Emphasis is often on the latter. Sectoral approaches to skills anticipation are an important part of the 'toolkit' for economic and skills development. They are best undertaken as part of a larger whole, which takes a holistic view of the issues involved in economic development, although some parts can also be undertaken in isolation. This is illustrated in some of the cases considered here.

Whether conducted as part of a holistic programme or focused more narrowly, the main rationale for such work is that market failures in skills development make a case for government interventions to try to ensure a better match between skills demand and supply.

A clear message is that sector matters: to understand the key drivers of change in skills demand, it is critical to have a sectoral focus and perspective. Sector lies at the heart of most approaches to skills anticipation and matching. Understanding technologies and markets at the detailed sectoral level, and involving representatives of employers and workers at that level, are crucial. Different sectors have very different skills needs because of the different economic activities they pursue and the technologies associated with them. It is essential to have a sectoral focus and perspective as defined above.

In most developed economies, the emphasis on the area of skills anticipation and matching has changed. Previously, there was a focus on direct intervention to influence the pattern of skills produced from the top down. Increasingly, the focus is on improving the

information available for the various actors to make the best-possible informed decisions and choices from the bottom up.

There is no simple recipe for one single sectoral approach. There are many different sectoral approaches which reflect the circumstances in which they have been undertaken, including:

- (a) the particular aims and objectives of the study, project or policy;
- (b) the existing institutional infrastructure, in particular the existence and strength of any sectoral bodies;
- (c) the existing statistical infrastructure, including relevant previous research, as well as raw data;
- (d) the broader economic and political context;
- (e) resource constraints, both financial and in terms of human capital.

These various factors help to shape and constrain what is both desirable and possible in a sectoral approach to skills anticipation. This includes details of the various methodologies and tools to be used, including choices about:

- (a) undertaking primary data collection rather than using existing information from official and other sources;
- (b) quantitative versus qualitative methods, including:
 - (i) different methods of collecting data (such as surveys, interviews);
 - (ii) different ways of anticipating the future (such as modelling, scenario development) (?);

Other important decisions relate to how (if at all) the various stakeholders are to be engaged. Potential stakeholders include:

- (a) employers and their representatives (business and employers' associations);
- (b) employees and their representatives (unions);
- (c) the State (local and national government and its various agencies);
- (d) education and training providers;
- (e) prospective labour market entrants, especially new entrants, their parents and career guidance services.

² The technicalities of implementation of these methods are not included in this Volume. Readers interested in more detail of these methodologies can refer to Volume 2 for foresight and forecasting methods, Volume 5 for establishment surveys and Volume 6 for tracer studies.



Taxonomy of sectoral approaches

A taxonomy of different sectoral approaches has been developed, based on an overview of typical current and recent practices and drawing on a subset of cases. The way institutional factors influence the approaches adopted is explored. This includes a description of the range of methods, tools and techniques available, the purposes they serve, their limitations and their data requirements. Requirements can differ: public employment services (PES), training providers or those dealing with the review of occupation standards (such as skills councils) are looking for answers to different questions.

The impact of alternative institutional frameworks, including the role of bodies such as sector skills councils (SSCs) and other similar organisations³, is considered in some detail. These bodies are involved in both research and practical implementation of policy. They allocate priorities for education and training and are also involved in undertaking research, allocating resources, and ensuring systematic and consistent decisions. Different institutional settings are examined. The factors which make some systems more responsive than others to labour market needs and/or to national or sectoral strategies and policies are assessed.

This offers practical guidance on success factors. Key steps that are indispensable for any sectoral approach are set out; options for the selection of tools and methods are presented. These highlight important constraints and other factors to be considered. Examples of such factors are the general political and economic context; institutional and cultural factors; financial and other constraints; and data availability.

There is no single solution or 'recipe' that will fit all cases and circumstances but it is possible to derive lessons from examples of good practice and certain inspirational methods. These vary depending on the question(s) to be asked and the context (cultural, institutional and statistical infrastructure) in each country.

This document presents a summary of tried and tested practices, common principles and key considerations underlying a sectoral approach to skills anticipation and matching. It draws on evidence from across the globe. It is not possible to provide in a single document detailed advice on all the tools, techniques, information and other issues which should be considered in undertaking such work.

Conditions for success and other key lessons

Successful cases have a number of factors in common. These include:

- (a) commitment and support from relevant stakeholders (not necessarily the full list above, but definitely including employers);
- (b) active engagement of stakeholders - this is critical and includes both sides of industry, but especially employers;
- (c) ownership – this is in part about commitment and engagement, but also includes the need to ensure representation of small and medium-sized enterprises (SMEs) as well as larger employers;
- (d) resources and capabilities - financial resources but also knowledge and experience;
- (e) relevant data – from existing sources or new primary data;
- (f) a mixture of methodologies, which reflect the circumstances (relevant data, financial and human capital resources, including relevant knowledge and expertise).

A key recommendation is that anyone considering a sectoral approach should examine the full range of methods and tools available – including combined methodologies – comparing the potential outcomes and conclusions before embarking on the process. A purely sectoral approach is just one of several options. The minimum requirements for a successful outcome of sectoral approaches are set out in detail.



³ Such as sectoral committees, observatories and other sectoral decision-making bodies.





The existing institutional context plays a key part in the first two factors mentioned above and the reform of existing institutions or development of new ones may also be an important element. There is often a need to try to develop a consensus. Partnerships and cooperation with existing bodies are often a crucial consideration. Achieving this is easier said than done. Organisations tend to follow their own agendas, which can be a source of conflict. However, it is also important to recognise that some competition is healthy and that harnessing market forces can also be an important element in maximising efficiency.

It is interesting to speculate on 'what comes first, the chicken or the egg': sectoral institutions or sectoral approaches? Some countries have a very long history of sectoral bodies and other organisations involved in skills, education and training development and policy. This has shaped the way skills needs are anticipated and possible skills mismatches are dealt with (as in Germany). In other countries, the reform of old sectoral bodies, or the creation of new ones, is at the heart of developing a sectoral approach to such matters (as in Brazil, Argentina and some EU Member States).

Having the right institutional infrastructure in place seems crucial to long-term success. This covers both sectoral bodies and other relevant institutions. The former are defined here as sector-based organisations whose overall objectives are to ensure that training in their sector meets the needs of employers, workers and society in general, and to promote skills development in their sector. Other institutions include those involved in education, training and skills provision, which play a part in, and contribute to, skills development. Establishing such institutions can take a long time and is something that has to evolve rather than a format that can be imposed from the top down.

However, the experiences of various countries show that some progress can be made on a more modest scale, through the partial application of the good practices identified, without the need for major institutional change.

The significance of the informal economy is an important issue for many transition and developing economies. This may be less well represented by existing institutions.

Other key lessons relate to:

- (a) the benefits in terms of fostering dialogue, involvement and engagement of all stakeholders, including:
 - (i) the general benefits of better labour market information (LMI) for a broad range of users of the results, helping labour markets to work better and helping learners to make early career decisions about what to learn;
 - (ii) the importance of sectoral approaches in raising awareness of policy-makers about key trends and issues;
- (b) the importance of the credibility of policy decisions and strategies based on solid evidence drawn from a sectoral or any other approach;
- (c) the need to encourage the development and building of relevant institutional frameworks and relationships;
- (d) the importance of follow-up with policy action and institutional development, without which any investment in sectoral (or any other) approaches risks irrelevance.

Whether a sector-based approach is appropriate depends on:

- (a) overall aims and objectives, including the detailed requirements of the target audience and the key questions to be addressed;
- (b) the constraints (political, financial and technical) that typically may be faced;
- (c) other contextual factors, including opportunities for exploiting support from stakeholders to achieve action at a sectoral level.

Precisely which tool or technique will provide the best answer will also depend on the various constraints faced by the policy-makers and analysts:

- (a) the need to triangulate the results from different approaches (no one-size-fits-all approach) and hence to go beyond a single approach;
- (b) the need to ensure buy-in;
- (c) the need to stress systemic approaches over pilots; long-term continuation and commitment is important, as there are no short-term fixes.



Caveats

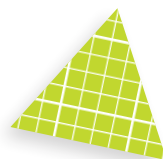
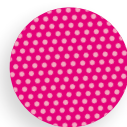
This document forms part of a wider set of guides developed jointly by Cedefop, the ETF, and the ILO. It sets out the advantages of following a sectoral approach. While the focus here is on presenting the case for sectoral approaches to skills anticipation and matching, it is important also to recognise the limitations of this mode. Some of these are highlighted in the detailed assessment of the individual cases, where some of the problems and pitfalls are indicated. All methods have their limitations and advantages. Users may need to consider the full set of guides before deciding which approach to adopt.

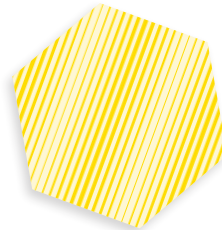
There are also a few general caveats. One problem with all approaches focused on just a single sector is that this provides only a partial view. For many purposes, a broader perspective is needed to capture the more general interests of the economy and the population. In such situations, multisector macroeconomic models or national enterprise surveys, covering all sectors, may be needed to provide a wider perspective. However, in many instances there is no substitute for an in-depth sectoral analysis to obtain a sound understanding of the key issues and their implications in terms of skills demand and supply.

The establishment of SSCs (or similar bodies) has been an increasingly popular phenomenon across the globe. It is often driven by governments wanting to engage employers with the skills development agenda. Future developments may require more self-sustaining organisations. Unless such bodies have deep roots or are given the time and necessary resources to establish themselves, they will not generate the hoped-for benefits.

Employers are not necessarily interested in investing their time in issues they perceive to be primarily of a public concern. Setting up structures to enable cooperation may prove difficult. It is also important to guard against the risk that such bodies may not always have interests that coincide with those of the government and society at large.

Finally, the future is not predetermined. Sectoral approaches to skills anticipation and matching are often concerned more with influencing the future for a predetermined section of the economy than with providing a clear picture of what this might ultimately look like.





Chapter 1. Introduction

This chapter provides a general introduction into skills anticipation and matching at the sectoral level, including background, aims and objectives. It provides a map to help readers navigate to those aspects they may find most interesting.

1.1. Background

This document is part of a series of guides on anticipation and matching of skills demand and supply. It focuses on approaches to skills anticipation and matching at sectoral level. It is intended to provide useful, practical, independent and impartial advice on monitoring and anticipating changing skills needs and reducing skills mismatches. It is relevant to a broad

range of different countries, covering those characterised as developed, transition and developing.

The intended audience is broad. It includes policy-makers considering a sectoral approach is appropriate for their country or sector along with technical analysts and researchers interested in the practical details of implementing such a project or study.

Skills are regarded as a cornerstone of economic and social policy, and a key element in ensuring positive outcomes for individuals. Anticipation of changing skill requirements is seen as an important element in ensuring a good match between the skills that individuals acquire through education and training and those that they need to succeed in the labour market and in life in general.

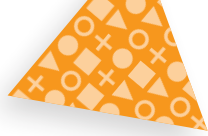
Box 1. International policy documents reflecting the importance of skills anticipation

On training costs, the general importance of skills and related issues, see ILO's *Human resources development recommendation, 2004 (R195), recommendation concerning human resources development: education, training and lifelong learning*, 92nd ILC session, Geneva, 17 Jun 2004. http://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO:12100:P12100_INSTRUMENT_ID:312533:NO

Regarding training strategy within a sectoral approach, see the ILO/G20 training strategy, where a sectoral approach is one of the key building blocks: *A skilled workforce for strong, sustainable and balanced growth: a G20 training strategy*. Geneva: ILO, 2010. http://www.ilo.org/skills/pubs/WCMS_151966/lang--en/index.htm

ILO recommendations for using sectoral skills strategies to recover from the recession are set out in the ILO consensus-based recommendations in *Upskilling out of the downturn: global dialogue forum on strategies for sectoral training and employment security*. Geneva: ILO, 29-30 March 2010. http://www.ilo.org/gb/GBSessions/WCMS_146292/lang--en/index.htm





Anticipation of changing skills needs and reduction of mismatches are especially important for transition and developing countries.

- (a) Skills mismatch is seen as a significant challenge, leading to adverse impacts on individuals and whole economies. This results in problems such as skills shortages, high youth unemployment, wasted resources and failure to maximise enterprise competitiveness ⁽⁴⁾.
- (b) Global competition, technology dependency and industrial restructuring are causing rapidly changing skills demands. The supply side is also being affected by demographic changes (migration, birth rates, ageing societies) and reform of education and training systems. Effective approaches, therefore, need to be developed for better monitoring and forecasting of skills supply and demand.
- (c) Improved matching systems are needed for better labour market outcomes. Monitoring and forecasting is not an end in itself but an input to evidence-based policy-making and better functioning labour markets.

There is a need to inform decision-makers better at various levels. This includes individuals who need to make career choices, all practitioners in education, training and skills development along with those involved in labour market management systems (PESs). They need to be informed about events in the labour market and to see how the information gained can best be translated into relevant policy actions and other decisions.

Detailed top-down workforce planning is not generally a realistic aspiration. In most market-oriented countries, where work on anticipating the future labour market has been carried out for many years, the emphasis has shifted. Originally, the focus may have been on using the information for planning purposes,

for example to try to plan in detail appropriate levels of provision in various areas of education and training. Today, the emphasis has moved towards a demand-led, market-driven system. The key role of such work is to provide information for all labour market participants to make markets operate more effectively.

1.2. Aims and objectives

The overall aim is to help countries improve their systems and ensure a better match between the supply of and demand for skills in the short and medium term. This will enhance the employability of young people and adults and improve business sector performance and economic competitiveness. The objective is to provide practical advice and recommendations on:

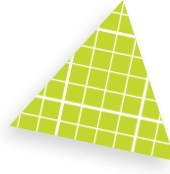
- (a) why sector-based skills anticipation and matching is helpful;
- (b) how to go about it, including informing the design and/or improvement of current practices in transition and developing countries.

Sector-based approaches and methods used in many different countries are compared. The recommendations draw on good practice in both developed and developing countries. Some of the approaches and ideas discussed may be suitable for developing countries, especially when data problems are considered. The discussion highlights where this might be an issue and suggests possible solutions.

The specific objectives focus on advice about sectoral approaches to skills anticipation and matching for stakeholders such as policy-makers, expert practitioners, education and training providers, PESs; the social partners, individuals making career choices, and specialist organisations engaged in research and analysis. It should serve as a reference and toolkit.



⁴ There is considerable literature on skills mismatch and the issue is also covered in more detail in Volume 1.



1.3. General approach

The approach to developing the guide has emphasised:

- (a) openness to the diversity of methods and approaches in skills anticipation under the general umbrella of sector-based studies and approaches;
- (b) a comparative perspective of selected, tested approaches to sector-based skills anticipation, highlighting the advantages and limitations from the point of view of specified criteria, for example cost, data requirements, reliability of results, coordination with other types of anticipation approaches;
- (c) the importance of context, considering different country conditions such as socioeconomic, labour market, education and training, public policies and budgets, data availability;
- (d) guidance on the possibilities for the gradual establishment of sector-based approaches, bearing in mind the capacities and possibilities within a country;
- (e) particular attention to the interpretation of the findings and conclusions for policy, programming and planning;
- (f) the main steps to be considered in developing a sector-based approach that can serve the needs of developing and transition countries.

1.4. Key definitions

It is important to define key terms and concepts, beginning with sector and skills.

The term sector is used here to define specific areas of economic activity; subdivisions used for analysis and classification in an economic system. This is discussed in detail in Section 3.3. Sectors cover the full range of economic activity from agriculture to manufacturing to services of all kinds. The definition includes both:

- (a) a strategic choice about which sector should be analysed, which relates to the overall aims and objectives of the exercise being carried out;
- (b) technical choices about how to define, classify and measure sectors more generally.

The former may be linked to the country's overall development strategy, including the sectors or clusters of economic activity within the country to be targeted or prioritised. This focuses on the potential connection between skills anticipation and economic development, although skills are just one of many factors that impact on economic development.

Sector is also used in some countries to refer to a subset of occupations and skills. The recommendation here is to make a clear distinction between sector or industry and occupation or skill.

Defining 'skills' is also far from straightforward. For many purposes, occupation or formal qualifications are used as proxies, but other aspects of skill (variously referred to as generic skills or competencies) are also important. However, these are generally much less easy to measure. This issue is discussed in more detail in Section 4.6.

A sectoral approach to skills anticipation and mismatch is defined as one which looks at changing skills needs from the perspective of a particular sector. For a full discussion of this issue see Section 2.1. Such an approach includes any study, larger project or programme that adopts a methodological and analytical outlook on the sector. It also includes work carried out within a framework of institutional and stakeholder involvement.

In some respects, the term 'sectoral approach' is a misnomer; all cases considered here have a strong sectoral focus. They adopt a vast and heterogeneous range of methodologies and tools, reflecting different contexts and constraints. It may be more appropriate,





therefore, to use the terms 'sectoral focus', 'sectoral analyses of skills' or 'sectoral studies' to refer to such work. However, the term sectoral approach has such widespread currency that it is easier to continue to use it here, recognising its limitations.

A brief overview of the range of methodological approaches and tools used in skills anticipation and matching is included in Chapter 2. Most, if not all, of these can be used as part of a sectoral approach. This includes the use of quantitative macro model results and other quantitative methods. It also includes more qualitative methods. Sectoral approaches can also be seen as one part of a more general system for anticipating skills needs and generating, using and delivering LMI.

Sectoral bodies are defined as sector-based organisations whose overall objectives are to ensure that training in their sector meets the needs of employers and government and to promote skills development in their sector. They may be involved directly in skills anticipation and matching but this is not necessarily the case. They may be set up and/or owned by the sector itself or by other organisations, including the government. See Chapter 3 for further details.

Other terms, such as anticipation, skills mismatch, statistical and institutional infrastructure are defined in the glossary.

1.5. Cases

Given the diverse socioeconomic contexts across countries, several case examples have been considered. They illustrate the diverse range of approaches and methods, reflecting different stages of economic development and (often complex) historical developments, including institutional arrangements

The cases are referenced in the relevant chapters for comparative and informative purposes. Brief and comparable summaries of the case studies are included in the annexes.

In each of the selected cases, the discussion covers:

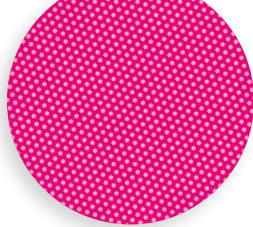
- (a) the general economic, political and institutional context in terms of the assessment of skills needs and the delivery of education and training;
- (b) the key participants and stakeholders and the different approaches they have developed;
- (c) key lessons learned;
- (d) references and resources for further analysis.

The discussion covers the general aims and objectives of the studies and approaches as well as technical aspects. These include the balance between quantitative and qualitative methods and how this has been influenced by the existing statistical infrastructure.

The quality of the statistical database is an issue of key importance, as shortfalls in the content can impose constraints on planning for developing countries that are not present in more developed economies. Many of the more qualitative approaches adopted have been developed to cope with situations where quantitative data are weak or non-existent. The economic and political context in which this work takes place, and the relevant institutional infrastructure, also play a key role in determining both what is required and what is feasible.

This is potentially a huge field, with literally thousands of studies that could fall under the general description of 'anticipation and matching of skills at sectoral level'. The review presented here is necessarily selective.





The countries were selected to provide information from various parts of the world and from countries at different stages of development, both economically and from the perspective of skills anticipation. The case studies are described in a comparative form and follow a similar structure. However, the main purpose is not to compare them but to extract the important and interesting information about each of the countries examined. Some case studies are more focused on methods used for skills anticipation at sectoral levels, while others present the sectoral institutions in more detail.



1.6. Structure

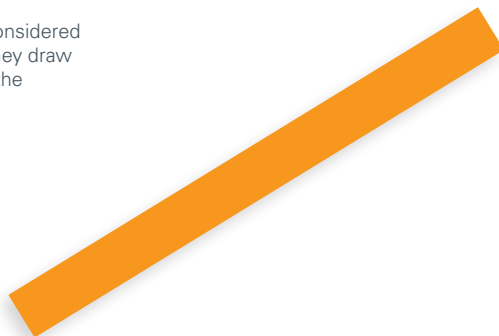
This chapter provides a general introduction, including background, aims and objectives.

Chapter 2 provides a broad taxonomy of sectoral approaches, highlighting their objectives and the main methodologies and tools used. It focuses mainly on methods, but also recognises the importance of institutional context and infrastructure ⁽⁵⁾.

Chapter 3 highlights institutional approaches conducive to skills anticipation and matching at sectoral level. It also considers the changes that sectoral approaches to skills anticipation and matching are intended to foster.

Chapter 4 goes into more detail on specific methodologies and tools. It moves towards a practical and didactic resource that readers can use to help make choices and decisions about what might work best in their particular circumstances.

The annexes summarise the country cases considered in developing the taxonomy of approaches. They draw out key lessons, including the importance of the institutional context.



⁵ Institutional infrastructure refers to all the various institutions in a country that have an interest in skills development. Such institutions include various government departments and agencies, other bodies and the education and training system (both academic and vocational)..



Chapter 2.

Sectoral approaches and methods

This chapter sets out a general taxonomy of the main approaches adopted, highlighting their objectives and the main methodologies and tools used. It draws on a review of current practices and the use of results in a selection of country case studies. It focuses mainly on methods, but also recognises the importance of institutional infrastructure.

2.1. Sectoral approaches to skills anticipation and matching

The need to anticipate changing skills needs to ensure a better match between skills supply and skills demand is now widely accepted (Wilson, 2013). Many different ways have been developed to try to achieve this aim and sectoral approaches to such matters are a key element for most countries (⁶).

Sectoral approaches are diverse and heterogeneous. Some feature highly complex methodology. They may include combinations of qualitative and quantitative components, scenario development, integration of expert assessments and in-depth discussion on the scenarios developed with pertinent stakeholders. Others are much simpler, relying on basic survey methods and little else.

In many respects it makes more sense to talk about a sectoral focus rather than a sectoral approach or methodology. A strong focus on a particular sector has many advantages when it comes to understanding changing skills needs, imbalances and mismatches.

Sectors are nothing new. They have been around since the days of medieval guilds when groups of employers came together to set standards and ensure that their members had the skills required to meet those standards (⁷).

More recently, sector skills councils (SSCs) or industry skills councils (ISCs) and other similar bodies have been set up in several countries. Their purpose is to address skills issues. In many countries, sectoral analysis, undertaken by or on behalf of such bodies, has become an integral part of the overall national system of skills needs anticipation (see the case studies of Australia, South Africa and the UK in the annexes).

In some countries, these bodies cover even broader skills issues, cutting across sectors as they are conventionally defined. For example, Portugal conducted around 30 sectoral studies between 2000 and 2005 but some of these focused on transversal and transferable skills. Similarly, some of the work in the Czech Republic has also focused on transferable skills. In the UK, one of the SSCs (e-skills) is as much focused on information and communications technology (ICT) skills generally (which cut across most sectors), as on the skills needs of the ICT sector. In some countries (such as France and South Africa), the term 'sector' is also used to refer to a subset of occupations and skills. This highlights the point made in Chapter 1 that there may be ambiguities about what is meant by the term 'sector' but it is recommended here that a clear distinction should be made between sector/industry and occupation/skill.

Experience from countries such as Portugal suggests that sectoral approaches may be most appropriate where the lack of data precludes the use of more quantitative, model-based methods.

National model-based quantitative forecasts, enterprise surveys and sectoral research may be combined in an ideal system. These approaches can complement each other in a coordinated way providing outcomes to inform policy and training provision.

⁶ 'Anticipation' of skills needs has taken many forms over time. Individual or multiple enterprises, groupings of employers, professionals (such as engineers), sector associations, government ministries and agencies and training providers, have all at one time or another been involved in anticipating changing skills needs in different ways. Formal, top-down planning was a key feature in many socialist planned economies. The focus here is on the use of various methods in open, market-driven economies.

⁷ The term 'sector' is defined in more detail in Section 4.3.



A clear case for a strong sectoral focus comes from the following policy objectives:

- (a) adapting training, by upgrading or elaborating occupation and training standards and curricula, for example, to meet labour market needs in a particular sector or group of sectors;
- (b) defining priority training courses for funding by particular employers.

Options include education and training programmes; funding arrangements (including incentives); priorities for reforming technical and vocational education and training (TVET) ⁽⁸⁾; professional development priorities; training infrastructure development priorities; and the operation of various schemes, including apprenticeships.

Many sectoral approaches have multiple objectives which go well beyond a narrow focus on skills anticipation or skills matching, such as a focus on improving productivity and economic growth at macro level (Australia and the UK). They also include aiding and supporting individual workers and the sectors in which they are employed (South Africa) ⁽⁹⁾.

From a skills needs perspective, a sectoral approach is typically used to address the following research issues:

- (a) types of skills and competencies that jobs may require;
- (b) emerging jobs;
- (c) changing skill profiles of occupations;
- (d) the ability of the training system to meet the needs of industry.

The main advantage of a strong focus on a particular sector is that it can draw on sector-specific knowledge and expertise. Who best to know about what is going on in a sector than those directly involved? The advantages include:

- (a) common language used by the actors involved;
- (b) closer engagement with employers, social partners and other stakeholders than is possible with a national or cross-sectoral level approach;
- (c) the possibility of going deeper into specific issues than is possible in general surveys covering all sectors, including a more detailed breakdown of specific occupations;
- (d) greater potential to focus on qualitative aspects of skills (such as soft skills, competencies) compared to more general methods which may focus just on numbers of jobs or on formal qualifications;
- (e) the possibility of capturing new emerging jobs and changes in job content.

Sectoral approaches designed to anticipate skills needs are not only aimed at research and policy questions. A key aspect of many sectoral approaches is engagement of the social partners: active involvement of both employers and workers (unions) is often the key to ensuring successful change. It can also help to foster social dialogue, engendering a virtuous circle of intervention and innovation. Employer involvement is the key to both understanding how skills needs are changing on the ground and making sure that any recommendations become a practical reality. The involvement of other stakeholders, such as education and training providers, can also be an important advantage in a sectoral approach.

A key advantage of a sectoral approach, therefore, is that it is usually conducted at a level where results can be easily followed up and recommendations implemented. Practicality and a direct link to policy and training provision are other potential strong points. A sectoral approach makes it easier to identify key stakeholders and to bring them together, although this may be more difficult outside the formal economy.



⁸ TVET is an international term used to denote vocational education and training (VET). The two terms are used interchangeably throughout this publication.

⁹ The country references are included in parentheses to guide the reader to the relevant case study for further details.



Sectoral approaches are also potentially less demanding in terms of data requirements, as they are more narrowly focused often placing more emphasis on qualitative rather than quantitative methods. They may still use methodologies that depend on the availability of robust and detailed quantitative data but the fact that sectoral studies can be conducted without a huge amount of prior investment in data is potentially a significant factor when considering their application in transition and developing countries ⁽¹⁰⁾.

Nevertheless, sectoral approaches have their limitations; for some objectives, other approaches may be more appropriate. For example, if the major policy concern is a reform strategy for TVET or the formulation of an active labour market policy (ALMP) at national level, a narrowly-focused sectoral approach will probably not suffice (although sector-specific considerations may add some important insights). If the emphasis is on the number of jobs likely to be in particular occupations in the future, then a more quantitative modelling approach, covering the whole national economy, may be essential.

In the context of national policy strategies it is important to acknowledge that sectoral analyses of skills are necessarily partial. One classic problem of this approach occurs when a series of sectoral studies are performed and later combined to provide a comprehensive national or macro level overview. This generally does not work, for a host of reasons including double counting, lack of consistency in definitions, and inconsistent underlying assumptions. It is important to complement sectoral approaches with methods that can provide a broader perspective. This may require macroeconomic modelling or national enterprise surveys, rather than more narrowly-focused sectoral research.

Institutional aspects are a crucial consideration within sectoral approaches and may provide incentives but also impose constraints on what is possible. Institutional aspects include the general political and social context and the more specific effects of existing institutions involved in education and training. Different countries have long histories of developing the institutional frameworks within which these kinds of questions are addressed. These shape the questions to be asked and determine how they are asked and answered. The cultural, political and economic context in developed, developing and transition countries is a key consideration when thinking about the transfer of these approaches (Chapter 3).

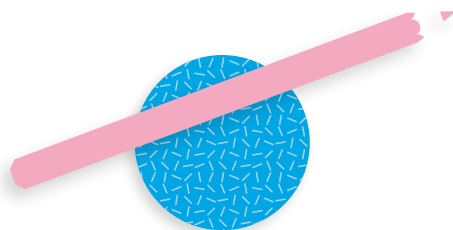
2.2. Methods used within the framework of sectoral approaches

Sectoral approaches use various methodologies to answer the policy questions indicated above. Depending on the institutional framework and the skills anticipation system in a particular country, these methodologies may be developed separately in the respective sector or may be common across sectors, sometimes using results derived from national and economy-wide tools.

In an ideal world, a combination of both qualitative and quantitative methods is needed. Available data and resources influence the method, or more generally the combinations of methods, used in most sectoral analyses of skills. Limitations in statistical infrastructures can help to shape the approaches adopted (Portugal, South Africa). Intended outputs, including the key policy and other questions that the work is aiming to answer, also have an influence.



¹⁰ This depends on the scale and depth of the study or project being undertaken. Some sectoral approaches have been conducted on a grand scale that requires substantial investment, as with the Portuguese approach or the EU sectoral studies. But it is possible to adopt more modest aims, as evidenced by the Georgian case study.



The focus here is on the methods that have been applied most commonly at a sectoral level. Most of the cases considered used a combination of several approaches rather than just a single technique ⁽¹¹⁾. The pros and cons of the various methods are briefly considered but the reader is advised to look at the other volumes in this series or a more detailed assessment. This includes, in particular, Volume 2 for foresight and forecast methods, Volume 5 for establishment surveys and Volume 6 for tracer studies.

Table 1 provides a brief overview of some of the main methodologies in regular use. No single approach provides all the answers. All have their strengths and weaknesses, advantages and disadvantages.

The main tools and techniques used within the framework of a sectoral approach include the collection of primary data and the various ways which these data can be analysed. Primary data collection includes surveys of facts or opinions, usually directed at employers, but also at households and other groups. Depending on general data availability, some sectoral approaches rely on specific employer surveys in a particular sector (Georgia). Others use the results of an economy-wide survey which enables detailed sectoral breakdowns (such as the UK national employer skills survey) ⁽¹²⁾. In the US, an economy-wide survey of employers produces very detailed data on patterns in skills demand (as measured by occupation) for virtually all sectors.

Note that sector-focused data may be collected for purposes other than anticipating changing skills needs. The prime purpose for which most official data are

collected is for public administration and tax collection: household surveys such as labour force surveys; employer surveys to establish the scale of employment and economic activity; PES statistics; education statistics; national accounts; and trade statistics.

In addition to formal surveys, other ways of gathering information include the use of interviews, focus groups, workshops and observatories.

Data can be analysed using a variety of techniques, including:

- (a) desk-based analysis, using secondary data, including sectoral studies and other industry research;
- (b) using the results of formal, quantitative models and forecasts for sectoral purposes - sectoral approaches can also use and exploit results from national and economy-wide models which allow sectoral breakdowns to enrich sectoral analysis (Australia) ⁽¹³⁾;
- (c) other methods of peering into the future, including Delphi-like methods, scenario development and other foresight activities;
- (d) other in-depth case studies, which often use a combination of both qualitative and quantitative methods.

The spectrum ranges from quantitative measurement and analysis through to much more subtle qualitative approaches. In between are methods that include both quantitative and qualitative elements, including the setting up of 'observatories' ⁽¹⁴⁾.

¹¹ For a recent review of different methods, see the various papers presented at the ETF round table event on Foresight and policies and strategies development for TVET: tools and added value in the context of transition and developing countries, which took place on March 8 and 9, 2012 in Turin (Italy): http://www.etf.europa.eu/web.nsf/pages/EV_2012_Round_table_on_Foresight?opendocument

The techniques considered included foresight, horizon scanning, Delphi methods and quantitative modelling. For other reviews, see Allison and Kaye (2005), Bell (2003), Bishop et al. (2007) and the European Commission Joint Research Centre (2010).

¹² The methodology for employer surveys is described in detail in Volume 5.

¹³ See Volume 2.

¹⁴ Observatories typically have a sectoral and often also a geographic focus. They are not methodological tools as such but an important mechanism or institutional arrangement for focusing attention on a particular set of skills and related issues.

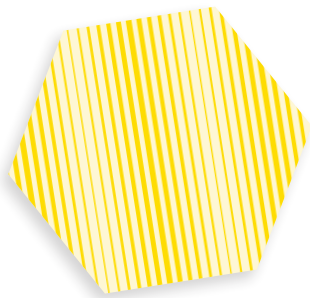


Table 1. Comparison of tools and techniques used in skills anticipation and matching

Approach	Advantages	Disadvantages	Use in sectoral context
Primary data collection ^(a)			
Factual surveys directed at employers (or other groups such as households) containing questions about employment levels, pay, unfilled vacancies, for example	Direct 'user' or 'customer' involvement Focuses on how people behave, not what they say or perceive	Getting responses could be problematic Need large samples to get robust data, therefore may be expensive	Most useful for sectoral approaches if the surveys are economy-wide and allow a breakdown by sector. Then they can provide comparisons across sectors and also reveal which sectors may compete for people with the same qualifications
Surveys of opinion directed at employers (or other groups) containing questions about skill deficiencies and skill gaps, for example	Direct 'user' or 'customer' involvement	May be subjective and inconsistent May focus too much on the marginal and ephemeral The respondents may not necessarily be knowledgeable about future skills needs	Can be both economy-wide as well as sector-specific. The sector-specific surveys can focus on more sector-specific problems or even selected occupations in the sector. However they may lack information on the more general context
Interviews and related techniques	May be able to address problems and concerns more subtly and in greater depth	May be unrepresentative	Very useful for sectoral approach, especially to address 'key players' in the sector (main employers, main vocational institution).
Workshops	Useful mechanism for exchanging views	Can provide a partial view	At the sectoral level the participants, who use a common language and often share common interests, can be brought together relatively easily for workshops
Other informal contacts	Useful mechanism for exchanging views	May be anecdotal and not grounded in reality	Informal contacts and networking are an important background for sectoral platforms where information can be shared
Analysis ^(b)			
General synthesis and critical assessment of available evidence			Necessary for any analyses. Useful for analyses of drivers of change in the sector – new trends in technology, trends in international business and the context in which the sector operates



Approach	Advantages	Disadvantages	Use in sectoral context
Formal, national-level, projections based on a quantitative model Uses econometric techniques or computable general equilibrium (CGE) or similar models ^(a)	Comprehensive Consistent Transparent and explicit Quantitative	Data-hungry Costly Not everything is quantifiable May give false impression of precision	Studies for specific sectors can gain the information from the model if these provide sufficient sectoral breakdown. Information from sectors obtained by other methods can also inform the models
Partial projections based on quantitative models, for example focusing on individual sectors or occupations	Transparent and explicit Quantitative Targeted	Not everything is quantifiable May give false impression of precision Partial analysis may be biased	Sector-specific drivers of change or more appropriate detail of jobs classification may be captured better by these models, but the interference with other sectors is missing
Other foresight methods ^(c)			
Focus groups, round tables, Delphi- style methods	Holistic Direct 'user' or 'customer' involvement	Can be non-systematic Can be inconsistent Can be subjective	Often used at sectoral level, either in a situation where the data do not allow for quantitative modelling or to validate or interpret quantitative forecasts. Useful for identifying drivers, new trends in technologies and processes, emerging occupations or skills in the sector
Scenario development analysis, encompasses many different forms	Holistic Direct 'user' or 'customer' involvement Focuses on uncertainty	Can be non-systematic Can be inconsistent Can be subjective	Very often used at sectoral level as the sector can define a reasonable scope of the scenario. The sector may also determine which people and institutions are relevant to the scenario development process
Case studies of particular sectoral, occupation or regional groups and/or observatories (using both quantitative and qualitative evidence)	Holistic (for the sector) Strong on sectoral and other specifics	Partial Potentially biased Inconsistent across sectors	This group of methods includes use of different methods applied in the context of sectoral objectives. They may be purely sectoral or cross-sectoral, e.g. aimed at one occupation across sectors

^(a) This can include surveys of employers and of households. These are undertaken with many different objectives; skills anticipation is rarely the main focus.

^(b) This can include analysis of general administrative data sets which focus on the economy and the labour market (such as the national accounts or census of population), as well as many purpose-driven data sources (such as the UK national employer skills surveys and the US O*NET database). Elaboration and further analysis on employer surveys can be found in Volume 5.

^(c) Further details on the nature of these, their performance and uses can be found in Volume 2.

Source: Adapted from Wilson et al. (2004, p. 6). This table has been modified to make a clearer distinction between levels of analysis, detailed methods adopted and a focus on particular sectors. It provides a brief summary of the many different methods used under the broad umbrella of sectoral approaches.



Sectoral approaches can also have some disadvantages, including the fact that they can be partial. This needs to be taken into account when considering the weight to be placed on findings from such studies. Whether or not a sectoral approach is most appropriate will depend on several considerations. These are set out more explicitly in the following chapters, especially Chapter 4.

The sector lies at the centre of most approaches to skills anticipation, including the more formal quantitative methods. For example, national, quantitative model-based projections generally cover the need to understand how a changing sectoral structure affects the demand for skills.

Other methods, such as employer surveys or more qualitative methods, also usually have a strong sectoral dimension for the same reasons.

Some model-based work involves sophisticated econometric analysis based, where possible, on available and reliable statistics. However, in many cases, much less complex quantitative methods are used, especially in countries where the data are too weak to support more sophisticated econometric techniques. This can include the use of expert judgement, although this is not confined to countries where the statistical infrastructure is weak ⁽¹⁵⁾. The sectoral studies carried out on behalf of the European Commission (see the EU case study in Annex 9) are a combination of the classic qualitative scenario development approach with a quantitative element that attempts to exploit systematically all available data on the sectors. However, this requires considerable resources if it is to be done well.

Other sectoral approaches place different weights on the different methodologies, listed above and highlighted in Table 1. By focusing on particular case studies, the following chapters draw out the key lessons to be learned about skills anticipation and matching at sectoral level.

A final point that emerges very clearly from the cases considered is that all these sectoral approaches are seen as part of a continuous process and are not just a one-off exercise.

2.3. Good practice, problems and pitfalls

This section draws on a selection of the detailed case studies introduced in Chapter 1 ⁽¹⁶⁾. It begins with examples from Portugal and the UK before highlighting the more general case of the sector-based studies carried out for the whole of the EU ⁽¹⁷⁾. It also covers examples of sector-based studies in several other countries, including developed, transition and developing countries. The main lessons are brought together and summarised in Section 2.4.

Anticipating changing skills needs and focusing on skills mismatches and imbalances is a relatively recent preoccupation at European level. Some countries, such as France, have engaged in indicative economic planning and labour market planning for many years. Most others only started such work in the 1970s, 1980s or later. The focus on sectoral studies generally came later still, with the Portuguese studies starting in the late 1990s. The UK SSCs were only established in 2002 and the EU only began to publish sectoral studies in 2008 (details of each of these can be found in the relevant case study in the annexes).

Most attempts to peer into the future of the labour market have had a strong sectoral element. All the macroeconomic modelling approaches to skills anticipation covered in the reviews in Heijke (1994) included a sectoral dimension. The United States of America (US) provides a classic example (Annex 22).

For most countries, sector is at the heart of systems delivering education and training, especially TVET. Germany is the best example (Annex 12), with its strong links between employers and education and training providers. These help to ensure that output

¹⁵ The latter is a key aspect, as in the approach taken by the US Bureau of Labor Statistics to projecting a changing occupation structure within sectors, despite the fact that the main sectoral projections are based on the use of a quite sophisticated quantitative model.

¹⁶ And as set out in more detail in the Annexes.

¹⁷ As commissioned by the Directorate-General for Employment, Social Affairs and Inclusion.



from the education and training system matches the needs of industry. In other countries, such as the UK, these links have weakened and have had to be reinforced by government intervention. The UK's SSCs can be seen as the latest attempt by the UK government to give employers a stronger voice in such matters (Annex 21). SSCs now cover most parts of the UK economy.

2.3.1. Filling data gaps (Portugal)

In the Portuguese sectoral approach, necessity is the mother of invention. The inability to generate standard quantitative projections was a key factor in stimulating the development of the sectoral approach in Portugal. Lack of relevant data and the absence of a suitable multisectoral macroeconomic model meant that it was not possible to replicate the work being undertaken in other parts of Europe such as Germany, the Netherlands and the UK (see Heijke, 1994, for a review of the situation in the early 1990s). The Portuguese sectoral studies conducted since the 1990s can be seen as an attempt to fill this gap, providing a forward look at skills needs.

The Portuguese approach highlights the importance of:

- (a) gaining a sound understanding of the sector of interest, the key drivers of change, and interlinkages with other parts of the economy;
- (b) developing detailed occupation profiles, which focus on the key skills required and how these are changing;
- (c) elaborating alternative scenarios to illustrate the uncertainties facing the sector and the possible sensitivity of the outcomes to those different situations.

The approach illustrates the possibility of developing useful insights into changes in skills needs in the future without having to invest in national macroeconomic modelling. It also highlights the additional value that

more qualitative approaches can offer that may not emerge from less subtle quantitative models.

Brazil has developed similar systems, possibly influenced by the Portuguese model. These include developing foresight methods that are less dependent on quantitative data, such as scenario development techniques and setting up observatories. However, as data systems have improved in recent years, the Brazilian approach has also involved quantitative methods.

2.3.2. A comprehensive sector methodology (EU)

Within the EU, the sector-based studies developed by the Directorate-General for Employment, Social Affairs and Inclusion (DG-EMPL) and the related European foresight methodology drew heavily on the experience of the Portuguese work, adopting many similar methodological features.

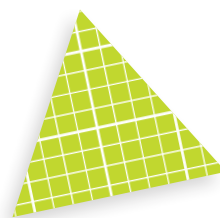
EU studies conducted from around 2008, provide a detailed and in-depth analysis of the situation facing a number of key sectors in Europe. In many respects, these studies can be characterised as best practice, incorporating most, if not all, the elements expected in a sectoral approach ⁽¹⁸⁾.

These illustrate the benefits of a holistic approach and of engaging with a large number of stakeholders. However, they have their shortcomings:

- (a) they cost hundreds of thousands of euros and may be difficult to replicate in less prosperous circumstances;
- (b) they are vulnerable to changing events. The change of circumstances following the global financial crisis of 2008 has led to a perception that the world has changed and that the studies are no longer relevant. However, given that the idea was to explore a range of situations, much of the analysis remains relevant and useful, even if some might perceive it as outdated.



¹⁸ What constitutes best practice is a moot point. Chapter 4 attempts to summarise some of the key features that might be expected to be included. This present chapter summarises the various tools and techniques that might be used.



The EU studies were part of a larger programme of research that was commissioned to support the Europe 2020 strategy. This included a detailed set of projections of quantitative skills demand and supply. Produced under the auspices of Cedefop, the work had a strong sectoral component and involved the use of a multisectoral macroeconomic model similar to that used in the UK for the Working futures projections ⁽¹⁹⁾.

