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# Skills forecasting in the South Mediterranean region

Approaches and lessons learned from pilot projects



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# Skills forecasting: A reality check to increase youth employment

The demand for skills is undergoing substantial change as a result of technological progress, globalization, demographic transformations, climate change, mass migration and other upheavals. And while the youth population grew by 139 million between 1997 and 2017, the youth labour force shrank by 58.7 million.

**Policy-makers and other actors need to anticipate future skills developments to prepare for future labour markets to avoid youth unemployment. To do so, they need the capacity to produce prospective studies on future skills needs using appropriate methodologies and analytical tools.**

South Mediterranean countries are facing the highest youth unemployment rates in the world. Their governments are concerned about structural imbalances in their labour markets and have expressed increasing interest in developing evidence-based employment policies in order to tackle the structural skills mismatches that characterize their economies. In response, UNESCO is supporting the development of national capacity to undertake labour forecasting in the South Mediterranean area.

The Middle East and North Africa are regions with the **highest youth unemployment in the world: 25.7%** (2019, ILO)

Based on the outcomes of the employment component of the Networks of Mediterranean Youth (NET-MED Youth) project, and in the framework of the Youth Employment in the Mediterranean project (YEM), funded by the European Union, this report draws upon the work done since 2014. It includes five skills forecasting models and its results from seven South Mediterranean countries, targeting priority actors in charge of the development and supervision of national skills-related policies and plans. The publication also builds on an international perspective to benchmark and compare the work carried out in the Mediterranean area with other initiatives around the world.



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*"Since wars begin in the minds of men and women, it is in the minds of men and women that the defences of peace must be constructed."*

# Skills forecasting in the South Mediterranean region

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# Acronyms

<b>ALMPs</b>	Active labour market programmes
<b>ARIMA</b>	Autoregressive Integrated Moving Average
<b>ASHE</b>	Annual Survey of Hours and Earning
<b>BERUFENET</b>	Berufsinformationen Einfach Finden
<b>BLS</b>	Bureau of Labor Statistics
<b>CAG</b>	Career Advice and Guidance
<b>CCA</b>	Cohort Component Approach
<b>Cedefop</b>	Centre européen pour le développement de la formation professionnelle (European Centre for the Development of Vocational Training)
<b>CGE</b>	Computable General Equilibrium
<b>CIDE</b>	Consortium of International Development in Education
<b>DGP</b>	Directorate-General of Foresight
<b>ECISD</b>	Ector County Independent School District
<b>EMTA</b>	Emerging Markets Traders Association
<b>ENE</b>	National Employment Survey
<b>ESS</b>	Employment Skills Survey
<b>ETF</b>	European Training Foundation
<b>EU</b>	European Union
<b>GVA</b>	Gross Value Added
<b>HCP</b>	Haut-Commissariat au Plan
<b>HE</b>	Higher education
<b>HTF</b>	Hard to fill
<b>ICT</b>	Information and communications technology
<b>ILO</b>	International Labour Organization
<b>IMF</b>	International Monetary Fund
<b>INS</b>	National Institute of Statistics
<b>ISCO</b>	International Standard Classification of Occupations
<b>IT</b>	Information technology
<b>JCP</b>	Job Centre Plus
<b>JOPMOD</b>	Jordanian Occupational Projection Model
<b>KISS</b>	Keep it simple, stupid
<b>LFS</b>	Labour Force Survey
<b>LMII</b>	Labour Market Information and Intelligence
<b>LMIIS</b>	Labour market information and intelligence system
<b>LSC</b>	Learning Skills Council