2.3.3. Centrally developed resources for sector purposes (UK)

The motivation for, and evolution of SSCs in the UK differed from the Portuguese case. By the turn of the millennium, the country already had a well-established, quantitative, model-based system for projecting the future labour market (Wilson, 2001). This evolved into the well-established Working futures series of detailed labour market projections, now in its fifth series. The government of the day argued that this kind of analysis was just one of a number of pillars needed to assess and inform the labour market; other key elements included the establishment of new institutions to provide a strong sectoral focus. These included the Sector Skills Development Agency and the SSCs. The government also established what grew into the national employer skills survey. This survey covers all sectors and provides detailed sectoral information on skills deficiencies and gaps. The UK government has also funded a series of projects to assess the rates of return to various education and training investments.

The Sector Skills Development Agency evolved into the UK Commission for Employment and Skills (UKCES). This retains responsibility for licensing and oversight of the work of the SSCs. The SSCs are charged with looking after the skills needs of the sectors they cover. This includes a budget for research, some of which is carried out in-house, some of which is subcontracted.

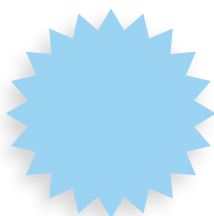
UKCES also provides all SSCs with various 'LMI resources' which are developed centrally. These resources include the Working futures projections (which contain considerable sectoral detail) and national employer skills survey information on detailed skills deficiencies in their sectors.

The sectoral focus provided by the SSCs in the UK has helped to redress the balance in skill policy towards the needs of employers. Although SSCs in the UK remain independent bodies, they have to operate within fairly narrowly defined limits set by the licensing body (UKCES). This includes somewhat detailed and prescriptive instructions on how to carry out labour market assessments for their sectors. UKCES has established procedures to monitor and appraise the research undertaken and to interpret the evidence assembled by the SSCs in support of their sector skills agreements and more general skills assessments.

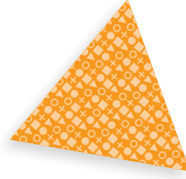
SSCs and similar bodies have been set up in a number of other countries including Argentina, Australia, Bangladesh, Canada, Denmark and South Africa. They usually have a tripartite form, with representatives of employers, workers (the social partners) and the State. Ideally, as in the UK, they form part of a broader system design to coordinate activities across sectors. In Canada, for example, this coordinating role is performed by Human Resources and Skills Development Canada (HRSDC).

2.3.4. Sectoral studies in a transition country (Czech Republic)

The experience of the Czech Republic highlights the transition from a centrally planned economy to a market economy. The Czech Republic has benefited from substantial support from the European Commission which has helped to fund its research



¹⁹ See Cedefop (2012) for details of the pan-European quantitative projections.



work; it has also enjoyed the general economic benefits of becoming a member of a much large trading block. These factors have eased the process of transition in a manner not possible for countries such as Georgia, which have not had the benefit of EU membership.

The Czech approach illustrates that, given sufficient resources, it is possible rapidly to develop a comprehensive system for anticipating changing skills needs and assessing skills imbalances and mismatches. It also illustrates the problems of maintaining this and linking it into the institutional infrastructure in more difficult financial circumstances. Much of the funding for the work summarised in the case study has been dependent on external finances from the European Commission or the EU.

The Czech experience provides many detailed lessons about the need for prioritisation, cooperation and coordination. Practical lessons that can be drawn from the Czech case study include:

- (a) the importance of considering the broader context: what else is going on that can help inform the study?
- (b) the problems of maintaining momentum unless this work is linked in to the relevant institutional infrastructure;
- (c) considerations in selecting sectors for analysis (promising or declining sectors);
- (d) detailed examples of survey instruments and questions to be posed;
- (e) key elements that add value, such as a SWOT analysis;
- (f) the importance of robust supply analysis, in this case based on an existing econometric model;

- (g) the value of other qualitative research and techniques in building up a general and in-depth picture, such as focus groups and interview methods;
- (h) the potential to exploit the huge investment in measuring generic skills made in the US by linking national occupational classifications to the US system;
- (i) the importance of developing a synthesis;
- (j) the importance of trying to ensure that these elements complement each other in a coordinated way and that all these outputs are analysed comprehensively to inform policy and training provision, but also the difficulties of achieving this.

Many other countries initiated a sectoral approach to skills anticipation following their transition to a market economy: Romania and Estonia are two examples. These could be added to the list of case studies for consideration to illustrate the experience for transition countries but resource and time constraints precluded such possibilities. This document should be seen as a work in progress, not a one-off exercise, with more cases being added as time goes by.

2.3.5. Quantitative modelling for sector-specific analyses (Australia)

Anticipating changing skills needs has been part of the Australian skills landscape for many years. As in the UK, this started with work at macro level. In recent years, the political emphasis has switched towards greater focus on sectors (or industries).

This is reflected in the development of ISCs in Australia, which take on a broader role than SSCs in the UK. Their remit covers sectoral productivity and the general quality of jobs and future working lives of all





Australians. They also have considerable discretion in how they execute their mission.

Though the Australian economy is still benefiting from the boom in demand for commodities, the primary concerns of many ISCs are the acute skills shortages in key areas.

The macro modelling work in Australia is different from that in the UK. The emphasis in Australia is on computable general equilibrium (CGE) methods rather than econometrics, but the final outcomes are similar ⁽²⁰⁾. A well-established team based at Monash University in Melbourne provides much of the analysis. It sells its results commercially to interested parties, including some ISCs.

The Australian case provides an illustration of the possibilities for combining quantitative, multisectoral, macroeconomic analysis with more qualitative approaches in sectoral analyses of skills.

Structural changes to the systems for anticipating sectoral skill changes in Australia have been developed in recent years. The current system places emphasis on mixed methods, drawing on the range of national-level data resources and models, including the work at Monash and other institutions.

2.3.6. Sectoral approaches for an emerging economy (South Africa)

The South African experience highlights the problems of dealing with these issues in the context of an emerging economy. These include concerns about performance management and governance.

The sector education and training authorities (SETAs) are the South African equivalent of the UK SSCs and the Australian ISCs. They are charged with the distribution of resources for training activity as well as research. This can pose problems of conflicts of interest and raise concerns about financial propriety.

The establishment of SETAs, and their subsequent reform, can be seen as part of the general process of economic and political development. Getting this right is a complex process, with many competing and often vested interests. The example of SETAs also illustrates that work on skills anticipation and matching may be only a small part of the remit of such bodies.

However, the experience of the SETAs shows that much can be done on anticipating and matching skills at sectoral level with only limited resources while highlighting the difficulties of operating with inadequately robust and independent data.

The assessment in the case study also suggests that there is often a need for more critical evaluation of some of the evidence collected in support of certain arguments and positions.

Lessons can be learned from the UK experience of evaluating and licensing SSCs to ensure fitness for purpose and appropriate use of public funding.

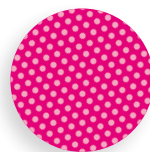
2.3.7. Sectoral studies on a limited budget (Georgia)

Annex 11 details pilot studies carried out for Georgia and sponsored by international donors; clearly illustrating that a sectoral approach can be a much more modest affair. It shows that it is possible to produce something useful within a short time frame and on a much more limited budget.

The key risk is that such studies can be just a one-off exercise with no lasting benefits. To be truly effective, a longer-term commitment and complementary investment in institutional development are needed. This is illustrated in some of the other cases explored above.



²⁰ CGE models place greater emphasis on theoretical considerations and less on statistical estimation of parameters than econometric techniques.



The examples considered in the Georgian case study are based on:

- (a) employer surveys, some of which have targeted specific sectors or subsectors (pharmaceuticals, construction, tourism, food processing) and sought to identify perceived demand (job openings and replacement, skills);
- (b) a more qualitative study of four sectors in 2012, which used statistical data and questionnaires addressing qualitative aspects, e.g. the relevance of skills, types of training.

Within the limited framework of the particular studies carried out in Georgia, a number of specific lessons can be learned:

- (a) technical lessons including requirements for greater transparency on statistical reliability, links to sampling frames and sample sizes, more information on the sources used and a critical assessment of the reliability of the evidence presented;
- (b) resource issues: including the involvement of international organizations (Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, as such exercises may not be affordable for transition and developing countries without external support.

2.3.8. Using employer surveys (Italy)

The Italian case illustrates the potential value of using employer surveys as part of a sectoral approach to try to assess short-term prospects for skills demands. No regular quantitative forecasts of the Italian labour market had been conducted until recently but several modellers are now beginning to develop CGE-based models that can be used for this purpose ⁽²¹⁾. Those charged with assessing the labour market have used a more sector-focused approach, based around the use of detailed employer surveys. As well as asking questions about the current situation, these surveys

also explore employers' views about the number of vacancies they expect to have in the future.

This approach has yet to be validated. Previous experience in other countries, such as the UK, asking employers direct questions about expected skills demands in the future, have had mixed results. Such approaches have been largely abandoned (for a discussion of this issue see Wilson et al., 2004). The Bureau of Labor Statistics (BLS) in the US does not carry out such surveys, although some individual States do so. Problems with such surveys include inconsistent and conflicting assumptions, double counting and difficulties in getting employers to respond with detailed results. Further assessment of the strengths and limitations of various types of employer survey can be found in Volume 5.

2.3.9. The long-term view (the US)

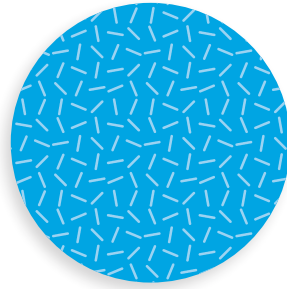
The US, primarily under the auspices of the BLS, has been engaged in regular labour market assessment and skills forecasting longer than any other country. Although it cannot be characterised as a sectoral approach, the methodology used by the BLS places the sector at the heart of its work. It employs sector experts to examine changing skills demands in particular sectors. This analysis is then combined with outputs from a detailed multisectoral macroeconomic model to develop quantitative projections of occupational employment. Implications for skills in the broader sense, including qualifications, generic skills and competencies, are then explored using the O*NET system. This provides one of the most detailed overviews of how skills demands are changing in the world ⁽²²⁾.

The aim is not to plan education and training from the top down, but to provide detailed labour information that can be used for making informed decisions by all the various actors, including individuals and employers.



²¹ See, for example, the work of Ciccarone and Tancioni (2012) and Deqiraj and Tancioni (2013).

²² The occupational information network (O*NET) is a free online database containing hundreds of occupation definitions to help students, job seekers, businesses and workforce development professionals to understand the world of work in the US. For further details see Annex 22.



Other countries have copied various aspects of the US system. The O*NET database has also been used directly in other countries, benefiting from the huge investment made by the US (see the Czech Republic case study). The US has consistently invested in O*NET over a period of 40 years, building on previous work and providing regular occupation projections since the 1950s. Other parts of the world have now realised that the development of such systems, models and databases is a long-term process and they are following a similar path. In the EU, for example, there is a big push to develop the European skills/competencies, qualifications and occupations (ESCO) framework ⁽²³⁾.

2.3.10. Importance of the institutional infrastructure and history (Germany)

The German experience, while not strictly an example of a sectoral approach (as narrowly defined above), has many lessons for those trying to go down such a route. In common with some other countries, Germany has a long history of involving and engaging employers directly in education and training. It does this mainly through its 'dual system', which focuses on vocational training and apprenticeships. This is reflected in its institutional infrastructure at both national and regional level. Employers and workers play an active role in these processes, supported by activities funded by both national and regional government (*Bundesländer*). Much of this is organised around sectors. In the German case, the link between industry or sector, occupation and qualification is much stronger and more direct than in many other countries. The German case study highlights the large number of government and other institutions involved and the complexity of the system that has been developed. This includes *Berufenet*, which is the German equivalent of O*NET (Annex 12).

All this has taken many decades to evolve and is not something that can be easily replicated by transplanting particular elements into other environments. Countries such as the UK have lower employer involvement and they have tried to achieve the same outcome by developing new bodies such as the SSCs. These give employers a stronger voice, but the concept has met with mixed success. SSCs such as Semta, which deals with the engineering, science and manufacturing sector and has long-standing relationships with employers ⁽²⁴⁾ have been able to achieve their aims. In other cases, newly-established SSCs have failed to achieve this kind of engagement and have had their licences revoked. The UK is still trying to develop a system that can achieve the same kind of engagement and involvement that many years of gradual evolution have created in Germany.

Other countries also have a strong history of sectoral involvement in skills development. The Netherlands is frequently mentioned in the discussion in Chapter 4, both in general terms and with regard to the *Kenniscentra* (knowledge centres). The Netherlands also has a strong track record in linking such issues with different approaches to skills anticipation and matching. It has a well-developed model, with very strong sectoral structures that have considerably more responsibility than the SSCs in the UK.

2.4. General overview and lessons to be learned

The discussion above has highlighted the importance of several issues:

- (a) the objectives and purposes of the sectoral study or approach – there may be a number of aims to consider or the stakeholders may have conflicting objectives;



²³ For details, see <http://ec.europa.eu/social/main.jsp?catId=1042&langId=en>

²⁴ Semta evolved from the old Engineering Industry Training Board, which was established in the 1960s.



- (b) context and constraints – including the general economic and political context, the institutional context on the assessment of skills need and the delivery of education and training (including key participants and stakeholders), the current statistical infrastructure, and resource requirements and limitations;
- (c) technical aspects – such as the balance between quantitative and qualitative methods, and the choices between various tools and techniques.

The appropriateness of a sector-based approach and the form this should take:

- (a) the overall aims and objectives, including the detailed requirements of the target audience and the key questions to be addressed;
- (b) the constraints that may typically be faced (political, financial and technical);
- (c) other contextual factors, including opportunities for exploiting support from stakeholders to promote action at sectoral level.

The most suitable tools and techniques for answering particular questions will also depend on the various constraints faced by the policy-makers and analysts.

One of the main conclusions for developing and transition countries is that some form of systematic effort to assess and anticipate changing skills needs is essential. A sectoral approach offers a way to do this that does not necessarily require huge prior investment. Developing and transition countries should therefore be encouraged to upscale their efforts over time and learn from other countries' experiences with sectoral approaches.

Although complex systems such as O*NET (the US), *Berufenet* (Germany) and the new ESCO framework are not achievable in the short to medium term for many countries, they provide examples of something to aspire to. The experience of some countries provides lessons about how to begin to develop appropriate institutional infrastructure and to avoid certain problems (South Africa). Others suggest more modest steps that can be taken to collect relevant data and bring interested stakeholders together, but also the pitfalls that need to be avoided (Georgia).

Systems such as O*NET can be used as a reference to benchmark the results of an individual country's own findings. They can also be exploited directly to build on the huge investments already made by countries such as the US in defining and measuring skills (Czech Republic). While not all of this is transferable to other countries, many skills patterns within jobs are now international.

The other examples of experiences from developing countries that are considered in more detail in Chapter 3 are all at an early stage. There are only a few real lessons to emerge from these experiences and they are as much about problems and pitfalls as best practice.





Chapter 3.

Institutional context – role of sectoral bodies

This chapter describes in more detail the institutional structures and approaches conducive to skills anticipation and matching at sectoral level. It considers a broad range of cases from both developed and developing countries.

3.1. Introduction

This chapter reviews the institutional contexts most conducive to sectoral approaches to skills anticipation, matching and development. It includes assessment of the factors which make different systems capable of identifying and responding to labour market needs consistent with national strategies and policies. It complements the previous chapters by focusing on the institutional aspects. It provides a review of previous research and publicly available documentation and contributes to the broader evidence base on good practice in skills anticipation, skills development and employability in institutional systems. This first section provides a definition of sectoral bodies and discusses some aspects of the rationale for the establishment of such bodies.

The countries in this study have established many different institutions to promote skills development ⁽²⁵⁾. Sectoral bodies are often the central institutions in the systems responsible for coordinating the assessment of skills needs and the delivery of such skills. However, many other bodies are also important, including those responsible for providing education and training more generally.

The discussion in this chapter is supported by a number of additional case studies, with examples from both developed and developing countries. They provide some insight into the range of issues that need to be considered when setting up sectoral approaches.

Countries have adopted sectoral approaches to skills development under various names, forms and institutions. Sectoral approaches are generally implemented to promote skills development in the sector, increase industry participation in training and encourage private funding for training.

A central element of many sectoral approaches to skills anticipation and matching is the establishment of sector-level training bodies (sectoral bodies) for the coordination of skills development efforts among stakeholders ⁽²⁶⁾.

Box 2. Definition of sectoral skills bodies

Sectoral skills bodies are defined as sector-based organisations whose overall objectives are to ensure that training in their sector meets the needs of employers and government and to promote skills development in their sector.

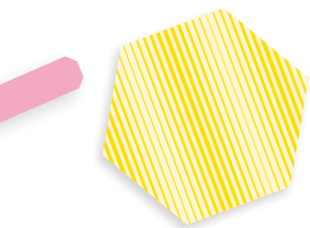
The term sectoral body as defined here may cover ISCs or SSCs (as in Australia, Bangladesh, Canada, India and the UK) and their equivalents in other countries (such as knowledge centres in the Netherlands national training services in Brazil, skills observatories in France, national trade committees in Denmark ⁽²⁷⁾, SETAs in South Africa and industry training organisations in New Zealand). Skills anticipation is not necessarily the only or main reason why sector skills bodies may be established. It is important not to overstate the role that sectoral bodies play in national LMI systems in general and skills anticipation systems in particular.



²⁵ The term 'skills development' has a broader meaning than just skills anticipation and matching. In this chapter, it is primarily used to refer to skills developed through vocational education and training. Some sectoral bodies also play a role in general economic development and help to set an 'industry agenda'.

²⁶ Sectoral bodies may be set up with other more general aims, such as promoting the interests of the sector and its economic development. The focus here is on those bodies whose primary focus is on education, training and skills.

²⁷ The English translations refer to the *kenniscentra* (the Netherlands), *serviço nacional de aprendizagem* (Brazil), *observatoires prospectifs des métiers et des qualifications* (France) and *de fagligræ udvalg* (Denmark).



To achieve their objectives, sectoral bodies identify current and future skills needs in their sectors. They work with major stakeholders to develop training measures to address these needs. The particular institutional settings, functions and methods through which sectoral bodies operate may vary. They engage with both demand (employers) and supply sides of the TVET market. They also provide a link between training and the labour market and can play a more general policy advisory role.

In a study prepared for the European Commission on sector councils in the EU, Ecorys (2010b, p. 12) found that sectoral bodies:

- (a) represent one or more specific sectors in the economy;
- (b) provide a platform for at least two types of stakeholder;
- (c) provide analysis of labour market trends in the sector;
- (d) focus on anticipating employment and skills needs within the sector and use this insight to inform the development of sectoral policies;
- (e) work in a structured and continuous way.

Based on this narrower definition, sectoral bodies operate by maintaining effective working relations with key stakeholders on both supply and demand to generate market intelligence. They also research or commission research on labour market trends in their sectors. They discuss the outcomes of this research with the social partners and develop jointly agreed proposals to address skills and training needs.

However, sectoral bodies are not just concerned with research and LMI. In many countries, bodies such as

chambers of commerce or chambers of industry have much more general objectives to support and develop the sectors they represent.

Many sectoral bodies are established, however, to provide a better match between labour market needs and training outcomes. They are needed because the market on its own may produce suboptimal outcomes⁽²⁸⁾: unemployment, skills shortages and gaps, and 'overeducation'. Limited competition between training providers may also contribute⁽²⁹⁾. Another issue is the long lead time involved in training, as current decisions about training ideally need to be based on skills demand in the future rather than now.

Governments all over the world are increasingly focusing on developing effective training systems to meet various challenges. With increasing global competition and rapid technological change, the overall productivity of the workforce needs to be increased to maintain competitiveness and contribute to economic growth. For many developed countries, this means a move towards a high value-added, knowledge-based industry structure, which requires a highly skilled labour force. Many countries have experienced skills mismatches and shortages, limiting the growth potential of their economy. For others, the main problem is finding jobs for the masses to ensure social stability.

Demographic changes, including population ageing in most developed countries and rapid population growth in developing countries, also have implications for skills policy. In the context of the recent economic downturn, governments have become increasingly conscious about how they spend tight budgets most effectively. They also need to be aware of where to invest in training for the highest return.



²⁸ Some market failures are related to information asymmetry about the quality of training provided and the quality of graduates. Others relate to uncertainty about the return on investment and a failure to recognise that education and training are often associated with positive external benefits that go beyond the immediate companies and individuals involved. Supply can also be slow to build up in the case of emerging skills needs, or where student numbers are too low (thin markets).

²⁹ Private TVET providers are normally more flexible in meeting employer demand. Public training providers are government-funded. Consequently, they are more focused on meeting education targets and more likely to have a 'supply focus'. Sung et al. (2006) argue that public providers have an important social role to play in addressing market failures and driving government agendas. This can generate overlap as well as dissonance between employer-focused sectoral approaches and provision through public providers. Some empirical evidence suggests that opening up the training market for competition helps to meet demand, as it pushes all providers to offer courses that meet demand if they want to remain viable.



Creating effective systems for training and workforce development is increasingly considered as an integral part of a broader economic development strategy.

Governments devise skills policies to support their overall economic development goals. They also pursue objectives such as equity, social inclusion, and the positive externalities associated with education. These considerations are particularly important in the context of developing countries, where skills policies are part of a poverty reduction strategy.

Skills anticipation and matching can play a key role in ensuring that training delivery meets industry's current and future needs: sectoral bodies can help articulate current and future demand for skills. They can also bring together different stakeholders to find solutions to fill the gap between demand and supply. The collective influence of employers can support a more strategic approach to workforce development within a sector. It can help to increase efficiency and the return on investment from training. Most sectors need both general and specific skills, so graduates from education and training should have the general skills necessary to enable them to operate in a modern economy and to acquire any additional specific skills as required.

To ensure that national skills development is effective, sectoral bodies need to be appropriately aligned with national or regional institutions, especially those concerned with delivering education and training.

While different sectoral approaches can address similar issues and share the same overall objectives, they differ in certain ways. This reflects the economic, social and political context in which they operate and the different characteristics of the training market. The following sections deal in turn with:

- (a) promoting engagement with training;
- (b) developing an industry agenda;
- (c) funding training provision;

- (d) funding sectoral bodies;
- (e) providing platforms for social dialogue;
- (f) sector coverage;
- (g) facilitating broader economic development goals;
- (h) aligning with the training system;
- (i) providing and using LMI;
- (j) regional skills bodies;
- (k) lessons learned from international good practice.

Together, these headings identify the key functions and features of sectoral bodies, which need to be considered when implementing sectoral approaches to skills anticipation and matching.

3.2. Promoting engagement with training

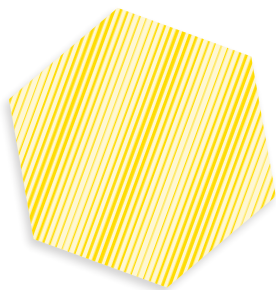
One of the primary roles of sectoral bodies is to encourage businesses in their sectors to increase participation and investment in training. Sectoral approaches can be characterised by the level of employer involvement (Sung et al., 2006):

- (a) industry-consulted: employers are engaged through voluntary consultation, such as industry-led bodies in the UK;
- (b) industry-owned³⁰: industry sets up bodies that define and deliver sectoral skills strategies and programmes, for example SENAI in Brazil, the textile industry in Hong Kong;
- (c) industry-modelled: major employers are used to create a blueprint for training across the sector, for example Singapore;
- (d) industry-driven: where TVET provision is determined by employer demand, for example the Netherlands.

These categories may often overlap.



³⁰ Often supported by central government funding.



The extent to which sectoral bodies are able to engage and represent relevant employers largely determines whether they are seen as legitimately representing the voice of the industry. Employers differ in terms of size, organisational structure and location; the larger the proportion of employers that sectoral bodies can reach across the various types, the more likely they can identify and articulate skills issues in their sectors. Sectoral bodies can, and do, engage with individual companies, but they mostly work with industry associations and chambers.

Sectoral bodies may need to apply different techniques to engage different types of employers, so engagement strategies should reflect the structure of the sector. It is important to engage the key players of the industry, which are normally business associations and larger employers; this can generate momentum and other companies may follow them. In most countries, larger employers invest the most in training their employees and are more likely to have formal workforce development strategies and programmes in place, together with dedicated staff. They often run their own training programmes so some may believe that they are self-sufficient in addressing training needs and may not feel the need to engage with sectoral bodies. Larger companies may also cut across sectors and so may need to deal with more than one sectoral body.

Engaging SMEs can be more difficult. They are less likely to have formal training and workforce development strategies and to engage with the training system. They are more limited in offering career pathways and have resource constraints in terms of funding and taking employees off-the-job for training. Geographic location may make it more difficult for sectoral bodies to reach SMEs in rural and remote areas, for example parts of Australia, Brazil and Canada.

In some cases, compulsory training levies have proven efficient in motivating SMEs to engage with the system, as they benefited from the contributions of larger organisations; France and Quebec are examples. In other countries, such as the UK, the trend has been in the opposite direction. Employers argue against the imposition of levies on the grounds that they impose an unnecessary burden ⁽³¹⁾.

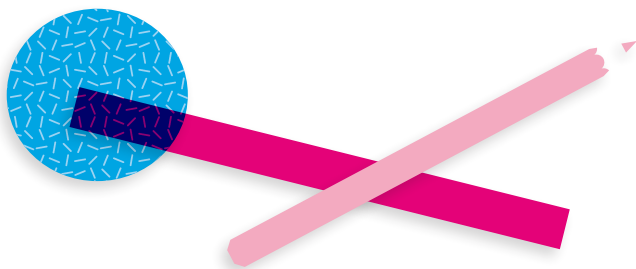
The importance of intermediaries should also be mentioned here. These include cross-sector chambers of commerce and other networks and entities that engage with employers in a particular sector, for example agribusiness retailers and banks in the agriculture sector.

Engagement can be particularly challenging in informal or unorganised ⁽³²⁾ sectors, which consist of many small companies and self-employed people. The share of informal employment is significant in many developing countries: the unorganised sector is estimated to account for over 90% of employment in India (Chenoy, 2011). Engaging with this sector is difficult for several reasons: e.g. the lack of upskilling opportunities and career pathways; the dispersed nature of the enterprises; and the low level of skill in the informal economy. As the informal sector plays a major role in many developing countries, dealing with this sector is a real challenge.



³¹ During the 1960s, the UK had an extensive system of industry training boards, which had the power to raise levies to fund training. These were largely swept away in the 1980s and now only two sectors (engineering and construction) retain such powers.

³² The unorganised sector consists of unincorporated private enterprises owned by individuals or households engaged in the sale and production of goods and services. They operate on a proprietary or partnership basis and have fewer than 10 workers.



Box 3. Engaging SMEs through tax credits in Argentina

In Argentina, as in most countries, SMEs play a dominant role in employment with around three out of four employees working for SMEs (World Bank, 2006, p. 21). Informal sector employment is also significant, accounting for around 60% of employment (World Bank, 2006, p. 1). Employees in the formal sector have better access to on-the-job training opportunities. Public training resources are generally also targeted at this group. During the 1990s, the national government introduced the fiscal credit regime to promote skills training. This provides financial support to SMEs by reimbursing a percentage of their expenditure on human resources training via a tax credit certificate. It supports training projects that link on-the-job training and the procurement of equipment by the participating entities. Special benefits are also available to train people in vulnerable employee groups. Since 2007, 70 000 workers from almost 900 companies have been trained. Two-thirds of these companies were SMEs (Ministry of Labour, Employment and Social Security, Argentina, 2011).

It is important for sector skills bodies to cover a large number and variety of employers so that they can represent the training and skills needs of the whole industry, rather than those of just a few key lobbyists. Employers are more likely to buy into a system that can offer clear advantages and meet their personal and business motivations. Employers value the opportunity to interact with and influence the training system as they frequently claim that it is excessively complex at present.

Sectoral approaches may encompass a range of incentives to promote engagement with training. In addition to providing funding for training (see below for more detail), sectoral bodies can work with employers to define competency frameworks which can be used to create industry skills profiles and qualification pathways. Employer-led competency frameworks and accreditation to industry standards may reduce information asymmetries on training quality and future employability for trainees. The completion of such training may signal employee capabilities to employers. National qualifications systems and qualification profiles may help to reduce the uncertainties associated with return on investment for employees, as these support employment with various employers across the industry. At the same time, employers can assess a larger pool of appropriately skilled employees.

Sectoral bodies may partly fund other sectoral activities, such as studies. Government subsidies for trainees' wages (as in the UK's Train to gain programme), the provision of matched funding (where the government shares the cost of training with the organisations in receipt of the training) and compensation (refund of trainees' wages) may also be used to increase engagement with the training system. Sectoral bodies may fund the accreditation of previous training for which employees gain nationally recognised qualifications. This can be more relevant in industries where companies already provide non-accredited in-house training. Employee commitment to training and upskilling can be enhanced through recognised prior learning and experience. This in turn can reduce staff attrition (Sung et al., 2006).

Sectoral bodies can also engage employers by providing best practices for training and workforce development. In Singapore, larger employers have been used in a number of sectors to provide a model for best practices in on-the-job training. These 'blueprints' were intended to improve the quality of training by learning from the best companies. They also act as a means of certifying skills acquired through the Singapore National Skills Recognition System.





In Bangladesh, five ISCs were established with the assistance of the ILO and the European Commission under the auspices of the TVET reform project ⁽³³⁾. These councils focus on the agri-food processing, transport equipment (such as ship-building), leather and leather products, information technology and tourism sectors. Experience from this project shows the importance of engaging existing industry-led bodies for industry buy-in. Initially, they were suspicious of the role of the ISCs, which cut across traditional issues championed by the existing bodies. Another interesting finding is that the ISCs had to be able to offer value and a return on investment to industry in addition to their work on standards and curriculum (which was the initial focus of sectoral bodies).

The type of incentives used within a sectoral approach may also depend on the importance of market mechanisms in the training market and the broader economy. Market mechanisms have been used to drive the development of sector-based approaches in the UK and the US. Governments have intervened to support employment and skills development by providing seed money to set up sector skills councils and a partnership approach. The expectation was for a successful sectoral approach that resulted in increasing engagement and generated similar solutions in other areas (Sparreboom and Powell, 2009). This has also been the experience in other countries such as Australia and New Zealand.

3.3. Developing an industry agenda

Through engagement with industry, sectoral bodies can provide a vehicle for bringing businesses together within their sectors and creating a shared agenda for the sector's future. The latter is crucial to the success of sectoral approaches. The level of organisation varies

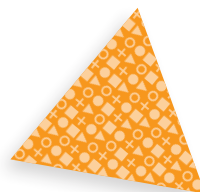
between countries and across sectors. In many countries where the tradition of business federations and social dialogue is strong, the social partners themselves have initiated the creation of sectoral bodies or assumed some of their functions. Germany is one such example and several others are discussed below. This capacity of the sectoral bodies is particularly important in developing countries where industry is not well organised and traditional industry organisations do not exist or are not functional. In these cases, sectoral bodies can provide leadership for businesses in the sector and can generate momentum for broader cooperation.

In Canada, the sectoral approach to skills development has been used since the 1980s, although the history of trade unions, business groups and associations goes back much further (to the late 1800s). The first sector councils were initiated by industry associations and the unions themselves. For example, the Canadian Steel Trade and Employment Congress was established in 1985 as a joint venture between Canada's steel-producing companies and the United Steelworkers Union. Other sectors set up similar institutions, including the Mining Industry Human Resources Council and the Canadian Automotive Repair and Service Council (Cardozo, 2010). Based on these initiatives, the current network of sector councils was initiated by the Canadian government as part of the Sector Council Programme in 1993.

In Argentina, the trade unions and the construction industry business chamber established the UOCRA Foundation. This body provides comprehensive training services to promote training and education and support the employment of construction workers. UOCRA has developed its own network of training institutions.



³³ The TVET reform project, funded by the ILO and the European Commission, assisted in identifying priority sectors in Bangladesh (see Annex 3 for further details).



Box 4. The UOCRA Foundation, Argentina

The UOCRA Foundation (a foundation that provides education and training to construction workers) was established by the Union of Construction Workers of the Argentine Republic (UOCRA) and the Argentine Chamber of Construction (CAC) in 1993. The foundation brings together stakeholders in the sector to promote the development of human resources in a systemic way. Besides UOCRA and the CAC, key stakeholders include the Statistics and Records Institute, the Sectoral Council for Certification of Competencies and Vocational Training, and the government.

The foundation set up the Network of Education-Work Institutions. This network includes 30 vocational training centres in the public education system and two post-secondary institutes. It acts as a coordinator between vocational training and the secondary and primary school system. It also focuses on primary and secondary school completion (ILO/Cinterfor, 2012). Training programmes are based on mutually approved occupation profiles and competency standards and the certification of competencies.

The foundation launched a national skills training scheme for construction workers in 2004 to provide training for secure, skilled employment in the sector. The scheme covers on-site health and safety training and seeks to strengthen the network of training centres. It also set up a fund for research, training and safety in the construction industry. Its remit is to provide training in the area of risk prevention and health and safety at work (for a more recent discussion see Gallart, 2008 and Anderson, 1997). The foundation provides specific training courses on request and provides training assistance for training institutions, enterprises and workers.

3.4. Funding training provision

In a training market, individuals, employers and governments buy training services (directly or indirectly), while training providers offer various training products to meet their demand. The ultimate users of skills are companies. They need to ensure that their employees have the right skills to maintain the competitiveness and profitability of the company. It may be argued that employers need to finance the development of their own skills resources, though there are often concerns that they may underinvest in training. Classical economic arguments (Becker, 1964) suggest that employers will usually only be prepared to cover the costs of training that is of direct benefit to them, and that any more general skills development will need to be paid for by the individual or the State⁽³⁴⁾. Market failures mean that there is often a strong case for government intervention to ensure that levels of investment in skills are optimal.

However, problems regarding displacement and deadweight costs mean that designing suitable interventions is far from straightforward⁽³⁵⁾.

For a general review of training costs and the importance of skills, see the ILO's *Human resources development recommendation, 2004 (No 195)* (ILO, 2004).

Funding is a key mechanism for incentivising businesses to participate more in training. Sectoral bodies can play various roles in collecting or monitoring the provision of financial incentives. They may run subsidised training programmes or provide subsidies for specific training. In many cases, direct administration of such programmes can be problematic due to limited administrative capacity, especially in developing countries.

Sectoral training funds have been established as alternatives in many countries. They are set up by

³⁴ One potential reason for underinvestment in training by employers is that, once trained, employees might leave for better jobs. This is the classic 'poaching' dilemma that applies to anything other than very specific training of benefit only within the organisation that provides it.

³⁵ Deadweight costs arise when the State provides funds for things that would have been done anyway. Displacement costs relate to situations where the positive benefits of State intervention are offset by negative impacts on other activities that would otherwise have taken place.



government or the industries themselves to collect, allocate and administer the funding.

Many governments have set up national training funds to support workforce development. Examples include the Skills Development Fund in Ghana, the National Skill Development Fund in India, the National Workforce Development Fund in Australia, the Lifelong Learning Endowment Fund in Singapore and the Vocational and Tertiary Education Training Fund in Botswana. Other countries have equivalent bodies. Sectoral bodies normally have some responsibility for the allocation and administration of funding from these sources (although this is not the case in India).

In many countries, statutory regulation requires employers to pay a levy, which is then redistributed to fund various training activities. These levies normally contribute to national or sectoral training funds. In the 1970s, the government in Hong Kong introduced legislation that enabled industries to create their own training associations and to impose a statutory levy on employers. Industry training associations were set up as statutory bodies in key economic sectors such as construction and textiles. Funds collected from the levy were used to set up the industry training associations and fund training programmes. The key role of these associations is to deliver on the training aspects of strategies set by the industry. They are basically seen as the 'skills branches' (Sung et al., 2010) of employers' associations in their industries.

During the same period, the UK was moving in the opposite direction. Many of the industry training boards set up in the 1960s were dismantled because of pressure from employers to reduce State interference. This led to a lack of sectoral involvement in skills development by the end of the millennium and, in turn, resulted in the establishment of a new set of bodies, the SSCs. While these fulfil some of the same objectives as the old industry training boards, they generally do not have the power to raise levies to fund training in a sector ⁽³⁶⁾. The question of who should pay

for training (the employer, the individual or the State) remains hotly contested in the UK.

The levy amount is often determined as a percentage of the employer's wage bill. In some countries, such as Brazil and South Africa, it is imposed uniformly on all sectors. In others, the levy is applied in selected sectors only. In Hong Kong, for example, training levies have only been imposed on sectors such as textiles and construction. In Australia, no uniform training levy is applied at national or State level, but training levies exist in specific sectors. The building and construction sector applies a training levy, which is set at different rates across the States.

In addition to collecting funding for training, the levies can also be used to induce specific behavioural change. In Singapore, the government imposed a tax on jobs involving low-paid (and low-skilled) labour as an incentive for employers to move into higher value-added industries and product markets. The proceeds of the tax are collected in the Skills Development Fund, which subsidises the training or upskilling of older workers in different sectors. To complement the fund, the Singapore government has also introduced a unique, endowment-based funding mechanism. While this might be a good idea in Singapore, where more than 80% of the labour force has at least a secondary or tertiary education, it could be potentially dangerous in developing countries where a large proportion of the labour force has only primary education or below.

In other cases, the levy is not imposed by national legislation, but employers are required to make contributions to training to sectoral training funds, normally initiated by business chambers and associations. In Denmark, for example, sectoral training funds are established through voluntary agreements between the social partners to provide funding for the development and testing of new training programmes. They are also used to finance research activities, including research on labour market issues.



³⁶ The exceptions to this rule are the SSCs representing the construction and engineering sectors, which have retained some powers of this kind.



In fact, the Ecorys report (2010a, p.48) states: 'Denmark has more than 1 000 collective labour agreements, several of which contain a clause on sectoral training funds'.

In France, occupation-level 'approved joint collecting organisations' (OPCAs) are responsible for collecting financial contributions from employers ⁽³⁷⁾. OPCAs are mutual funds that are set up and managed by the social partners to collect the statutory training levy at sectoral level. OPCAs collect the levy and identify

priorities on which the training fund will focus. They forecast future skills needs to identify training priorities. Finally, OPCAs distribute the fund to the identified priorities.

Other good examples of how funding can be used to incentivise can be found in the G20 training strategy: knowledge-sharing workshop on skills for employment, held in Turin in 2011 (ILO, 2011d; in particular the examples for Costa Rica, the Netherlands in Session 2a and Bangladesh in Session 2b).

Box 5. The lifelong learning endowment fund, Singapore

The continuing education and training (CET) system in Singapore is supported by two main funding sources. The Skills Development Fund has existed since 1979 and is financed by a skills development levy, which is a statutory contribution paid by all employers for all their employees. The levy was originally set to put a higher burden on less skilled workers, to promote upskilling of employees.

The Singapore government established a unique financing mechanism for CET, the lifelong learning endowment fund, in 2001. This was introduced under the Lifelong Learning Endowment Fund Act 2001, to provide increased funding for the acquisition of skills and expertise; to develop and upgrade skills and expertise; and to enhance the employability of individuals. The fund had initial capital of SGD 500 million and the government makes additional payments into it from time to time. The endowments are progressively set aside and the fund uses the interest earned on these endowments to fund training. An important feature of this fund is that the amount available for funding is not linked directly to the performance of industries or the economy and is therefore a more stable source of funding. The Singapore Workforce Development Agency manages the fund.

The Skills Development Fund has an annual budget of around SGD 80-90 million. The lifelong learning endowment fund is the larger funding stream: its endowments are estimated to amount to SGD 5 billion. Employers can claim back roughly 90% of course fees and cover absenteeism costs from these funding sources.

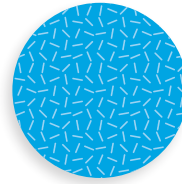
Box 6. Sectoral training funds in the Netherlands

The Netherlands operates around 100 bipartite sectoral funds for training and development. Contributions are determined as a percentage (normally between 0.5% and 1%) of a company's wage bill. They are decided by collective agreement between the social partners in the sector. The size of a particular fund reflects a number of factors including the size of the sector, research and development needs and differences in compensation rights for training companies. This means that the size of the levy is determined by the specific needs of the sector and requires consensus and shared responsibility on the part of the social partners. While there is normally resistance to compulsory, uniform national training levy, employers actually invest more in training when an agreement can be made at sectoral level. These funds serve as solidarity funds for training in the sector, as even companies who do not provide training contribute.

The funds provide compensation for the cost of training and, in some cases such as the construction sector, employers can receive compensation for the worker's non-productive hours of training days. Funding is also available for researching trends and new skills needs, developing regional training centres and school facilities, and providing career guidance in secondary schools. The funds are especially important for SMEs, SMEs that do not normally have dedicated personnel for training and workforce development, and that rely heavily on the support of the training fund.

Source: Renique (2010).

³⁷ This highlights a key problem in making comparisons across countries as the focus on occupation cuts across sectoral boundaries.



3.5. Funding sectoral bodies

A key question in relation to setting up sectoral bodies is their own financing. Their main funding sources include the national or sectoral training funds detailed

above (from levies and employer contributions), the central budget, and donor and project funding. The latter is particularly important in the context of developing countries.

Box 7. Examples of centrally funded sectoral bodies

ISCs in Australia are supported by the Australian government through base and project funding. The amount of funding granted to each ISC varies in line with the number and size of sectors, enterprises, workforce and occupations covered.

Similarly, sector councils in Canada are funded by the federal government through core funding (for recurrent expenditure) and project funding. Funding varies between councils according to the level of activities and the delivery of government policy by the councils.

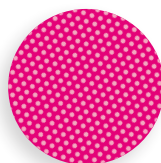
In New Zealand, industry training organisations are funded by the New Zealand government, but they operate largely independently of direct State control. A total of 10% of the tertiary education budget is brokered directly by the industry training organisations; their funding partly reflects the amount of training brokered.

In the UK, SSCs are funded and regulated by government through UKCES. This contrasts with most other countries where similar entities are self-regulated or funded directly by national government departments. For this reason, the UK system is viewed by some as one of the most tightly regulated and State-directed.

A key feature of sectoral skills development in Brazil is the network of industry-led institutions providing training services for the industrial (SENAI), commercial (SENAC), transportation (SENAT) and rural (SENAR) sectors. While these institutions are mainly financed through a compulsory payroll tax, they are managed by industry bodies, creating a strong link between vocational training and labour market needs.

The development of a comprehensive sectoral system can be costly. Sectoral bodies must be established, alongside appropriate administrative, governance, advisory and research capacities to be able to provide high-quality services. Their funding needs are determined by the range of functions and activities they assume. One of the big ticket items is training provision, but the LMI and research capacity of sectoral bodies is also often limited due to budgetary constraints.

A conflict of interest may potentially also arise where sectoral bodies give advice on policies and priorities that affect training organisations. If they are also in the training market, there is a risk they will provide advice that favours their plans in this field; this extends to delivery and assessment or certification services. For these reasons, many developing countries focus on identifying priority sectors of the economy and establish bodies in these sectors only.





Box 8. Establishing sectoral skills bodies in emerging and developing economies

In Botswana, sectoral committees have been established within the Human Resource Development Council (HRDC) for key and strategic sectors in the economy. Their objective is to provide a platform for stakeholders jointly to identify skills needs and develop actions to address them. Key sectors have been identified as ‘driving’ or ‘enabling’ sectors. Current driving sectors include mining and resources, tourism, financial and business services, transport and communications, manufacturing, and commercial agriculture. ‘Enabling’ sectors include health, education and training, ICT, research and innovation, and science and technology (Ministry of Education and Skills Development, Botswana, 2009, p. 25).

In Ghana, the Council for Technical and Vocational Education and Training (COTVET) has an Industrial Training Advisory Committee and five subcommittees that represent various key skills areas. The establishment and capacity building of these institutions is supported by project funding and donor organisations, including the World Bank’s Ghana skills and technology development project.

In Bangladesh, TVET reform supported the identification of priority sectors. Similar bodies, known as sector working committees, were established under the skills development project. Funded by the Asian Development Bank and the Skills Development Council, these committees are active in the construction, light engineering and ready-made garments sectors and in the informal economy. The terms of reference for the sector working committees are the same as for the ISCs. They are expected to become legally constituted ISCs once they are fully operational and membership is reviewed to ensure appropriate sectoral representation.

In India, the board of the National Skill Development Corporation (NSDC) has approved the establishment of 18 SSCs, covering the high-growth sectors that have been identified. A further six SSC proposals are currently under consideration and an additional eight are in the pipeline (Chenoy, 2012). The SSCs operate as autonomous bodies. They are national partnership organisations that bring together stakeholders, including industry, employees and academics. Funding is initially provided by the government, but the SSCs are expected to become self-funded, for-profit organisations over time. This means that their long-term viability largely depends on their capacity to raise money from their other functions.

Concerns have been raised over the fact that the business model for SSCs in India has forced some SSCs to focus more on revenue-raising efforts at the expense of their core mandate of developing industry networks and generating policy advice (for more details, see Comyn and Verick, 2012).

3.6. Platforms for social dialogue

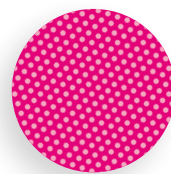
3.6.1. The governance of sectoral skills bodies

A key feature of sectoral bodies is that they operate as platforms for industry stakeholders. By bringing together the social partners, sectoral bodies can help identify issues and develop mutually agreed solutions, covering a broad range of information and ensuring commitment from stakeholders. Sectoral bodies provide platforms for social dialogue by having the

social partners represented on their governing boards. Their activities in organising consultations, forums and conferences also help to promote social dialogue.

Sectoral bodies involve employers to ensure their skills needs are articulated; most also include employee and government representatives on their boards, working committees or subsector committees through voluntary or compulsory arrangements. Employers and employees are often represented on the governing boards through business associations and federations,





professional organisations and trade unions. Most sectoral bodies have bipartite or tripartite structures, depending on national traditions of social consensus. For instance, union involvement is voluntary in Australia, while in Canada it is compulsory in proportion to the unionisation of each sector. In the Netherlands, where consensus between the social partners has traditionally been important, unions have equal representation in the sectoral bodies. In the UK, the SSCs are largely employer-led. The involvement of governments and regulators also varies between sectoral bodies and across countries. For example, their participation is compulsory in the Netherlands and Australia and voluntary in Canada.

Sectoral bodies might also include other partners on their boards, as is the case in the Netherlands where the sectoral approach includes 17 national knowledge centres. These cover the main sectors of the economy such as construction, health care, intermediate engineering professions, administrative professions, logistics, transport and agriculture. The centres are funded by the government and their boards have equal representation from education providers, employers, and unions. Each centre has an advisory committee on qualifications made up equally of education providers and social partners. These committees provide advice to the Ministry of Education on the qualification structure and competency profiles required for the sector. Through these arrangements, the knowledge centres provide the core platform for dialogue between the labour market and education.

In Botswana, sectoral committees are established in key strategic areas of the economy. They provide a platform for stakeholders to cooperate on identifying skills needs and developing actions to address them. Members of the committees represent employers, employees and unions, the government, education and training organisations, experts and community organisations. The HRDC is governed by an expert board comprising 15 to 20 members, including two international experts in tertiary education and human resources planning (Human Resources Development Advisory Council, Botswana, 2010).

3.6.2. Aiding social dialogue

Apart from ensuring stakeholder representation in their governing bodies and subcommittees, sectoral bodies also bring stakeholders together through activities such as forums and consultations. As part of their skills matching function they often bring together businesses and training providers to ensure a better match between training outcomes and labour market needs.

A network of observatories engaged in occupational forecasting is a key element of the French sectoral approach. The observatories are monitoring institutions that bring together stakeholders with the aim of arriving at a 'shared diagnosis' (Guégnard, 2007). They can be organised at national level around sectors, as in the case of forecasting observatories for occupations and qualifications (OPMQs), or at regional level, as in the case of regional employment and training observatories (OREFs).

In Hong Kong, 21 vocational training boards operate under the Vocational Training Council, covering all sectors of the economy. These boards have tripartite governance structures. Their terms of reference explicitly require them to liaise with relevant bodies on the development and promotion of vocational education and training in the industry. Such bodies include employers, employers' associations, trade unions, professional institutions, training and education institutions, and government departments.

The foresight modelling and scenario planning process of the National Department of SENAI in Brazil is managed by an executive group. The group consists of technical experts, academics and business representatives, who are both the producers and users of the information generated. The executive group discusses and analyses the outcomes at the Antenas Temáticas, a workshop-like event, where the group generates recommendations on vocational training and the provision of technical and technological services for the sector.





3.7. Sector coverage

Sectoral bodies cover diverse groupings of economic areas, reflecting the specific social and economic context in their country. The definition of sector is dealt with in detail in Section 4.3. Sectoral bodies are commonly organised in consideration of:

- (a) narrower or broader industry groupings of the real economy - as in Australia (main industry groupings), and New Zealand (narrower groupings); often they do not adopt strict standard industrial classification (SIC) boundaries (as in the early version of the UK SSCs and the Indian SSCs) which can cause problems as official data usually follow these systems of classifying economic activity; groups of occupations and trades, as many occupations are not industry-specific but are transferable between sectors, like the OPMQs in France and the trade committees in Denmark ⁽³⁸⁾;
- (b) a mixture of the two as in the case of the South African sectoral bodies (SETAs) which must cover all employees, hence all occupations within a company in their sector; this effectively means that some sectoral bodies are cross-sectoral;
- (c) a sectoral approach that may be comprehensive across all sectors or focussed on selected sectors only.

There are approximately 120 trade committees in Denmark (Ministry of Education, Denmark, 2008).

There are currently only 11 ISCs in Australia which cover all sectors of the economy. The UK has also been pruning the number of SSCs: they currently number just 19 and their footprints follow SIC boundaries more closely. New Zealand has 38 industry training organisations and the government has explicitly decided not to define the exact number of organisations required, allowing industry to create the number and structure they need ⁽³⁹⁾.

The number of sectoral bodies may need to change over time, as their groupings must be flexible to adjust to changes in the economic, policy and social context. They also need to allow for the emergence of new sectors. They need to be able to change their structures and regroup so that they can continue to represent different skills needs across the real economy. For example, the number of sectoral bodies was dramatically rationalised in the UK, with the current 19 SSCs created to replace over 70 national training organisations. In the Republic of Korea, new sector councils for human resources development were established in the green finance, renewable energy and automotive sectors in response to the government's green growth initiative, which was launched in 2008.

Governments can be selective in applying the sectoral approach to concentrate resources in priority areas (Box 9). The example of Bangladesh demonstrates how priority sectors can be identified in the context of developing countries.



³⁸ This raises questions about whether or not they are, strictly speaking, sectoral bodies.

³⁹ In everyday usage, the words 'sector' and 'industry' are often used interchangeably. 'Sector' is sometimes used to refer to broader categories or groupings of more detailed industry categories, but there is no established and agreed set of definitions.



Box 9. Identifying priority sectors in Bangladesh

The TVET reform project in Bangladesh focused on skills and was funded by the ILO and the European Commission. The project helped to identify priority sectors in Bangladesh (see Annex 3 for more details). Priority subsectors and skill areas were identified in the initial stages of the project using a two-stage methodology (based on Rahman et al., 2012). First, the performance of subsectors was analysed using several criteria: the subsector's share in total value added; the share in total manufacturing employment; and trends in labour productivity, export growth, the growth of the value of assets, skill intensity and the potential for employment for women. A number of subsectors were selected on the basis of these criteria. The growth in productivity was also analysed by calculating total factor productivity. The analysis used a range of secondary data including information from the Bangladesh Bureau of Statistics (for the census of manufacturing industries), the Export Promotion Bureau, Board of Investment, and business chambers. In the case of the subsectors selected through this process, future skills needs were initially identified using a small-scale enterprise survey and then further developed using sector strategic plans.

A number of measures were proposed to support skills development in these sectors: identifying skills demand; matching demand with supply; enabling TVET institutions to offer courses that industry wanted; establishing mechanisms by which industry can provide input into TVET; and strengthening the links between industry and TVET institutions. To support industry engagement, the project assisted the establishment and operation of five industry skills councils in these sectors.

The sectoral approach may also include national or federal umbrella bodies, often referred to as transversal councils. In many large EU Member States, sectoral bodies and an umbrella body operate at national level: common cross-sector issues are discussed and decided within this structure. In many smaller Member States, only one transversal council operates at national level. A number of sectoral working groups are dedicated to particular sectors (Ecorys, 2010b, p. 24). The same approach is implemented in developing countries like Ghana and Botswana.

In Canada, the Alliance of Sector Councils (TASC) is the coordinating body for the national sector councils and similar organisations. TASC supports the work of sector councils by providing leadership and promoting the sector council approach: sharing best practices; supporting collaboration between sector councils and identifying common priorities; mentoring emerging councils; and commissioning research to support a common agenda for sector councils (TASC, n.d.). Similar network arrangements exist in Australia, New Zealand and the UK.

3.8. Broader economic development goals

As skills development is an integral part of the broader economic development agenda, sectoral approaches can also be used to achieve various longer-term objectives. Governments often use sectoral bodies to promote training for skills to support increasing productivity and higher value-added production, including upskilling and lifelong learning. Sectoral bodies can also be established to support priority and emerging sectors. They can identify the skills and competencies required to develop the industry, and organise and promote training in these areas. Governments can use funding as a lever to ensure that their objectives are achieved.

Sector councils in Canada were originally set up by the government with the specific role of aiding structural change in heavy industry by redeploying the workforce. They were supposed to become independent of government funding after three years, partly to ensure real buy-in from employers and to reduce the perception of the councils as an extension of government. However, the government decided to retain sector councils and continued funding them to maintain leverage over training and skills development in the industry.



Experience in Singapore also demonstrates the role that sectoral skill institutions can play in economic development. The government's economic development strategy explicitly identifies which sectors of the economy it would like to grow and it has sponsored the emergence of new industry sectors through the activities of the Economic Development Board. New areas of growth included nanotechnology, optics and phonics, as these were seen as strategically beneficial to the national economy. Such top-down management of the economy is only possible in circumstances where the State has considerable control over a range of economic and labour market matters.

Support to broader economic development goals is particularly important in developing countries where there are limited funding and administrative and coordination capacities available for the launch of sectoral approaches are limited. In such cases, governments need to be selective in identifying the key sectors in which to concentrate workforce development efforts. For example, this approach is implemented in Bangladesh, Botswana, Ghana and India (Box 8).

3.9. Aligning with the training system

To increase the responsiveness of training delivery to industry needs, sectoral bodies bring industry and training providers together and in search of appropriate training outcomes. The relationship between training providers and sectoral bodies can be characterised as collaborative or competitive. Collaboration is more likely in the case of sectoral bodies that have coexisted and evolved together with the training system over time (Sung et al., 2006). Sectoral and education bodies mirror one another in the Netherlands: dedicated

education providers work with knowledge centres in each sector to develop training products based on specific employer needs.

Competition can arise where sectoral bodies have been more recently introduced into the training system by the government. For example, the ISCs in Australia were introduced into a system where training providers had already established their positions. While ISCs were responsible for creation and maintenance of training packages (competency standards), these were not compulsory for training providers. Training providers were also able to offer their own courses accredited to national or State standards.

Industry training advisory bodies (ITABs) existed at national level and were preceded in certain sectors by training councils. They were a feature of the training system in Australia from the 1970s. The increased tension between training providers and ITABs or ISCs in Australia arose when skill standards and 'training packages' were given precedence over curriculum as the key point of control in the training system.

Sectoral bodies can provide training and so compete directly with training providers. This introduces the potential for conflicts of interest if the sectoral bodies also give advice on training policy. Although training provision is not a central activity for most sectoral bodies, they may undertake it to address issues such as the lack of labour market-driven training. This is often the case for emerging skills needs and where there are thin markets.





Box 10. Sectoral body engagement in training provision (Argentina, Brazil, Hong Kong, the Netherlands, Singapore and South Africa)

SENAI in Brazil provides a range of technical education and vocational training products, including apprenticeships, qualification courses, technical courses, undergraduate training and postgraduate training.

The UOCRA Foundation in Argentina (which provides education and training to construction workers) set up its own network of education-work institutions, which includes 30 vocational training centres in the public education system and two post-secondary institutes. The Foundation acts as a coordinator between the vocational training system and the secondary and primary school system. It also focuses on primary and secondary school completion (Box 4).

In the Netherlands, the knowledge centres are also legally permitted to engage directly in training provision.

In Singapore, industry-specific training is delivered by the CET centres, which are public training providers organised around industries. The centres provide an integrated solution for job seeking, training and matching trainees with employers. They are responsible for a range of services from the start of the training process to employment: recruitment, counselling, career guidance, training provision, assessment and post-course monitoring. To ensure industry currency and relevance of programmes and delivery, many centres have established their own industry advisory boards. Some 49 CET centres have been established, covering 23 sectors of the economy, including retail, tourism, hospitality, aerospace, security, finance, digital animation, process engineering, culinary skills, basic literacy, numeracy and service skills. It is questionable whether these are examples of sectoral bodies delivering training or of training agencies adopting a sectoral approach.

In Hong Kong, the skills anticipation, matching and training delivery functions are integrated under the Vocational Training Council (VTC), which is also the largest training provider (see Box 11 for further details about the VTC).

In addition to direct training provision, sectoral bodies may also commission particular training courses to address specific issues on a more or less ad hoc basis. For example, the SETAs in South Africa provide a range of training programmes primarily by contracting private training providers to address the skills needs of the respective sector.

Other examples exist whereby sectoral bodies are directly involved in managing training initiatives. In these initiatives, training providers receive funds to deliver training in a particular sector, as was the case in the productivity places programme in Australia which provided targeted training for the development of skills to meet existing and future industry demands. ISCs were directly involved in the administration of the programme, which provided access to up to 711 000 qualification commencements over five years, from 2007 to 2012. The programme was aimed at existing workers who wanted to gain or upgrade their skills and job seekers wishing to enter the workforce.

The workers' union in the tourism sector in Argentina (UTHGRA) set up its own training programmes via agreements with over 20 vocational training institutes throughout the country. The business federation in the sector (FEGHRA) provides on-the-job training for member companies, mainly SMEs in the hotel and food service industries. Training in the sector is based on mutually approved competency standards.





3.10. Using labour market information

To enable skills anticipation and matching, many sectoral bodies collect, produce and use LMI. The key functions of LMI in sectoral systems are (Bewick, 2011):

- (a) shaping industry advice on current and emerging skills needs and job opportunities to enable governments to develop sectoral and national strategies and to make students aware of the sector;
- (b) supporting the development of demand-led funding routes by measuring employment and skills outcomes;
- (c) developing specific training products to meet labour market demand.

Sectoral bodies apply a range of approaches and use various data sources for skills anticipation ⁽⁴⁰⁾. Most of them use employer surveys and collect qualitative information from employers on current and short-term skills needs through various formal and less formal qualitative methods. A particular strength of sectoral bodies in this respect is that they have continuous direct contact with employers and can collect primary information from them. Quantitative and qualitative methods used for skills anticipation are described in Volume 2, many of which can be applied or used at the sector level.

Many sectoral bodies provide in-depth analysis of their sectors through sectoral studies, combining their own regular qualitative data and publicly available statistics. More sophisticated studies are also undertaken, involving quantitative methods and econometric modelling to provide long-term forecasts for employment by sector, occupation and qualification. While sectoral bodies are well positioned to collect industry-wide information, not all sectoral bodies have the resources to perform regular higher-level modelling and analysis tasks in-house.

Some sectoral bodies use external research to model the broader macroeconomic context and future trends in employment by sector and skill level. This provides a more rigorous approach to assessing industry skills needs and aids validation of qualitative industry information.

Critical to the success of sectoral bodies in fulfilling their LMI role is their capacity to use the data, LMI and modelling information available from other sources, and to extend and inform this with data and information collected through their own efforts.

In many countries, governments provide baseline LMI and forecasts centrally, which can be used for workforce planning in the sectors. The central coordinating bodies might take on the following research and information functions (Sung et al., 2010):

- (a) identifying international trends and areas of national competitive advantage, and aligning national policy priorities accordingly;
- (b) providing information to sector councils on national trends, including the generation of quantitative forecasts;
- (c) ensuring the comparability of cross-sector research, for example by promoting the use of consistent employment categories and methodologies, and identifying common research interests among sectors.

They also need to establish processes and provide coordination and quality assurance to ensure that the LMI generated or collected by sectoral bodies feeds into the broader national and sectoral skills development strategies.

The VTC in Hong Kong provides an example of an integrated, centrally led sectoral approach to skills anticipation and matching (Box 11). In the UK, UKCES plays a similar role, although the SSCs in the UK are fairly independent once they have received their commission.



⁴⁰ See Volume 1 for overview of data sources relevant for skills anticipation.

Box 11. Skills anticipation and matching by the VTC, Hong Kong

The VTC is the largest TVET provider and professional skills development group in Hong Kong. The council is supported in its work by five functional committees, 21 training boards and five general committees.

The Education and Manpower Bureau works with the VTC to provide forecasts for skills demand and supply in sectors that are strategic to the development of the economy. The strategic sectors identified by the Economic Development and Labour Bureau are financial services, trading and logistics, tourism, professional services, creative industries, information technology and information services. The Education and Manpower Bureau provides the macroeconomic framework for identifying broad skills areas over the medium term, using a number of quantitative projections that forecast demand for broad occupational groups in the specified sectors. The forecast is not intended to provide specific details on the numbers or type of occupations but to signal general trends. The vocational training boards provide specific details about the short-term skills needs within each sector. These details are obtained from surveys and studies commissioned to provide further qualitative information on change drivers (Sparreboom and Powell, 2009).

Using data about enrolments and completion trends, the Education and Manpower Bureau identifies the potential supply of skilled graduates and any imbalances between demand and supply by educational attainment across the sectors. The vocational training boards also identify the likely supply of graduates in their industries and develop recommendations to meet imbalances.

Since the VTC is the major provider of skills, it can act on the recommendations by influencing the supply of skills by developing new training products or influencing student choice through promotions and career guidance.

A further approach to skills anticipation is the use of prospective studies, including foresight and scenario planning. These approaches provide plausible alternative futures for stakeholders to encourage

informed and structured discussions. Jointly agreed solutions can then be developed to address potential risks. The prospective studies conducted by SENAI in Brazil are a good example of this (Box 12).

Box 12. Prospective studies by SENAI, Brazil

The National Department of SENAI has developed a framework using foresight modelling and scenario planning. SENAI's first foresight study was prepared in 2004. SENAI's model captures technological and organisational change in the industry and its possible impacts on future training and qualification needs. The foresight model develops sectoral prospects at national level, with modules for technology foresight, organisational foresight, analysis of emerging occupations, analysis of occupation trends and vocational training responses. The process is managed by an executive group comprising technical experts, academics and business representatives, who are both producers and users of the information generated. The results of the various modules feed into the Antenas Temáticas. This is a workshop-like event, where the executive group discusses and analyses the outcomes. It then generates recommendations for SENAI in relation to vocational training and the provision of technical and technological services for the sector in question. The results of the foresight exercise, including the recommendations, are released in various publications on SENAI's website. In addition to providing information for students, researchers and industry, the results feed into continuous monitoring of occupations to support SENAI in developing skills strategies.



Sectoral institutions other than sectoral training bodies can also generate and use LMI. For example, some training funds identify current and emerging skills needs. In France, sectoral collection agencies, the OPCAs, distribute funds based on identified priority skills needs. Another key feature of the French sectoral approach is the use of contracts for forecasting studies known as CEPs. CEPs use government funding to incentivise companies and occupation groups to engage in research to identify their medium-term skills needs and to implement measures to meet them. The contracts also require action and commitment to develop employment and skills. CEPs are based on an agreement between the government and the occupation and trade union organisations. CEPs may be organised around sectors or regions.

3.11. Regional skills bodies

Sectoral approaches are generally implemented as part of the national workforce development system. However, the national system may also subsume other, typically regional, approaches. In this case, the sectoral approach can coexist with the regional approach and sectoral bodies operate alongside regional skills bodies. The sectoral approach can also be implemented at regional level.

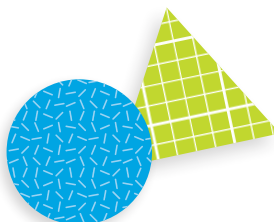
Several factors are conducive to the establishment of regional skills institutions: the size of the country; the level of organisation of the industry; the tradition of social dialogue; the strength of the regions; and the tiers of government. They are more likely to be established in large countries with strong traditions for

industry associations and social dialogue. They are also more likely in countries where the government operates across two tiers, including the central or federal level and the State or regional level (or their equivalents). To ensure that local skills issues are appropriately represented, States or regions often create their own sets of skills bodies. Many countries, including Argentina, Australia, Brazil, Canada, Denmark, France and the UK, have developed parallel sectoral and regional approaches ⁽⁴¹⁾.

In Australia, 11 ISCs operate at the Commonwealth (national) level, while most States have their own parallel sectoral skills institutions. New South Wales has 10 industry training advisory boards; South Australia has 9 industry skills bodies; Queensland has 14 industry skills bodies; and Western Australia has 10 training councils.

In Brazil, the encouraging results of the sectoral technical committees in the State of Rio de Janeiro led to their expansion throughout the country. Regional activity helped to drive development of the national system, which works as a network of regional bodies (Box 13).

Conflict may arise between State-level bodies, which represent the issues of local industries, and federal bodies, which respond to the priorities of the federal government. In some two-tier countries, States manage and have jurisdiction over the TVET system. The influence of federal level sectoral bodies may remain limited as they lack leverage and effective coordination and communication between the two levels is essential to avoid uncoordinated duplication.



⁴¹ Note that definitions of local and regional vary enormously depending on the size of the countries involved. What some countries regard as federal, State or regional level may involve areas bigger than many small countries.



Box 13. SENAI's sectoral technical committees in Rio de Janeiro, Brazil

SENAI is the Brazilian network of regional industry federation training services. Founded in 1942 to support Brazil's industrial development, its mission is to promote vocational training and technical education, stimulate innovation in industrial technologies and increase the competitiveness of Brazilian industry. The regional SENAI departments have autonomy over their research activities and they cooperate on research on an ad hoc basis. The networking character of the organisation promotes the transfer of successful regional activities to other regions. Sectoral technical committees were set up around the year 2000. Their remit was to help identify training needs and draw up profiles for the training provided to meet this demand. These committees began to operate in the State of Rio de Janeiro but positive results led to their expansion throughout the country. Committee members are business experts, representatives of employers' associations and unions, academics and members of public institutions in education and labour. They share information and knowledge that is used to produce competency profiles, which in turn feed into training programme design. The result is a type of training that is in sync with market trends and regulated by demand.

3.12. Lessons learned from international good practice

Many governments have used international good practice to inform the development of their own sectoral approaches, often as part of a broader reform of the TVET system. The process can include:

- (a) conducting a comprehensive and critical review of sectoral approaches across countries;
- (b) inviting foreign experts to advise on good practice;
- (c) building cooperation with sectoral institutions from other countries or international agencies;
- (d) adapting the findings to local conditions.

The design of the new sector-based approach to CET in Singapore was informed by the sectoral models of other developed countries, primarily the UK and Australia, which were then adapted to the Singaporean context. The Indian government launched a major reform of the skills training system under the national skill development mission: the new national skill development policy was approved in 2009 and is based on a sectoral approach to skills anticipation and matching. Informed by international good practice, it

addresses reform in a systematic, comprehensive and sustainable way. However, the national skill development policy does not explicitly address issues of sustainability.

Multilateral and bilateral international organisations can be helpful in influencing the adoption of sectoral approaches through technical assistance and technical cooperation programmes. Such programmes are supported by the ILO, the Organisation for Economic Cooperation and Development (OECD), Cedefop and ETF. Guides like this document can also be useful. The examples of sectoral approaches discussed in this chapter demonstrate a number of features that successful sectoral approaches share ⁽⁴²⁾:

- (a) enable employers to play a key role in identifying skill requirements and defining the competencies and qualifications required in their sectors;
- (b) involve workers in determining skills needs: the involvement of unions, professional organisations or employee representatives ensures that they gain transferable skills and recognition for their wider skills;
- (c) maximise use of a range of financial incentives;

⁴² These conclusions draw heavily on Sung et al., 2006.



- (d) use government funding to ensure that sectoral bodies take into account longer-term social objectives such as restructuring (moving employees to higher value-added jobs), improving growth prospects or meeting equity objectives;
- (e) involve some of the funding for public training provision being directed through employer-led sectoral bodies; the flow of public money through the system can generate positive synergy between the various elements of the system;
- (f) acknowledge and manage the tensions between tiers of government and States or regions;
- (g) involve a combination of qualitative and quantitative methods, which reflect the data available.

3.13. Implications for government

These features have a number of practical implications for governments in their sectoral approaches ⁽⁴³⁾.

- (a) Ideally the system needs to be led by industry and the various institutions and stakeholders need to be encouraged to work towards the same objectives.
- (b) The sectoral approach does not need to cover all sectors of the economy; it can focus on selected priority sectors. Different sectoral approaches can be applied in different sectors.
- (c) Sectoral bodies need to be organised along the real divisions of the economy so they meaningfully represent differences between sectors. They need to help develop a common agenda within the sector.
- (d) Sectoral bodies need to have clearly defined functions, including priorities for training delivery and sector development objectives.
- (e) The research and LMI functions of sectoral bodies and any related central coordinating bodies need to complement each other, even in work on skills anticipation.
- (f) The performance of sectoral bodies needs to be monitored to ensure accountability and provide feedback on efficiency.

- (g) The State has an important role to play in providing basic statistical information as a public good. This includes both general economic data and LMI.

Sectoral bodies also need to have the institutional capability not only to produce research and LMI, but also to use the results and transform them into practical policies, programmes and measures at different levels. The capacity-building challenge for government and its partners should not be underestimated.

Governments should also ensure that sectoral bodies are broadly representative, with the membership and involvement of all those employers and subsectors from the sector. It is equally important that sectoral bodies engage in skills anticipation and matching by jointly identifying issues with relevant stakeholders. These shared diagnoses can then be used to develop jointly agreed solutions to address the challenges. For this reason, the capacity of sectoral bodies to engage with industry and provide a platform for stakeholders is central to their success.

Governments need to show clear support and commitment to implementing and continuing support for the sectoral approach. In the case of less well-organised industries, they also need to lead the development of a joint vision for the sector's future. If a country does not have sectoral bodies with such capabilities, the government may have to become involved itself in the sector-based or sector-focused anticipation of skills needs until such bodies mature.

Industry-led bodies can make it difficult to align sectoral strategies with the government's more general development strategy. Industry must play a proactive role, but the overall lead should remain in State hands.

Some of the problems and pitfalls in setting up institutional frameworks have been highlighted. These include avoiding an approach that is too fragmented (with each sector doing its own thing) and not getting bogged down in the confusing technical complexities of some approaches. Such issues suggest the need to try to ensure consistency across the board and to make systems understandable to all users.

⁴³ These conclusions draw heavily on Sung et al., 2010.



Chapter 4.

Practical considerations in sectoral skills analysis

This chapter sets out some practical steps and considerations relevant to skills anticipation and matching at sectoral level that will be referred to jointly as a sectoral skills analysis in the remainder of the document.

In broad terms, sectoral skills analysis seeks to establish:

- (a) the key objectives and the key questions to be asked;
- (b) the context and the main constraints to be considered;
- (c) the technique to be used, bearing in mind also the balance between quantitative and qualitative methods and the nature of data to be collected and used.

4.1. Aims and objectives

It is clear from the various case studies that anticipation and matching of skills at sectoral level can have multiple objectives. This is often complicated by the presence of multiple stakeholders, who may have conflicting aims. It is important to clarify initially what the exercise is trying to achieve.

Some sectoral skills analyses have very narrowly defined objectives around meeting the sector's demands for skills (Georgia). Others are much more broadly defined and may include general economic performance. The broadest examples considered include very general aims about performance at a range of different levels, including the sector, the economy and the individual participants in it (Australia, South Africa and the UK). This may involve developing a grand 'vision' for the sector which can be used to help determine its future course rather than simply responding to external forces.

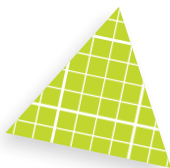
It is a good idea to start by setting out the questions the analysis is trying to answer and the target audience for these. Sector-based anticipation and matching studies may be carried out to:

- (a) inform general education and training policy (⁴⁴);
- (b) help to provide useful LMI and advice to labour market participants more generally;
- (c) inform specific options on training programmes, schemes and initiatives to be supported, revised or reduced;
- (d) identify priorities for the professional development of the TVET workforce;
- (e) aid curriculum development and review priorities;
- (f) inform financing models, including the need for incentives;
- (g) inform budget options;
- (h) meet other more general aims and objectives, such as government and other stakeholder ambitions for economic development, productivity, growth and industrial policies.

A range of specific policy or policy-related questions can be formulated on the basis of the objectives. These might include:

- (a) the number of jobs of a certain type expected to be available in the future;
- (b) the number of job openings, including replacement needs arising from retirement, succession or labour turnover;
- (c) the sorts of skills that people will need to have to be successful in these jobs.

⁴⁴ There is an implicit assumption here that all countries have an established education and training policy at the macro level and probably also at a sectoral level. However, this implies that resources are available to support the development of such policies, which may be difficult for some developing countries.



Other general issues addressed in the sectoral skills analyses include:

- (a) productivity;
- (b) economic growth;
- (c) job quality;
- (d) links between skills and economic performance;
- (e) equality and equity issues;
- (f) mismatches in skills demand and supply.

The last point can relate to both cyclical (short-term) and structural (long-term) mismatches, which can take various forms including market failure.

4.2. Context: opportunities and constraints

4.2.1. The current general political and social context

It is clear from the case studies that the political and social context is crucial to determining both the expectations and feasibility of any sectoral skills analysis. This has a bearing on the current institutional framework within which those conducting such an analysis have to operate. It also affects the data and information they have to work with.

Tensions can arise when market forces are allowed to operate concurrently with interventions to achieve particular objectives. Governments have problems in trying to pick winners and there are plenty of examples of failed attempts to plan economies from the top down. At the same time, it is also clear that government interventions, either explicit or implicit, can help to shape the direction of the economy and to achieve broader social and economic objectives.



Neither the political and economic context, nor the institutional frameworks within which skills decisions are made, are fixed for ever and political innovations can change both. Many countries have experienced almost continuous flux as governments search for the key to problems such as how to achieve economic growth and reduce poverty.

4.2.2. Institutional framework

Any sectoral assessment of skills issues needs to take into account existing institutional arrangements, including all those institutions and organisations that have a stake or interest in the demand for or supply of skills. This infrastructure may have a long and complex history, which can be both a strength and a weakness. For example, well-established organisations representing both employer and unions can aid change in some countries, leading to a dual system of education or some other apprenticeship system. These need to be taken into account when involving and engaging with stakeholders.

4.2.3. Statistical infrastructure

Statistics are the lifeblood of economic and political analysis. These are collected by governments and other bodies primarily to monitor and understand the current situation and most statistics do not address future skills needs or skills mismatches. Many official statistics are collected to assess the tax liabilities of individuals and organisations, meaning that their use for other more analytical purposes is a relatively recent phenomenon.

In any sectoral skills analysis, it is important to conduct a proper audit of existing data and information, including other relevant analyses. See Volume 1 for more information on data auditing for skills analysis and anticipation.



4.2.4. Resources

Skills anticipation and matching analysis is resource-intensive. Substantial resourcing is needed to achieve the successful collection, analysis and modelling of primary data, and the same is true of other forecasting methods.

There is a strong case for central provision on this front, as economies of scale are frequently possible and this type of work contributes to the 'public good'. This underlies the rationale for the huge investment in such work in the US (see Annex 22). It is also the reason why the UK, Australia and other countries provide extensive data and analyses to centralised bodies for the sector skills councils to exploit.

However, useful sectoral skills analysis can be conducted within much more modest budgets. While replicating the work conducted by the US in O*NET and related systems would require many millions of dollars, the Georgian case study shows that it is possible to add value with a project costing far less (just a few thousand euros). The other cases illustrate a range of possibilities between these extremes.

Developing countries face a particular challenge in that developing policies is typically easier than implementing them. Funding can often be found for policy development but not for sustained policy implementation.

4.3. Defining the sector

4.3.1. Considerations

Two different aspects must be addressed when defining and choosing the sector:

- (a) the strategic choice about which sector should be analysed; this is largely related to the overall aims and objectives of the analysis;
- (b) technical choices about how to define, classify and measure the sector and its boundaries.

4.3.2. Strategic choice of sector

Conducting a comprehensive and detailed set of sectoral studies is expensive but it is not always necessary to cover the whole economy.

The criteria used to choose a particular sector for analysis can include:

- (a) growth potential in terms of gross domestic product (GDP), employment, exports;
- (b) changes in technology, which have a strong influence on skills in the sector;
- (c) users and institutional context - priority can be given to sectors in which an institutional platform, capable of using and applying the results and insights from a sectoral skills analysis, already exists.

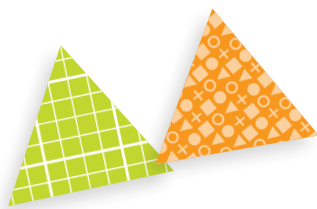
The choice of priority sectors cannot be disconnected from the government's development strategy but must be informed by the general priorities set for economic development. For example, a particular sector may be the focus of other government development or economic policies, as is the case with the manufacturing industry in India.

The strategic choice of sector can also be part of the earlier process of setting aims and objectives and can include aspects of developing a more elaborate vision of the longer-term future for the sector concerned: assessments of competitive advantage; threats from foreign competition; position of the sector from a strategic development perspective; and significance in terms of regions.

4.3.3. Defining and measuring sectors

Statisticians have worked hard to define and measure the levels of activity in different parts of the economy. They developed SICs to make it easier for researchers to work with official statistical data for a particular sector and to compare their results with other sectors, including cross-country comparisons. The use of SICs is an important element in harmonising different data sources and aiding data sharing.





Classifications typically categorise organisations according to their principal economic activity. This is similar to, but not the same as, classification of organisations based on the main commodities produced. When this kind of statistical measurement was first used, the bulk of economic activity was focused on physical commodities and manufacturing but matters have become more complicated with the growing importance of the service sector and the knowledge economy.

Some sectoral analysts have focused on the limitations of SICs when trying to understand particular sectors. They have perhaps discarded them too quickly as 'outdated and inappropriate', and failing to reflect current realities on the ground, so ad hoc alternatives have been suggested instead. This risks throwing the baby out with the bath water.

While SICs undoubtedly have limitations, statisticians – who have spent long hours considering such matters in meticulous detail – are usually much more aware of these than those who try to set up alternatives at short notice. In most countries, SICs are gradually being harmonised to match international standards, aiding comparisons across countries.

One key issue raised in many sectoral skills analyses relates to the supply chain or value chain. There is a need to develop a good understanding of the key drivers of activity levels in a particular sector, which are often linked to the supply chain, up or down stream. Upstream are the suppliers of raw materials and other inputs used by the sector to produce its principal output (products or services). Downstream are the customers who buy these outputs. They may be final consumers or other sectors that buy these products or services, adding further value to them before selling them on.

Statisticians and economists measure these links using input-output tables covering transactions between sectors. The transactions are defined using the appropriate SIC. If such tables do not exist, analysts rely on more ad hoc means of understanding the links,

adopting qualitative rather than quantitative approaches. By doing so, they focus on general relationships between different SIC categories, which are seen collectively as a new 'sector' that cuts across SIC boundaries. While this may be useful, in some respects it can also muddy the waters when it comes to understanding what is going on and, in particular, when measuring its scale.

Most official statistics are based on SIC definitions, which are seen by some as outdated and too narrow. The systems used to classify occupations (standard occupational classification, SOC) or qualifications (⁴⁵) suffer a similar fate and all SIC or SOC categories inevitably tend to be backward looking. The new and evolving categories are small to begin with and therefore are not given great emphasis while the large categories are often areas where things are in decline. Most statisticians are well aware of these problems and regularly renew and revise their systems of classification accordingly (⁴⁶). Volume 1 describes further methodological considerations related to the use of international standard classifications of sectors, occupation and education.

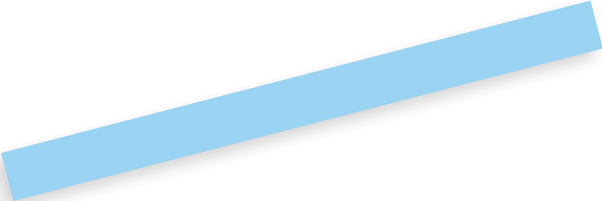
4.3.4. Broader definitions of a sector

Some countries have developed broader definitions of the term 'sector' which do not focus solely on the principal economic activity, the basis of official classifications of industry. They include ideas about occupational sectors and observatories (in France) and transversal sectors (in Canada).

It is logical that sectors are usually defined based on principal economic activity as the demand for labour is derived from this activity. However, it is also possible to focus on an analysis of 'skill' sectors. This is particularly useful if the main objective of the exercise is to change education outcomes to fit labour market needs. For example, in Croatia a skill sector is defined as a group of qualifications which use a certain field of knowledge and those occupations which use these training outcomes in the world of work (Box 14).

⁴⁵ The international system for classifying occupations (ISCO) or the international system for classifying educational data (ISCED) can be used to develop national systems.

⁴⁶ The O*NET system in the US focuses specifically on some emerging occupations where significant growth is expected from current small beginnings.



4.3.5. A broader perspective

In some situations a narrowly focused sectoral approach has limitations. Sectors do not exist in isolation but operate as part of a larger economic system. In such cases, a broader perspective, which goes beyond the more immediate links may be needed represented by a supply chain, value-added analysis and/or a cluster-based approach.

While a focus on a particular sector can be helpful and informative, it can also be subject to bias and be

misleading in some circumstances. In such cases, a broader perspective, taking into account the more general economic context, may be necessary. This can be achieved by complementary work that sets the individual sector in its proper context and typically requires the use of some kind of general multisectoral macroeconomic model. However, there is also the risk of defining a sector too narrowly and limiting it to a few occupations or job roles, as is the case with the SSC for plumbing in India.

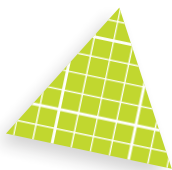
Box 14. Considerations in the definition of sectors, Croatia

In Croatia, a skill sector is defined as a group of qualifications which use a certain field of knowledge. The term also refers to the occupations which use these training outcomes in the world of work. Most countries classify education and research areas, generally along lines such as natural, social and technical sciences. These disciplines contain detailed fields and subfields. In Croatia, all accredited training programmes are coded accordingly. These codes link to occupations based on ISCO-08 (following a process of consultation with skills councils), so that a link can be established between qualifications and occupations based on a knowledge area.

A similar approach is adopted in France and Germany. In Germany, a much more rigid relationship exists between qualifications, occupations and industries. Even here, however, it has been necessary to develop a so called 'transition matrix approach' to recognise that one-to-one correspondence does not exist between these three 'dimensions'. Croatia classifies occupations into groups, ranging from the simplest (which may not require any qualifications at all) to the most complex, which require many years of schooling and possibly also very specific work experience.

The spread of occupation groups across the Croatian economy is also analysed using a transition matrix approach. This can help to provide understanding of how knowledge is used in different settings. From this, a special index is developed, showing which economic sectors have high concentrations of certain skills or occupations. The index identifies key industries for a certain skill group. Low concentration or high dispersion of skills across sectors indicates that there are no particular sectors which require scrutiny for these skill areas. Information technology industries are an example, accounting for only 30% of total demand for those skills in the economy. This has many implications for designing training outcomes, which have the same central skill area but have many diverse uses and also indicates that modular education needs to provide building blocks which can be linked to the main core skills to benefit from the mobility of workers from one industry to another. In other cases, such as farming and forestry skills, there are very high indexes of concentration in a few economic sectors. Mobility is limited, which means that specialisation within the training system needs to follow the needs of a few industries. In cases where data sources make this possible (such as the Western Balkan countries, where the OECD is currently working on improving the data), this can be an important element in developing a sectoral approach.

Both sector-based demand assessment and anticipation and occupation-based approaches require the same cross-referencing between official classifications of industry, (such as the international standard industrial classification (ISIC) and the statistical classification of economic activities in the European Community (known by the French acronym NACE)) and classifications of occupations (such as the ISCO). Different stakeholders have different interests. For employers, industry (principal economic focus) is of prime importance. The focus on occupation is often more important for training authorities. However, as the case studies for the US and Germany show, a focus on occupations does not mean a lack of interest in economic sectors. This approach makes the use of knowledge and skills the most important aspect both in economic sectors and in the economy as a whole.



4.4. Data audit

4.4.1. Conducting an audit

A data audit is essential to establish what information is needed and what is currently available from existing sources that could help to answer questions. Only then can an assessment be made of what new information needs to be collected.

A distinction can be made here between cases where there is a need to collect primary data, when the basic data do not exist at all, and others where such data do exist but no relevant analyses of existing data have been undertaken to answer the particular questions of interest.

The different ways of achieving this can then be considered and a choice made, given the resources available. Again, there are often multiple objectives and the questions being asked need to recognise this. The data needed to answer these questions must be carefully assessed.

4.4.2. Sources of information

Where possible, it is important to exploit existing data. Some sectors and countries are much better served than others in this regard but the situation as a whole is improving. The revolution in ICT means that information is now accumulating exponentially, as is the ability to collect, analyse and 'crunch' numbers.

Those carrying out the analysis can commission or conduct the collection of primary data. This can take various forms, including:

- (a) formal surveys:
 - (i) of fact;
 - (ii) of opinion or perception;

- (b) other sources of information and opinion:
 - (i) interviews;
 - (ii) focus groups;
 - (iii) other less formal meetings and networks.