<b>MAC</b>	Migration Advisory Committee
<b>MAS</b>	Ma'had Abhath As-Syasat Al-Iqtisadiya Al-Filastini
<b>MDICI</b>	Ministry of Development, Investment and International Cooperation
<b>MENA</b>	Middle-East and North Africa
<b>MENFP</b>	Ministry of National Education and Vocational Training
<b>MESRS</b>	Ministry of Higher Education and Scientific Research
<b>MESRSFC</b>	Ministry of Higher Education, Scientific Research and Management
<b>Training</b>	
<b>MoPIC</b>	Ministry of Planning and International Cooperation
<b>MRA</b>	Manpower Requirement Approach
<b>NEO</b>	National Employment Office
<b>NESS</b>	National Employer Skills Survey
<b>NET</b>	National Expert Team
<b>NET-MED Youth</b>	Networks of Mediterranean Youth
<b>NILS</b>	National Institute of Labour Studies
<b>NNP</b>	National Classification of Professions
<b>NOMIS</b>	National Online Manpower Information System
<b>NOS</b>	National Office of Statistics
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>OES</b>	Occupational Employment Statistics
<b>ONEQ</b>	National Employment and Qualification Observatory
<b>PCBS</b>	Palestinian Central Bureau of Statistics
<b>PEFE</b>	Palestine Education for Employment
<b>PES</b>	Public Employment Service
<b>PIAAC</b>	Programme for the International Assessment of Adult Competencies
<b>PRESIMO</b>	Prévision et Simulation Modèle
<b>RD</b>	Replacement demand
<b>RDA</b>	Regional Development Agencies
<b>ROA</b>	Research Centre for Education and the Labor Market
<b>SNA</b>	System of National Accounts
<b>SOL</b>	Shortage Occupation List
<b>SSDA</b>	Sector Skills Development Agency
<b>SWOT</b>	Strengths, Weaknesses, Opportunities, and Threats
<b>TVET</b>	Technical and vocational education and training
<b>UKCES</b>	United Kingdom Commission for Employment and Skills
<b>UN</b>	United Nations
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>VET</b>	Vocational education and Training



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# Executive summary

In most countries the demand for skills is undergoing substantial change as a result of technological progress, globalisation, demographic transformations, climate change, mass migration and other upheavals. Policy makers and other actors need to anticipate future developments in order to prepare for what comes next. To do so they need the capacity to produce prospective studies on future skills needs using appropriate methodologies and analytical tools. There is a general consensus that governments play a key role in the generation of such information and making it available to all relevant stakeholders: policy makers, employers (including sectoral representatives), education and training providers, and civil society in general.

Most of the South Mediterranean countries are facing very high youth unemployment rates and are concerned about structural imbalances in their labour markets. They have expressed increasing interest in developing evidence-based employment policies in order to tackle the structural skills mismatches characterising their economies.

In response, UNESCO is supporting development of national capacity to undertake labour forecasting in the South Mediterranean area. One example is the Networks of Mediterranean Youth (NET-MED Youth) project, funded by the European Union.<sup>1</sup> This involves building skills forecasting models, producing initial projections and engaging other stakeholders (including youth organizations) in the discussion of results. The project aims to increase the relevance of each country's education and training system.

Over the last few years, three regional NET-MED Youth workshops were held in order to:

- Lay down the overall methodology for skills forecasting in the target countries (November 2014);
- Discuss the regional situation based on evidence of existing data and research (June 2015); and
- Present the outcomes of the skills forecasting work conducted, provide a platform for discussion within national teams and enhance cooperation on this topic across the region (October 2017).

This report draws upon the work done since 2014, including the five skills forecasting models developed and the detailed results produced in seven South Mediterranean countries (Algeria, Israel, Jordan, Lebanon, Morocco, Palestine and Tunisia). Its main audience is priority actors in charge of the development and supervision of national skills-related policies and plans in the various countries involved. The report also builds on an international perspective, aiming to benchmark and compare the work carried out in the Mediterranean area with other initiatives across the world. It focuses on:

- The methodology and models developed and used, including complementarity with other tools and methods (including enterprise surveys, sector skills reviews);
- Key findings from the new skills projections; and
- Lessons regarding governance and involvement of national stakeholders.

<sup>1</sup> [www.netmedyouth.org](http://www.netmedyouth.org)

**Part I** presents a brief overview of international work on skills anticipation.

**Part II** offers a summary of the key findings for the countries in the South Mediterranean region that have produced new skills projections.

**Part III** reviews the main lessons learned and considers the positioning of the South Mediterranean as an innovative region in terms of skills anticipation, not just in terms of model

development, knowledge creation but also in terms of the institutional arrangements set-up to connect countries' best practices and players at international level. It then concludes with recommendations on the next steps that might be taken.

**Annex** outlines the issues involved in developing a comprehensive labour market information and intelligence system (LMIS).

# Introduction

Countries in the South Mediterranean are facing enormous labour market challenges following the popular uprisings of the Arab Spring in 2010. Political and economic turbulence has exacerbated existing economic and labour market problems, with many of these countries experiencing very high youth unemployment rates.

These developments are taking place against a broader worldwide economic backdrop of rapid technological change, globalization and demographic change, including mass migrations. In combination, they are leading to rapid changes in both the demand for and supply of skills, alongside increasing concerns about structural imbalances in labour markets.

While predicting the future in such circumstances is fraught with difficulty, there is a growing consensus that the state has a key role to play in providing better information about labour market trends, and what the future may have in store for those in and out of the workplace.

To address these challenges, the United Nations Educational, Scientific and Cultural Organization (UNESCO) has supported the development of national capacities in undertaking labour market forecasting work in the South Mediterranean area through the Networks of Mediterranean Youth (NET-MED Youth) project. This has been funded by the European Union. Since 2014, countries covered by the NET-MED Youth project have been working with UNESCO to develop appropriate methodologies and related capacities to produce prospective knowledge on current and future skills needs and how these compare with what is likely to happen on the supply side of the labour market. The aim is to develop a skills forecasting model and produce initial labour market projections for each country, as well as involving stakeholders (including youth

organizations and other social partners) in the discussion of results.

Following two regional workshops in 2014-2015, which explored the lessons learned from different methodologies used for skills forecasting worldwide and assessed the situation on the ground, UNESCO mobilised specialised technical assistance from an external expert team to help each beneficiary country (Algeria, Israel, Jordan, Lebanon, Morocco, Palestine and Tunisia) develop its ability to plan for the future.

This publication provides a critical review of the work conducted during 2014-2017. It is addressed primarily to those in charge of the development and supervision of national skills-related policies and plans in the seven countries. It also builds on a broader international perspective and aims to benchmark and compare the work carried out in the South Mediterranean area with other initiatives across the world.

It focuses on four key elements:

- 1** Methodology and models - a critical review of the pilot work done, in the context of international best practice, including complementarity with other tools and methods such as enterprise surveys and sector skills reviews;
- 2** Preliminary findings, key emerging results from the projections produced to date;
- 3** Assessment of how the current work programmes position the South Mediterranean area as an innovative place in terms of anticipating skills needs, developing appropriate models, knowledge creation, and also in the institutional arrangements connecting the region with best practices at international level; and

- 4 Governance and involvement of national stakeholders, the use of skills forecasting results for policy action by institutions, sectoral stakeholders, civil society more generally and especially young people.

All seven countries face considerable difficulties in developing robust systems for skills forecasting based on quantitative modelling methods. Key concerns relate to obtaining relevant data and developing a suitable macroeconomic model to drive the projections. Nevertheless, in four of the seven countries (Algeria, Jordan, Palestine and Tunisia) it has been possible to develop an initial set of quantitative skills projections that have already proved useful to those participating in the project. In two other countries (Israel and Morocco), the feasibility of producing such projections has also been established, as well as their potential value to users. In Lebanon, it was not possible to develop a quantitative forecasting model, but the feasibility of using qualitative methods was explored and established as a viable alternative approach. While there is undoubtedly considerable scope to refine and improve further the methodology and approach in all of these countries, the work already concluded demonstrates the feasibility and usefulness of developing such forecasting capability in all cases.

For the five countries where it was possible to produce projections (Algeria, Jordan, Lebanon, Palestine and Tunisia), preliminary findings imply that these countries are likely to face continuing problems of imbalance and mismatch. Again, while the precise nature of these problems may be subject to ongoing analysis and debate, there is a clear need for policy interventions to address concerns on both the demand and supply sides of skills development. Both individual labour market participants and labour market stakeholders need information about what lies ahead so that they can prepare and plan for it. Despite uncertainties about how the future may unfold, many of the developments projected are likely to happen regardless, because: many demographic and technological

trends are very clear; and the general direction of further globalisation accompanied by shifts in employment towards services and away from the primary sector are also evident. These possibilities can be sketched out by exploring a range of scenarios using the tools now available.

The NET-MED Youth project has provided a unique platform to explore how such systems can be used to help address some of the very real and practical problems these countries face. The attempt to develop common models and systems across the South Mediterranean area mirrors the approach adopted by the European Centre for the Development of Vocational Training (Cedefop) at a pan-European level. While such an approach brings with it its own problems, it helps to facilitate comparisons across countries and therefore knowledge exchange and learning about good and best practice. The programme has also acted as a catalyst to bring together stakeholders in each country. In some cases, this has highlighted areas of conflict still to be resolved.