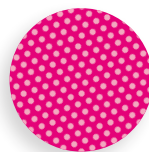
Many countries have existing sources such as population censuses or regular labour force surveys that can provide useful information on changing employment patterns and related matters. However, they each have their limitations, especially when it comes to measuring a changing employment structure. Censuses are typically carried out infrequently and become outdated. Labour force surveys are carried out more frequently but are usually based on quite small samples and rely on individual responses, which may be biased. Employer surveys, such as the occupation employment statistics survey in the US, offer much more robust information, but at a cost. Box 15 sets out some of the pros and cons of different data sources.

Box 15 also highlights other key questions about some of these potential data sources in the context of sectoral skills analyses. These need to be answered to determine if existing data meet the requirements of the analysis. If not, the data sources will need to be adjusted, new data will have to be collected or other steps taken to fill the gap.

4.4.3. Data availability and quality

In considering the use and value of existing data sources, it is worth asking:

- (a) does the data source deliver data regularly?
- (b) is its future sustainability assured?
- (c) is the frequency sufficient?
- (d) how long are the time series?





- (e) are there significant breaks in the series?
- (f) are the data national, regional or local?
- (g) does it allow such breakdowns?
- (h) is it economy-wide or sector-specific?
- (i) what sectoral breakdown is available?
- (j) are the data available in an appropriate form to the people who need to work with it? For example: are the necessary breakdowns available; are the microdata sets accessible; how do the laws on protecting personal data influence the accessibility?

Some employer surveys focus on skills deficiencies and gaps rather than employment structure (e.g. the UK national employer skills survey). In some cases, this may have a forward-looking element, as is the case with the Italian Excelsior survey. This general approach of asking employers directly about current and future skills issues has its limitations, focusing on marginal and ephemeral problems rather than longer-term structural change (for a critical review of the UK surveys, see Wilson, 2009).

Relevant data may also be available from a variety of other sources, including the PES, pension systems, and taxation systems, as well as more general national accounts and trade statistics. Specialised graduate surveys, focusing on the destinations of graduates on completing education, are also available in some countries. Such surveys can add useful insights into the supply side and skills utilisation.

One, sometimes forgotten, source of data is knowledge collected by the PES, especially administrative records. In poorer economies, in particular, this is an untapped but potentially useful source of information. In combination with other sources, information collected by the PES can serve as a basis to project trends for specific segments of the labour market (Box 16).

Data can also be obtained from education and training institutions as well as the general business community. Such organisations are usually strong when it comes to tacit knowledge about the usual business processes in their institution.





Box 15. Possible data sources for sectoral analysis ⁽⁴⁷⁾

Census of population

Most countries hold a census, typically once every 10 years, which often contains relevant data:

- Does the census include education and labour market information (occupations, sectors, level and field of education)?
- How relevant are the most recent census data in terms of qualitatively observed changes in the economy?

Labour force (household) survey

Labour force surveys are typically conducted annually or even more frequently. Things to check include:

- Is the entire labour force sufficiently covered? Labour force (household) surveys have the potential to capture informal employment. They sometimes fail to cover rural populations, remote areas and people who do not live in ordinary households (such as those who live in institutions, migrants).
- Are the breakdowns of the labour force available by age, gender, level or field of education attainment?
- Are breakdowns of employment by occupation and industry available; what classifications are used and what detail is available?
- Are data on pay or wages included?

Establishment (employer) skills survey

- What part of the economy does it cover (private or public, size of establishments, selected sectors)?
Enterprise surveys usually do not cover informal employment. Sometimes they only cover establishments above a certain minimum number of employees.
- Is a breakdown by sector or region possible?
- What information does the survey provide?
 - share of employers facing skill shortages;
 - hard to fill vacancies; reasons for this;
 - occupations which are hard to fill and skill shortages;
 - types of skills which employers cannot find;
 - training needs;
 - pay and working conditions.

See Volume 5 for details on implementation of establishment skills surveys.

PES statistics

- What share or which segment of job seekers and vacancies do these statistics cover and which are not covered?
- What information do the statistics contain on vacancies and job seekers?
- Do the statistics use standard classifications of occupations?
- More generally, what relevant coding systems and number sequencing methods are used? (Important when comparing data.)
- Are the records from individual employment offices merged in one database? Do they use an integrated information system?
- Note that the PESs may also collect other types of data from employers, including up-to-date data on industry types within their area, normal market pay rates for specific occupations in their area and working conditions.
- It is also worth checking to see if it is possible to work with the data collected as a time series, is pertinent because time series of administrative data make it possible for the PESs to identify trends in employer demand for certain types of occupations. However, changes in administrative procedures and operational rules can often make it difficult for the PESs to keep data series consistent over long periods of time.

See Volume 4 for details on collection and use of data collected by the PES.

⁴⁷ Data audit of various data sources for analysis of skills supply, demand and mismatch are described in more detail in Volume 1.



Box 16. Use of data from the PES and other administrative sources

The Croatian Employment Service is currently considering pooling information from mediation and career guidance services with local business information to gain a better understanding of skills needs. More about the role of PESs in this process can be found in Volume 4.

In addition to obvious data sources such as employer surveys designed specifically for the purpose, other avenues could be extremely helpful in understanding the use of skills. For example, the ex-Yugoslav republics all had the same mechanism for financing social security, with old-age, sickness and unemployment payments based on contributions paid from gross and net wages. Data on individual payments are kept by the pensions entity on all employees and self-employed people eligible for these payments. The data collected include information on the economic activity of the enterprise where the individual works (coded according to NACE) and the type of job (occupation coded within the company according to ISCO-08). This cross-referencing of economic sector and occupation is very important in countries such as Croatia to understand how skills are applied. (See for example <http://www.asoo.hr/default.aspx?id=702>, which provides a detailed description of the methodology, data sources and results for 13 skill sectors). This is quite close to the methodology used by the US Bureau of Labor Statistics where staffing patterns reflect shares of occupation groups used in any particular sector.

Useful and relevant data can be obtained in other ways. These include preparing in-depth case studies using interviews and other techniques (the methodology and use of these is described in Volume 2).

In some cases, it may also be appropriate to use data from other countries, assuming that similar patterns and issues apply. Generic CGE-type models frequently adopt this approach to fill gaps in available data.

Consideration of the need for primary data collection also raises the issue of whether these data should or could be collected centrally. Such centrally provided data resources offer economies of scale and therefore cost savings, as well as other advantages of consistency and comparability.

Various technical issues still impact upon the robustness of the data:

- (a) definitions and classifications to be used;
- (b) sampling issues;
- (c) developing robust questionnaires ⁽⁴⁸⁾:
 - (i) focus on facts if possible;
 - (ii) avoid leading questions;
 - (iii) try to get beneath the surface;
- (d) deciding who needs to be questioned.

The last point raises questions about who needs to be consulted in a broader sense.

4.5. Consulting and engaging key stakeholders

Appropriate people should be involved in the successive stages or for the various components of any sectoral skills analysis. At the start, two aspects need to be considered.

- (a) Who needs to be actively involved in designing and carrying out the analysis?
- (b) Who is the audience for the (often multifaceted) final output?

The former may also include:

- (a) the need for high-level political buy-in;
- (b) the importance of social dialogue and involvement of the social partners, including private partners in training policy, decisions and planning.

Therefore, the key stakeholders and the key audiences need to be established. These may overlap and may include:

- (a) government, State, ministries (at national, regional and local level);
- (b) academic and other research organisations;
- (c) employers;

⁴⁸ This guide is not the appropriate place to go into detail about relevant questions to ask, or technical aspects of questionnaire, survey and sample design. The reader is referred to the more technical discussion on these issues in the various references in the bibliography.



- (d) sectoral bodies (including employers' associations and chambers of commerce);
- (e) trade unions;
- (f) education and training providers (including providers of TVET);
- (g) PESs;
- (h) private employment agencies;
- (i) career guidance professionals;
- (j) individuals making career choices and decisions (and their advisors);
- (k) the general public.

Issues of responsibility, power and ownership over the process also need to be considered. The success of sectoral skills analyses depends on securing both financial and other support from the key players involved.

The needs and interests of the various target groups must be factored in. This applies to the overall aims and objectives set for the particular project or study, the issue to be addressed, and the final outputs and results delivered at the end of the exercise.

4.6. Clarifying key questions

The detailed research questions are closely related to the more general aims and objectives of the sectoral skills analysis (as set out in Section 4.1). Most analyses address one or more of the topics listed below. The extent and depth to which each of these topics is examined depends on the main policy questions to be addressed. They can be divided into several broad categories.

4.6.1. Understanding the context for the sector

Most sectoral skills analyses involve a systematic and thorough analysis of the economic context for the sectors. This may be based on a broader understanding of the general economic situation taken from a quantitative, multisectoral model (such as in the UK or the US) or a more partial analysis, focused around the particular needs of an individual sector (such as the Portuguese or EU sectoral studies).

In either case, it is important to obtain a clear view on:

- (a) key drivers of change in the economy such as rising incomes; changing consumption patterns; globalisation; international trade and competition; demographic shifts (ageing populations, migration); technological change; climate change;
- (b) links to other parts of the economy such as supply chain or value-added issues; input-output tables and relationships; locations where goods and services are delivered and produced; shifts between the formal and informal economy.

4.6.2. Sector position and outlook

The following aspects must be examined when addressing the sector position and outlook:

- (a) analyses of trends and future development;
- (b) drivers of change in the sector including technology (recognising the potential of the latter to be disruptive), ownership of companies and competition;
- (c) international competitiveness, supply chain, clusters;
- (d) scenarios.





4.6.3. Implications for jobs and skills demand

A number of factors will determine the implications:

- (a) the number of jobs demanded;
- (b) changes in the requirements for skills;
- (c) drivers of change in skills demand (technological change; organisational change within the sector);
- (d) implications in terms of qualifications and skill requirements.

4.6.4. Skills supply

Most sectoral skills analyses also include an assessment of skills supply (including the possible role of migration), although this is usually a separate exercise. Such results are often used to draw conclusions and make recommendations about priorities after comparisons have been made with the work on the demand side. Also included is information on numbers of graduates with the relevant education and their distribution in different sectors. Overall stocks are also estimated: changes in the education structure of the economically active population are especially relevant.

Most sector skills bodies consider supply side issues, including the performance of the TVET system, in their reporting. Data on the number of places, enrolments, completions, certification outcomes, progression and other outcomes are also relevant.

4.6.5. Synthesis and proposed responses

This entails drawing together the results from Sections 4.6.1 to 4.6.4 to reach an assessment of the outlook for skills demand and supply. Appropriate responses are then formulated in terms of changes in policy and priorities for action among different stakeholders. The aim is to influence both skills demand and supply, ensuring a better balance between the two.

4.7. Qualification frameworks and skills anticipation

Work on qualifications standards and the development of qualifications frameworks is becoming increasingly popular. In Europe, this is formalised in the ESCO initiative ⁽⁴⁹⁾. Countries introducing systems to anticipate skills needs can find it useful to connect this activity with the introduction of qualifications frameworks. Often these activities are completely unconnected, which is a drain on resources. A piecemeal approach also foregoes the synergies which these systems could have if looked upon as a single skills development or policy initiative.

In Croatia, the two processes are integrated. The Croatian Employment Service collects information on competencies and occupations and monitors the changes taking place over time. Outcomes are made available to the skills councils, which are responsible for defining occupation standards. Qualification standards can be proposed on the basis of the responses to labour market needs. The whole process is monitored and influenced by the National Human Resources Council which ensures that these findings are reflected in government policies in regional development, education and employment. Sectoral bodies can help to express skills needs with reference to priority programmes at broad national vocational qualifications framework (NQF) levels, targeting certain skills for specific occupation groups.



⁴⁹ For more information, see <http://ec.europa.eu/social/main.jsp?catId=1042&langId=en>



Box 17. Measuring skills

Considerable benefits are gained by adopting standard systems of classification for skills, if and when they exist. However, the problem is more complex here because there is no consensus on the best way to measure skills. The two most commonly employed measures are qualifications and occupation. These are relatively simple to measure and well-established systems for classifying them now exist. However, they are regarded by some as poor proxies for the actual skills required by employers and those used by individuals in their jobs. When asked about skills and skills needs, employers tend to focus on other aspects of individuals and jobs than on qualifications or occupations. When recruiting new employees, employers are typically concerned with generic skills such as communication skills, problem-solving abilities, technical skills (including science, technology, engineering and mathematics), as well as basic skills such as numeracy and literacy. The same is true when it comes to describing skills deficiencies. Employers tend to list these generic skills rather than a lack of any particular qualifications among their employees. The ILO considers these core employability skills (Brewer, 2013). Most countries do not have comprehensive measures of such skills. This has raised the question of whether a quantitative assessment of the quality of changing skills needs is possible. This would involve not simply measuring the numbers of people employed in particular occupations but also how the skills content of the occupations has changed. However, some progress has been made involving a combination of both quantitative and qualitative approaches, including the forthcoming programme for the international assessment of adult competencies (PIACC) led by the OECD.

The most significant established example can be found in the US. The O*NET system provides almost 250 different measures of skills, abilities, work activities, training, work context and job characteristics for around 1 100 different US occupations (see Table A2 in Annex 22 for details). This includes information gathered from job incumbents and from assessments by professional job analysts (see Tippins and Hilton, 2010 for a comprehensive description and review of O*NET). This information is also linked to information on current employment levels, rates of pay and future employment prospects.

The data can be used to identify at least six distinct ways of defining and measuring skills: qualifications and/or education attainment; education length; occupation; tests; self-assessment; and job requirements or activities. Several advantages and disadvantages are associated with each of these different conceptualisations and measures of skills. Skills are multidimensional, socially constructed, intangible and often unobservable. Each of the different measures of skills can be argued to have some relative merits and demerits.

The qualifications that individuals have acquired and the occupations or jobs that they perform are the measures of skills in most common use. These can be compared internationally, particularly when international classification systems are employed. The international standard classification of education (ISCED) is maintained by UNESCO⁽⁵⁰⁾ and ISCO is compiled by the ILO⁽⁵¹⁾. Most countries are gradually harmonising their own systems towards these international standards. Qualifications frameworks, including the new European ESCO initiative, are also becoming increasingly popular in many countries. Most systems for classifying occupations are based on some notion of the skill levels required to do the job. However, qualifications can be less satisfactory as a measure of skills used in employment. They are typically gained before individuals enter the job in question and there is no guarantee that the skills they may acquire are used in that job. Any skills that are acquired while gaining a particular qualification can soon depreciate, especially if they are not used.

⁵⁰ See UNESCO web page on ISCED: <http://www.uis.unesco.org/Education/Pages/international-standard-classification-of-education.aspx>

⁵¹ See ILO web page on ISCO: <http://www.ilo.org/public/english/bureau/stat/isco/index.htm>



The skills subsequently gained while in employment – through learning-by-doing, formal and informal on-the-job training or off-the-job training then used in employment – are those that are of primary interest to individuals and employers. They are also the most relevant to public policy. Individuals seeking to move jobs, firms seeking new employees, agencies responsible for helping people to get back to work, training providers, human resources managers and policy-makers responsible for identifying skills shortages, trends and future requirements all require skills that are used, valued and rewarded in employment. Qualifications are, at best, a poor proxy for the skills that individuals acquire or use in their jobs. They are also a weak measure of the attributes possessed by individuals and rewarded in the labour market.

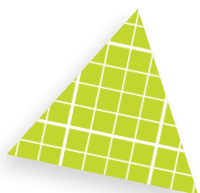
Occupations arguably provide a more meaningful summary of the skills that individuals are using in employment. This is particularly the case when the occupation classification is hierarchical and higher occupation levels can be associated with higher levels of skills. However, occupation classifications do not record the actual skills that are used, nor do they effectively recognise that jobs are typically bundles of skills: the skills used in any job cannot be captured by a unidimensional indicator such as the SOC code. Skills can differ even within occupations; the international classification ISCO-08 suggests a different approach to measuring the skill levels of occupations compared to earlier, more traditional, approaches.

More recently, the advantages of the ‘job requirements’ approach to measuring skills have found increasing favour. This approach measures skills that are used by individuals in their jobs, the information being obtained from their (self-reported) answers to questions regarding the degree (and sometimes intensity) to which their jobs require them to perform particular tasks. Examples include the UK skills surveys (Felstead et al, 2007) and the Singapore skill utilisation project (Sung et al., 2010). However, given the relatively small scale of skills surveys of this kind – primarily due to their cost – it is only possible to use the information to assess skills at an aggregate level (1-digit SSOC (Singapore Standard Occupational Classification)). Thus, skills surveys are unable to capture much of the heterogeneity within and between jobs, while the range of job skills recorded is limited to the dimensions captured by questions listed for a particular job or task ⁽⁵²⁾.

In contrast to the relative lack of information on skills in most countries, the US has long devoted considerable resources to measuring and recording the skills used in employment. The Dictionary of Occupational Titles (DOT), first published in 1939, has evolved considerably over time. O*NET, for example, was almost 20 years in development as a replacement to the DOT, and the full version of this new system was first published in June 2008. O*NET is now the main source of occupation competency information in the US. It utilises a modified version of the US SOC to record information for around 1 100 different occupations across six different domains: worker characteristics; worker requirements; experience requirements; occupation requirements; occupation-specific information; and workforce characteristics. Much of the information in the O*NET ‘content model’ is gathered from self-reported assessments by job incumbents. These are based on standardised questionnaire surveys, supplemented by professional assessments by job evaluation analysts. Table A2 in in Annex 22 provides a summary of the information collected.

Different approaches to skills measures and use of standard classification are also discussed in Volume 1.

Source: The discussion in this section draws heavily on Dickerson et al., 2012; and Dickerson and Wilson, 2012.



⁵² The PIACC programme also includes various indicators of skills, including literacy. The Cedefop pilot employer survey uses the task approach.



4.8. Choice of methodology, tools and techniques

This subsection considers the choice of methodology and how best to answer the questions once these have been identified. These matters are also considered in much more detail in Volumes 1, 2, 5 and 6.

4.8.1. Tools and methods

A sectoral approach to skills analysis can encompass a vast range of different quantitative and qualitative components (Chapter 2). In some cases, these form an integral part of the analysis itself; in others, they are complementary elements conducted separately (and possibly independently).

In an ideal world, all elements would be fully coordinated and harmonised, though this is generally not the case. However, many countries, including Australia and the UK, seem to be moving in this direction.

In smaller countries, it is perhaps easier to keep track of and join up all the skills anticipation activities conducted by different organisations.

Economies of scale occur with many of these activities, helping larger countries to produce general resources that can be used by many different sectors. One example is the information provided by UKCES to SSCs.

However, as countries get larger, institutional arrangements, data sources and data flows become more complex and difficult to coordinate. Those involved also tend to be larger and more complex and become harder to coordinate.

The US, one of the freest market-oriented economies, has some of the most centralised provision of LMI in its Bureau of Labor Statistics.

4.8.2. Coordination and coherence

It is important to consider how the sectoral skills analysis needs to be linked with other aspects of the skills anticipation system and related LMI, for example quantitative, multisectoral, macroeconomic models. In some countries, such as the UK, this is built in to the system. In others, such as South Africa, resources have not been available to develop such methods, although the feasibility of doing something similar has been established (see Wilson et al., 2004).

4.8.3. Developing views about the future

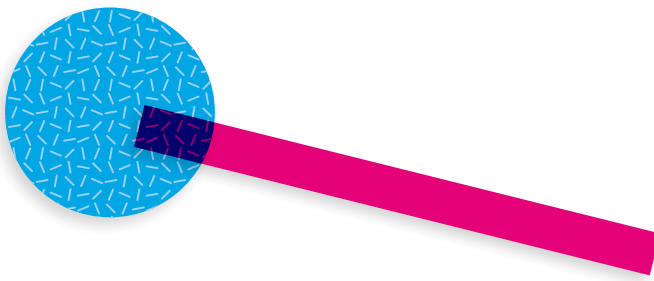
The many tools and techniques used to peer into the future (Chapter 2) include:

- (a) asking people what they think via:
 - (i) opinion surveys (among employers or other groups);
 - (ii) the Delphi method (systematic gathering of expert opinion);
- (b) other foresight techniques such as:
 - (i) formal, quantitative modelling:
 - different levels of sophistication;
 - general versus partial analysis;
 - econometric versus computable techniques;
 - (ii) other ways of generating new knowledge and understanding about possible futures, including various scenario development techniques.

The pros and cons of different methods depend on the circumstances and precise aims and objectives. There is no simple, one-size-fits-all solution: each approach has strengths and weaknesses. These are briefly summarised in Table 1 in Section 2.2.

Detailed quantitative results are often required and so some kind of quantitative model is essential. In other cases, more qualitative methods may be advantageous in helping to develop broader strategies that are robust in a range of different circumstances.





4.8.4. Statistical problems in conducting surveys

If sectoral analyses of skills are to be convincing they need to be based on solid evidence. In the absence of existing data, primary data may need to be collected, raising questions about how to ensure the information obtained is reliable and robust and not just anecdotal.

Primary data collection can appear to provide a 'quick fix', offering almost instant gratification. It seems that immediate results can be obtained simply by:

- (a) drafting a questionnaire;
- (b) sending it out and getting responses back;
- (c) analysing and publishing the results.

However, there are numerous pitfalls that can trap the unwary or less experienced analyst. This is not the place to provide a detailed review of survey techniques, sample design and related issues; such matters, including the technical aspects, are covered extensively in the literature. For a comprehensive introduction to the area, see the suggestions made by the Royal Geographical Society⁽⁵³⁾. Another source of information is Robson's *Real world research: a resource for users of social research methods in applied settings* (Robson, 2011).

A quick overview highlights problems such as:

- (a) the need to distinguish between questions of fact and of opinion or perception. The focus should be on obtaining factual data rather than opinions or perceptions, but the former are generally much more difficult to obtain than the latter;
- (b) particular concerns arise when asking for opinions about the future. Such views are generally subjective and not very reliable;

- (c) the need for representative surveys to get unbiased data. Good sampling frames are also important to ensure that the sample surveyed provides a true representation of the population. This requires considerable prior investment to understand what the population of interest looks like, for example the number of employers in a particular sector, differentiated by size of organisation and geographic location⁽⁵⁴⁾;
- (d) the need for adequate samples to ensure that the information collected is statistically robust. Well-established statistical principles govern this area⁽⁵⁵⁾;
- (e) technical issues arise about the best way to obtain certain types of information. For example, are data on occupation employment structure best obtained by asking employers or individuals?

Analysis and consolidation of results, including their critical appraisal, is a key part of the process.

The most obvious type of survey to undertake is one aimed at employers, see Volume 5. Such surveys are at the heart of many of the sectoral approaches presented in Chapter 2. Also included here are one-off surveys for single sectors and comprehensive national surveys designed to provide information on all sectors.

Other types of survey may provide useful information that a sectoral skills analysis may use, for example surveys of graduates and their skills, employability and utilisation of skills, see Volume 6.



⁵³ *Sampling techniques*. <http://www.rgs.org/OurWork/Schools/Fieldwork+and+local+learning/Fieldwork+techniques/Sampling+techniques.htm>

⁵⁴ This is something of a 'chicken and egg' situation. Until some basic survey work has been done, it is impossible to know what the population to be surveyed looks like. Administrative records, often developed for tax collection purposes, can provide this kind of basic information. Many countries also have some official census or survey data, which also give insights into the composition of a sector.

⁵⁵ These include rules which recognise the need to oversample some categories, such as large firms, to get representative data. Simple random samples might miss large firms, thus biasing some results.



4.9. Carrying out analysis

4.9.1. Required resources and conditions for success

Limited resourcing has already been highlighted as one of the key constraints of sectoral skills analysis. In some countries, huge sums are invested in skills anticipation generally (the US), and on providing a strong sectoral focus in particular (recent experience in the UK). In most cases, these are part of a broader investment in systems and institutions rather than just a particular project. However, the case study from Georgia demonstrates that it is possible to undertake more modest exercises on more limited budgets.

One important consideration is how much of the work can be performed 'in-house', i.e. within the sector itself or the government agency or department that might be commissioning the work, and how much must be subcontracted to external organisations. Even where work is carried out in-house, it still has an opportunity cost in terms of staff time and other variables.

One of the objectives of the exercise may be to increase data, analytical capacity and knowledge within a particular organisation, thus favouring the in-house approach. However, there are also advantages to specialising and using external consultants, including lower immediate costs.

A number of relevant sector players may be able to execute various roles. Institutional arrangements, networking, data sharing and shared responsibility are all possible options, as has been the case in the UK, where UKCES supervises a network of SSCs, each of

which has links to employers in its sectors as well as to education and training providers.

Such arrangements can help with shared costs and economies of scale. This occurs, for example, when UKCES provides data from the national employer skills survey and the Working Futures projections to all SSCs.

4.9.2. Learning from previous guides

The ILO's skills for trade and economic diversification (STED) tool provides an interesting example of how to organise a sectoral skills analysis in the context of more general economic development objectives. Gregg et al. (2012) describe a six-stage process as set out in Table 2, excluding various additional preparatory stages relating to the choice of sectors. The main stages (1 and 2) focus on general prospects for the sector, while stages 3 to 5 consider the implications for skills.

Table 2 also includes a number of other preparatory stages (preparatory stage 00 to preparatory stage 05). A more detailed checklist at each stage sets out the main steps to be followed. For example, the STED guide describes the main steps for stage 1 (sector position and outlook) as shown in Table 3.

Many of these elements are needed in any good sectoral skills analysis. Stages 1, 3, 4 and 5, in particular, focus on skills anticipation or matching. However, given the broad range of activities that can be undertaken under this general heading, it is difficult to be too prescriptive about what precisely should be included.

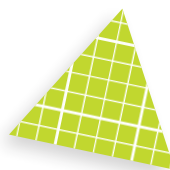
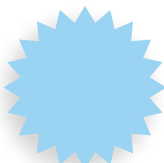




Table 2. Key stages in conducting sector studies

No	Stage	Details
P stage 00	Objectives	Clarify policy and other aims and objectives
P stage 01	Defining the sector	
P stage 02	Carrying out a data audit	Check existing data available
P stage 03	Consulting key stakeholders (institutional audit)	Identify and get on board all relevant stakeholders
P stage 04	Audience	Identify the main audience(s)
P stage 05	Clarify questions	Clarifying the key questions to be addressed
P stage 06	Choice of methodology	Deciding how best to answer the key questions and selection of optimal methods
Stage 1	Sector position and outlook	Sector characterisation; business environment; envisioning the future
Stage 2	Business capability implications	Gap in business capabilities required to achieve objectives
Stage 3	What type of skills?	Implications for types of skills needed
Stage 4	How many workers by skill type?	Modelling employment and skills demand
Stage 5	Skills supply gap	Gap between skills supply and types of skills needed
Stage 6	Proposed responses	Proposed response to future skills needs

Source: Modified from the ILO Skills for trade and economic diversification guide (Gregg et al. (2012)). Preliminary steps (P Stage 00-05) need to be carried out before executing the main study (stages 1-5).



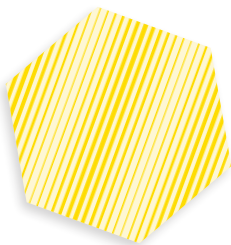


Table 3. Example of a checklist from the STED guide

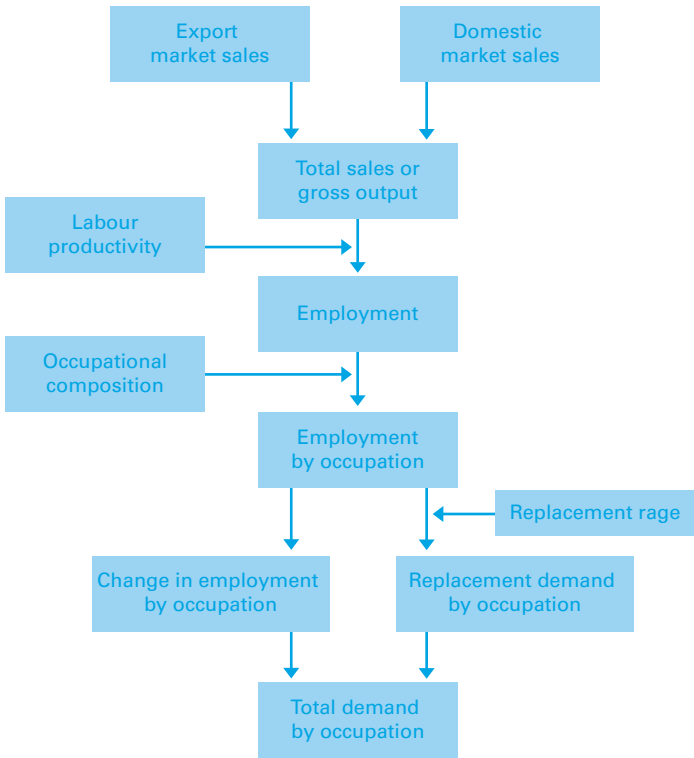
Stage 1: Sector position and outlook	
... should have done the following:	
Established a clear working definition of the sector	Required
Profiled the sector quantitatively based on statistics	Required: but may be limited by data availability
Researched the sector qualitatively: the industry value chain; position in markets; technologies; economic geography; and evidence of comparative advantage	Scoping research required
	More depth where significant issues are apparent
Scanned the sector's business environment	Required: but focused on most significant issues
Analysed world market trends using trade data and market research data	Trade data analysis; market research where information is easily available
Undertaken a competitive analysis of the sector	Scoping research required; more depth required where significant issues are apparent
Identified the sector's main drivers of change	Required: but focused on most significant issues
Developed scenarios for the future development of the sector and chosen a preferred scenario	Required
Developed a vision for the future of the sector	Required
... should have produced the following outputs:	
Statistical profile of sector	Required: within limitations of available data
Descriptive profile of sector	Required: but focused on most significant issues
... should have produced the following outputs:	
Statistical profile of sector	Required: within limitations of available data
Descriptive profile of sector	Required: but focused on most significant issues
Analysis of business environment and of the sector's place in the environment	Required: but focused on most significant issues
Summary of issues from sector characterisation and analysis of business environment	Required
Description of the vision for the future of the sector	Required
Future comparative advantage of sector	Required
... should have used the following information sources:	
Details on prescribed sources of data for this particular stage	Required: data sources used depend on data availability



The STED guide sets out a demand model framework for thinking about the demand for skills (Figure 1). It mirrors the more general frameworks developed by Cedefop and others which consider the changing patterns of skills demand and supply using quantitative econometric and related modelling techniques.

The demand for skills is seen as derived from the demand for goods and services. The only real differences between the frameworks is the extent to which Figure 1 tries to narrow things down to a particular sector (however defined) and the way in which the boxes are linked.

Figure 1. STED framework for the demand model



Source: Gregg et al., 2012.





The Cedefop approach explicitly recognises that a sector operates within a broader economic context. It also attempts to quantify relationships (the links between the boxes); in this case, it does so using econometric methods. In other cases, such as the Monash model used in Australia, a CGE model is used to articulate the size and strengths of the various relationships. CGE models are particularly useful when considering the various feedback and indirect effects that can often undermine the good intentions of policy-makers. Policy-makers too often forget the 'law of unintended consequences' ⁽⁵⁶⁾.

The sectoral approach developed in Portugal, which was further extended in the EU sectoral studies (conducted by the DG-EMPL and discussed in Chapter 2), adopts a narrower perspective. It focuses on the main relationship between the sector and its suppliers and customers. This approach relies on qualitative rather than quantitative evidence to assess the size and significance of the links (see Table 3 for details of the main steps involved).

When considering the future, quantitative models essentially start with an assumption that past patterns of behaviour will continue. They then incorporate views about certain exogenous drivers and come up with a benchmark view. However, in both cases, it is possible to develop alternative scenarios around that benchmark by changing the mix of exogenous assumptions or other model interventions.

In the Portuguese and EU sectoral studies approach, the emphasis is on developing and exploring the implications of a range of scenarios that try to cover the possible uncertainties facing the sector.

This example of a particular type of scenario development method ⁽⁵⁷⁾ focuses more on a qualitative understanding of the important links.

The ILO's STED approach also uses scenario analysis to map out possible futures and then attempts to develop a vision of how to achieve the more attractive ones, or at least avoid the worst.

The advantage of econometric and other economic models is that they make some of the assumptions about drivers and relationships, and their strengths, more transparent. More qualitative approaches, such as logic maps, may not do this. However, econometric methods have their own problems (Saltelli, 2012).

All modelling, whether it is formal and quantified or informal and qualitative, is a simplification of reality. It can take many different forms:

- (a) quantitative or qualitative;
- (b) partial or holistic;
- (c) econometric or CGE;
- (d) off the shelf or customised;
- (e) supply or demand:
 - (i) current assessment;
 - (ii) where to next?

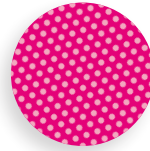
The key is to:

- (a) establish the current position based on solid evidence;
- (b) think about where things are going, in a consistent and transparent manner.



⁵⁶ The idea of unintended consequences dates back at least to Adam Smith in *The theory of moral sentiments* (Smith, 1800, p. 93). The sociologist Robert K. Merton popularised the concept in *The unanticipated consequences of purposive social action*.

⁵⁷ In some approaches, the emphasis is much more on the involvement of participants in developing the scenarios. However, this is very time-consuming and therefore expensive. The EU sectoral studies involved some participation by experts and stakeholders in developing the scenarios. Nevertheless, they still focused more on preparing the scenarios rather than on the active involvement of key actors, as was the case with the oil company executives for whom this kind of technique was first developed.



Box 18. Key steps in the European sectoral foresight methodology

The European Commission developed the European foresight methodology to provide insight into skills needs at a pan-European level in key sectors. It comprises three main parts.

- Part I: Analysis of recent sector trends and drivers with an emphasis on innovation, skills and jobs
- Part II: A future-oriented examination of possible sectoral developments especially focused on skills and jobs using scenario development techniques
- Part III: Exploration of a range of main strategic options ('choices') to meet possible future skills and knowledge needs, including implications for education and training

The European foresight methodology contains 10 main steps. Eight steps are common to all the studies:

- Step 3: Analyse the main trends and structures for the sector
- Step 4: Identify the main drivers of change (economy, technology, organisation)
- Step 5: Identify emerging or changing sector job profiles, skills and competencies
- Step 6: Build possible scenarios and identify implications for employment trends
- Step 7: Analyse a scenario's implications for competencies and occupation profiles
- Step 8: Identify strategic choices to be taken by companies to meet skills needs
- Step 9: Identify the implications for education and training
- Step 10: Present the key findings and main recommendations

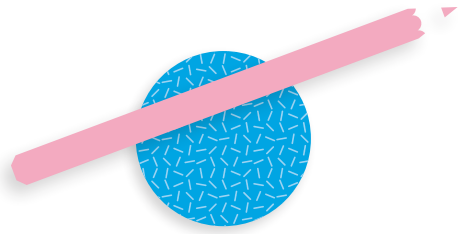
Steps 3 to 5 form part I; steps 6 and 7 form part II; steps 8 and 9 form part III.

Data for the studies were collected from the following sources:

- official statistics from Eurostat, the European labour force survey and Cedefop;
- reviews of existing reports, analyses, statistical publications, policy papers and communications from the social partners, the EU and others;
- sectoral meetings and consultations with the social partners and other EU level stakeholders.

For further details, see the EU case study of the sectoral studies conducted by the European Commission's DG-EMPL (Annex 9). See also Section 2.3.2.





Box 19. The ILO approach to anticipating skills needs for a greening economy

Sustainable development has become a major policy issue for countries at all levels of development. One of the keys to making sustainable development policies successful in environmental, social and economic outcomes is ensuring that the right skills are available when they are needed.

The ILO has produced several research reports attempting to identify skills for green jobs (ILO, 2011a; ILO, 2011b; ILO, 2011c; Cedefop and ILO, 2011) ⁽⁵⁸⁾. This research resulted in a practical guide on anticipating skills needs for green jobs (Gregg et al., forthcoming). The guide defines the following research questions to address:

- the number of jobs involved, now and into the future;
- the skills required, now and into the future;
- the training and education required, now and into the future.

The guide then devises research methods, depending on the type of research question (qualitative or quantitative) and the level of analysis: macroeconomic level, sectoral level, regional or local level, company level or training provider level. Research methods vary extensively between quantitative modelling, qualitative surveys and Delphi-like interviews with stakeholders.

Green jobs may appear in a green sector or in a brown sector which is trying to adapt sustainable methods of production. Green jobs are, therefore, not confined to a single sector and are cross-sectoral by nature. However, major policy and investment decisions – lowering carbon dioxide emissions, promoting renewable energy resources or green building, supporting reforestation projects and similar – affect specific sectors. New jobs are created, certain jobs disappear, others are substituted or job content is altered. These developments affect demand for skills at sectoral level so skills needs assessment is especially useful at this level.

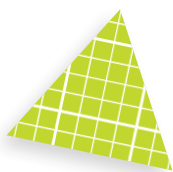
The guide offers the following steps for sector analysis:

1. select sector;
2. map sector;
3. analyse employment trends;
4. identify key drivers of change;
5. analyse sector outlook;
6. analyse skills needs (quality and quantity);
7. identify skills gaps or shortages;
8. make recommendations.

Source: Gregg et al., forthcoming.



⁵⁸ According to the ILO, green jobs are defined as jobs that reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable. This definition covers work in agriculture, industry, services and administration that contributes to preserving or restoring the quality of the environment while also meeting the criteria for decent work: adequate wages, safe conditions, workers' rights, social dialogue and social protection.



4.10. Outcomes: reporting, dissemination and action

Once an analysis or project has been completed, it is essential that its findings are communicated to all those who can benefit from them.

Given the diversity of approaches covered under the general heading of 'sectoral', findings can also take many forms. Outputs can range from a single short report to a complex mix of concrete and less concrete forms. The process of simply taking part in a sectoral skills analysis can be important. For example, exposure to scenario development techniques can alter the mind-set of participants (although this kind of impact is not limited to just those techniques). This can have a major impact on policy-makers and policy-making in ways that are difficult to quantify.

The question of dissemination is tied up with issues of engagement and ownership. Good practice in the dissemination of the findings from such exercises can help to reinforce feelings of engagement and ownership by key participants.

However, it is often desirable to reach out to a much wider audience than those who are directly involved, either in conducting the analysis or participating in it.

The main audiences include:

- (a) policy-makers (government and agencies at national, regional and local level);
- (b) researchers and analysts;
- (c) sectoral bodies themselves;
- (d) employers;
- (e) employees;
- (f) investors;

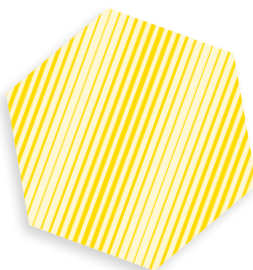
(g) education and training providers;

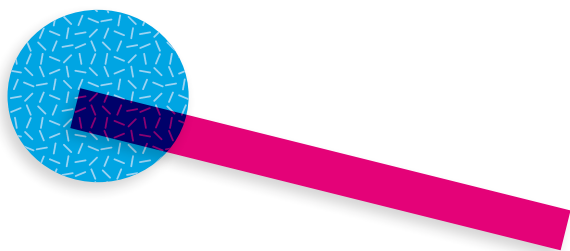
(h) individuals and their advisors.

Some, but not all, of these may be involved in designing the particular approach being followed. Others can be brought into the loop at the final dissemination stage. In many cases, one of the key objectives of the sectoral bodies involved is to act as a conduit for a flow of relevant LMI from the analysis to an appropriate audience; the UK SSCs are a case in point. This audience may include various TVET institutions, especially policy-makers and practitioners involved in education and training.

Different users of findings from sector-based approaches have different priorities. Policy-makers need information that can help them make choices about priorities for intervention. Education and training providers need more detailed information to help develop curricula and to decide on the numbers of places to make available on different courses. Employers want help in understanding the impact of technological change and other drivers on their markets: they want to know what that means for the types of skills they should employ. Individuals making career choices want to know what is going on in the labour market and what it means for their personal skills investment decisions.

The information can be used to help guide thinking on education and training courses to be run. It can help with questions on occupation standards and curriculum details and can also guide the scale of such courses with regard to numbers of places and people likely to be needed. This is managed very directly from the top down in a few countries, such as Singapore. In most cases, however, there is growing recognition that such complex processes cannot be planned from the top: decisions need to be made at more micro level,





although national governments are often loath to delegate for fear of losing control and this can lead to significant tensions. This applies to many developed countries, such as the UK, as well as to some transition and developing countries where a history of centralised planning still casts a shadow. Some developing countries such as Botswana and South Africa, have also experimented with top-down planning but the emphasis has shifted towards more market-oriented approaches.

Work on skills anticipation, whether at national or sectoral level, is invariably carried out on behalf of the government. The dissemination strategy is, therefore, usually focused on policy-makers rather than making LMI widely available to the general public. Germany is a good example, although the work of the PES there has a more general audience in mind, being focused on matching individuals searching for work with the jobs available.

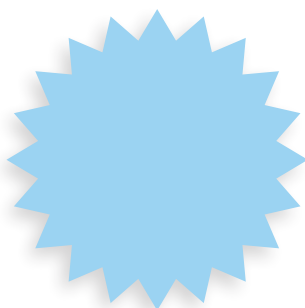
Some countries, such as the US and the Netherlands, have a much wider target audience in and the information generated is intended to inform all labour market participants about the situation they face and what their options are.

There are many possible uses for the data acquired; the focus is on the nature of trends and changes in the structure of the demand for skills. These can then be used to understand skills needs with aims such as:

- (a) influencing the nature and scale of investment in education and training by providers;
- (b) influencing the career choices of individuals, including career guidance in a lifelong setting;
- (c) better matching of supply and demand, including filling vacancies and reducing unemployment ⁽⁵⁹⁾;
- (d) better targeting of labour market policies;
- (e) regional development planning;
- (f) industrial policies.

Countries which have never conducted skills-related research need to be aware of all the various possibilities of the data collected from such work, relating to the past, present and future of skills use.

Box 20 presents several examples of outputs from some of the cases considered.



⁵⁹ Recognising that some level of vacancies and unemployment is inevitable and healthy in a well-functioning market economy.



Box 20. Examples of outputs from selected case studies

European Union skills panorama

The European Union skills panorama provides information and intelligence at pan-European level that aims to:

- help improve the capacity for skills assessment and anticipation;
- inform skills governance through the anticipation of skills needs;
- improve responsiveness of education and training systems;
- improve matching of labour supply and demand across Europe.

For more details, see <http://euskillspanorama.ec.europa.eu/>

For details of sectoral skills studies conducted by the European Commission's DG-EMPL, see <http://ec.europa.eu/social/main.jsp?catId=784&langId=en>

Ireland

Ireland has a general system for skills anticipation. It is similar to the UK in many respects. Sectoral studies are produced for a number of sectors, including manufacturing, construction and many service sectors.

For more details, see <http://www.skillsireland.ie/publication/egfsnSearch.jsp?tp=Sectors>

UK

Sector skills assessments are key sources of authoritative and focused sectoral labour market intelligence, designed to inform the development of skills policy across the UK. They combine top-down analysis of official data with bottom-up intelligence to provide a consistent, comparable and rich understanding of skills priorities within different sectors of the economy. The data cover the four UK nations. The sector skills assessment report for the agriculture, forestry and fishing sector was produced by Lantra, the SSC for land-based and environmental industries. Lantra is committed to helping land-based and environmental businesses access the training, qualifications, skills and workforce development essential to business success.

For examples of sector skills assessments in the Lantra agriculture sector, see <http://www.ukces.org.uk/assets/ukces/docs/publications/briefing-paper-ssa12-agriculture.pdf>

South Africa

Under the Skills Development Act, the Chemical Industries Sector Education and Training Authority (CHIETA) is required to prepare a sector skills plan every five years within the framework of the national skills development strategy. National skills development strategy III has five areas of strategic impact that drives CHIETA's planning process:

- equity impact in class, race, gender, age, disability and HIV/AIDS;
- programmes to support access, success and progression;
- pivotal programmes;
- skills programmes and other non-accredited short courses;
- programmes that build the academic profession and engender innovation.

For an example of a SETA sector skills plan (chemicals), see <http://www.chieta.org.za/chieta-downloads/viewcategory/16-sector-skills-plan.html>

Australia

For details of an ISC environment scan, see <http://www.isc.org.au/environmental-scans.php>

Czech Republic

For details of a Czech assessment, see <http://www.nuv.cz/file/330/> (Czech only).



The cases examined in Chapter 2 highlight the importance of:

- (a) institutional context, as in type of economy;
- (b) institutional infrastructure;
- (c) the existing statistical infrastructure, including other research and related activities as well as other surveys and relevant data sources.

Key characteristics of the cases include:

- (a) coverage;
- (b) key motivation;
- (c) audience;
- (d) components of research, including whether or not they involve primary data collection, modelling or other foresight methods;
- (e) complementary research that can help inform the results.

Many of the steps involved are not necessarily sequential and may be conducted simultaneously and in parallel. One of the objectives in many cases is to build up 'in-house' capability, capacity, knowledge and understanding.

4.11. Key sectoral approach steps

The key steps in any sectoral skills analysis involve:

- (a) clarifying the aims and objectives;
- (b) carefully defining the sector or sectors to be considered;
- (c) conducting a data audit;
- (d) consulting key stakeholders;
- (e) identifying the main target audiences;
- (f) clarifying the key questions to be addressed;
- (g) deciding how best to answer them (choice of methodology);
- (h) executing the analysis;
- (i) disseminating the findings and implications.

Other considerations to be taken into account include the general political and economic context and various constraints, financial and otherwise. Such considerations include:

- (a) the general economic and political context (market economy, centrally planned, mixed);
- (b) the state of economic development;
- (c) the political and cultural background;
- (d) the involvement of the social partners;
- (e) the institutional infrastructure, capabilities and capacity;
- (f) the existing statistical infrastructure, including the existence of other research and related activities, as well as other surveys and relevant data sources.

Carrying out the analysis can involve many different elements and other characteristics that are found in some, but not necessarily all, sectoral skills analyses. Key characteristics include:

- (a) the presence or absence of primary data collection;
- (b) the use of modelling or other foresight methods;
- (c) the role of interviews and other forms of consultation;
- (d) the classification and definition of the sector (limitations and benefits of using standards systems of classification);
- (e) a SWOT analysis;
- (f) technology scanning;
- (g) clusters;
- (h) qualitative profiling;
- (i) software (the use of standard packages such as Excel, SPSS, STATA or other more specialised software);
- (j) industry value or supply chain analysis;
- (k) complementary research that can help inform the results.

Essentially, this means:

- (a) establishing, based on solid evidence, where the sector is now as far as its skills needs are concerned;
- (b) thinking, in a consistent and transparent manner, about where it is going in the future in terms of changing skills needs.

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ANNEXES:

COUNTRY CASE STUDIES

These annexes provide an overview of the case studies used to illustrate and inform the review. They cover different approaches, all with a sectoral focus, including examples from developed, developing and transition countries.

In some cases, the focus is directly on a sectoral approach to skills anticipation and matching (as in the Portuguese sectoral studies). In others, the focus is more on institutional structures and how these can support skills anticipation and matching (as in South Africa and the UK).

In undertaking the review, it became clear that, in many countries, the role of the sector in skills anticipation has some general lessons for other countries, even though they are not presented as examples of sectoral analyses of skills per se (Germany, Italy and the US).

In each case, the aim is to highlight the key lessons, using a common template as follows:

(a) context: this includes key stakeholders and the role of the social partners plus some reference to the general economic and political context in which the studies or approaches have been carried out;

(b) key stakeholders and approaches: this involves clarifying policy and research objectives and defining the main challenges and primary questions that the approach is intended to address. It also covers the main methodology or combination of methodologies used to assess future skills needs or matching problems. It includes the key research processes and instruments adopted and how these are used to establish policy messages, recommendations and actions. Finally, it addresses how the particular method, study or approach complements others in the overall national system of anticipating skills needs;

(c) lessons learned: this refers to good practice and recommendations for replication. It includes costs and funding issues; key factors to ensure success; and steps to implementation;

(d) references and resources: this section contains further information for the reader who is looking for more material on the subject.

The case studies were intended to be concise, ideally about three pages in length. In some cases, more pages were added where it was felt they provided useful information and insight. The case studies are intended to be self-contained and self-explanatory.





Annex 1. Argentina

A1.1. Context

Argentina experienced a major economic and political crisis in 2001. Unemployment rose to nearly 20% and income inequality and poverty increased significantly (Gallart, 2008, p. 22). The economy recovered from the downturn by 2006 and it has performed well in recent years. The automotive, textile and power industries, in particular, grew at record rates.

Manufacturing and services are responsible for around 15% and 50% of employment, respectively. SMEs play a dominant role in employment, employing around three out of four employees (World Bank, 2006, p. 21). Employment in the informal sector is also significant, at around 60% of all employment (World Bank, 2006, p. 1). Employees in the formal sector have better access to on-the-job training opportunities; public training resources are also directed at this group.

The government is focused on creating a globally competitive, skilled workforce to reduce poverty and ensure sustainable, steady economic growth.

A1.2. Key stakeholders and approaches

The TVET system in Argentina is decentralised. Provincial governments have responsibility for service provision, financing and supervision of all non-university education in public and private institutions.

The fiscal credit regime, introduced during the 1990s, is a key national government initiative designed to promote skills training. It provides financial support to SMEs by reimbursing a percentage of their expenditure on human resources training via a tax credit certificate. It supports training projects that link on-the-job training and the procurement of equipment by the participating entities. Special benefits are available to train people in vulnerable employee groups.

Since 2007, 70 000 workers from almost 900 companies have been trained. Two-thirds of these companies were small and medium-sized enterprises (SMEs) (Ministry of Labour, Employment and Social Security, Argentina, 2011).

The Ministry of Labour, Employment and Social Security has implemented elements of a sectoral approach to skills anticipation and matching by promoting the establishment of sectoral bodies. Their role is to identify skills needs in specific sectors; develop skill profiles in some occupation areas; and generate training responses and recognition of prior learning processes. The sectoral bodies operate through social dialogue. They seek consensus between the different stakeholders to develop and implement short- and medium-term skill strategies by ⁽⁶⁰⁾:

- (a) selecting and strengthening training institutions in the sector;
- (b) engaging employees in certification and continuing education;
- (c) developing sectoral human resources development strategies;
- (d) matching skilled workers and companies in the sector.

The ministry launched a labour competency certification programme in 2004 with the aim of making training more relevant to employer needs. In this, tripartite teams of industry, union and government representatives identify the key skills for various occupations across different sectors and these become part of the curricula of training institutions. Employees are then trained and certified on the basis of these competencies. Relevant industry associations and federations are also consulted in the process. Recent data show that 23 sectors are covered, resulting in

⁶⁰ See <http://www.trabajo.gov.ar/consejossectoriales/index.asp?cat=4> (in Spanish).



190 competency standards and the corresponding evaluation instruments (Gallart, 2008).

The National Institute for Technical-Professional Education is a TVET institution accountable to the Ministry of Education. It has developed an initiative to create sectoral TVET networks partly linked to the Ministry of Labour, Employment and Social Security initiative. The institute has also been charged with establishing national guidelines and a regulatory framework for technical and vocational education across Argentina.

Some sectors have also developed their own institutions to promote skills development and to ensure that training is relevant to industry needs. The UOCRA Foundation was established by the Union of Construction Workers of the Argentine Republic (UOCRA) and the Argentine Chamber of Construction (CAC) in 1993. The aim of the initiative was to promote training and education for construction workers and aid their entry into the labour market. The foundation brings together stakeholders in the sector to promote the development of human resources. Besides UOCRA and the CAC, key stakeholders include the Statistics and Records Institute, the Sectoral Council for Certification of Competencies and Vocational Training, and the government.

The foundation set up the Network of Education-Work Institutions, which includes 30 vocational training centres in the public education system and two post-secondary institutes. It acts as a coordinator between vocational training and secondary and primary school. It also focuses on primary and secondary school completion (ILO/Cinterfor, 2012). Training programmes are based on mutually approved occupation profiles and competency standards and on the certification of competences.

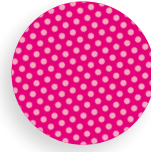
The foundation launched a national skills training scheme for construction workers in 2004 to provide training for secure, skilled employment in the sector. The scheme included on-site health and safety training and the strengthening of the network of training centres. It also set up a fund for research, training and safety to enable the construction industry to provide training in risk prevention and health and safety at work (Gallart, 2008). The foundation delivers specific training courses on request and provides assistance to training institutions, enterprises and workers.

The tourism sector has also established its own institutions for developing human resources. Like the UOCRA Foundation, the workers' union, UTHGRA, set up its own training programmes by concluding agreements with over 20 vocational training institutes throughout the country (ILO/Cinterfor, 2012). The business federation for the hotel and catering sector, FEGHRA, provides on-the-job training for member companies, mainly SMEs in the hotel and food service industries. Training in the sector is based on mutually approved competency standards.

Besides national initiatives for skills development, sectoral approaches have also been implemented at regional level. The TVET Council in Rosario operates in the municipality of the city of Rosario⁶¹). It was established by the trade unions and employers in the area as a not-for-profit organisation to develop local TVET. The general objectives of the TVET Council in Rosario are to help employees to acquire skills, reduce costs and improve the quality of courses. The council was inspired by the example of the Canadian sector skill council model. The council provides a platform for enterprises and unions to address local TVET issues and to improve learning results. Its governing bodies are bipartite, based on equal representation of employers and workers.



⁶¹ This section is based on Cinterfor: Technical and vocational training council, Rosario, Argentina: <http://www.oitcinterfor.org/en/>.



The council has identified key competencies across a range of occupations. It has also developed a methodology to identify training needs in sectors and individual companies and assessed training needs in key industrial sectors in the area. It has developed a certification process for trainers, instructors and workers for identified competencies.

The work of the council is supported by sectoral training committees, which comprise employers, employees and training institutions. Sectoral committees identify sectoral training needs, broker training agreements between industry and training institutes, design courses in line with industry needs, and trace training outcomes for monitoring efficiency and quality.

A1.3. Lessons learned

It is difficult to evaluate the sectoral skills anticipation system in Argentina as a centralised, coherent policy framework has not been implemented. The TVET system is decentralised and sectoral institutions are scattered across industries and regions.

Unions and business federations have established bipartite or tripartite platforms for sectoral skills development in construction and tourism. Their ownership of training institutions or training programmes ensures that the system is responsive to labour market needs.

The tax credit regime applied by the national government provides a strong incentive to engage SMEs in TVET.

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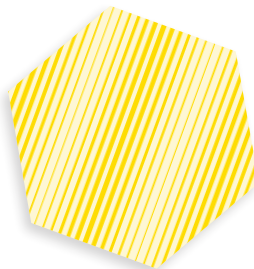
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Annex 2. Australia

A2.1. Context

The Australian TVET system operates across two tiers of governance: State and territory governments have jurisdiction over education policy and their training authorities administer TVET in their jurisdiction. These agencies are responsible for allocating funds, registering training organisations and accrediting courses. They play a key role in developing and endorsing training packages. The State training authorities are accountable to their minister, who is a member of the Council of Australian Governments' Standing Council on Tertiary Education, Skills and Employment. The sectoral approach is a key feature of the TVET system, with industry skills councils (ISCs) at national and State or territory level and advisory boards playing a central role in skills anticipation and matching.

Skills and labour shortages have been prevalent features of the Australian labour market for a number of years. While shortages in trade-exposed sectors have eased due to recent changes in the global economy, they prevail in other areas. Long-term challenges for the labour market include an ageing population and a slowdown in the growth of labour productivity. Addressing these issues by creating a highly skilled, world-class labour force has been the primary focus of the government's workforce development policies.

A2.2. Key stakeholders and approaches

In 2012, the Australian government established the Australian Workforce and Productivity Agency (AWPA) to take over the role of Skills Australia. The latter, established as an independent body to advise on skills and related issues, comprised representatives of academia, education and training provision, economics and industry.

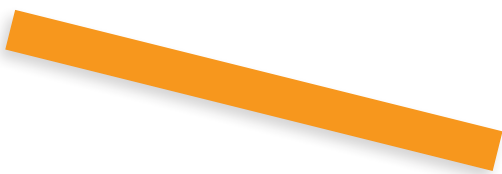
The independent AWPA extends the role and functions of Skills Australia, involving representation from both employers and unions. It has responsibility for directing skills funding to meet industry needs. AWPA engages directly with industry on workforce development issues and develops strategies to address sectoral and regional industry needs. AWPA is responsible for:

- (a) conducting skills and workforce research, such as research on the quality of jobs and future working life in Australia; this includes some responsibilities for skills anticipation in the workforce development strategy at national level;
- (b) providing independent advice on sectoral and regional skills needs to support workforce planning;
- (c) driving engagement between industry, training providers and government on workforce development, apprenticeships and TVET reform;
- (d) administering the new national workforce development fund and prioritising industry sectors, regions and groups for funding;
- (e) developing sectoral skills and workforce development plans in conjunction with ISCs and industry;
- (f) promoting workforce productivity.

One of AWPA's key functions is administration of the newly created national workforce development fund, an Australian government programme that supports the training of workers in areas of identified business and workforce development need. Rather than being financed from levies ⁽⁶²⁾, the fund is based on partnership between industry and government, with government funding supplemented by a contribution from employers. Additional funding is allocated to support upskilling and reskilling people over 50.



⁶² There is no uniform national or State training levy, though training levies exist in specific sectors. For example, the building and construction sector applies a training levy, but its rate varies across the States.



ISCs help to administer the fund, helping businesses identify their training needs, selecting a registered training organisation, and monitoring the implementation of projects.

ISCs bring together industry, training providers and governments to create a common, industry-led national agenda for skills and workforce development. Their key role is to represent industry in managing and planning TVET, developing training products, and providing advice on industry skills needs to national, State and territory governments. ISCs are independent, not-for-profit companies, governed by industry-led boards. They are bipartite in ownership and through the membership of their boards but are not required to have equal representation. ISCs are supported by the Australian government through base and project funding. The amount of funding received by each ISC varies in line with the number and size of sectors, enterprises, workforce and occupations it covers.

Initially established under the auspices of Skills Australia, the 11 ISCs are:

- (a) AgriFood Skills Australia;
- (b) Community Services and Health Industry Skills Council;
- (c) Construction and Property Services Industry Skills Council;
- (d) ElectroComms and Energy Utilities Industry Skills Council;
- (e) ForestWorks Industry Skills Council;
- (f) Government Skills Australia;
- (g) Innovation and Business Skills Australia;
- (h) Manufacturing Skills Australia;

- (i) Skills DMC (drilling, mining and civil infrastructure);
- (j) Service Skills Australia;
- (k) Transport and Logistics Industry Skills Council.

The formal roles of ISCs include:

- (a) collecting information on industry training needs from employers, unions and professional industry associations;
- (b) providing industry intelligence and advice on current and future workforce development and skills needs to AWPA, government and enterprises;
- (c) supporting the development, implementation and continuous improvement of training and workforce development products and services;
- (d) assuming primary responsibility for the development and maintenance of training packages (equivalent to competency standards);
- (e) providing independent skills and training advice to enterprises and matching identified training needs with appropriate training solutions;
- (f) coordinating the national workforce development fund in conjunction with AWPA.

ISCs do not provide training or assessment services, nor do they work with individual companies. They focus on strategies that serve the needs of the wider industry.

ISCs provide key labour market intelligence to AWPA and other stakeholders through annual 'environmental scans' of their respective industries. Each ISC prepares an environmental scan of the sector each year as an early warning system, providing a clear understanding of the factors currently shaping and impacting the sector and the implications for workforce development.





Much of the analysis conducted by the ISCs appears to be in-house, desk-based research and synthesis. However, it also involves engaging with relevant stakeholders, although this is explicitly recognised as informal and anecdotal.

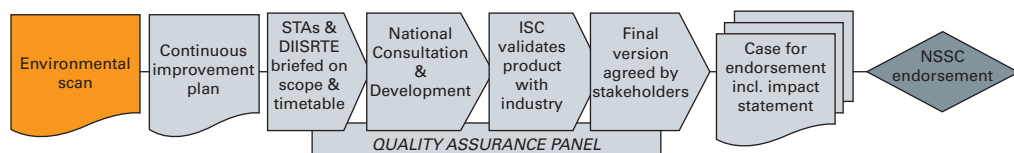
Some primary data collection is involved, typically small-scale surveys, targeted at particular groups and focused on topical issues. Although these may sometimes lack statistical credibility, they are regarded as a useful means of gathering up-to-date evidence.

Some ISCs have engaged in small-scale scenario development exercises, such as AgriFood Skills Australia's think tank. This mirrored more general work of a similar kind promoted by Skills Australia.

ISCs rely on general LMI (labour market information) provided by Skills Australia, AWPA and the Australian Bureau of Statistics. These centrally provided data are a cornerstone of their work.

They also rely on others for secondary analysis, including formal quantitative projections (such as the Centre of Policy Studies and the Centre for the Economics of Education and Training at Monash). The Monash studies are based on the use of a CGE (computable general equilibrium) multisectoral macroeconomic model which produces detailed employment forecasts by industry and occupation. These general results are used to produce more specific industry-level forecasts (Shah and Long, 2010). This is a good example of quantitative modelling work being used in a sectoral context.

Besides providing intelligence about industry skills needs to stakeholders, environmental scans form the basis for the development of training packages, which summarise the key messages about training needs in the sector and the implications for education and training providers. This is based on the following general model which was established in 2008:



Note: STAs are the State Training Authorities and DIIRTE is the Department of Industry, Innovation, Science, Research and Tertiary Education.

ISCs work as a network and cooperate to provide consolidated, formal advice to government on specific issues that affect skills needs across sectors. The Industry Skills Councils Forum report on training packages is an example of such work (ISC, n.d.; 2009; 2011).

States and territories have their own industry-led sectoral skills development networks, which also cover some of the same ground ⁽⁶³⁾. Industry training advisory bodies (ITABs) or industry training advisory

councils are autonomous, industry-led bodies that aim to identify and prioritise their industry's skills and workforce development needs. ITABs assist in the development of training products, provide training and career information resources, promote TVET in their industries, and support training providers. They are State-funded bodies, with funding tied to the provision of services to support critical areas of the TVET system.

⁶³ Various arrangements exist across the States and territories. The number of State-level ITABs are as follows: Australian Capital Territory (2), Northern Territory (6), Western Australia (10), Tasmania (1 + industry liaison officers), Victoria (ITABs were abolished in 2012), Queensland (11), South Australia (9), New South Wales (11).



Like the ISC environmental scans, most ITABs produce annual reports on change drivers, providing qualitative and quantitative information on current and future skills needs in their sectors and identify training solutions. Besides surveying industry to collect first-hand information, the reports use other methodologies and data sets to provide an analysis and broader context on industry skills needs.

The functions of ITABs significantly overlap with those of the ISCs. ITABs focus on industry needs at State and regional level, while ISCs focus more on the overall strategic development of their sectors and the national training system. ITABs often work together with their national ISC counterparts on different issues: attracting people into the industry; improving the industry's image; building workforce capability and engagement; and improving the quality of training delivery in thin markets.

The work of the ISCs and ITABs feeds into broader national skills policies and the national workforce development strategy through AWP. The first strategy was prepared in 2010 and the second was released in 2013 by AWP, using scenarios to identify long-term drivers of skills demand and supply. It also uses macroeconomic modelling to extract skill implications from the various scenarios. In the last phase, 'industry snapshots' are developed, combining the results from the scenarios, modelling and industry-specific data ⁽⁶⁴⁾.

Various national quantitative modelling and forecasting activities are conducted regularly. This includes the work of the Centre of Policy Studies and the Centre for the Economics of Education and Training, both based at Monash University, and Deloitte Access Economics, a private economics advisory practice (Koucký et al., 2010).

These quantitative projections include detailed analysis at State and sectoral level, which feed into the thinking of some ISCs.

The Australian National Centre for Vocational Education and Research (NCVER) also provides data and projections. Whereas the work of the Centre of Policy Studies and the Centre for the Economics of Education and Training deals with occupations and qualifications and covers the whole of Australia, NCVER is more narrowly focused on TVET-related issues ⁽⁶⁵⁾ including supply-side models for particular groups and an emphasis on generic skills.

A2.3. Lessons learned

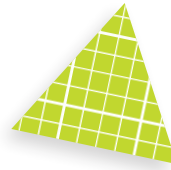
ISCs cover all sectors of the economy at both national and State level. The government supports them by providing funding and formally involving them in TVET policy-making. This is essential for building the administrative, research and governance capacities of the ISCs.

AWP works with the ISCs to formulate sectoral skills development strategies. It ensures that sectoral labour market intelligence feeds into the national workforce development plan. This approach seems effective in combining qualitative and quantitative intelligence from a broad range of sources, using sophisticated economic modelling and a rigorous analytical process.



⁶⁴ Australian Workforce and Productivity Agency: *Industry snapshots*: <http://www.awpa.gov.au/our-work/Workforce%20development/Pages/Industry-Snapshots.aspx>

⁶⁵ Some of these are more narrowly focused, such as Karmel and Mlotkowski, 2010.



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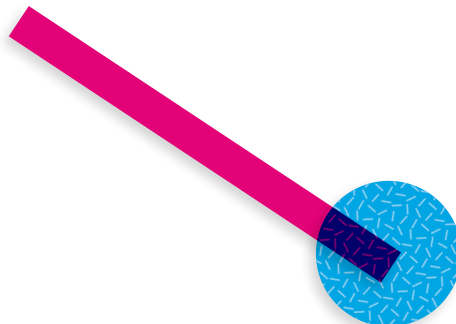
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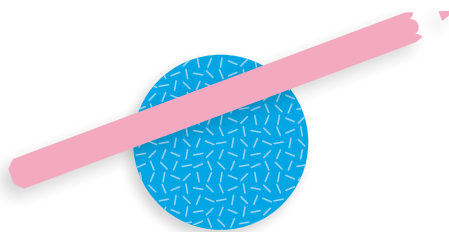
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Annex 3. Bangladesh

A3.1. Context

Economic growth in Bangladesh has accelerated during the past two decades. It has been accompanied by strong growth in the labour force and relatively low levels of unemployment. The labour market is still characterised by high levels of underemployment, low participation by women and low wages. Nearly half of those employed work in the agricultural sector; another quarter work in industry, while the services sector accounts for around 15% of employment (Nuttall, 2011).

The population of Bangladesh is growing, with a strong increase in the proportion of young people. Estimates suggest that the economy would need to create two million jobs every year to accommodate the influx of young people into the labour market (Nuttall, 2011).

The availability of a skilled workforce is seen as critical for future economic development and poverty reduction. The current supply of TVET graduates is seen as inadequate, both in quantitative and qualitative terms. Training quality issues – outdated technology, teaching methods and curriculum, lack of trained teachers and the relevance of training programmes to industry needs – are key concerns for the TVET system.

A3.2. Key stakeholders and approaches

Public TVET institutions are operated by various ministries. These include the Ministry of Labour and Employment, the Ministry of Education (Directorate of Technical Education), the Ministry of Agriculture and the Bureau for Manpower Employment and Training. The last of these focuses on training workers for overseas employment (Kashem et al., 2011).

The government of Bangladesh, together with international agencies, launched three development projects to reform the TVET system. These are: the TVET reform project (2008–12), funded by the ILO and the European Commission; the skills development project (2009–13), funded by the Asian Development Bank and Skills Development Council; and the skills and training enhancement project (2010–14), funded by the World Bank.

The TVET reform project primarily focused on skills development in the manufacturing and information technology sectors. Priority subsectors and skill areas were identified in the initial stages of the project using a two-stage methodology (Rahman et al., 2012).

First, the performance of subsectors was analysed from several angles: the subsector's share in total value-added; the share in total manufacturing employment; the trend in labour productivity; export growth; the trend in the growth of the value of assets; and the potential for employment for women. A number of subsectors were selected from these criteria. Productivity growth was also analysed by calculating total factor productivity. In the subsectors selected through this process, future skills needs were initially identified using a small-scale enterprise survey and then further developed using sector strategic plans. Measures were proposed to support skills development in these sectors: identifying skills demand and matching demand with supply; enhancing the capacity of TVET institutions to offer courses that industry wanted; establishing mechanisms by which industry can provide input into TVET; and strengthening the links between industry and TVET institutions.

To encourage industry engagement, the project assisted the establishment and operation of five





industry skills councils (ISCs). These councils focus on agri-food processing, transport equipment (such as ship-building), leather and leather products, information technology and tourism. ISCs bring together major enterprises and industry bodies to provide specific advice on occupations and skills in demand and to identify key skills project priorities in their sectors. The ISCs operate as tripartite committees, involving representatives from employers, employees and government. They are set up within centres of excellence or as committees within industry-led associations. According to their terms of reference, the ISCs (Ministry of Education, 2011):

- (a) monitor skills development practices and address deficiencies;
- (b) formulate industry-specific skills development plans and practices;
- (c) advocate and aid workforce development activities in industry;
- (d) develop industry's capability to deliver skills training and upskill employees;
- (e) advise the National Skills Development Council on demand for skills;
- (f) provide leadership and strategic advice on skills development needs and priorities;
- (g) support the delivery of industry-related training and/or professional development programmes for instructors and trainers;
- (h) contribute to the development and review of skills standards and qualifications and participate in the development and review of new training curricula;
- (i) support the strengthening of industrial apprenticeship programmes;
- (j) develop partnerships with training providers.

So far, the ISCs' formal status is limited to being recognised by the Bangladesh Technical Education

Board as the key contact point for standards and curriculum development in their sectors. Donor-funded projects support the establishment of the ISCs. Their financial viability depends on the passing of the National Skills Development Council Act, which will formalise their status and allocate public funding for their operations. The ISCs are expected to become self-funded through membership fees and other commercial activities in the future.

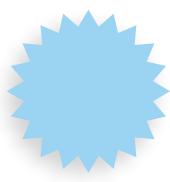
Drawing on experiences from the TVET project, similar skills bodies, known as sector working committees, were established under the skills development project. These committees are active in construction, light engineering and ready-made garments and in the informal economy. The terms of reference for the sector working committees are the same as for the ISCs. They are expected to become legally constituted ISCs once they are fully operational and the membership is reviewed to ensure appropriate sectoral representation.

A further component to improve skills anticipation is a strengthened and more integrated skills data system, currently under development. It will be overseen by the National Skills Development Council and its secretariat. The secretariat will be responsible for integrating and analysing data on both skills supply and demand. The ISCs will collect and provide data on industry skills needs for the new skills data system. A detailed national skills demand survey is also being conducted with inputs from the ISCs to complement the existing LMI (labour market information).

A3.3. Lessons learned

Sectoral skills anticipation and matching is still in its early stages in Bangladesh. The ISCs have been operating with mixed success since their establishment and it is too early to evaluate the effectiveness of the sector working committees. The more successful ISCs have been able to overcome initial resistance from industry-led bodies, which were



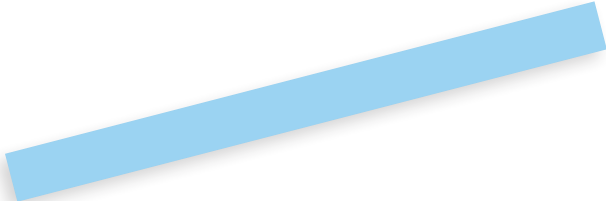


suspicious of the ISCs as their role cuts across issues that traditionally have been championed by these bodies. The ISCs have (ILO, 2010):

- (a) engaged key industry associations and individuals;
- (b) developed and articulated a shared vision and action agenda for the sector's future;
- (c) established formal links to industry centres of excellence;
- (d) been established in sectors where TVET is the main source of skills for the sector.

For industry to engage, ISCs need to be able to offer value and a return on investment, in addition to the work on standards and curriculum, which is often the initial focus of these bodies.

The TVET reform project produced a number of findings relevant to the establishment of sectoral bodies. Some of these are listed here (based on Rahman et al., 2012).

- (a) The relevance of training to industry needs can be improved by formally involving employers in the management and advisory councils of training institutions. Allowing greater autonomy to publicly financed training institutions can also help.
 - (b) To improve the responsiveness of the TVET system to industry needs, employers and employees need to be represented on TVET development committees, particularly those dealing with the development of skill standards and national qualifications.
 - (c) Subsector working committees can be established in priority subsectors to identify training and skill requirements for key occupations.
 - (d) LMI, particularly tracer studies, can provide important feedback on the performance of the training system. Tracer studies provide information on the labour market status of graduates and on how training gets used.
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Annex 4. Botswana

A4.1. Context

Botswana experienced considerable economic development over the past four decades and has recently become a middle-income country. Economic growth has been primarily driven by the mining and resources sector, in particular diamonds. To mitigate the vulnerability of heavy dependence on diamond mining, the government launched a number of initiatives to diversify the structure of the economy, aiming to become a knowledge-based economy by developing the country's human resources.

The labour market is characterised by high levels of unemployment, particularly for young people and unskilled workers. The share of formal sector employment is nearly 50%, which is high compared to other developing countries⁶⁶. The skill levels of the workforce are generally low: every second person is unskilled, one-third of the workforce has intermediate skills and only 16% have higher-level skills (Neill, 2012).

Participation in TVET is low, as it seems to offer only limited levels of opportunity to graduates. Training provided by many institutions is poor quality, as graduates lack critical skills and do not meet employer requirements. The responsiveness of the training system to labour market needs is weak.

A4.2. Key stakeholders and approaches

Various approaches have been applied to skills anticipation in Botswana. In the 1980s, the Ministry of Finance and Development prepared annual manpower plans using a top-down, traditional, manpower planning approach. Later manpower projections were prepared using the macroeconomic model of Botswana. From the 1990s, a bottom-up approach to planning was introduced which focused on education supply. The last

draft manpower development planning report was prepared in 2004, but then manpower planning was abandoned again due to capacity and data issues (Ministry of Communications, 2009). Demand-driven human resources development planning has been introduced recently. With this approach, labour market demand for skills is anticipated over time and the education and training system is set to support the delivery of appropriate supply.

The central element of the new approach is the national human resource development strategy launched in 2009. This recommended the production of a national human resources development plan using a sectoral approach. The plan will be preceded by detailed sector-specific plans, produced under the supervision of sectoral committees.

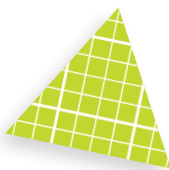
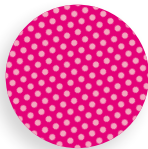
The new sectoral approach focuses on key sectors of the economy, which represent national priorities given their strategic importance and growth. These include 'driving' and 'enabling' sectors. Current drivers are sectors such as mining and resources, tourism, financial and business services, transport and communications, manufacturing and commercial agriculture. Enabling sectors are potential future drivers such as health, education and training, ICT, research and innovation, and science and technology (Ministry of Education and Skills Development, 2009, p. 25).

The new sectoral approach is based on partnership between stakeholders, including government, employers, employees and unions, civil society, education and training institutions, to ensure comprehensive planning and commitment to the success of the sector.

The Human Resource Development Council (HRDC) plays a central role in preparing and implementing the national human resources development plan. Among



⁶⁶ Ministry of Education and Skills Development (2009, p. 15).



other tasks, the HRDC is responsible for (Ministry of Education and Skills Development, 2009, p. 36):

- (a) advising the government on human resources development matters;
- (b) coordinating policy between education and training and employment;
- (c) planning and forecasting skill requirements at national and sectoral level and assessing any mismatch between demand and supply;
- (d) formulating sector-specific human resources development plans;
- (e) coordinating a national human resources development database to assist forecasting and matching;
- (f) addressing unemployment through retraining and national internships;
- (g) administering the training levy and the vocational and tertiary education training fund;
- (h) overseeing the skilled migration and reverse migration strategy;
- (i) publishing an annual performance report on national human resources development.

The HRDC is governed by an expert board of 15 to 20 members, including two international experts in tertiary education and human resources planning (Human Resource Development Advisory Council, 2010).

Sectoral committees are established in key strategic sectors of the economy, providing a platform for stakeholders to identify skills needs and develop actions to address them. Members of the committees represent employers, employees and unions, the government, education and training organisations,

experts and community organisations. The key tasks of the sectoral committees are preparing sectoral human resources development plans and providing a link between their respective sectors and the HRDC. They are also responsible for (ibid. p. 24):

- (a) advising the HRDC on emerging trends and training and skills needs in the sector;
- (b) developing measures to address mismatches between skills demand and supply;
- (c) providing a link between education and training institutions and employers to ensure that the training system is responsive to labour market demand;
- (d) developing on-the-job training with employers;
- (e) monitoring the implementation of apprenticeship programmes;
- (f) cooperating with other sectors to identify cross-sector occupations and skills;
- (g) stimulating employer investment and commitment to training.

A coordinated approach to the collection and management of data and the development of appropriate labour market intelligence capacities is critical to the success of the new approach. Under the HRDC, the national Human Resource Development Planning Committee will provide various inputs: global and local labour market monitoring; labour market observatory functions; human resources development impact assessments for major projects; and human resources development database and information systems.

The Botswana Training Authority ensures that LMI is considered when developing training programmes and





curricula, which are revised every five years. It runs tracer studies, stakeholder forums, surveys and interviews to identify future skills needs. Employers, trainees and trainers are involved. The authority conducted a study on priority skills in 2010, which identified the critical and priority skills needs of Botswana over the next five years. Research tools included the job opportunity index, surveys, interviews, consultation meetings, focus group interviews and a prioritisation method (Phiri and Motsisi, 2012).

A4.3. Lessons learned

Sectoral skills anticipation is still in its formative stage in Botswana. A comprehensive and coherent conceptual framework for the new approach has been developed and approved. Sector-specific and national human resources development plans are not expected to be completed until 2016, so information on the effectiveness of the approach is not yet available.

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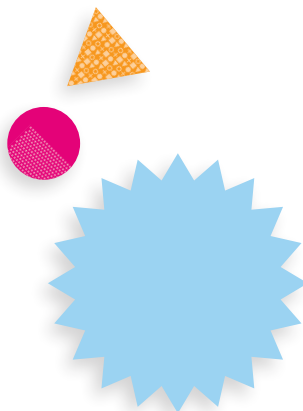
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Annex 5. Brazil

A5.1. Context

Brazil is Latin America's largest economy and the world's fifth-most populous country. Its economy has been rapidly growing in recent decades and is seen as one of the most dynamically expanding economies in the world. The economy has traditionally been supported by the exports of agricultural and primary goods. Over the past couple of decades, however, the services sector has become the main driver of growth.

The recent global financial and economic crisis only affected the country mildly, as reflected by the temporary rise in unemployment in 2009. To strengthen the economy, the government announced the 'Brasil Maior' plan in 2011. This included tax incentives for labour-intensive sectors that are sensitive to international competition. It also focused on innovation, investment and industrial development measures. The government also announced a national programme of access to technical schools and employment (Pronatec); this aims to create an additional eight million vocational training places to support the competitiveness of the economy (Economist Intelligence Unit, 2012, p. 7). Education policy measures focus on addressing both quality and quantity challenges in vocational training and education in general.

Many industrial sectors, including oil and gas, civil construction and automotive, face a shortage of talent and a lack of skilled workers. Multinational companies have identified skills shortages as a key issue; many have developed internship programmes, increased spending on training and wages, and transferred workers from other areas to secure necessary skills.

Participation in vocational training and higher education is generally low in Brazil. The promotion of vocational training may be particularly challenging in rural areas and in the informal sector, which still accounts for over 40% of employment (ILO, 2012).

A5.2. Key stakeholders and approaches

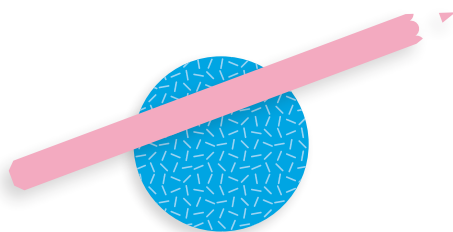
Approaches to skills anticipation include labour market observatories, vocational training institutions and technical advice forums. The key objective is to identify industry needs, including the needs of specific companies or groups. The approach is competency-based with a sectoral focus, and the social partners work together to identify skills needs and competences (Vargas, 2012).

A key feature of sectoral skills development in Brazil is the network of industry-led institutions providing training services for the industrial (SENAI), commercial (SENAC), transportation (SENAT) and rural (SENAR) sectors. While these institutions are mainly financed through a compulsory payroll tax, they are managed by industry bodies, creating a strong link between vocational training and labour market needs. These institutions are based on a partnership between government organisations and stakeholders such as employers' associations, rural labour unions, cooperatives and other associations in their respective sectors. Their organisation structure is decentralised across regional administrations and States and is flexible, in line with the availability of resources and labour market demands (Gomes, 2004).

SENAI is the network of regional industry federation training services. It was founded in 1942 to support Brazil's industrial development. Its mission is to promote vocational training and technical education, stimulate innovation in industrial technologies and increase the competitiveness of Brazilian industry (Arruda, 2011). The SENAI network is part of the National Confederation of Industry (CNI).

SENAI provides a range of technical education and vocational training products: apprenticeships, qualification courses, technical courses, undergraduate training, and postgraduate training. It also offers technology and innovation services, such as technical assistance, technology transfer and applied research.





Priority actions for SENAI to support skills development in the industrial sector include (Arruda, 2011):

- (a) expanding the skills certification programme nationwide;
- (b) increasing the supply of courses in line with labour market needs;
- (c) developing training programmes for teachers, technicians and managers;
- (d) maintaining and updating facilities and technologies;
- (e) expanding SENAI's distance learning network;
- (f) evaluating the education process systematically.

SENAI has autonomy over the research activities of its members and research cooperation between them is ad hoc. To anticipate skills needs, the National Department of SENAI has developed a framework using foresight modelling and scenario planning. The first foresight study was prepared in 2004, aiming to capture technological and organisation change in industry and its impacts on future training and qualification needs in both quantitative and qualitative terms. The process is managed by an executive group comprising technical experts, academics and business representatives, who are both the producers and users of the information generated.

The foresight model develops sectoral prospects at national level, including modules for technology foresight, organisation foresight, analysis of emerging occupations, analysis of occupation trends and vocational training responses. The results of these modules are integrated and fed into the Antenas Temáticas, a workshop-like event, where the executive group discusses and analyses the outcomes, then generates recommendations for the National Department of SENAI for vocational training and

technical and technological services for the particular sector.

The recommendations generally relate to:

- (a) the provision of new courses;
- (b) changes in curriculum design;
- (c) the provision of new technical and technological services;
- (d) updating and training for trainers;
- (e) new studies.

The results of the foresight exercise are released in various publications on the National Department of SENAI's website. The recommendations are also published. In addition to providing information to students, researchers and industry, the results feed into continuous monitoring of occupations to support the National Department of SENAI in developing skills strategies.

The National Department of SENAI carried out scenario planning in 2010. Its aim was to provide a sound analytical basis for strategic planning to 2024, in order to avoid possible future mismatches between the supply and demand in its professional education services (CNI and National Department of SENAI, 2010). For this exercise, the National Department of SENAI used a methodology developed by the Global Business Network, a consulting company. Four scenarios were developed by considering possible future outcomes: the macroeconomic and political and institutional context; the technological context; the technical and vocational education training context; and the technical and technological services context. Qualitative variables were identified by consulting with experts in individual structured interviews and expert panel discussions. To determine the impacts of





technology change, technology diffusion paths and occupation impacts were identified in expert interviews. Employment projections in each scenario were prepared using quantitative modelling and then disaggregated to occupation-level employment projections, which were mapped to demand for the corresponding qualifications. The final results showed the demand for workers with low, medium and high qualification levels in each scenario.

Prospective studies are also carried out by regional observatories in the Brazilian State of Paraná. These include the Observatory for Prospecting and Disseminating Technologies, the Observatory for Prospecting and Disseminating Social Initiatives (SESI) and the Observatory for Industrial Development (Instituto Euvaldo Lodi) (Paris Dionisio, 2012). These bodies were created specifically to conduct prospective studies on the future of industries and society in the State. In a recent study, the observatories analysed future skills demand by identifying promising future industry sectors and strategic routes for them and developing professional profiles for this future. A total of 222 professional profiles in 12 economic sectors were prepared. SENAI also conducts prospective studies in Paraná for other States on a contract basis.

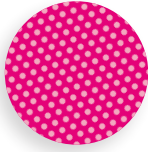
A5.3. Lessons learned

The SENAI network is decentralised at regional level in Brazil and its members are part of the industry federation. This ensures that they provide services that meet local industry needs. The studies for skills anticipation offer a number of benefits: they can integrate an extensive range of information, provide a shared vision across stakeholders, and support development of joint recommendations. The involvement of stakeholders can increase commitment to outcomes.

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Annex 6. Canada

A6.1. Context

Though the Canadian economy experienced a slowdown due to the global recession and the deceleration of the US economy, the outlook remains positive, due to the strong demand for Canada's resources. The effects of the downturn have been more pronounced in internationally competitive sectors, such as manufacturing while sectors servicing the domestic markets, such as construction and services, are faring better.

The labour market needs to respond to the structural adjustment of the economy. As labour market pressures and skills shortages in certain areas have eased, the reskilling of displaced workers has become a key issue. As the economy recovers, pressures related to population ageing, increasing global competition and rapid technological change are expected to re-emerge. Upskilling is key to creating a highly skilled and adaptable workforce and addressing skills shortages.

The Canadian government's workforce development strategy focuses on three priorities to address these challenges: updating the skills of the existing workforce; addressing the needs of groups with special needs (young people and the Aboriginal population); and increasing the participation of foreign-trained professionals and new migrants.

A6.2. Key stakeholders and approaches

The central element of the sectoral skills development approach in Canada is the sector council programme. Sector councils are partnership organisations that operate as platforms for employers, employees, education providers, government and other professional associations. Their key objectives are to identify skills and training needs and human resources

issues in their industries, develop solutions to meet these needs, and ensure that the training system is responsive to the industry's needs. They are independent, not-for profit organisations, governed by a tripartite board of directors. The boards have a strong focus on industrial relations and must include employers and employees, regardless of whether or not they are unionised. They must represent the subsectors. The industry partners decide on the actual composition of governance.