Overall, however, the project has illustrated the benefits of bringing together key stakeholders, including the various government departments and agencies, as well as social partners and especially the various groups representing young people. It also illustrates the problems and pitfalls in doing so.

Governance is a central issue – and a good network of government departments and agencies has now been established in most countries. There are new links to other stakeholders and especially to youth groups. Nevertheless, building on the foundations established in the NET-MED Youth project, more needs to be done. In particular, it is clear that a ‘champion’ is required to take the lead in coordinating activities on the ground and driving them forward. But this engine has to be embedded in institutions rather than in individuals. Finally, presenting the results for public scrutiny and criticism is a necessary part of getting such a project off the ground – even if it inevitably affects credibility. There are other issues

related to access to data (e.g. confidentiality, ownership, power) which remain problematic in some countries.

A number of other important messages can be drawn from the pilot work carried out.

Skills forecasts can help to identify emerging issues and act as a focus for debate and a platform for assessing key problems and possible solutions. However, they are not a panacea. In most countries with more mature systems of skills forecasting, there is no simple mechanistic link between the projections and policy formation and intervention. Rather, such information forms part of a broader labour market information and intelligence system (LMiIS) that all stakeholders, including those with an interest in education and training, can draw upon when devising their plans and strategies. In some countries such as Canada, there is an explicit set of government regulations providing a framework for collaboration between the Ministry of Education and the Ministry of Labour in using skills forecasting for planning technical and vocational education and training (TVET).

For many labour market participants, the use of forecast information will be an unconscious and continuous process rather than something explicit. In the case of government departments and agencies, a more direct and explicit process can be expected, but one moderated by political considerations as much as by labour market and economic considerations.

This publication also looks at other examples, such as the US system, which has been under development for over 70 years. It focuses on the provision of very detailed labour market information, including projections, relevant to all participants and stakeholders. Projections are not directly linked to policy or particular decisions and choices, but are part of a rich, regular and easily accessible flow of information that is aimed at helping labour markets to function as efficiently as possible. In many other countries, such as the United Kingdom, efforts have been made to develop similar systems, but

usually based on more modest budgets. In the United Kingdom, skills projections have been used to guide policy in the main government departments concerned with education and the labour market. Again, there is no direct link between the projections and particular policy decisions or interventions, although on a number of occasions specific quantitative scenarios have been developed to inform policy at the highest level. A key aim of the current set of skills projections in the United Kingdom is to inform career guidance and advice at a detailed level through the Labour Market Information for All portal.

The work conducted suggests that engaging with stakeholders, especially with young people, and exchanging such information have great potential to provide an up-to-date and reliable picture of the world they face. Of course, accuracy depends on the quality of the data underlying the analysis as well as that of the analysis itself. In many cases, there is a great deal of data available but it is not focused on what is needed for skills needs assessments and forecasting. For example, educational data may be plentiful but not consistent, comprehensive or integrated. The experience of other countries with more mature systems (e.g. the United Kingdom, the United States and various other European countries) suggests that it can take decades to establish a LMiIS that can make robust and trustworthy skill projections possible. Nonetheless, some newcomers do catch up to, and in some cases 'leapfrog' ahead of more established systems, as illustrated by the Czech Republic discussed in Section 1.2.

The reputation of the statistical agencies and other organizations carrying out this work is something that has to be established through years of use and testing against reality. Peer review and openness to constructive criticism is an important part of building trust. Independence is also crucial. Projections are trusted in countries such as France, Germany, the Netherlands, the United Kingdom and the United States because they are regarded as politically

neutral. In some countries, some elements of forecasting work are subcontracted to academic or consultancy organizations, sometimes in a competitive tendering situation, as in the United Kingdom. In others, the government has maintained the capacity to do the work within its own departments (e.g. France and the United States). Building up such trust takes time and commitment.

In the case of the South Mediterranean countries, identifying which organization will be supporting the labour information system is crucial for success in establishing a skills development system. That organization should be recognised as the focal point, be working in close collaboration with the statistical agency and other relevant ministries. It should develop a mechanism for agreeing on and setting priorities, as well as developing ways to share results and analysis. This requires 'buy-in' and commitment from the national government.