The 33 sector councils currently in place represent key sectors of the Canadian economy and operate at national level. The number of councils varies in response to changes in the structure of the economy. Councils can be established once key industry stakeholders recognise the need to identify and address skills issues and agree to work together.

Sector councils undertake various activities to meet emerging skill requirements, address skills and labour shortages and build essential skills in the workplace. Their tasks include:

- (a) providing labour market intelligence in the form of sectoral studies, labour market forecasting and analysis;
- (b) formulating skills profiles and national occupation standards to promote skills standardisation;
- (c) developing skills development tools, career information and youth work experience programmes;
- (d) developing human resources management tools to help employers recruit and retain workers;
- (e) designing targeted recruitment and skills development initiatives for community groups (Aboriginal people, immigrants and foreign-trained workers).





Sector councils are funded by the federal government through core funding (for recurrent expenditure) and project funding. Funding varies between councils, as it depends on the level of activities and the delivery of government policy by the councils (Sung et al., 2006a).

Canada has used a sectoral approach to skills development since the 1980s. The first sector councils were initiated by the industry associations and unions. For example, the Canadian Steel Trade and Employment Congress was established in 1985 as a joint venture between Canada's steel-producing companies and the United Steelworkers Union. Other sectors set up similar institutions, including the Mining Industry Human Resources Council and the Canadian Automotive Repair and Service Council (Cardozo, 2010, pp. 14-25). The current network of sector councils was initiated by the Canadian government as part of the sector council programme in 1993. The programme's basic objectives were to promote workplace learning and training in line with industry needs and to increase business investment in training by providing contributions to employers. The budget was expanded in 2001 in line with government goals to extend coverage of the sector councils to 50% of the workforce and to strengthen their influence. Since 2004, the programme has been integrated with the government workplace skills strategy. It is managed by Human Resources and Skills Development Canada (HRSDC), under its broader role to promote skills development, support labour market participation and inclusiveness, and ensure an efficient labour market⁶⁷.

Sector councils operate in a two-tier system across Canada's 10 provinces and two territories. Funding for labour market development initiatives comes from the federal government. However, provinces develop labour market programmes and education and training systems according to their own priorities; national sector councils need to consider these regional differences when developing tools and services.

The sector council programme provides some leverage over the provincial governments' education and training policy for the federal government.

In addition to national sector councils, some provinces (Manitoba, Quebec and Nova Scotia) also have parallel systems of regional skills development organisations.

The sector council programme also supports skills development through other organisations, known as skills tables, which are regionally focused. They operate on similar principles to sector councils but are intended to be temporary and cross-sectoral. Their remit is to address labour market requirements and skills gaps in priority subsectors of a region. So far, only one skills table, the Asia Pacific Gateway Skills Table, has been established.

The Alliance of Sector Councils (TASC) is the coordinating body for national sector councils and similar organisations. It supports the work of sector councils in several ways: providing leadership and promoting the sector council approach; sharing best practices; aiding collaboration between sector councils and identifying common priorities; mentoring emerging councils; and commissioning research to support a common agenda for sector councils.

Sector councils are involved in the collection, analysis and dissemination of LMI. The scope, methodology and rigour of the work depend on the particular research issues and specific industry needs. They are also determined by the council's coverage and its research capacity. The labour market intelligence disseminated by the sector councils ranges from skills demand and supply forecasts, based on economic modelling, to analysis of first-hand labour market data and human resources information. While sector councils are effective in meeting the information needs of their respective stakeholders, their research efforts are not integrated into a common framework that could create synergies.

⁶⁷ Employment and Social Development Canada: *Funding: sectoral initiatives*: http://www.esdc.gc.ca/eng/jobs/lmi/sectoral_initiatives/index.shtml



Some councils, including those involved in tourism, construction, information technology, environment, electricity, mining and petroleum, have established advanced frameworks for data collection and forecasting⁽⁶⁸⁾. Others provide various forms of labour market intelligence, often through occasional sectoral studies or specific reports. Some councils act as consultants to provide targeted labour market intelligence to particular employers or subsectors. Besides building their research capacities, these projects also generate funds for them.

At national level, the Policy Research Directorate in HRSDC produces detailed, 10-year labour market forecasts using the Canadian occupation projection system⁽⁶⁹⁾. This uses various models to identify likely medium-term trends in the level, composition and sources of labour demand and supply for 140 occupations. Ultimately, the models help to identify occupations where imbalances are likely to develop or persist over time. The results are available at national level only, by broad skill level or by broad occupation group. This projection system offers a useful framework for SSCs and other stakeholders involved in skills anticipation.

A6.3. Lessons learned

The Canadian sectoral system has been effective in adapting to changes in the structure of the economy and in capturing emerging trends. This is reflected by the changing number and coverage of sector councils. Their activities have also expanded from supporting restructuring through training initiatives to broader workforce development issues.

Engagement and coordination remain key challenges for the sector councils because they operate across geographically dispersed industries, sometimes overlapping with provincial sector councils.

Stakeholders recognise the importance of a national, cohesive approach to skills and training issues and

more effective implementation solutions. The phased rollout of the government's workplace skills strategy should support this approach.

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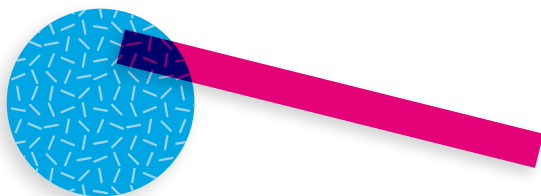
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⁶⁸ See, e.g. the Construction forecasts website: <http://www.constructionforecasts.ca>; the Alberta's labour market link: <https://alberta.labourmarketlink.com/> and CTHRC (2012).

⁶⁹ See <http://www23.hrsdc.gc.ca/l.3bd.2t.1ils@-eng.jsp>



Annex 7. Czech Republic

A7.1. Context

The Czech Republic ⁽⁷⁰⁾ has seen dramatic changes over the past 25 years. Working within the framework of the EU, it has transitioned from a centrally planned state to a market economy.

Sector skills councils (SSCs) were set up in 2007 to focus on sectoral skills needs. This was a response to the growing dissatisfaction of employers with the quality and quantity of graduates and, in particular, their field of study. The SSCs' main task is to develop up-to-date occupation profiles that will become the basis for changes in school programmes, especially in upper secondary education. Their second task is to develop sectoral labour market strategies to deal with major skills mismatches. They do this using sector skills agreements.

SSCs were set up to cover all parts of the economy and there are currently 29. Some sectors still do not have their own SSCs, although this gap may be filled in the future. Some SSCs were based on existing institutions, such as industry associations.

SSCs currently conduct little or no research on anticipated future skills needs or mismatching. They have had to concentrate on the major task of developing a national occupations framework. This is aimed at identifying current skills needs and tasks for key occupations.

Although SSCs were supposed to be able to develop their own labour market analyses, the Ministry of Labour has not been in a position to finance such activity across the board for all SSCs. It has funded some pilot sectoral studies, which have been carried out primarily by a private not-for-profit organisation, the National Training Fund (NTF).

Only those involved in developing sector skills agreements needed the more detailed information

which the NTF outlined in ad hoc sectoral case studies. For the engineering SSC, this took the form of a short sectoral study. Other industries needed occupation profiles (similar to those in O*NET) for the occupations that were their responsibility, including agriculture, food processing, transport and logistics, glass and ceramics.

No central agency coordinates SSC activities: a consortium of three main players is responsible for this and for developing the national occupations framework:

- (a) the Confederation of Industry of the Czech Republic ⁽⁷¹⁾, which generally represents larger companies;
- (b) the Czech Chamber of Commerce ⁽⁷²⁾, representing mostly SMEs;
- (c) the company Trexima ⁽⁷³⁾, which provides methodological and administration support and is also responsible for information technology solutions (such as the portal and database for the national occupations framework).

SSCs cooperate closely with the National Institute for Education ⁽⁷⁴⁾, which is responsible for adopting the required changes in school programmes. The institute's employees are members of the relevant SSC. Most SSCs also have education and union representatives among their members.

While the social partners play a role, they are perhaps not as involved as they would be in some other parts of the EU.

There is still no overarching institutional framework to support and finance further sectoral studies across the economy. Plans to develop such a system have been mooted. While the desirability of developing 'evidence-based policies' is recognised in principle, constraints on resources limit what is possible in practice.

⁷⁰ This case study is based on detailed correspondence with, and contributions from, Jiri Branka, without whose help the study would not have been possible.

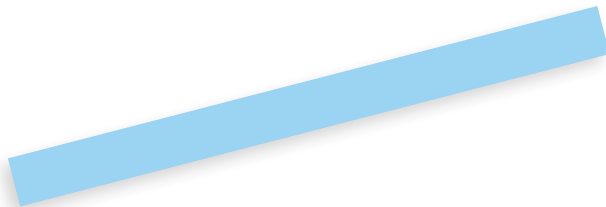
⁷¹ See <http://www.spcr.cz/en>

⁷² See <http://www.komoracz.eu/>

⁷³ See <http://www.trexima.cz>

⁷⁴ See <http://www.nuv.cz>





All the examples presented here were either carried out as one-off research projects or as part of 'system projects'. The aim of the latter was to create a methodological and institutional base for nationwide frameworks and policies (such as an information system to support continuing vocational education and training).

Funding for the studies was provided centrally, usually from EU structural funds. These were made available through 'operational programmes' run by the Ministry of Labour and Social Affairs or the Ministry of Education, Youth and Sports. Minor contributions were provided from the State budget.

Most of the research and analytical work has been conducted by units such as the NTF rather than by the sectors themselves.

The studies carried out so far aimed to develop and test different methodologies, using one or two sectors as examples. This was intended to serve as a basis for a nationwide system covering more sectors but such a system has not yet been implemented.

A7.2. Key stakeholders and approaches

The Czech Republic has seen some inward investment in areas such as manufacturing, though this has only partly offset the longer-term shift away from primary and manufacturing employment in favour of services and the knowledge economy. The main challenges for the sectoral studies relate to the need to meet the changing requirements of the economy as it has adjusted to this shift.

The specific focus of the studies varies significantly, depending on the priorities of the main client for the work. Much of the focus has been on testing different methodologies.

The Czech Republic has tried to build on good practice in other market economies. A strong sectoral focus has

been a distinctive feature. UK SSCs were a major inspiration for the SSC system in the Czech Republic, while the methodologies for sectoral studies were developed mainly based on experience shared by experts from the UK and Ireland.

Sectoral studies provide in-depth analyses of the skills needs of the economy over a five- to 15-year horizon. Sectors are usually defined by the EU's statistical classification of economic activities (NACE). Over the last six years, five detailed sectoral studies were carried out in the Czech Republic:

- (a) *Future skill needs in energy utility sector* (NACE rev 1.1 – 40) in 2007–11 (carried out in 2006, updated in 2008 and 2012);
- (b) *Future skill needs in ICT services* (information technology professionals in all economy sectors) in 2008–20 (carried out in 2008);
- (c) *Future skill needs in electronics and electro engineering industry* (NACE 30-33*) in 2008–20 (carried out in 2008);
- (d) *Future skill needs in automotive and mechanical engineering sector* (NACE rev 2, 28-29) in 2012–16 (carried out in 2011);
- (e) *Future skill needs in space research industry* ⁽⁷⁵⁾ (not defined by NACE), carried out in 2012 (not yet published).

Two studies were also carried out at regional level:

- (a) Employment and the labour market in ICT services and evaluation of their development potential in selected regions of the Czech Republic;
- (b) Employment and the labour market in electronics and electro engineering industry (NACE 30-33) and evaluation of their development potential in selected regions of the Czech Republic.



⁷⁵ Given the small size of this particular industry in the Czech Republic, the study is shorter than regular sectoral studies.



All these sectoral studies were carried out by the NTF. They were commissioned for different customers and different purposes and so use different methodologies. The first three studies, carried out between 2006 and 2008 (on the energy sector, information and communications technology (ICT) services and electronics and electro engineering) were research projects with the main goal of developing and testing suitable methodology. They comprised:

- (a) a focus on key features of the sector and its related labour market: recent trends in sector and employment structure, investments, regional structure, sensitivity to global economic development; this part is usually based on desk research and data analysis (business surveys, labour force surveys, PES data and other sources);
- (b) quantitative inputs from the ROA-CERGE forecasting model;
- (c) analysis of the supply or value chain for the sector – focusing on the structure of companies and employers (not necessarily according to NACE, but on the level of complexity and the nature of value added) as a factor influencing global competitiveness in the sector and the demand for skills; a detailed, micro-level analysis of employers and interviews is needed for this part of the survey;
- (d) strategic analysis of key trends influencing the sector in the years to come, using scenario development techniques;
- (e) labour market demand and its future development, based on in-depth interviews and analysis of labour force survey microdata, highlighting issues such as an ageing workforce and implications for skills demand;
- (f) key sector challenges, summarising major findings of previous chapters;

- (g) profiles of key occupation groups, based mostly on labour force survey and PES data (trends in employment and vacancies, age and qualification structure).

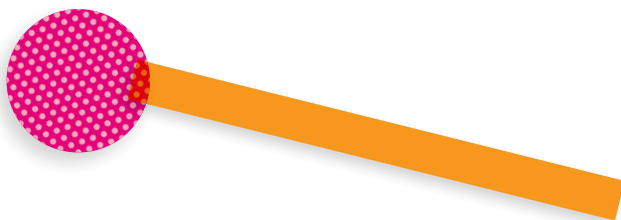
The studies on the energy sector (2006) and on the electronics and electro engineering sector (2008) were based on traditional sector identification using the relevant NACE codes.

The study on ICT services adopted a different approach; ICT occupations are not sector-specific and most people of interest work outside the narrowly defined, NACE-designated ICT sector. The study analysed ICT experts across all sectors, focusing on current and future demand for their skills. The supply side was also covered, including forecasts of graduates over a five-year period.

The Independent Energy Commission was the direct customer for the energy sector study update in 2008. The commission had already developed its framework for a long-term energy strategy for the Czech Republic; the sectoral study was designed to determine the skills that would be needed to meet this long-term strategy. Its aim was also to highlight major current skills mismatches at a secondary and tertiary education level.

The study on the automotive and mechanical engineering sector in 2011 was designed to support the engineering SSC in carrying out its sector skills agreement. Such agreements are aimed at resolving skills mismatches in occupations with ISCED 3–4 level education, the level at which many employers currently feel they have major problems in filling vacancies. Therefore, the study concentrated on lower- and middle-level occupations and fields of education it mainly used the same structure as the previous forecasting studies described above.





This study also introduced a chapter on labour market supply and its future development, based mainly on a forecast of graduates in key education fields. Other approaches tested for the first time in this sectoral study were analyses of job seekers and job vacancies for key sector occupations. As the Czech Republic does not have a national employer survey, analysis was based on detailed data from the PES. The shares of job vacancies not covered by these microdata were estimated. Because of the sectoral study's objective (to analyse current and short-term issues) the forecasting of future labour market balances covered just four years. It included a detailed quantitative forecast for graduates.

In contrast, the 2012 update of the study of the energy sector and the current space research industry sectoral study focus mainly on top-level occupations and skills. They are part of analyses performed by the Czech national research and innovation system, which is managed by the Technology Centre of the Czech Academy of Sciences.

Key questions to be answered here include the quality and availability of university graduates from technical and related fields of study, the skills and competencies of researchers and specialists, and skills mismatches for key occupations. The study of the energy sector also introduced some innovation into the methodology. In addition to addressing energy production (the generation and transmission of electricity, heat and gas), it also covered the mechanical and electrical engineering companies supplying the sector with energy-related technologies and research. This approach ensured that the entire energy value chain in the Czech Republic was covered. It also helped to identify skills needs and skills gaps at a strategic level.

Plans are in place for the Czech Republic to be not only self-sufficient in energy production, but also to become an important player in global markets with related technologies.

All the studies use a mix of qualitative and quantitative approaches. Conclusions can be drawn and adjustments made to education programmes to adapt them to future labour market demands. The studies help to develop new occupations and make key changes in existing ones.

The Ministry of Education has proposed a 'system project' on labour market forecasting, intended to ensure that sectoral studies are conducted for all major industries and, ideally, for the entire economy. It will set up a database of studies to be continually updated, serving as a source of information for relevant decision-making and further research on skills needs.

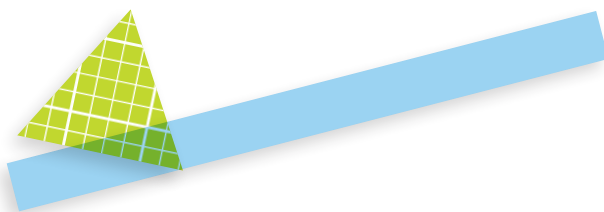
Policy-makers (Ministry of Education, Ministry of Labour, Ministry of Industry and Trade, and regional authorities) are the main target group but information tools are planned as a by-product for end-users (schools, students, career counsellors). Wider cooperation with SSCs is also expected. The SSCs should use the outputs of such studies for their own purposes, such as sector skills agreements, and should also participate in the actual sectoral studies via employer surveys, interviews and workshops.

The processes used in the Czech Republic's sectoral work include:

- (a) desk research;
- (b) scenario development techniques;
- (c) primary data collection;
- (d) interviews and case study development;
- (e) value and supply chain analysis;
- (f) technology assessment;
- (g) quantitative forecasts.

The studies differ mainly in their key focus, varying according to key target audience and their particular requirements at the time the study is conducted.





Complementarity with national skills needs anticipation

The Ministry of Education does not currently produce its own projections and, therefore, quantitative forecasting comes from a number of research centres. These include the Centre for Economic Research and Graduate Education, the Research Institute for Labour and Social Affairs, and the Education Policy Centre in addition to the NTF and its analytical unit, the National Observatory for Employment and Training.

The NTF, the National Observatory for Employment and Training and the Research Institute for Labour and Social Affairs use an adapted version of the ROA model to produce projections by occupation and qualification group. Both the National Observatory for Employment and Training and the Centre for Economic Research and Graduate Education helped to adapt the model for the Czech Republic, but the observatory is no longer engaged in its development and use.

The Education Policy Centre also produces both sectoral and skills projections along with information products for a portal for graduates (⁷⁶). It also uses the O*NET system to analyse skills needs within sectors and occupations. By mapping occupation categories in the Czech Republic to those used in the US, the centre can develop detailed skills profiles based on the huge O*NET database.

Most of the Czech sectoral studies are based on NACE rev. 1.1. These are shorter analyses, which focus mainly on recent developments within sectors. Forecasts are now based on the documents provided by Cambridge Econometrics for the Czech Republic.

These analyses are similar to those produced by the NTF in the Czech future skills in industries initiative (⁷⁷).

These are not sectoral studies but they include detailed sectoral results.

The NTF also carried out a pan-European study on the transferability of skills; this has a sectoral dimension. There was a proposal to develop the methodology further at a national Czech level (following the example of 'sector competency models' in O*NET) but this has not been followed through.

A7.3. Lessons learned

There is a need for an approach using a mixture of methods and tools. The particular needs of the client must be a focus. There is a need to deliver customised outputs from the studies for different users (information tools).

Closer cooperation must be established with respective industry players to increase response rates for surveys and to facilitate the interviews needed for information gathering.

The methodology must be developed to create inexpensive updates; it is not feasible to carry out in-depth studies on each sector regularly.

There is a need to prioritise and focus on a few sectors, probably the most important from the perspective of the development of the Czech economy. There are not enough resources to cover all sectors in a reasonable time frame.

Sector perspectives can be biased (or over optimistic).



⁷⁶ See <http://www.infoabsolvent.cz>. The level of sectoral detail is provided on http://www.infoabsolvent.cz/Temata/ClaneekAbsolventi/4-4-02/Charakteristiky_a_perspektivy_odvetvi_ekonomiky_v_CR_a_v_EU/34. The websites are available only in Czech.

⁷⁷ See <http://www.budoucnostprofesi.cz/sectoral-studies/industries-development.html>



Websites

[URLs accessed 10.7.2014]

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<http://www.spcr.cz/en>

Czech Chamber of Commerce.
<http://www.komoracz.eu/>

National Training Fund and National Observatory for Employment and Training studies for Czech Future Skills. Electrical engineering: <http://www.budoucnostprofesi.cz/sectoral-studies/electrical-engineering.html>

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Sector studies and education field profiles for SSCs.
<http://www.nuov.cz/folder/49/> and <http://www.nuov.cz/folder/50>

Trexima, focusing on people: Comprehensive services in human resources. <http://www.trexima.cz>

National Institute for Education. <http://www.nuv.cz/>





Annex 8. Denmark

A8.1. Context

The flexibility of the Danish labour market has been successful in adjusting to structural changes in the economy and in allowing the country to maintain high levels of employment and low levels of unemployment in recent decades. Labour market flexibility is partly due to high levels of investment in human resources through adult education and continuing training and the central role of dialogue between the social partners in addressing local development needs.

There is a strong tradition of participation in adult education and continuing training; Denmark is among the top-performing countries in Europe in terms of participation and provision. A key feature of Danish adult and continuing training and State upper secondary and higher education is that there are no tuition fees. Further, the State provides grants and loans to students to support participation. New qualifications and competencies are developed by the social partners through collective bargaining, so learning is also driven by real employer needs (Ministry of Education, 2007).

The Danish economy is facing similar issues to those of most other developed economies. Globalisation and technology change have resulted in economic restructuring and a shift towards more knowledge-intensive sectors. Population ageing poses future challenges for increased labour force participation and the provision of services for the elderly.

To tackle these challenges, and to respond to the EU requirement to develop national strategies to address the Lisbon strategy goals, Denmark initiated extensive education reform. In 2004, the government set up a tripartite committee on lifelong skills upgrading, with the explicit goal was of strengthening adult and continuing training. The government's globalisation

strategy, published in 2006, identified education, lifelong skills upgrading, research and innovation as the key to creating a leading knowledge society that is competitive and cohesive. The strategy for lifelong learning also identified actions to increase both the skill levels of the workforce and adult education and continuing training, especially among those with low levels of education and training attainment. However, the recent introduction of austerity measures in response to the global economic crisis limited the implementation of the strategy.

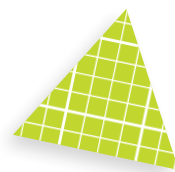
A8.2. Key stakeholders and approaches

Skills anticipation and matching in Denmark is decentralised and based on close cooperation between the social partners, rather than a common analytical framework. It is characterised by a high degree of stakeholder participation, with vocational colleges, teachers and trainees also involved alongside the social partners. Active participation of the social partners at all levels guarantees that the content of TVET programmes meets the demands of the labour market and that qualifications are recognised by industry. The social partners are represented in a number of councils and committees acting at local, sectoral and national level; their involvement is stipulated by legislation which specifically states that the social partners should be involved in the TVET process by performing both advisory and decision-making roles (Ministry of Education, 2008, pp. 15–17).

The key sectoral institutions involved in skills anticipation are the national trade committees and the sectoral training funds.

National trade committees provide advice on TVET qualifications relevant to their sector, as well as on the content, structure, duration and evaluation of





programmes and courses. Approximately 120 trade committees (2008) cover all the trades in Denmark. Employers and employees are equally represented in these committees to ensure that training meets industry skills needs at both national and local level. Trade committees are responsible for monitoring the evolution of labour market trends and skills demands. Using this information, they continuously upgrade the training programmes and ensure that their overall composition is up to date. The committees provide a platform for stakeholders to discuss any proposed changes to the training programmes. Responsibilities for programmes are discussed and then allocated to the various trade committees. They are also responsible for approving training places, testing and certification (Ministry of Education, 2008, pp. 17–18).

In addition to maintaining competencies and qualifications, trade committees are also required to produce labour market analysis when applying for financial support from the Ministry of Education for the development of new TVET programmes. In this, skills anticipation directly supports a specific planning or decision-making issue.

The work of the trade committees, including the provision of labour market intelligence and analysis, is supported by their secretariats. This work is jointly financed by the social partners and the Ministry of Education. The methodologies used by the trade committees and their secretariats vary, but most combine quantitative and qualitative information and techniques. These include surveys, focus groups, interviews, case studies, sector analyses and statistical analyses. Some analytical work is outsourced and attempts have been made to increase the coherence of methodologies across the various trade committees.

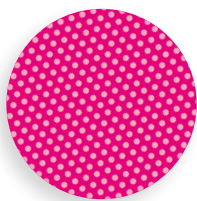
For example, the secretariat for trade committees in the industrial sector has published a manual on the analysis of skills needs to inform other trade

committees and other stakeholders in the planning and development of education and training courses (Econ Pöyry, 2008).

Sectoral training funds are also used to finance research activities, including on labour market issues. The funds are established through voluntary agreements between the social partners and provide funding for the development and testing of new training programmes. 'There are over 1 000 collective labour agreements in Denmark of which several contain a clause on sectoral training funds' (Ecorys, 2010, p. 48).

Other bodies at national and local level are also responsible for skills anticipation and matching. They include (Ecorys, 2010):

- (a) the Advisory Council for Vocational Education and Training and the Ministry of Education commission surveys and forecasts for specific sectors and industries, usually through external consultants or universities;
- (b) at regional level, local training committees play a key role in skills matching, by developing local education plans and adapting these to the needs of the local industry;
- (c) the Danish Institute of Government Research provides quantitative forecasts on skills demand by education attainment over 10-year periods. These forecasts inform the identification of potential future imbalances on the labour market;
- (d) the Economic Council of the Labour Movement is an independent thinktank financed by a number of trade unions. It provides medium and long-term quantitative assessments of the supply and demand of different types of labour, by education attainment level;



(e) the National Labour Market Authority and the four labour market regions of Denmark publish the labour market balance every six months. The balance brings together data about employer recruitment difficulties and job openings to identify demand for occupations. It also includes detailed unemployment statistics. From this information, imbalances between supply and demand are identified by occupation, sector and region. Based on their prospects, job opportunities are classified into groups, which help the PESs to target their efforts in relation to training the unemployed (European Commission, 2011).

A8.3. Lessons learned

At sectoral level, skills anticipation and monitoring is spread across the various trade committees. As these committees are organised around traditional economic sectors and industries, it might be difficult to capture skills needs in emerging industries, such as information technology, well-being and entertainment, in this system (Econ Pöry, 2008).

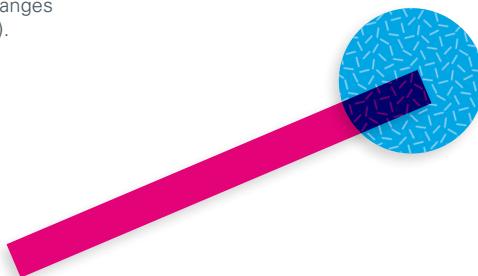
The labour market intelligence provided by the trade committees does not feed into a common framework. Due to the different methodologies used, the intelligence is not comparable across sectors. Research and forecasting are mainly aimed at developing immediate training responses, rather than long-term national workforce development strategies.

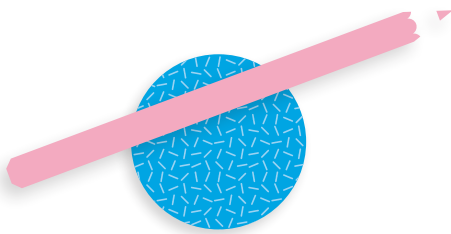
Adult education traditionally involved two branches: one provided short-term courses for people with qualifications and the other provided longer courses for unqualified people. These branches have merged in recent years. The branch that is focused on the short term has been more effective in adjusting to changes in the labour market (reactive, short-term focus).

It has proved responsive in meeting the immediate needs of industry, due to the extensive and formalised institutional and cooperation mechanisms in place between the social partners and stakeholders.

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Annex 9. European Union

A9.1. Context

As part of the new skills for new jobs initiative (European Commission, 2008), the European Commission published a series of sector-based studies in 2009 that looked at emerging and future skills needs up to 2020 ⁽⁷⁸⁾.

They adopted a scenario development approach, the European foresight methodology, designed by Prof. Maria João Rodrigues with support from the European Commission. This was inspired by earlier work on Portugal (see Annex 18).

This methodology was developed to perform comprehensive sectoral analyses and gain foresight on emerging competencies across the whole of the EU. It was intended to complement the quantitative modelling projections being undertaken in parallel by Cedefop (Cedefop, 2010).

The studies were published as part of a project called Comprehensive Sectoral Analysis of Emerging Competencies and Economic Activities in the European Union. They were commissioned by the DG-EMPL ⁽⁷⁹⁾. Much of the work was undertaken before the financial crisis of 2008 and the subsequent impact on the world economy. Only three of the studies explicitly address the impact of the crisis. Most of the sectors covered are shown in Table A1. The automotive and defence sectors are also included.

A9.2. Key stakeholders and approaches

A9.2.1. Policy and research objectives

The main challenges to be addressed by the EU sectoral studies related to meeting the changing requirements of the economy and labour market as it has adjusted to the dramatic shifts caused by technological change, demographic change, globalisation and other drivers.

The results and recommendations from the studies were intended to form a useful guide for the attention of European, national and regional actors. They aimed to help them to adapt their choices and actions to promote the strategic management of human resources and to foster stronger synergies between innovation, skills and jobs.

The specific focus of the studies varied quite significantly, depending on the priorities of the sector.



⁷⁸ See <http://ec.europa.eu/social/main.jsp?catId=784&langId=en>. Two of the studies – on the automotive sector and the defence industry – were pilot studies, designed to test the approach.

⁷⁹ Of these studies, 11 were executed by a core consortium led by the Netherlands Organisation for Applied Scientific Research (TNO), two were conducted by Economix, one by Alphametrics, one by IKEI and one by Oxford Research.



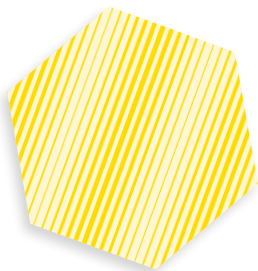
Table A1. Sectoral studies conducted by the DG-EMPL

Lot	Description	NACE Rev.2	NACE Rev.1.1
1	Textiles, wearing apparel and leather products	13-14-15	17-18-19
2	Printing and publishing	18-58	22
3	Chemicals, pharmaceuticals, rubber and plastic products	20-21-22	24-25
4	Non-metallic materials (glass, cement, ceramic, etc.)	23	26
5	Electromechanical engineering	27-28	29-31
6	Computer, electronic and optical products	26	30-32-33
7	Building of ships and boats	30.1	35.1
8	Furniture and others	31-32-33	36
9	Electricity, gas, water and waste	35-36-37-38-39	40-41
10	Distribution, trade	45-46-47	50-51-52
11	Tourism including hotels, catering and related services	55-79.1	55-63.3
12	Transport	49-50-51-52	60-61-62-63
13	Post and telecommunications	53-61	64
14	Financial services (bank, insurance and others)	64-65-66	65-66-67
15	Health and social work	86-87-88-75	85
16	Other services, maintenance and cleaning	94-95-96-97-98	90-91-93-95

Note: For details of each study follow the link at <http://ec.europa.eu/social/main.jsp?catId=784&langId=en> and choose the sector of interest.

The automotive and defence sectors were also included (pilot studies to establish feasibility).





A9.2.2. Main methodology

All the studies had three main parts.

- (a) Part I analysed recent sector trends and provided a clear and concise overview of most developments, summarised the current state of the sector, with an emphasis on innovation, skills and jobs. The findings of Part I combined original data analysis (using Eurostat structural business statistics and labour force survey data), with results from an extensive literature review of existing research evidence. The prime function of Part I was to provide the foundation and building blocks for Parts II and III.
- (b) Part II was future-oriented and examined possible sectoral developments. More specifically, it looked at developments in skills and jobs over the period to 2020. The core of Part II consisted of developing plausible future scenarios and assessing their implications for jobs, skills and knowledge. These were developed in partnership with participants as the work was undertaken. The implications were then analysed for various job functions.
- (c) Part III reviewed a range of main strategic options (choices) to meet the possible future skills and knowledge needs. These included implications for education and training. All of the studies concluded with a number of recommendations: for the sector (individual firms, sector organisations and sector partners); for education and training institutes and intermediary organisations; and for policy-makers (at various levels, ranging from the EU to local level).

The European foresight methodology has 10 main steps, with eight steps common to all studies:

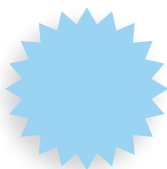
- Step 3: analyse the main trends and structures for the sector;
- Step 4: identify the main drivers of change (economy, technology, organisation);
- Step 5: identify emerging or changing sector job profiles, skills and competencies;
- Step 6: build possible scenarios and identify implications for employment trends;
- Step 7: analyse scenario implications for competencies and occupation profiles;
- Step 8: identify strategic choices to be taken by companies to meet skills needs;
- Step 9: identify the implications for education and training;
- Step 10: present the key findings and main recommendations.

Steps 3 to 5 form Part I; steps 6 to 7 Part II; and steps 8 to 9 Part III.

Data for the studies were collected from the following sources:

- (a) statistics from Eurostat, the European labour force survey and Cedefop;
- (b) reviews of existing reports, analyses, statistical publications, policy papers and communications from the social partners, the EU and others;
- (c) sectoral meetings and consultations with the social partners and other EU level stakeholders;
- (d) expert interviews, including with representatives from universities, companies, the social partners and relevant international organisations.





Finally, the results of all studies were presented to, and discussed by, panels of leading European experts within each sector.

The experts included representatives from academia, research and development, industry and sector organisations, including workers' and employers' representatives. All of these had a strong interest and extensive expertise in the sectors concerned and the related skills issues.

A9.2.3. Key research processes and instruments

The processes used in the European sectoral studies include:

- (a) desk research and analysis of secondary data;
- (b) limited primary data collection;
- (c) value and supply chain analysis;
- (d) technology assessment;
- (e) interviews and case study development;
- (f) scenario development techniques based around a common methodology.

The studies differ mainly with regard to the key focus of the stakeholders involved and, to some extent, the company or organisation responsible for coordinating the study.

A9.2.4. Complementarity with EU system

The studies complemented the quantitative modelling projections being undertaken in parallel by Cedefop (Cedefop, 2010). The Cedefop team carried out a comparison of the results from the two approaches (Wilson et al., 2010).

A9.3. Lessons learned

There is a need for a holistic approach and a combination of different quantitative and qualitative methods. All stakeholders must be engaged.

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Wilson, R.A. et al. (2008). *Alternative approaches to anticipating employment and skills trends: comparison of the DG-EMPL sectoral studies and the Cedefop projections*. Thessaloniki: Cedefop. Forecasting skill supply and demand in Europe: technical report; No 7.

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Annex 10. France

A10.1. Context

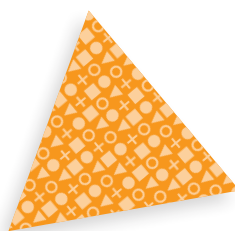
One of the key challenges facing the labour market in France is population ageing. Although estimates suggest that the growth of the working age population will slow down later than in other developed economies, recruitment difficulties are expected to rise in sectors where the labour market is already tight, and in those that provide services for the elderly (Gineste and Brunhes, 2008). It is becoming more important to ensure that the working age population is highly skilled and can meet the needs of new growth sectors.

As a result of the decentralisation of the government in 1982, the regions are now responsible for implementing vocational education policy in France. Stakeholders at national, sectoral and regional level have an interest in skills anticipation and matching. Many institutions are involved in producing labour market and training needs analysis.

A10.2. Key stakeholders and approaches

Key institutions for skills anticipation and matching at sectoral level include those with contracts for forecasting studies (CEPs), forecasting observatories for occupations and qualifications (OPMQs), and approved joint collection agencies (OPCAs).

CEPs are a key feature of the French skills anticipation framework, designed to provide incentives to companies and occupation groups. These incentives are provided with government funding for research to identify their medium-term skills needs and to implement measures to meet them. In addition to preparing studies, the contracts also require action and commitment to develop employment and skills. CEPs are based on an agreement between the government and the occupation and trade union organisations. CEPs may be organised around sectors or regions.



The network of observatories for occupational forecasting is another key element of the sectoral skills anticipation approach. The observatories are monitoring institutions that bring together the various stakeholders with the aim of arriving at a 'shared diagnosis' (Guégnard, 2007). They can be organised at national level around sectors (OPMQ) or at regional level (OREF). However, in the more industrial sectors, the OPMQs are organised around occupation groups including automotive, plastics, chemicals, food, insurance and computing occupations (for a list of OPMQs, see Ecorys, 2010, p. 100). OPMQs have operated in various occupational sectors since the 1990s. New legislation was introduced in 2004, which made the establishment of forecasting observatories for occupations compulsory for each sector.

Most OPMQs are not separate entities but are managed jointly with either an OPCA or an employers' organisation offering operational and administrative assistance. At the same time, they can provide input for the OPCAs into the process of identifying priority training programmes.

OPCAs are mutual funds set up and managed by the social partners to collect the statutory training levy at sectoral level. They collect contributions from employers and identify priorities on which the training fund will focus; this first requires forecast of future skills needs. OPCAs then distribute the funds to the identified priority areas.





The key activities of the OPMQs include:

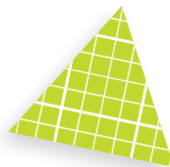
- (a) collecting and analysing employment and training data about current trends and needs;
- (b) identifying key economic, technological, regulatory and demographic drivers and forecasting their future impacts on employment, occupations and training needs;
- (c) disseminating data to stakeholders, including the government, regional councils, employers' federations and trade unions.

Most OPMQs use macroeconomic forecasts in combination with surveys and qualitative information to generate projections for qualifications demand and supply in their sectors. These results are then refined through extensive consultation with the training and labour market bodies in the sector. The final result reflects a consensual view on future direction and issues of training and qualifications in the sector.

The OPMQs focus primarily on the production of surveys and analyses in different areas: forward-looking jobs and skills management; training and recruitment needs; forecasting; age management; certification schemes; and equality at work. They also produce statistical databases and map occupations. OPMQs cooperate on an ad hoc basis, though further synergies could be created by sharing results, tools and methodologies (d'Agostino and Delanoë, 2012).

In addition to the sector-level institutions, a number of regional and State bodies are also involved in skills anticipation.

The Ministry of Labour has been using sectoral forecasting studies since 1988 to provide a detailed analysis of change drivers for skills and qualifications demand. Nearly 70 studies have been published under



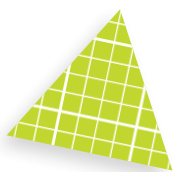
this initiative (Estrade, 2007). The studies examine the broader socioeconomic context and identify training demand for initial and continuing vocational education. This provides the basis for the development of a sectoral training plan, which is jointly agreed by the government and the social partners. Private consultancies are normally commissioned to prepare the studies, with joint funding from the government and the social partners. There is no common methodology for the studies, although most combine quantitative projections and surveys.

The government plays a key role in producing and publishing key statistics and analyses and in providing methodological support at national, sectoral and regional level. The Ministry of Education and the Centre for Strategic Analysis (CAS) provide national macroeconomic forecasts on supply and demand in occupations and qualifications. The Centre for Strategic Analysis is responsible for coordinating forecasting activities, including forward studies of occupations and qualifications across the various departments. It also develops common methodologies and publishes comprehensive forecasts.

The National Union for Employment in Industry and Commerce (UNEDIC) and the consultancy firm BIPE also prepare reports on anticipating needs in occupations and skills, using trend projection, statistical analysis and survey methods. The Centre for Research on Education, Training and Employment (Céreq) provides analysis and research to assist stakeholders in developing and implementing policies on vocational education and training and human resources management.

OREFs are regional employment and training observatories. They produce information for decision-makers, enabling them to achieve a better match





between training provision and labour market needs in the region. Like the OPMQs, OREFs coordinate the work of different institutions and services in the region. They promote a 'shared diagnosis' approach, particularly in the development of the regional training development plan.

Employment and occupation observatories also exist at subregional level, as some industry associations have established their own observatories to focus on local trends. Job centres serving local areas also collect first-hand information about short-term skills needs and play a key role in skills matching.

A10.3. Lessons learned

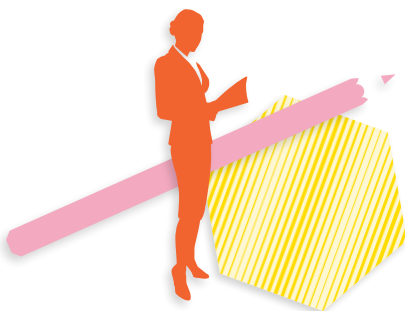
France has a well-established system for anticipating skills needs. Various bodies at national, regional, sectoral and local level produce a wealth of intelligence about current and future skills and employment needs. Research outputs generally meet the specific needs of the immediate stakeholders as they are based on their active participation, cooperation and a shared diagnosis view.

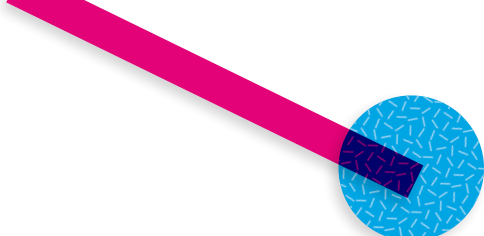
While the Centre for Strategic Analysis provides a sound framework for the work of the sector observatories, their capacity to carry out research varies greatly across sectors and regions. This raises issues about the robustness and comparability of results.

Many separate bodies are involved in skills anticipation at different levels, producing a large volume of work. Consolidating research activities, using common methodologies and establishing processes for synthesising the various fragments of intelligence are seen as possible ways to increase the coherence of the skills anticipation work (Gineste and Brunhes, 2008).

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Annex 11. Georgia

A11.1. Context

Georgia is a transition economy, undergoing significant structural change and considerable political uncertainty, including disputes with neighbouring countries.

Mismatches exist between employers' perceived requirements and the output from education and training.

A pilot study was undertaken under the auspices of Germany's Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, which supported the work financially and technically. The study was conducted in the tourism, apparel, information and communication technology (ICT) and food processing sectors, chosen as potentially fast-growing areas of the economy.

The Ministry of Economy and Sustainable Development in Georgia carried out the work, providing experts to help with the research. This was complemented by input from other experts and assistance with inputs from other ministries. The research team operated under the supervision of GeoWel Research, which also provided the relevant training.

A key aim was to support inward investment.

A11.2. Key stakeholders and approaches

The key concern was the perceived mismatch between employer needs and the output from formal education. The key gaps identified practical experience and the need for discipline, responsibility, seriousness and motivation.

A11.2.1. Main methodology

A combination of quantitative and qualitative techniques was used: interviews with key players and stakeholders; a small survey consisting of 50 companies in each sector, using a simple random sample (but concentrating on large companies since the focus of the study was on stimulating inward investment) and an established sampling frame; and desk research using existing data.

A11.2.2. Key research processes and instruments

The desk research provided a brief overview of the sector, its characteristics and context.

It is unclear from the available sources of information how soundly based the 'evidence' for these assessments was.

The survey and other evidence were then used to flesh out the picture of employment and skills issues. This included responses to questions about the characteristics and competency of the current workforce as well as recruitment matters. It is unclear how robust the findings from the survey are, since no information is given about margins of error.

A11.3. Lessons learned

The study shows that something useful can be achieved using existing data and modest new primary data collection.

Greater transparency is needed on statistical reliability given the small samples used.

More information must be provided about the source and reliability of other evidence presented.

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The World Bank is currently performing a workforce development survey, based on their 'SABER workforce development' methodology. The former Yugoslav Republic of Macedonia and Georgia are among the pilot countries. For further information see: SABER: *SABER in action*. <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTEDUCATION/0,,contentMD-K:23191129~pagePK:148956~piPK:216618~theSitePK:282386,00.html>



Annex 12. Germany

A12.1. Context

Germany is a developed economy with some very well-established systems for assessing current skills gaps and how these may be changing.

Primary responsibility for training content lies with the Federal Institute of Vocational Education and Training (BIBB), guided by advice from the sector and social partners. The Federal Ministry of Economics and Technology (BMWi) is also a key institution. Together with the Ministry of Education and Research (BMBF), it is responsible for designing and enacting curricula for vocational education ⁽⁸⁰⁾.

All of these entities, apart from the BIBB, are key players in the TVET system and often represent the interests of companies (employers) when new curricula or TVET regulations are introduced. They also carry out or commission research on qualifications needs or sectoral developments, although the main responsibility for this kind of research lies with IAB, the institute for employment research of the Federal Employment Agency.

The German system is complex and has developed organically over many decades. There are many players, often with overlapping and sometimes conflicting objectives. This makes it difficult to present a succinct and coherent picture of skills anticipation and matching.

Sector has always been at the heart of the German system in assessing education and training needs. The development of systems such as the UK's sector skills councils can be seen as an attempt to replicate the best features of the German system in terms of providing a voice to employers about priorities for education and training.

A12.2. Key stakeholders and approaches

The key policy and research objectives have been to assess changing skills needs and gaps across the economy as a whole, as measured by occupation and other more general measures of skill.

The work on skills projections is carried out for the government. The dissemination strategy is focused

primarily on policy-makers rather than making LMI widely available to the general public.

The work of the PESs has a more general target group, focusing on matching job seekers to available jobs.

A12.2.1. Main methodology

Previous work has involved a combination of methods and data involving many sectoral and other bodies concerned with the monitoring and development of skills in Germany.

The latest work in this area involves a combination of quantitative and qualitative methods, but the sector remains very much at the heart of both (Vogler-Ludwig et al., 2013). New quantitative projections for Germany are developed at a detailed sector, occupation, qualification and region level using an econometric modelling approach. A novel part of the research design is that it is carried out in parallel with a qualitative study focusing on sectors using scenario development methods.

Such work was previously undertaken by the IAB and the BIBB but this has now gone over to a private company, Economix. This includes the most recently published quantitative forecast, which contains many sectoral analyses (BIBB, 2012).

A12.2.2. Key research processes and instruments

Various actors contribute to establishing LMI and developing recommendations for priorities in investment in education and training. Many government departments and agencies are involved and the Federal Employment Agency's IAB has primary responsibility for analysing current developments on the labour market.

The BIBB is responsible for developing and analysing TVET-based occupations. The institute belongs to the Federal Ministry of Education and Research and, together with the Ministry of Economics and Technology, is responsible for designing curricula and regulations for TVET. These are often based on sectoral analyses conducted by the BIBB (and sometimes other bodies). The Ministry of Labour and Social Affairs also contributes to general policy directions.

⁸⁰ See http://www.eduserver.de/zeigen_e.html?seite=98 for a brief overview of the roles involved.



The PES (the Federal Employment Agency) plays a key role. It has developed a system for monitoring and assessing skills matching, which shares many features with the US O*NET system.

Many different actors, including those dependent on interest groups (employers, unions) and other independent organisations (research centres and institutions), also contribute to analysis of the labour market and the development of policy recommendations.

A12.2.3. Complementarity with the national system

A sectoral focus is a key characteristic of the German approach.

This involves a complex combination of methods and tools, with major investment in data collection, modelling and analysis. It is also based on decades of evolution and development of relevant institutions and the relationships between them.

A12.3. Lessons learned

The German approach places the sector at the heart of thinking about changing skills needs.

The social partners are actively involved, with unions and employers in particular having a central role in influencing the patterns of investment in skills.

The process takes many years and requires the full support of the government.

The idea of mobility between sectors (transition/flexibility/mobility matrices) is also a key feature of the approach, especially as developed by the BIBB (BIBB, 2012).

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Annex 13. Ghana

A13.1. Context

Ghana is a developing country in Sub-Saharan Africa that seeks to attain middle income status by 2015. Its economy has grown steadily over the past decade and growth is expected to accelerate further due to increasing revenues from oil exploration. The key driver of economic growth has been commodity exports, including mining and agricultural goods. Agriculture remains the key sector of the economy, though its relative contribution to GDP has been decreasing. The sector is responsible for over 50% of employment. Over 80% of the labour force is employed in the informal sector, mainly in agriculture and rural sector jobs (YEN and IYF, 2009, p. 15). The retail trade is another important area for employment in the informal sector, particularly around urban areas. These sectors are expected to have the highest potential for job growth in the near future.

Ghana has a young population. Children between the ages of 0 and 14 account for about 40% of the total population while young people aged between 15 and 34 account for a further 33% (YEN and IYF, 2009, p. 16). The labour force is generally undereducated: only one in three employees have attended school; less than a third of them holds a primary or junior school certificate; and only one in 10 employees has a secondary school leaving certificate or higher (World Bank, 2011, p. 3).

(TVET has been inadequate in providing either the quantity and quality that employers need in both the formal and informal sector. It has also failed to achieve poverty reduction targets. Among students, TVET is seen as a second-class option to university education, resulting in low student numbers and limited funding for the sector and, ultimately, affecting the quality of provision (Bortei-Doku Aryeetey et al., 2011).

The lack of an appropriately skilled labour force has been identified as a major challenge for businesses: it hampers economic growth and competitiveness at the macroeconomic level. To address this challenge, the government of Ghana's second growth and poverty reduction strategy focuses on future manpower needs in Ghana as well as meeting the Millennium Development Goals. The reform of TVET in Ghana aims to:

- (a) create a more demand-driven system that focuses on the key growth sectors of the economy;
- (b) introduce competency-based training;
- (c) introduce uniform standards, qualifications and certification;
- (d) ensure the professional development of TVET instructors;
- (e) establish clear governance and coordination structures for TVET (Baffour-Awuah and Thompson, 2012, p. 28).

A13.2. Key stakeholders and approaches

The Council for Technical and Vocational Education and Training (COTVET) was established by the government in 2010. Its role is to coordinate and oversee all aspects of TVET and to develop national policies for skills development across all sectors: pre-tertiary, tertiary, formal and informal. COTVET's high-level objective is to create a TVET system that increases the productivity and competitiveness of the skilled workforce and the income-generating capacities of people ⁽⁸¹⁾. COTVET operates through an agency of the Ministry of Education. It is governed by a 15-member board with tripartite representation.

The key functions of COTVET are to:

- (a) rationalise assessment and certification in TVET;
- (b) support TVET research and development;
- (c) provide funding for TVET activities: essentially through the Skills Development Fund, with funding from the Danish International Development Agency (DANIDA) and the Ghana Education Trust Fund;
- (d) aid collaboration between training providers and industry to promote demand-driven curriculum development and placement and national internship programmes;
- (e) promote cooperation with international agencies and development partners;
- (f) report annually on skills development in Ghana;
- (g) advise the government on TVET issues.

⁸¹ COTVET: *Standing committees*: <http://www.cotvet.org/new/committee.php#.UJl2Xmfc-sY>



COTVET is also responsible for assessing current and future skills needs in growth sectors and for developing processes to identify skill requirements, including scarce skills and key competencies.

COTVET's work is supported by four standing committees: the National TVET Qualifications Committee, the Industrial Training Advisory Committee, the Training Quality Assurance Committee and the National Apprenticeship Training Committee. Industry's involvement in TVET is formalised through the Industrial Training Advisory Committee and its subcommittees, whose key function is to develop national occupation standards and qualifications. To do this, they monitor the labour market and promote the formation of Industrial Training Advisory Committee subcommittees in occupations that lack national occupation standards and qualification structures. They also assist industry sectors in establishing trade or industry associations. Until recently, one cross-sectoral training advisory committee had been established for all industries. Five subcommittees, representing various skills areas including welding, electronics, auto mechanics, cosmetology, garment making and plant engineering are also in place. New and emerging sectors such as oil and gas are also forming subcommittees.

COTVET's work is also supported by international development partners, including the World Bank's Ghana skills and technology development project. This aims to increase productivity and employment in priority sectors of the economy by promoting demand-driven skills development and increased adoption of technologies. The first component of the project focuses on strengthening the institutional background of skills development, primarily through the capacity building of COTVET. This includes assisting the development of the national skills strategy, establishing a TVET management information system, and establishing processes to coordinate, monitor and evaluate services across sectors and agencies.

Ghana's national skills development strategy is being developed through sector-specific development plans. This involves assessing skills supply and demand, market failures and opportunities for public interventions in selected sectors, and sector-specific economic and social outcomes. Sectors have been prioritised in line with the government's economic and

private sector development strategy. The focus is on sectors where a lack of skills and technology limit growth. Attention is also paid to sectors that offer opportunity for employment or productivity growth and have the potential to demonstrate improvements from skills and technology interventions within three to five years (World Bank, 2011). COTVET has already assessed skills needs in the oil and ICT industries. Further priority sectors will be assessed on the completion of sector development strategies.

A13.3. Lessons learned

The sectoral approach to skills development in Ghana is still in its early stages and it is too early to evaluate its effectiveness.

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Annex 14. Hong Kong

A14.1. Context

The economy of the Hong Kong Special Administrative Region has successfully adjusted to a number of structural changes in recent decades. A major shift occurred when the key sector of the economy – export-oriented manufacturing – moved to mainland China, while the services sector expanded significantly. Increasing globalisation, competition and labour mobility have had a number of significant implications for skills development policies; these include the need for continuous skills improvement to increase competitiveness and the standardisation of skills and qualifications in line with industry needs. A number of arrangements were introduced by the government under the Education Bureau ⁽⁸²⁾ to ensure better coordination of the social, economic and labour market policies in addressing these issues.

Sectoral skills development in the Hong Kong Special Administrative Region is addressed by a number of institutions. They engage in a range of activities including training delivery, manpower planning, influencing supply and training and qualifications design. Key institutions include the industry-owned industry training associations, the Vocational Training Council (VTC) vocational training boards and industry training advisory committees.

A14.2. Key stakeholders and approaches

The VTC is the largest vocational education and training provider and professional skills development group in Hong Kong. It was established in 1982 as a statutory body by government legislation. It brings together industry, employees and academics to develop market-responsive and demand-driven training programmes. The VTC advises the chief executive on developing a comprehensive TVET system, which

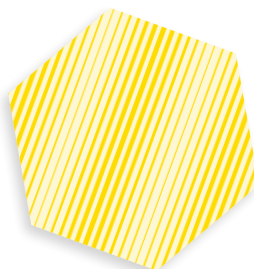
provides skills for enhanced employability and global competitiveness.

The VTC is governed by its council, which comprises 22 members from the industrial, commercial, service, labour and education sectors and key government departments. Industry is represented across the various boards and committees of the VTC. These provide input on course planning, curriculum design and quality assurance to ensure that the system meets the needs of industry. The work of the council is supported by functional committees, 21 training boards and five general committees which cover cross-sectoral training issues: apprenticeship and trade testing; information technology training; management and supervisory training; technologist training; and vocational training for people with disabilities ⁽⁸³⁾.

The vocational training boards are organised as tripartite structures, covering the main sectors of the economy. Each board has its own terms of reference, but they perform common core activities:

- (a) manpower planning in their industries;
- (b) course planning, curriculum development and quality assurance systems;
- (c) identifying the skills and training required for principal jobs in the industry;
- (d) advising on quality standards for skills assessments, trade tests and certification for in-service workers, apprentices and trainees;
- (e) engaging stakeholders, including employers, employers' associations, trade unions, professional institutions, training and education institutions, and government departments.

The vocational training boards' work on manpower planning provides an essential input to the national



⁸² Formerly referred as the Education and Manpower Bureau.

⁸³ VTC: Governance structure: http://www.vtc.edu.hk/html/en/about/train_com.html



skills development framework (Sparreboom and Powell, 2009). Most boards collect and publish annual or biannual data about skills needs in their sectors in the form of manpower surveys and statistical reports. They survey enterprises in their industries about current and future skills needs by main occupation category and identify changes in employment levels and vacancies.

The national skills development framework focuses on skills that are in high demand and are used in strategic sectors of the Hong Kong economy. The Economic Development and Labour Bureau identifies the strategic sectors of the economy. The Education Bureau prepares medium-term macro forecasts using quantitative projections for each of these sectors, including trends for employment by broad occupation group. These forecasts are not intended to provide exact answers as to how many extra people need to be trained with certain qualifications but set the scene for incorporating micro-level, qualitative intelligence on skills needs in the short term. This is provided by the VTC and is derived from the vocational training boards' employer surveys. Combining these types of intelligence not only aids data validation but also ensures that one type complements the other in cases where a particular approach has limitations. Based on this integrated intelligence, the Education Bureau identifies the anticipated changes in employment demand by occupation group and education attainment.

The Education Bureau identifies the potential supply of skilled graduates using data on enrolments and trends in completion. It also determines imbalances between demand and supply by education attainment across the sectors. The vocational training boards also identify the likely supply of graduates in their industries and develop recommendations to meet imbalances.

The VTC provides training through its 13 member institutes for around 240 000 students each year. It does so through various pre-employment and in-service programmes and internationally recognised qualifications⁸⁴). Since the VTC is the major provider of skills, it can act on recommendations by influencing the supply of skills. It does this by developing new training products or influencing student choice through promotions and career guidance. The government also provides funding for tuition fees for capital-intensive courses in high demand areas to encourage uptake in these areas.

The VTC operates in eight-year planning cycles. Its second strategic plan was launched in 2008 and identified 10 strategic initiatives for developing vocational education and training by 2016–17. The initiatives focus on value innovation and capability building, based on a partnership approach to lifelong skills development. The strategic plan is revised annually to reflect any key changes based on reports published by the vocational training boards.

Other sectoral bodies, such as the industry training associations, also report to the VTC. These associations were set up in the 1970s as statutory bodies in key economic sectors such as construction and textiles. The government introduced legislation that enabled industries to create their own training associations and to impose a statutory levy on employers. Funds collected from the levy were used to set up the industry training associations and fund training programmes. The rate of the levy is normally determined in relation to the industry's performance, such as the value of work completed or goods exported. The key role of the industry training associations is to deliver on the training aspects of strategies set by the industry and they are basically seen as the 'skills branches' (Sung et al., 2010) of employers' associations in their industries.



⁸⁴ See <http://www.vtc.edu.hk/html/en/about/council.html>



For example, the Construction Industry Training Board carries out the following tasks for the Construction Industry Council ⁽⁸⁵⁾:

- (a) providing training courses for the construction industry;
- (b) establishing and maintaining industrial training centres for the construction industry;
- (c) providing work placements for graduates;
- (d) taking responsibility for assessment and certification and developing standards;
- (e) collecting and publishing training output statistics by year and study area in the industry.

Similarly, the Clothing Industry Training Authority (CITA) focuses on enhancing the global competitiveness of the clothing industry: adopting an industry-led approach in the training and development of managers and technical professionals; promoting productivity and quality improvement programmes; and supporting the use of information technology in the industry ⁽⁸⁶⁾. The Clothing Industry Training Authority refocused its activities from basic skills training to higher-level, niche-market skills as mass manufacturing moved to mainland China.

Sector industry bodies also play a key role in the development of competencies and the implementation of the Hong Kong qualifications framework. The Education Bureau has assisted in the formation of 18 industry training advisory committees in key industries. The committees comprise representatives of employers, employees, professional bodies and other stakeholders ⁽⁸⁷⁾. They are responsible for developing and maintaining competency standards and the mechanism for recognising prior learning. They promote the qualifications framework to industry and provide advice on skills development needs to stakeholders if they are referred by the Secretary for Education.

A14.3. Lessons learned

This approach to skills anticipation and matching covers all the steps in the process: identifying industry skills needs; collecting and analysing labour market intelligence; developing action plans to meet needs; influencing demand and supply; and influencing training delivery. Industry is involved in all steps of the skills development process, ensuring that training can meet labour market needs.

This setting requires effective coordination between the VTC, the vocational training boards and the national skills development agencies. The national skills development framework is set up in a way that maximises synergy between the research of various bodies and combines qualitative and quantitative intelligence from key sources for a comprehensive view.

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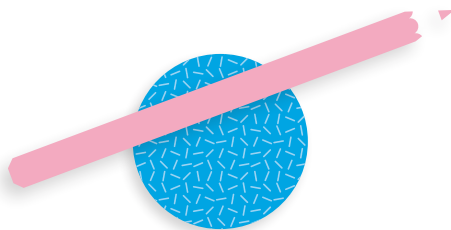
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⁸⁵ See <http://www.hkcic.org/eng/courses/output.aspx?langType=1033&id=384&langType=1033>

⁸⁶ See http://www.clothingtraining.org.hk/lang_eng/intro.html

⁸⁷ See http://www.hkqf.gov.hk/guie/com_ITAC.asp



Annex 15. India

A15.1. Context

After a strong recovery from the effects of the global financial and economic crisis, economic growth in India is projected to return to over 6% in the next few years (IMF, 2012). Unlike most developed economies, economic growth will be accompanied by a growing population and a growing working age population. India's population is estimated to grow to 1.4 billion by 2026, with over 80% of this in the 15 to 59 age group (NSDC and UNDP, 2011). Nearly 12 million young people will join the workforce every year (Majumdar, 2008). As a result, India will have the world's largest working age population and account for 25% of the world's total labour force.

Despite the abundance of labour, growth and development is already limited in reaching its potential because labour productivity is low. Moreover, much of the workforce is unskilled or not adequately skilled; only around 6% receives any formal or informal vocational training. The proportion of formally trained young people in the labour force is among the lowest in the world (CII and Technopak, 2009) and the vocational training system has insufficient capacity to meet industry's needs. As in-service training is typically low and very expensive, a large proportion of employees remain with outdated skills (NSDC, n.d.). These quality issues result in widespread skills gaps across various sectors of the economy, particularly in agriculture, manufacturing and services.

Another feature of India's labour market is the large proportion of the unorganised sector which is responsible for over 90% of employment (Chenoy, 2011). This sector basically consists of small companies or self-employed people. Tapping into it is difficult due to the lack of upskilling and career pathways, the dispersed nature of the enterprises, and the low value of skills in the informal economy.

The Indian government launched major reform of training in 2008 under the national skill development mission. Implementation of the national skill development policy, informed by international good practice, was approved in 2009. It addresses the issues in a systematic, comprehensive and sustainable way.

A15.2. Key stakeholders and approaches

The National Skill Development Corporation (NSDC) was set up as part of the national skill development mission. Its purpose was to act as a 'catalyst' in skills training and development by encouraging private sector and industry participation. It aspires to contribute significantly (about 30%) to the overall target of skilling and upskilling 500 million people by 2022. A large part of the NSDC's efforts are directed at skills development programmes in the unorganised sector.

The NSDC is a not-for-profit company set up by the Ministry of Finance and operating as a public private partnership; 49% is owned by the government of India and 51% by industry. Its board represents the government and the private sector, with the latter having a majority. The NSDC is supported by the National Skill Development Fund, a government-owned trust that invests in the NSDC and is run by professional fund managers.

The NSDC commissioned and published work through a private consultancy to provide a detailed analysis of skills needs in 20 high-growth sectors and the unorganised sector until 2022 ⁽⁸⁸⁾.

The reports are also available for nine regions and are based on common methodology across the different industries. They use macro projections to identify future trends in combination with available statistics and primary information. The reports analyse industry

⁸⁸ IMaCS (IRCA Management Consulting Services).



size and growth. They identify demand drivers, current and future employment and skills needs, skills gaps, emerging occupations and focus areas for skill building.

The NSDC established sector skills councils (SSCs) in key sectors to fulfil the following functions:

- (a) setting up an LMI system to assist planning and delivery of training;
- (b) identifying skills development needs and preparing a catalogue of skill types;
- (c) developing a sector skills development plan and maintaining an inventory of skills;
- (d) developing skill competency standards and qualifications;
- (e) standardising an affiliation and accreditation process;
- (f) participating in affiliation, accreditation and standardisation;
- (g) planning and carrying out training of trainers;
- (h) promoting academies of excellence.

The SSCs operate as autonomous bodies. They are national partnership organisations that bring together stakeholders, including industry, employees and academics. Funding is initially provided by the government, but the SSCs are expected to become self-funded, for-profit organisations over time.

The SSCs are expected to play a key role in anticipation of skills needs and matching through research activities, including building up a skill inventory database for industry by skill type and region (NSDC, n.d.). However, at this stage it is not clear how this will be established. SSCs are responsible for identifying current and future skill requirements, both in quantitative and qualitative terms, at national and regional level. They review the supply of skilled personnel, identify shortfalls in numbers and skill sets,

identify trends and future requirements, and benchmark international practices. Based on this information, the SSCs map the requirements for additional workforce training over the next 10 years. As another key area of research, they also provide productivity analyses of human resources.

The SSCs are also expected to play a key role in matching skills with jobs by ensuring that training delivery meets industry requirements. This includes developing and updating training modules and providing training to trainers, institutes and employees. The SSCs are also responsible for establishing certification and accreditation processes, setting up the national vocational qualifications framework in their industry, and rating public and private training institutes.

Besides the sector-level bodies, most State governments have set up State skills development missions to coordinate the skills development agenda. While not yet formally established, three years after the national mission came into being, the State skills development missions provide a regional aspect to skills development, identifying key sectors for skills development in the State and coordinating the implementation of policies with central government, industry and private training organisations. The structure of the development missions differs in each State, depending on the local environment and vision for skills development ⁽⁸⁹⁾.

A15.3. Lessons learned

The new approach is still in the early phase of implementation. The SSCs in particular are still new; some have only been in operation for a year. To date, the board of the NSDC has approved 18 SSC proposals for funding, covering the 18 identified high-growth sectors. A further six SSC proposals are currently being considered and an additional eight proposals are in the pipeline (Chenoy, 2012).



⁸⁹ National Skill Development Agency: *Skill development landscape in India*; *National skill council: vision, strategy and core principles* <http://www.skillsdevelopment.gov.in/skill-landscape-in-india>



The conceptual framework of the new approach is comprehensive and ambitious, based on principles informed by international best practices⁹⁰. However, the SSCs need to face a number of issues to fulfil their set objectives: limited staff capacity; the lack of a common and agreed framework and methodology among SSCs for producing LMI; the alignment of SSC coverage with national statistical data; the integration of SSC intelligence inputs into the overall skill system; industry engagement and buy-in; union involvement at board and committee level; and clarity about the role of SSCs in quality assurance and certification.

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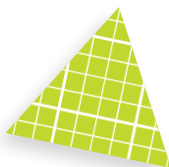
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⁹⁰ As discussed by the Planning Commission: coordination action on skill development: http://planningcommission.nic.in/reports/genrep/skilldev/rep_skilldev4.pdf



Annex 16. Italy

A16.1. Context

Italy is a developed economy, undergoing structural change and experiencing some political uncertainty linked to the euro crisis. It has well-established systems for assessing current skills gaps and how these may be changing.

A16.2. Key stakeholders and approaches

The approach seeks to assess changing skills needs and gaps across the economy as a whole, as measured by occupation, and other more general measures of skill.

Italy does not have a separate framework to analyse and anticipate skills needs at sectoral level, although changes in the sectoral employment structure are seen as one of the main drivers of changes in the demand for skills.

In 2010, the Italian government charged the Institute for the Development of Vocational Training of Workers (ISFOL) with coordinating all the major skills-related initiatives. ISFOL is a public body whose aim is to develop and promote research activities and information gathering in various fields related to

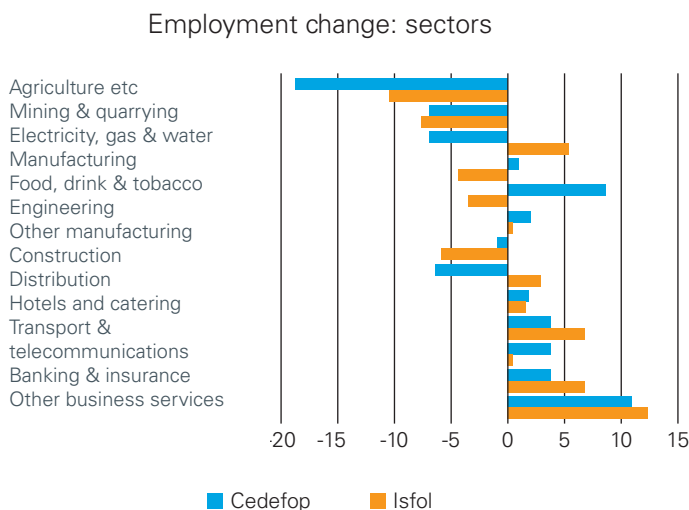
vocational education and training. Together with the National Institute for Statistics, ISFOL participates actively in the design and implementation of several international surveys such as the continuing vocational training survey (CVTS) and the programme for the international assessment of adult competencies (PIAAC).

A16.2.1. Key research processes and instruments

Activities related to anticipation of skills needs are currently centred on two pillars which have a sectoral dimension.

The first pillar is the sectoral forecasts conducted by ISFOL, whose objective is to predict employment and occupation needs over the medium term. The most recent estimates were conducted in 2011 for 2015. Although not derived from a general comprehensive macro model, such as that adopted by Cedefop, ISFOL forecasts occupational needs for 30 sectors; the forecasts distinguish between expansion and replacement demand. Figure A1 compares ISFOL sectoral forecasts with those from Cedefop over the same time horizon, showing a broadly similar pattern of change.

Figure A1. Sectoral employment: change between 2010 and 2015 – Comparison between ISFOL and Cedefop (percentage of 2010 values)





Each forecast is accompanied by a short description of the pattern of development in the sector.

The second pillar is the Excelsior survey on occupation-related needs, carried out every year by Unioncamere (the Italian union of the chambers of commerce) on approximately 100 000 firms. The survey asks employers about their expected future hiring over the next year and about the expected training required for them. Excelsior was originally designed as an occupation-related survey. Since 2010, it has also surveyed skills and includes a section dedicated to assessing the skills required for future hiring.

It focuses on general and transversal skills (such as problem solving, the ability to work in teams and writing) but not on those specific to the occupation or the sector.

A16.2.2. Complementarity with the national system

The ISFOL medium-term forecasts and the Excelsior survey together provide a comprehensive body of information about each occupation.

The following information can be obtained for each occupation with a three-digit code:

- (a) a description of the activities and tasks required (based on the O*NET classification);
- (b) a description of the skills and competencies needed;
- (c) a brief presentation of short-term (Excelsior) and medium-term (ISFOL forecasts) demand;
- (d) a simple graphical tool that shows the strength of future demand (strong, medium or low).

A16.3. Lessons learned

The approach is centred on the occupation for even though forecasts are at sectoral level, the sectoral dimension is key to obtaining aggregate robust estimates for each occupation. None of the analyses currently investigate the specific needs for skills particular to individual sectors.

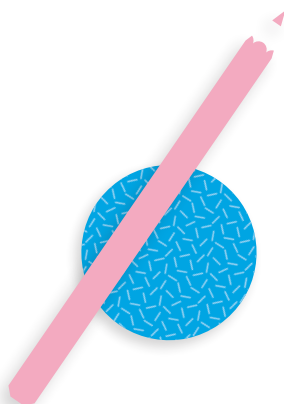
In terms of pure economic forecasts, the sectoral dimension is often neglected. Currently, only one reliable forecast is conducted twice a year for a selected group of industrial sectors. This is performed by the research institute Prometeia and the banking group Intesa Sanpaolo.

Websites

[URLs accessed 10.7.2014]

Details of the occupation assessments can be found at <http://excelsior.unioncamere.net/>.

ISFOL *medium-term forecasts* and *results of the Excelsior survey* can be downloaded from a dedicated ISFOL website. <http://professionioccupazione.isfol.it/>





Annex 17. Jordan

A17.1. Context, key stakeholders and approaches

The mechanisms governing labour supply and demand, and the institutional context for human resources development in Jordan, are summarised below.

Each level of education is governed by a line ministry and a specialised council. Basic and secondary education is governed by the Ministry of Education and the Education Council. The Education Council's main mandate is to oversee the implementation of education policy and to help link education with economic development plans. The council's membership is based on sectoral representation to ensure a comprehensive, balanced and market-oriented vision. Each of the following has a permanent council member: the private sector, the culture sector, the tourism and antiquities sector, the higher education sector and the religious affairs sector. Basic and secondary education have undergone major reform, with efforts made to enhance quality, relevance and flexibility and to match graduates' skills and their productivity.

TVET faces significant challenges: an associated stigma of 'academic failure'; inadequate facilities; outdated equipment; unmotivated instructors; a lack of emphasis on applied and hands-on practice; little or no involvement of the private sector; and a constraining human resources system that prevents it from attracting and retaining the best trainers.

The main TVET strategy is better matching for trainee skills to increase employability in the private sector, replacing foreign employees, increasing entrepreneurship skills, and encouraging self-employment among graduates.

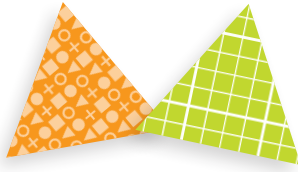
TVET sector is governed by the Ministry of Education, the Ministry of Labour and the Employment-Technical and Vocational Education and Training Council (E-TVET Council).

The E-TVET Council has 16 members and is chaired by the Minister for Labour. The secretary generals of the Ministry of Education, Ministry of Labour, Ministry of Social Development and the Ministry of Higher Education and Scientific Research, the presidents of the National Center for Human Resources Development and the Al Balqa Applied University, and the major general of the armed forces are permanent members. The remaining seven seats are taken by the private sector, which has three permanent seats. Two of them are for the chambers of trade and commerce and one is for the trade unions; the other four seats are for the leading sectors of the economy. Membership is for two years and is renewable; the minister traditionally selects the leading sectors.

The E-TVET Council has a special fund to support its activities, build up the capacity of the sector's key institutions and develop various public and private sector training activities. The fund's main source of revenue is the additional sums the Ministry of Labour charges employers for every work permit that the ministry issues or renews for foreign workers. The Ministry of Labour has also established the accreditation and quality centre to develop accreditation and quality assurance standards for TVET.

The E-TVET fund has a funding committee of six members; four are from the private sector and are usually selected on a sectoral basis. The current committee has representatives from banking, manufacturing and tourism. The committee filters and





assesses training and employment funding proposals, based on national unemployment trends, the sectoral distribution of foreign workers, and the expected job openings by sector and industry. It presents its recommendations to the E-TVET Council for approval and funding.

Higher education is governed by the Ministry of Higher Education and Scientific Research and the Higher Education Council. To ensure that the quality of private higher education is at the right level, the higher education sector established the Higher Education Accreditation Commission.

The government established the National Center for Human Resources Development at intermediary level between labour supply and demand. This entity reports to the Higher Council for Science and Technology, which has the status of a semi-government body. The president of the National Center for Human Resources Development is a board member of the E-TVET Council and the secretary general of the Ministry of Labour is a board member of the National Center for Human Resources Development. The latter has developed the national human resources information system, which includes education information and LMI.

The LMI contains survey statistics produced by the Department of Statistics, which gathers data on employee qualifications in 14 ISIC-defined economic sectors. It also collects administrative data on certain employees. The social insurance system, which covers three major groups: the 14 ISIC sectors in the private sector; the public sector and the army; and the civil service system, which covers public sector employment. This LMI system was the major source for measuring skill level by economic sector for the national employment strategy and the two occupation forecasting models developed for Jordan.

A17.1.1. Policy and main objectives

The national objectives of the human resources development strategy are summarised below, according to their time horizon.

Short-term objective (2014): start absorbing unemployed individuals

Four priority actions are recommended to meet this objective: develop a foreign labour policy and management strategy; ensure that micro-enterprises and SMEs have access to credit; target active labour market policies to achieve optimum efficiency in the different sectors; and curtail public sector employment.

Medium-term objective (2017): ensure better skills matching and micro and SME growth

Three priority actions are recommended: support school-to-work transition programmes; reform the E-TVET sector; and extend social security coverage and health insurance coverage.

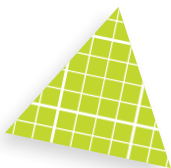
Long-term objective (2020): achieve increased productivity through human capital and economic restructuring

Three actions are recommended: invest in the future through childhood education; pursue sustainable fiscal and monetary policies; develop investment policies that target economic growth and job creation.

A17.1.2. Combination of methodologies

The National Center for Human Resources Development developed an occupation forecasting model to generate estimates for 2006 and 2010. The model divided the Jordanian economy into industrial sectors at the first digit level of ISIC; workers are employed in different occupations within these sectors.





The number of workers in different occupations depends partly on the nature of the sector and partly on the demand for its products. Projections of employment by occupation at the four-digit ISCO level were derived using the simple extrapolation of the trends in the time series of employment for 1995–2006. Projections of employment in the projection year (2011), together with the occupation structure of economic sectors in the base year (2006), were generated.

The Ministry of Planning and International Cooperation and the Ministry of Labour are currently working with a Canadian consultant who has developed an occupation forecasting module as a subcomponent of a macroeconomic model. This divides the economy into 14 sectors as in the previous model and classifies the occupations in each sector at the second digit level of ISCO (43 occupations). The final results of the model are expected to be ready in June 2013.

The national employment strategy stated that the expansion of employment in Jordan requires the Jordanian economy to be classified by sector and skill for a number of reasons: to distinguish tradable sectors from non-tradable sectors; to distinguish the skills that Jordanians are able and willing to acquire from those they are not; to determine the skills and sectors that are more open to foreign workers; and to ascertain which sectors in the economy could attract foreign direct investment.

The national employment strategy viewed the sectoral composition of the Jordanian economy in terms of its contribution to GDP, sectoral employment and skill level, and its competitiveness. A map for the various sectors of the Jordanian economy was developed to show employment creation, the levels of skills required by each sector and the exposure of each to international competition. The strategy measured the skill level of those employed in that sector against the number of workers with a diploma level or higher education divided by the number of total workers in the sector.

The demand for labour by sector and skill level was then grouped into four clusters, the first representing the high-skilled and highly tradable sectors or those known as export-oriented or knowledge-based. The three sectors in this cluster are ICT, air transport and pharmaceuticals but these three have a low employment share. The second cluster represents the high-skilled, less tradable sectors, mainly the service sector, education, telecommunications, finance, insurance and business services. Apart from education, these sectors are not labour-intensive. The third cluster is low-skilled, highly tradable sectors including agriculture, manufacturing and mining. The fourth cluster includes low-skilled, less tradable sectors, such as the wholesale and retail trades, construction, hotels and restaurants. Collectively, these sectors employ a high share of the workforce.

A17.1.3. Key processes

The E-TVET Fund collaborated with the Ministry of Labour to fund and manage an active labour market programme over the last five years. The programme aims to upgrade and increase the relevance of trainees' skills to meet employer requirements. The programme included the following aspects:

Satellite units

- (a) Implementing agency: Ministry of Labour and National Employment Programme.
- (b) General objective: the programme provided skills in specific industries, mainly in the textile industry. It helps women in remote rural areas, where training and job opportunities are scarce, to enter the labour market (mainly in textile factories).
- (c) The training methodology in this project adopted a mentoring approach. Each group of trainees worked under the supervision of a senior member of staff at the factory. The mentor provided the trainees with some theoretical training, practical training on a few specific skills, and also supervised them directly as they worked.





Training and employment of recent ICT graduates

- (a) Implementing agency: Ministry of Labour and National Employment Programme.
- (b) General objectives: to reduce unemployment among university graduates in ICT specialties; to support companies that work in that sector.
- (c) Target group: recent university graduates with a specialty in an ICT-related subject.
- (d) Relevant sector: ICT sector.
- (e) General description: companies and trainees enter their information on the programme website, where companies recruit trainees. All training is on-the-job and the mechanism is left up to the companies. Companies are required to pay JD 300 per month for the full duration of the course, JD 150 of which are subsidised (JD = Jordanian dinar).

Training and employment of male nurses

- (a) Implementing agency: Ministry of Labour and National Employment Programme.
- (b) General objectives: to train and employ newly-graduated male nurses who hold a BSc or a diploma; to provide male nurses with the skills and expertise needed to find work opportunities at the end of their training.
- (c) Relevant sector: health sector.
- (d) General description: male nurses (BSc and diploma holders) receive on-the-job training at hospitals under the auspices of the Jordanian Nursing Association and the Private Hospitals Association. Upon completion of training, hospitals are required to hire graduates for one year.

Paid employment

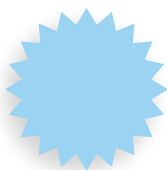
- (a) Implementing agency: Ministry of Labour and National Employment Programme.

- (b) General objectives: to train and employ unemployed men and women in wage employment in the private sector; to provide companies and factories with a skilled Jordanian workforce.
- (c) Target group: unemployed Jordanians aged 18 to 38 years.
- (d) Relevant sectors: hospitality, textile, wood and metal industries, electrical and electronic appliances, chemical industry, other.
- (e) General description: the programme targets any company with a large number of workers and a large number of foreign workers. Industrial parks and qualifying industrial zones (QIZ) are therefore the programme's main targets. Factories recruit trainees through the labour directorates around Jordan.

National employment training (NET)

- (a) Implementing agency: Jordanian armed forces.
- (b) General objectives: to employ civilians through the armed forces; to qualify them to work in the construction sector in cooperation with the Ministry of Labour and the private sector.
- (c) Target group: Jordanian males aged 17 to 35 years.
- (d) Relevant sector: construction sector.
- (e) General description: trainees admitted into the programme start with two months of military training. This is followed by four months of vocational training in three main occupation groups: construction work, civil and architectural work and mechanics and electrical work. The first six months (workshop training) take place in the NET training facility in Shweir, 150 km east of Amman. Lodging is also provided for the full duration of the training. Afterwards, trainees are placed in on-the-job training, under NET's supervision, for six months with companies in the construction sector.





Tourism programme

- (a) Implementing agency: Vocational Training Corporation.
- (b) General objectives: to train a qualified workforce in line with international standards; to meet the needs of the Jordanian labour market in tourism and hospitality.
- (c) Target group: Jordanians aged 15 and above.
- (d) Relevant sectors: tourism and hospitality; private and government hospitals (food production); food suppliers and catering.
- (e) General description: two training programmes are in place. Level 1 provides general hotel and restaurant skills (food production and service) at three centres. Level 2 is the optional specialised programme and requires prior completion of level 1. Participants specialise in food production, service or room service.

Training and employment of recently graduated engineers

- (a) Implementing agency: Jordanian Engineers Association.
- (b) General objectives: to provide technical training to newly-graduated engineers; to introduce them to the labour market through on-the-job training with private sector employers.
- (c) Relevant sector: all private sector businesses.
- (d) General description: workshop and on-the-job training takes place for six months at any establishment in need of engineers. The Jordanian Engineers Association provides a skills course and a specialised technical course through the Engineers Training Centre. Upon completion of training, companies sign an employment contract with the graduate for one year.

A17.2. Lessons learned

Jordan's long experience in developing its human resources yielded a general consensus on a number of major issues.

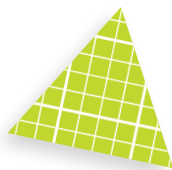
There is agreement that a sectoral – as opposed to labour market-wide – focus is appropriate when dealing with human resources and skills development issues in the Jordanian context.

The efforts of various government departments and other groups to address skills issues from a sectoral perspective appear uncoordinated. As a result, there is a need to clarify the roles and responsibilities of the various labour market stakeholders.

The importance of adopting a step-by-step approach is acknowledged. The prevailing view is that, by building on demonstrated successes (such as in tourism), momentum, support and experience will guide other priority sectors.

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Annex 18. Portugal

A18.1. Context

Portugal has a long history of sectoral approaches to anticipating change in skills needs. Early international exchanges highlighted the problems of developing quantitative model-based projections in the absence of the relevant data such as input-output tables, comprehensive and consistent time series on economic and labour market indicators, and the lack of a detailed multisectoral macroeconomic model. This resulted in emphasis on more partial approaches focusing on the needs of particular sectors ⁽⁹¹⁾.

Between 1997 and 2006, around 35 reports were produced on more than 20 different sectors. Transport alone was the subject of six reports covering different subsectors. Some reports were detailed and focused (glass products, decorative stones and ceramic products); others were much broader and general (agri-food, hotels and tourism).

These reports adopted a common methodology, originally developed by Fatima Suleman, Madalena Fernandes and Maria de Fatima Morais ⁽⁹²⁾. This involved active participation by the social partners, education and training providers, government departments and agencies and other entities. Funding was provided centrally via the Ministry of Qualifications and Employment and was sourced originally from the European Community Social Fund.

Most of the research and analytical work was conducted by specialist research institutes, such as the Institute for Innovation in Training in Lisbon (Infor), between 1996 and 2003. The Institute for Quality in Training (IQF) then took over. This institute was subsequently restructured: some responsibilities were assumed initially by the Portuguese National Agency for Qualifications (ANQ) and in 2012 by the National Agency for Qualification and Vocational Education (ANQEP).

After 2007, as education and training was reformed, several institutional developments allowed for better use of the sectoral studies. The national qualifications system was created to raise Portuguese qualifications levels by promoting access to a diverse set of qualifications paths and increasing the relevance and quality of national qualifications. The national qualifications catalogue and the sector councils for qualifications, launched in 2009 by the National Agency for Qualification, were important for reducing the gap between labour market qualifications, skills needs and education and training provision. The national qualifications catalogue currently comprises 267 TVET qualifications (European qualifications framework levels 2, 4 and 5) covering 39 education and training fields. The existing sector councils for qualifications, covering 16 industries, act as working groups with technical and advisory competencies in education and TVET policy-making. Each sector council includes key stakeholders and representative members from a broad set of institutional bodies: the social partners, training providers, technological centres, ministries, some leading companies, and independent experts.

A18.2. Key stakeholders and approaches

Portugal has experienced dramatic structural change since becoming a member of the EEC in 1986 (Yordanov, 2009). The opening up of the Portuguese economy forced many industries to improve their efficiency while others proved to be unsustainable. These changes resulted in significant shifts in skill requirements. The sectoral studies conducted since then have tried to improve understanding of this process and aid change and adjustment.

The main challenges addressed by the sectoral studies have related to the need to meet the changing requirements of the economy as it has adjusted to

⁹¹ The explanation provided in Chapter 2 emphasises the need to understand the economic and political context against which the studies and approaches have been carried out: deep structural change and the need to shape TVET provision towards new skills requirements. The choice of method was mainly a strategic one and there was a conviction that these were the best methods to use given the data available and the aims of the work.

Several projection exercises based on quantitative models were carried out over the period since the 1960s: using the Parnes demand function in the framework of the Mediterranean Regional Project (OECD, 1964); using the MEM model (manpower and education model developed by the World Bank and the International Bank for Reconstruction and Development) for human resource strategy and development at national level; extension of education forecasting and simulation studies in developing countries, based on a simulation model for the development of education (Sidemucs, UNESCO); the M3E model (CEPCEP, UCP), a simulation model for the economy, education and employment (which has also been tested in several studies since the 1980s). From 2000 to 2009, a considerable number of forecast and foresight studies were carried out at national, regional and sectoral level. The most recent studies using the M3E model are by Carneiro et al. (2011) and Figueiredo et al. (2012).

⁹² The original methodology was reviewed and adapted in 2002 (Infor, 2002).



these shifts. For instance, the tourism study helped promote dialogue between enterprises and other stakeholders, involving them in a strategic thinking and encouraging them to set long-term targets for sector qualifications levels.

Even though all the studies used the same methodology and the same structure, the specific focus of the studies varied quite significantly, depending on the sector and the issues it faced.

The main aim of the sector councils for qualifications is to support the National Agency for Qualification and Vocational Education in updating and developing the national qualifications catalogue.

A18.2.1. Main methodology

The methodology used in sectoral prospective studies is:

- (a) define the sector;
- (b) diagnose the key challenges facing the sector;
- (c) develop sectoral and occupation profiles;
- (d) formulate a detailed sector profile, including key characteristics, supply chain issues, technological aspects, a SWOT analysis;
- (e) develop scenarios specific to the sector to highlight the prospective element, typically three or four scenarios (gold, silver (and/or bronze) and brass);
- (f) develop occupation and skill profiles and their dynamics ⁽⁹³⁾;
- (g) carry out quantitative and qualitative reviews of the supply side of skills;
- (h) assess the implications for skills mismatches.

The studies generally do not provide much quantitative data, for example on numbers of jobs. The main audience is policy-makers, education and training providers and other sectoral stakeholders.

The sector councils for qualifications follow a very open methodology, which aims to:

- (a) identify current and future sector developments;
- (b) identify qualifications and skills needs;
- (c) suggest amendments to the national qualifications catalogue, updating and developing it by designing new qualifications or restructuring existing ones;
- (d) promote matching processes between TVET provision and sectoral labour market needs.

The work follows the national qualifications catalogue methodology principles on updating qualifications standards:

- (a) an occupation profile (main activities and competencies);
- (b) a training standard (short duration training units);
- (c) standards for the recognition, validation and certification of competencies (competency units and assessment tools).

A18.2.2. Key research processes and instruments

The processes used in the Portuguese prospective sectoral studies typically include:

- (a) desk research;
- (b) limited primary data collection;
- (c) interviews and case study development;
- (d) value and supply chain analysis;
- (e) technology assessment;
- (f) development of scenarios based around three main axes:
 - (i) markets and products;
 - (ii) technology;
 - (iii) organisation.



⁹³ The design of the occupation profiles is a key element (for details see Lameira, 2005a). Among other sources these profiles draw on the US O*NET database.



The methodology for the scenarios was developed by the research team in advance. It was then applied to the sector, rather than being developed by all participants as part of the process (for further details on the scenario development methodology see Caramujo, 2005).

Strategic decisions regarding the sector councils for qualifications are taken in plenary sessions and then worked through by members responsible for practical recommendations. The recommendations are then coordinated by the National Agency for Qualification and Vocational Education.

A18.2.3. Place within national system of anticipating skills needs

Unlike many other countries, Portugal had no alternative system for skills anticipation based on quantitative model projections ⁽⁹⁴⁾. The approach was designed to substitute for such a system using data that were readily available ⁽⁹⁵⁾.

Although several other anticipation studies have been carried out (at national, regional and sectoral level), the work of the sector councils for qualifications is currently the most systematic institutional mechanism for skills needs anticipation in Portugal. Methods, results and recommendations from the anticipation studies, produced by university research centres, consultancy firms or associations, are usually integrated as complementary inputs.

For an overview of the national system of skills needs anticipation and the recommendations made, see Carneiro et al. (2010).

A18.3. Lessons learned

This case study has demonstrated the feasibility of developing something useful using qualitative as opposed to quantitative techniques.

The focus on scenarios highlights the need to deal with uncertainty.

Where a strategic vision on national competitiveness and innovation is in place, a clear view on the key drivers is a fundamental element for sectoral and inter-sectoral dynamics and analysis.

Taking stock of expert and empirical knowledge from a diverse range of sources is essential for creating meaningful and likely future scenarios.

Stakeholder involvement raises sectoral and national awareness of the importance and usefulness of skills needs anticipation and matching processes.

Such work can promote a better understanding of changing skill requirements and broad competency-based occupation profiles.

Consuming too much time and resources may have opportunity costs: the studies can sometimes be 'overtaken by events' and are expensive to keep up to date.

The work highlights the difficulties in using comparative analysis and combined quantitative forecasting methods.

Further institutional developments introduced by the sector councils for qualifications allowed for:

- (a) better coordination between public services, education and training providers, employers and workers' representatives;
- (b) systematic feedback mechanisms between skills needs, qualifications design and TVET provision;
- (c) the use of competency-based approaches to promote mobility for workers and learners, in some cases exploring inter-sectoral links.



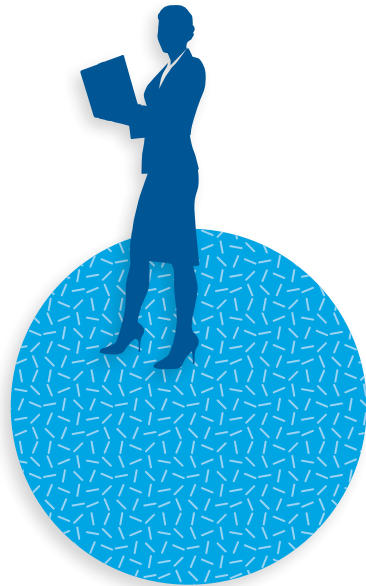
⁹⁴ But see comments in footnote 88.

⁹⁵ Please, see comments in footnote 88.



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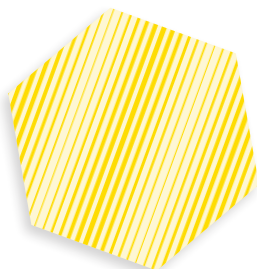
Annex 19. Singapore

A19.1. Context

The city-state of Singapore has been able to adapt to changes induced by the global economy. Foreign direct investment has been a key driver of economic development in the country and foreign workers, a significant share of Singapore's workforce, have also been a major factor. Because of its reliance on foreign resources, the economy is highly sensitive to changes in the global economy. Due to its small size, even small sectoral shifts have a large impact on the national economy.

Singapore's governance model is often described as a 'developmental State', where the State plays a determinant role in driving economic development in a market-based economy (Sung, 2011). In this system, the government identifies strategic sectors in cooperation with the private sector. It drives structural change, mainly using market-based incentives. Coordination between key government departments ensures effective intervention in strategically important areas of economic development.

This system supported a systematic and comprehensive approach to workforce development. The original focus of the government's workforce development strategy was to address structural unemployment and economic restructuring brought about by the recession in 2001–02. By 2010, this focus had changed and the government's Economic Strategy Committee identified two strategic priorities for workforce development: upskilling the workforce to ensure global competitiveness and reducing the reliance on foreign workers and the levels of low-wage employment.



A19.2. Key stakeholders and approaches

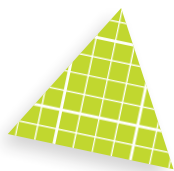
The Singapore Workforce Development Agency was established in 2003 to reform the continuing education and training (CET) system so that it can better meet labour market needs. The agency is a statutory board under the Ministry of Manpower. Its mission is to 'lead, drive and champion workforce development, enhancing the employability and competitiveness of Singapore's workforce' ⁽⁹⁶⁾.

The reform of the skills system was informed by international good practice, mainly in the UK and Australia. The CET system is based on a sectoral approach to skills development and includes the following main elements: the Workforce Development Agency, industry skills and training councils, training funds, a national qualifications framework, and CET centres. Each of these plays a well-defined role in skills development, ranging from identifying industry needs and setting strategic directions to developing and delivering training products. The system is planned and driven by the government. Stakeholders, including multinational companies, trade unions and education providers, are involved through regular and extensive consultation.

The Workforce Development Agency coordinates the CET system and provides strategic direction. It was also charged with establishing a skills and curriculum framework, a national qualifications framework and a quality assurance system. The Singapore workforce skills qualifications framework identifies key competencies that employers require and defines national standards across 30 industries ⁽⁹⁷⁾. These standards were defined in collaboration with industries, along a sectoral framework. The Workforce Development Agency's curriculum design division is responsible for designing the various levels of the workforce skills qualifications framework and maintaining the qualifications.

⁹⁶ Singapore Workforce Development Agency: *Our history*, <http://www.wda.gov.sg/content/wdawebbsite/L209-001About-Us/L209A-History.html>

⁹⁷ Singapore Workforce Development Agency: *What is WSQ?* <http://www.wda.gov.sg/content/wdawebbsite/L207-AboutWSQ.html>



Industry skills and training councils and manpower skills training councils are key elements of the new, comprehensive sectoral system. Councils have been established in each major sector of the Singaporean economy. The Workforce Development Agency tried to utilise sectoral bodies which had previously existed to avoid duplication and obtain industry buy-in. One example is the Institute of Banking and Finance, which helped to develop the financial services competency standards (Sung et al., 2010). In other cases, new industry skills and training councils were appointed by the Workforce Development Agency. They are responsible for identifying competency requirements and they play a key role in designing and implementing the workforce skills qualifications framework in their industries. The councils also develop sector strategic plans and sector skills profiles, and identify skills gaps.

Industry-specific training is delivered through the CET centres, which are public training providers organised around industries. They are responsible for a range of services from the start of training to employment. This includes recruitment, counselling, career guidance, training provision, assessment and post-course monitoring. To ensure industry currency and relevance of programmes and delivery, many centres have established their own industry advisory boards.

In addition to students wishing to enter the industry, CET centres focus on two main groups of trainees: the unemployed who want to reskill and employees who want to upskill. The centres provide an integrated solution for job seeking, training and matching trainees with employers. CET centres are responsible for finding job placements for unskilled trainees and monitor if the trainees stay in these jobs; they also monitor the employment status of upskilling employees. Because of this requirement, CET centres have first-hand information about skills demand in

their industries. This post-course monitoring provides information about the relevance of training products and their quality and is also used to measure the impact of public funding. The centres are subject to continuous improvement review to ensure that the standards and quality of training are maintained.

Some 49 CET centres have been established, covering 23 sectors of the economy, including retail, tourism, hospitality, aerospace, security, finance, digital animation, process engineering, culinary skills, basic literacy, numeracy and service skills ⁽⁹⁸⁾.

The reformed CET system is supported by two main funding sources. The Skills Development Fund has existed since 1979 and is financed by a skills development levy, a statutory contribution paid by all employers for all their employees ⁽⁹⁹⁾. The Lifelong Learning Endowment Fund was established in 2001 by the Singapore government to provide increased funding for training. The endowments are progressively set aside and the fund uses the interest earned on these endowments to fund training. An important feature of the endowment fund is that the amount available for funding is not linked directly to industry performance and so is a more stable source of funding.

The Skills Development Fund has an annual budget of around Singapore dollar (SGD) 80-90 million. The lifelong learning endowment fund is the larger funding stream with endowments are estimated at SGD 5 billion. Employers can claim back roughly 90% of course fees and cover absenteeism costs from these funding sources.



⁹⁸ Singapore Workforce Development Agency: *CET Centres Complete list*. <http://www.wda.gov.sg/content/wdaweb/L101-ForIndividuals/L220A-004CETFULList.html>

⁹⁹ SkillsConnect: *Skills development Levy (SDL)*. <https://www.skillsconnect.gov.sg/web/guest/SDL>



A19.3. Lessons learned

The Singaporean CET system offers a good example of the creation of an integrated, State-led sectoral skills development system. The design of the new sectoral approach was informed by the sectoral models of other developed countries, which were adapted to the national context.

The endowment-based funding mechanism and the CET centres are unique features of the system. The combination of anticipation, training and matching functions under one roof ensures that training is delivered only when there is real demand for it. Rather than delivering skills in response to industry's needs, this system focuses on proactively generating industry demand in priority areas.

The Workforce Development Agency spent almost six years developing the various elements of the CET system, so it is still fairly new.

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Annex 20. South Africa

A20.1. Context

South Africa inherited some institutional features from its earlier historical association with the UK but it has followed an independent and distinctive path in recent years.

Prior to 2000, there were 33 industry training boards in South Africa that covered various sectors. They focused primarily on apprenticeships (vocational education and training) rather than more general education.

The Skills Development Act (1998) defined the Sector Education and Training Authority (SETA) system. This involved developing a series of sector skills plans within a clearly defined national skills development strategy framework.

SETAs were set up for each sector in the early part of the millennium to provide South Africans with the education and training that will meet the needs of different sectors. The target audience is those going through initial education and training and those that need to learn new skills, including the unemployed.

In 2000, 23 SETAs were established. Each had responsibility for covering particular sectors and subsectors, defined according to their primary economic activities (such as banking or health and welfare). SETAs cover all industries and occupations. They are responsible for both private and public sectors within their footprints.

SETAs have much greater powers and responsibilities than the old industry training boards. They are responsible for developing courses of education and training relevant to their sectors. They have the task of collecting skills levies from employers within their sector and making these resources available to fund relevant education and training.

Following a trial period, the SETAs were re-established and recertified in 2005. Recertification was repeated on an interim basis in 2010, with licences being extended for just one year pending a more radical rethink.

The South African government also has an industrial policy action plan. Its aim is to align skills development efforts to support this plan, ensuring that the country has the skills it needs over the next five years.

A20.2. Key stakeholders and approaches

The SETAs are responsible for ensuring that the country has the skills it needs over the next five years for the particular sectors and subsectors they cover.

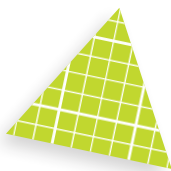
They are responsible for collecting and allocating resources for 'learnerships', internships, unit-based skills programmes and apprenticeships within their sectors. The funds collected are distributed to employers and training bodies and also to learners in the form of discretionary grants and bursaries.

A20.2.1. Main methodology

SETAs use a variety of methods to assess the labour markets for which they are responsible. For example, the Education Training and Development Practices SETA (ETDP SETA), which covers the SIC categories associated with research, education and training, non-governmental organisations (NGOs), trade unions, political parties and libraries, describes:

- (a) primary data collection, such as the extensive labour market survey conducted during 2006–07;
- (b) extensive consultation with stakeholders: over 1 000 workshops held throughout the country, including all available and relevant data and research funds and employers;
- (c) extensive monitoring and evaluation, covering all provinces, carried out in 2008 to measure the impact achieved to date and to identify any necessary adjustments to strategies;
- (d) exhaustive secondary research, identifying and collating all available and relevant data and research for each constituency (including simple quantitative modelling and forecasting).





A20.2.2. Complementarity with the national system

No skills forecasting takes place at national level in South Africa. An external review established that such work was probably feasible but it has not been taken forward (Wilson et al., 2004).

A20.3. Lessons learned

The Department of Higher Education and Training has now taken over responsibility for skills development from the Department of Labour. Various changes have been introduced to deal with concerns about the performance, management and governance of the SETAs.

In particular, it was argued that there was a need for a better alignment of training and skills development to the needs of industry, especially relating to the provision of training for artisans and technicians.

The following changes were introduced within the framework of a new national skills development strategy, covering the period up to 2016:

- (a) 15 of the existing SETAs have been recertified with minor changes;
- (b) six new SETAs have been formed as a result of the amalgamation of existing SETAs or subsectors of existing SETAs;
- (c) the number of SETAs has been reduced from 23 to 21.

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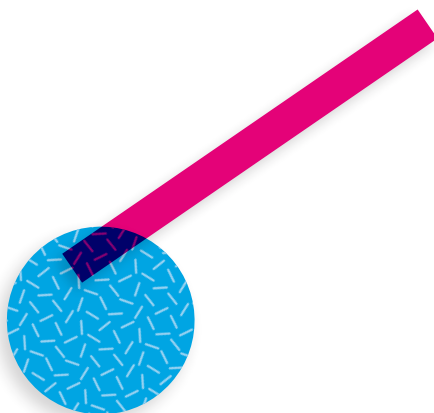
Wilson, R.A. et al. (2004). *Developing a national skills forecasting tool for South Africa*. Pretoria: South African Department of Labour.

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SETAs: Basic guide to sector education and training authorities. <http://www.labour.gov.za/DOL/legislation/acts/basic-guides/basic-guide-to-sector-education-and-training-authorities-setas>

There are links to web pages for each SETA at <http://www.vocational.co.za/>





Annex 21. United Kingdom

A21.1. Context

Over the past decade, the UK has developed a strong sectoral focus to its analysis of changing skills needs by setting up new institutional structures focused on sectors. Sector skills councils (SSCs) have been established to help articulate the skills needs of employers.

The UK has been engaged in skills anticipation and matching since the mid-1970s. Initially, this work was focused on the use of quantitative modelling with a strong emphasis on sectoral detail.

In 1997, the incoming Labour government initiated major reforms in this area, arguing the case for evidence-based policy. Skills were seen as the key to both improving economic performance and dealing with problems of social exclusion and related issues. The government put considerable additional resources into measuring changing skills needs and related areas.

SSCs are State-sponsored, employer-led organisations that cover specific economic sectors in the United Kingdom. They are licensed by the government through the UK Commission for Employment and Skills (UKCES). The SSC system is supported by central government funding distributed through UKCES. UKCES took over from the Sector Skills Development Agency in 2008. The Sector Skills Development Agency and the SSCs were first established in 2002 following an initial assessment of the situation by the Labour government. Many SSCs were based on existing institutions, but some were entirely new bodies. They were formed primarily from interested parties on the employer side of the labour market.

Matters have been complicated by the devolution of power to Scotland, Wales and Northern Ireland, resulting in variations in policy and practice within the UK.

A21.2. Key stakeholders and approaches

SSCs have four key goals:

- (a) to reduce skills gaps and shortages;
- (b) to improve productivity;
- (c) to boost the skills of their sector workforces;
- (d) to improve learning supply.

There are currently 25 SSCs, covering about 85% of the British workforce.

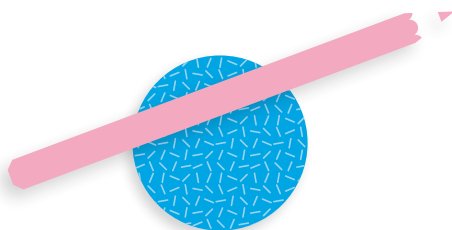
The specific focus of the studies varied quite significantly depending on the priorities of the SSC, driven by employers. Some SSCs also incorporate the views of the social partners more though the UK system places much greater emphasis on the employer side compared to other countries.

There has been a general move away from an emphasis on the use of such work to inform planning of education and training. The current trend is towards helping to make markets work more efficiently by better informing all participants about the labour market situation they face.

A21.2.1. Main methodology

SSCs conduct some of their own research and commission other bodies to carry out research for them. UKCES also provides some research centrally. This includes:

- (a) the Working futures series of detailed occupation and qualification projections by industry (produced using a multisectoral macroeconomic model);
- (b) the national employer skills survey, which provides a detailed analysis of skills deficiencies across the UK;
- (c) the UK employer perspective survey, which provides more general information on employers' views.



These centrally provided resources are used to support the activities of individual SSCs.

The SSCs adopt a range of methods to anticipate changing skills needs and to assess mismatches and imbalances between skills demand and supply. They cover all the approaches, quantitative and qualitative, identified in Table 1 in the main report.

Subject to the terms of their agreement with UKCES, SSCs have considerable freedom of choice and flexibility when it comes to selecting the technical methods and tools used in their work. Some use quite sophisticated quantitative modelling, others focus primarily on more qualitative methods. Many collect and collate their own data and labour market information (LMI), including some online interfaces.

The UK SSCs are, therefore, both LMI beneficiaries and contributors.

A21.2.2. Key research processes and instruments

The processes used by SSCs include:

- (a) desk research and analysis of secondary data;
- (b) quantitative modelling and forecasting;
- (c) primary data collection;
- (d) value and supply chain analysis;
- (e) technology assessment;
- (f) interviews and case study development;
- (g) scenario development techniques.

The sectors differ mainly with regard to the key focus of the stakeholders involved in the process. In recent years, UKCES has attempted to impose common standards and objectives.

In 2012, SSCs were tasked with producing sector skills assessments for their sectors. Based on a standard template, the assessments used a minimum standard set of LMI, much of which was provided centrally.

Sector skills assessments are seen as key sources of authoritative and focused sectoral labour market intelligence, designed to inform the development of skills policy across the UK. They combine top-down analysis of official data with bottom-up intelligence to provide a consistent, comparable and rich understanding of the skills priorities within different sectors of the economy, across the four UK nations.

The sector skills assessment referenced in Box 20 in the main report provides a good example. It covers the agriculture, forestry and fishing sector.

A21.2.3. Complementarity with the national system

The work carried out by SSCs can be seen as part of a coherent system, although, in practice, things are probably not as well joined up as they might appear.

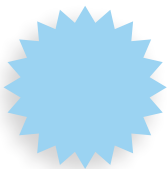
A21.3. Lessons learned

The key lesson from a UK perspective was the importance and value of getting an employer perspective on skills and training issues. The employer voice had largely been lost with the general dismemberment of the industrial training board network in the 1980s ⁽¹⁰⁰⁾.

A second lesson was the need to take care when defining sectors. Initial attempts to form SSCs paid little attention to existing systems of classifying industries. This led to difficulties in finding data to match the 'footprints' that emerged, which often cut



¹⁰⁰ Although a few industry training boards have survived and transformed themselves into SSCs.



across SIC boundaries. There was a failure to recognise the problems of systematic classification. In some cases, new ad hoc systems were suggested that have not stood the test of time. All official data in the UK are presented using the standard industrial classifications and standard occupational classifications (SIC and SOC), which official statisticians have taken great pains to develop and to reflect the realities of the economy and the labour market.

UKCES has gradually encouraged a move towards defining SSC footprints in line with established SIC. The latest national employer skills survey collects data for these SIC-based SSC footprints.

Websites

[URLs accessed 10.7.2014]

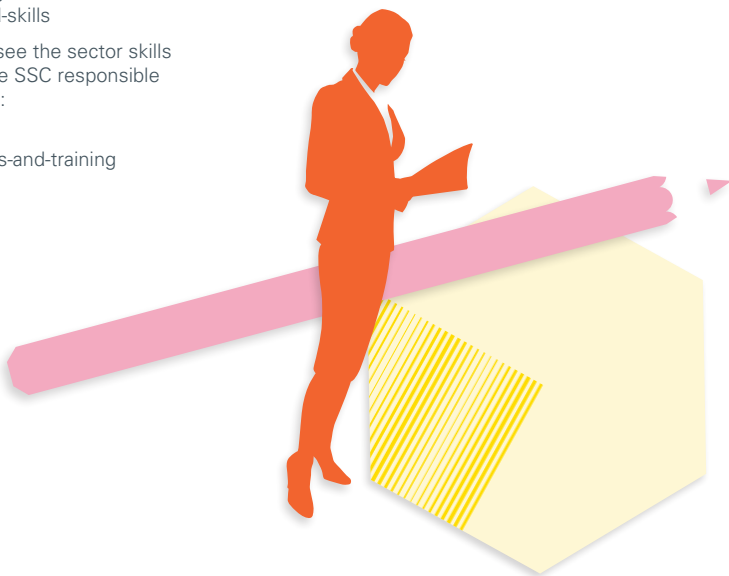
To find out more about UK sectoral skills councils in general and the UK Commission for Employment and Skills, see:

Sector Skills Councils. <https://www.gov.uk/search?q=Sector+Skills+Councils>

UKCES, UK Commission for Employment and Skills. <https://www.gov.uk/government/organisations/uk-commission-for-employment-and-skills>

As an example of a particular SSC, see the sector skills assessment produced by Lantra (the SSC responsible for agriculture and related activities):

Agricultural skills and training. <https://www.gov.uk/agricultural-skills-and-training>





Annex 22.

United States of America

A22.1. Context

The US is a developed economy that has been engaged in skills anticipation, in the form of occupation projections and matching of skills demand and supply, longer than any other country. This does not take the form of sectoral analyses of skills as such, but sector is at the centre of the US approach.

This case study is included because it became obvious as the report was being drafted that the US experience offered some general lessons, even though it is not an obvious example in terms of carrying out a sectoral skills analysis in the conventional sense.

A22.2. Key stakeholders and approaches

Assessment of changing skills needs and gaps across the economy as a whole focuses on occupation and other more general measures of skill.

The primary aim is to help make markets work better by providing useful LMI and intelligence centrally. It is not about top-down planning of education and training.

A22.2.1. Main methodology

The US has well-established systems for anticipating changing skills needs and for providing useful information to labour participants about the nature of jobs, including the generic skills needed to carry them out successfully ⁽¹⁰¹⁾.

A22.2.2. Key research processes and instruments

The US approach is based on three pillars, all of which have a sectoral dimension:

- (a) the occupation employment statistics survey;
- (b) the Bureau of Labor Statistics models and systems for projecting the labour market;
- (c) the O*NET system for identifying skill requirements within occupations.

The first pillar provides a very detailed picture of the structure of employment by occupation within industries. The second – projections of occupational employment made by the Bureau of Labor Statistics – uses a detailed multisectoral macroeconomic model, in combination with the judgement of sectoral experts about changing occupation patterns within industries or sectors. The employment statistics survey provide the cornerstone for this work.

The final pillar is the O*NET system, which monitors changing skill requirements within occupations. This is a complex and resource-intensive system, developed over many years. It involves several elements to assess current and changing skills needs within occupations. For further details, see Table A2.

The Bureau of Labor Statistics does not place great emphasis on trying to measure short-term skills mismatches through major surveys of vacancies. These are regarded as ephemeral in a competitive market economy. Nor is much emphasis placed on detailed supply modelling and projection by qualification.



¹⁰¹ For a more extensive review, see Wilson, 2010.



Table A2. Supplementary information about the US O*NET system

Survey instrument	main content	no of items 'descriptors'
Education and training	Required education, related work experience, training	5
Knowledge	Various specific functional and academic areas (physics, marketing, design, clerical, food production, construction)	33
Skills	Reading, writing, maths, science, critical thinking, learning, resource management, communication, social relations, technology	35
Abilities	Writing, maths, general cognitive abilities, perceptual, sensory-motor, dexterity, physical coordination, speed, strength	52
Work activities	Various activities (information processing, making decisions, thinking creatively, inspecting equipment, scheduling work)	41
Work context	Working conditions (public speaking, teamwork, conflict resolution, working outdoors, physical strains, exposure to heat, noise and chemicals, job autonomy)	57
Work styles	Personal characteristics (leadership, persistence, cooperation, adaptability)	16
TOTAL		239

Source: Handel (2012); Tippins and Hilton (2010).



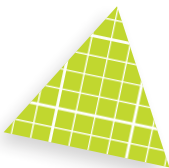
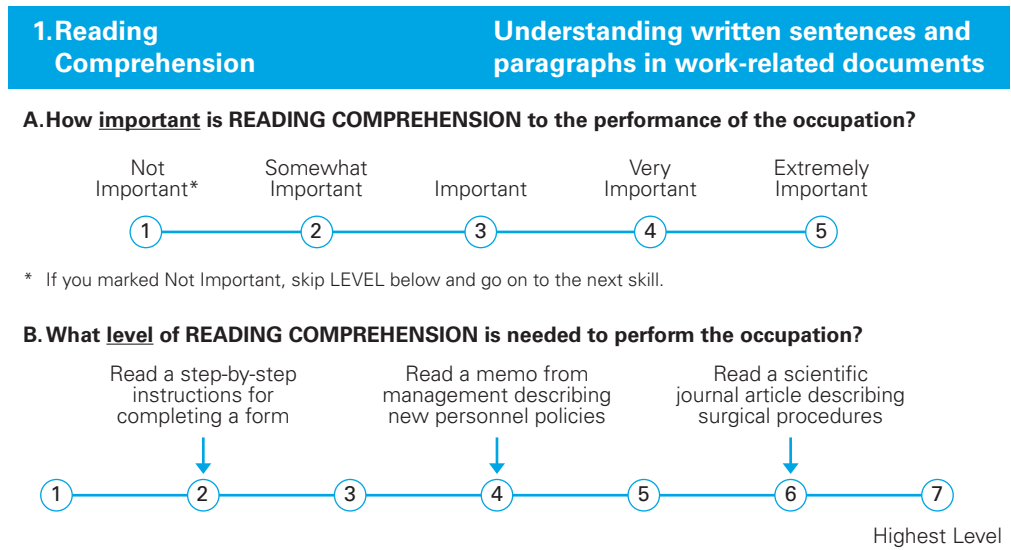
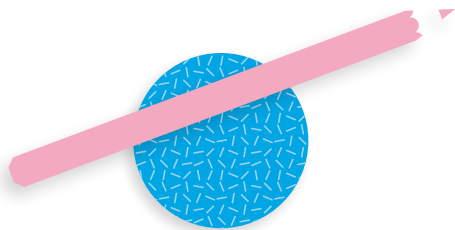


Figure A2. Example of O*NET question with importance and levels scales



Source: National Centre for O*NET Development: skills questionnaire (<http://www.onetcenter.org/questionnaires.html>).





A22.2.3. Complementarity with the national system

A sectoral focus is at the heart of the US approach, but the US does not place great emphasis on a sectoral approach as narrowly defined here. Its analysis covers all sectors simultaneously.

The approach adopted by the Bureau of Labor Statistics involves a complex combination of methods and tools (both qualitative as well as quantitative), with major investment in data collection, modelling and analysis. This has taken many decades of evolution and development.

A22.3. Lessons learned

There is a fundamental need for robust and detailed data on occupation employment within sectors. These are supplied by the US occupation employment statistics survey of employers, a cornerstone of the US approach to anticipating skills needs.

The O*NET skills database is the result of many years of substantial investment, steadily building on the work of earlier years. The experience of a number of countries outside the US suggests that it is possible to 'piggy back' on this investment and exploit it for own benefit (as in the Czech Republic, Italy and the UK).

The US experience in developing O*NET also illustrates that quantitative methods can contribute an insight into changing generic skills and competencies (although many other methods and techniques are needed as well).

References

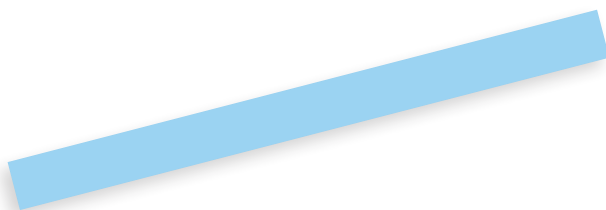
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- Wilson, R.A. (2010). *Lessons from America: a research and policy briefing*. Wath-upon-Deane: UKCES. UKCES briefing paper series. <http://dera.ioe.ac.uk/2193/>



ACRONYMS

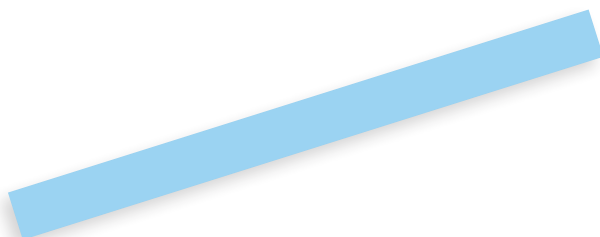


AWPA	Australian Workforce and Productivity Agency (Australia)
BIBB	Federal Institute of Vocational Education and Training (Germany)
BLS	Bureau of Labor Statistics (the US)
BMBF	Ministry of Education and Research (Germany)
CAC	Argentine Chamber of Construction
Cedefop	European Centre for the Development of Vocational Training
CEP	Contrat d'études prospectives [contract for forecasting study] (France)
CERGE	Centre for Economic Research and Graduate Education (Czech Republic),
CET	Continuing education and training (Singapore)
CGE	Computable general equilibrium
CHIETA	Chemical Industries Sector Education and Training Authority (South Africa)
Cinterfor	Centro Interamericano para el Desarrollo del Conocimiento en la Formación Profesional [Inter-American Centre for Knowledge Development in Vocational Training]
COTVET	Council for Technical and Vocational Education and Training (Ghana)
DG-EMPL	Directorate-General for Employment, Social Affairs and Inclusion
E-TVET	Employment-Technical and Vocational Education and Training (Jordan)
Ecorys	European research and consultancy company
ESCO	European skills/competencies, qualifications and occupations
ETF	European Training Foundation
EU	European Union
FEGHRA	Business federation for the hotel and catering sector (Argentina)
HRDC	Human Resource Development Council (Botswana)
HRSDC	Human Resources and Skills Development Canada
IAB	Institut für Arbeitsmarkt und Berufsforschung [Institute for Employment Research] (Germany)
ICT	Information and communication technology
ILO	International Labour Organization
ISC	Industry Skills Council (Australia, Bangladesh)





ISCED	International standard classification of education (maintained by UNESCO)
ISCO	International standard classification of occupations
ISCO-08	Latest version of ISCO
ISFOL	Institute for the Development of Vocational Training of Workers (Italy)
ISIC	International standard industrial classification (of all economic activities); a United Nations system for classifying economic data
ITAB	Industry training advisory body (Australia)
Lantra	Sector skills council for land-based and environmental industries (UK)
LMI	Labour market information
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne [statistical classification of economic activities in the European Community] (equivalent to the European SIC)
NCVER	Australian National Centre for Vocational Education and Research
NSDC	National Skill Development Corporation (India)
NTF	National Training Fund (Czech Republic)
O*NET	US system for classifying and measuring skills (US)
OECD	Organisation for Economic Cooperation and Development
OPCA	Organisme paritaire collecteur agréé [occupation-level approved joint collecting organisation] (France)
OPMQ	Observatoire prospectif des métiers et des qualifications [forecasting observatory for occupations and qualifications] (France)
OREF	Observatoire régional de l'emploi et de la formation [regional employment and training observatory] (France)
PES	Public employment service
PIACC	Programme for the international assessment of adult competencies
ROA	Research Centre for Education and the Labour Market (based in Maastricht)
SENAC	National Training Service for the Commercial Sector (Brazil)
SENAI	National Service for Industrial Training (Brazil)
SENAR	National Training Service for the Rural Sector (Brazil)
SENAT	National Training Services for the Transportation Sector (Brazil)

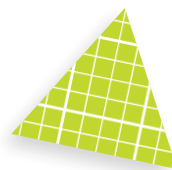




SETA	Sector Education and Training Authority (South Africa)
SIC	Standard industrial classification (= NACE or ISIC)
SME	Small and medium-sized enterprise
SOC	Standard occupational classification
SSC	Sector skills council (Argentina, Canada, India, the UK)
STED	Skills for trade and economic diversification
SWOT	Strengths, weaknesses, opportunities, threats (analysis)
TASC	Alliance of Sector Councils (Canada)
TVET	Technical and vocational education and training
UK	United Kingdom
UKCES	UK Commission for Employment and Skills
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UOCRA	Union of Construction Workers of the Argentine Republic
US	United States of America
UTHGRA	Workers' union in the tourism sector in the Argentine Republic
VET	Vocational education and training
VTC	Vocational Training Council (Hong Kong)

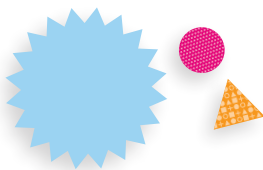


KEY TECHNICAL TERMS



Anticipation	Anticipation (of changing skills needs) is a term used to encompass a range of both quantitative and qualitative methods of peering into the future to try to assess what it might look like. Skills needs may be anticipated in the short term (less than a year), medium term (one to five years) or longer term (more than five years). See Chapter 2 for more details of the various methods used.
Apprenticeship	Systematic, long-term training alternating periods at the workplace and in an educational institution or training centre. The apprentice is contractually linked to the employer and receives remuneration (wage or allowance).The employer assumes responsibility for providing the trainee with training leading to a specific occupation (Cedefop).
Cluster	A cluster is understood as a network of suppliers, producers, customers and competitors connecting between themselves and with institutions of knowledge production and diffusion to build new competitive factors and new competencies and to increase added value (Volume 2).
Competency	The proven or demonstrated individual capacity to use know how, skills, qualifications or knowledge in order to meet usual and changing occupation situations and requirements (UNESCO).
Computable general equilibrium methods	CGE models are empirically based models that estimate how an economy may react to specific policies, new technologies, and external shocks or changes (ILO, 2011a).
Delphi method	This is an expert survey implemented in two or more rounds where the results of the previous round are provided as feedback in the second and later rounds of the survey (Volume 2).
Employability	Refers to the combination of factors which enable individuals to progress towards or get into employment, to stay in employment and to progress during career (Cedefop, 2008). It includes portable competencies and qualifications that increase an individual's capacity to make use of the education and training opportunities available to secure and retain decent work, to progress within the enterprise and between jobs, and to cope with changing technology and labour market conditions (ILO, 2004).
Forecasting	Quantitative forecasts produce information on quantitative aspects of future labour markets through statistical projections, econometric models or similar methods. Quantitative forecasts use data about the present and past to estimate future developments (Andersen et al., 2010). Forecasts may include alternative quantified scenarios based on various assumptions (Volume 2).
Foresight studies	Foresight studies are typically multi-disciplinary, mostly qualitative approaches based on interviews, discussions, focus groups, Delphi methods to analyse present and future developments. The key feature of foresights is their action orientation (Volume 2).





Institutional infrastructure	This refers to all the various institutions in a country that have an interest in skills development, including the various departments and agencies of government, the education and training system (both academic and vocational) and other bodies.
Job	A set of tasks and duties performed, or meant to be performed, by one person, including for an employer or in self-employment (ILO, 2012).
Labour market information	Data relevant to the labour market including employment levels by job type, pay, vacancies and unemployment. The data can be differentiated by key dimensions and classifications (such as industry, occupation, qualification, gender and region). They can also include other pertinent information on demography, migration flows, changes in technology and various economic indicators (Volume 1).
Matching	Matching denotes approaches and actions that aim to increase the employability of the workforce and reduce skills shortages, including filling jobs with qualified jobseekers. This term is broader than job referral or placement.
Occupation	An occupation is defined as a set of jobs whose main tasks and duties are characterised by a high degree of similarity. A person may be associated with an occupation through the main job currently held, a second job or a job previously held (ILO, 2012).
Public employment service (PES)	The core functions of PESs include job search assistance and placement services; collection, analysis and dissemination of labour market information; development and implementation of targeted labour market programmes and services; the administration of unemployment insurance benefits, where applicable; and other regulatory services such as oversight of private employment agencies (ILO, 2009) (Volume 4).
Qualification	A formal expression of the vocational or professional abilities of a worker which is recognised at international, national or sectoral levels (ILO). An official record (certificate, diploma) of achievement which recognises successful completion of education or training, or satisfactory performance in a test or examination.
Sector	Although widely used, the term sector is not always precisely defined. For statisticians, the term is synonymous with industry. Standard industry classifications are used to differentiate employment, output and other indicators according to the principal economic activities involved. This is discussed in detail in Section 4.3. Another aspect includes the strategic choice about which sector should be the focus of attention (which is often linked to priorities for economic development). Again this is discussed in detail in Chapter 4.
Sectoral approach	This is defined as an approach which looks at changing skills needs from the perspective of a particular sector or group of linked sectors. A fuller discussion can be found in Chapter 2, and also in Chapter 4, which focuses on sectoral skill analysis.





Sectoral skills bodies	Sectoral skills bodies are defined as sector-based organisations whose overall objectives are to ensure that training in their sector meets the needs of employers and government and to promote skills development. A more detailed discussion can be found in Chapter 3.
Skill gap	Used as a qualitative term to describe a situation in which the level of skills of the employee or a group of employees is lower than that required to perform the job adequately, or the type of skill does not match the job requirements (Cedefop, 2010).
Skills	These can be defined and measured in many ways. The two most common methods are by occupation or qualification. While these both have their limitations they are also generally available in most countries. A general discussion of these issues and other ways of measuring skills can be found in Chapter 4.
Skills mismatch	An encompassing term referring to different types of skill gaps and imbalances such as over-education, under-education, over-qualification, under-qualification, over-skilling, skills shortages and surpluses, and skills obsolescence. Skills mismatch can be both qualitative and quantitative; referring both to situations where a person does not meet the job requirements and where there is a shortage or surplus of persons with a specific skill. Skills mismatch can be identified at the individual, employer, sector or economy level (Volume 1).
Skills shortage	Mostly used as a quantitative term to describe a situation in which certain skills are short in supply, for example where the number of jobseekers with certain skills is insufficient to fill all available job vacancies.
Statistical infrastructure	This refers to all the relevant LMI available from official and unofficial sources, including statistical and econometric modelling competencies.
Supply chain	A supply chain is a system of organisations, people, activities, information, and resources involved in moving a product or service from supplier to customer. Supply chain activities transform natural resources, raw materials, and components into a finished product that is delivered to the end customer (Wikipedia).
SWOT analysis	Analytical tool which helps to identify main internal (strengths and weaknesses) and external (opportunities and threats) factors that may shape the reality (now or in the future) (Volume 2).
Value (value-added) chain	Describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use (ILO).



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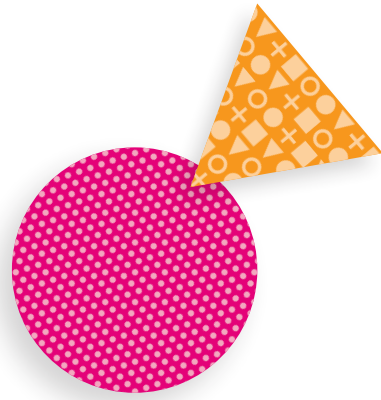
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This guide is a part of the ETF, ILO and Cedefop series of guides on skills anticipation and matching. All the guides follow a common structure, although they vary in level of detail, technical content and case studies. The ETF, Cedefop and the ILO worked closely together to develop the guides, usually with one agency/organisation taking the lead and the others providing inputs, case studies, comments and reviews. All guides have undergone extensive validation and peer review; they were also discussed in detail in international expert seminars in which academic representatives, anticipation and matching experts, and potential end-users from across the world provided comments and feedback on content and usability. Experts and staff of the three organisations also peer reviewed the guides before their publication.

A sectoral focus and perspective are seen as essential in anticipating changing skills needs. The guide examines sectors as the key points where changes in skills demand occurs, the term sector being used to define specific areas of economic activity.

A range of sectoral studies and approaches, using many different tools and methods, has been identified in the guide. Choices need to be made as to which approaches are used: several factors come into play and these are set out in detail. Various methodological options, covering both quantitative and qualitative approaches, are reviewed. Many of the cases considered involve a combination of several such approaches.

By providing the reader with concrete examples and case studies, this publication is a tool for employment policy- and decision-makers to understand whether a sectoral approach is appropriate, as well as for technical analysts and professionals who want to know how it should be implemented. It provides an overview of the role of sectoral bodies and what they do in anticipating changing skills needs. The country case studies show how skills are analysed at the sector level in different contexts and conditions.

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