Quantitative skills forecasts are of course just one element in a broader labour market information and intelligence system. There are many other ways of thinking about the future of the education system and its interaction with the labour market. The present publication briefly summarises some of the other tools and information needed to form a fully-fledged LMIS. Annex A outlines the broad steps needed to set up a comprehensive LMIS.

In Lebanon, and to a lesser extent in Palestine, there have been attempts to explore these possibilities. The Lebanon study adopts a qualitative sectoral approach to considering future prospects in its labour market. In Palestine, although the emphasis was on developing quantitative projections, the active involvement of groups representing young people as well as other institutional stakeholders resulted in a strong qualitative input into the scenarios produced. This publication suggests that this kind of qualitative approach should be explored further, in parallel with the existing quantitative

modelling. Ideally, a holistic and comprehensive system should be established, including both quantitative and qualitative information that provides contextual information, metadata, necessary to produce more realistic and useful skills forecasts. The potential for use of other qualitative methods, especially scenario development, should also be considered. As with sectoral approaches, any such initiative must be properly resourced and coordinated with existing activity.

A key message of this publication is not to expect instantaneous benefits and results. Developing a LMIS and, in particular, producing good systems for anticipating future skills needs, takes a great deal of time and effort. Mature systems, such as those in the United States and other member countries of the Organisation for Economic Co-operation and Development (OECD), have taken many decades to develop. They have also required considerable investment in basic statistical infrastructure (i.e. economic and labour market data), as well as investment in institutions and capacities for analysis and modelling. Some countries, like the Netherlands and the Czech Republic, have shown it is possible to speed up this process if the political and economic will is there to commit resources appropriately.

It is also important to recognise that skills forecasting itself is best regarded as an ongoing process, rather than something with a definite beginning and end. Views of the future need regular updating in the light of new information and changing circumstances. It is a slow and iterative process, influenced by decisions being made today and requiring continued support externally and internally.

It is not enough to simply produce the projections. It is important to move from there to policy and actions, but this also takes time. The Canadian system is an example of a system where the projections are well integrated with policy actions, but this has taken decades to develop, and remains the exception rather than the rule. Few countries show a very direct link

between skills projections and policy actions. Generally, the relationship is much more subtle and nuanced. Skill projections are just one of a number of inputs into the development of policies and decisions.

Occupational employment projections by themselves are also not enough - it is also important to get a handle on the implication of these projections for generic skills. The United States is one of the few countries to attempt to build this directly into its quantitative projections. The US Bureau of Labor Statistics produces detailed projections broken down by occupation, but then also provides historical information on the kinds of skills needed within occupations, both technical and soft. The latter are often quite generic and need to be embedded in curricula, while the former are usually the responsibility of employers rather than education systems. Initial education and training and higher education should be more generic. But employers need to get involved in specific education and training to customise it to their particular requirements.

Detailed results and, in particular, a strong focus on occupational imbalance may be 'a bridge too far' for the South Mediterranean countries. Predicting skill shortages at this micro level is notoriously difficult and the experience of other countries suggests that a broad-brush assessment would be a more realistic objective than detailed predictions of gaps or specific manpower numbers. Nonetheless, these lessons can be very helpful for advancing the long-term effort of building useful and reliable skills forecasting models and capacity.



# **PART I**

A review of international work  
on skills anticipation

## 1.1 Introduction

In order to ensure a better understanding of changing workplace needs and how to address them, many countries are now exploring the feasibility and utility of systematically trying to anticipate what the future might look like. Most countries share similar problems of how to meet the demand for skilled workers that drive the economy and matching this demand with the supply of people that emerge from their educational and training systems. The mismatch between qualification requirements and the level of vocational training and formal qualifications being acquired by individuals is becoming a global concern.

Many countries are only just beginning to set up systems for anticipating changing needs for certain skills. Other countries have been building such systems for many years. This paper summarizes what can be learned from the experience of the latter group of countries and the methods they employ to identify workforce demands of the future.

There have been many previous attempts to do this. For example, the European Agency for Vocational Education and Training (Cedefop), the European Training Foundation (ETF) and the International Labour Organization (ILO) have recently published a series of guides on the subject,<sup>2</sup> while others have published many reviews and related articles and reports.<sup>3</sup> There is a great number of existing literature on workforce forecasting.

This section provides a brief summary of the methodological approaches used to establish future needs for skills. It describes international best practice, including an assessment of the strengths and weaknesses of different approaches. The main focus, however, is on the experience of industrialised economies in Europe, North America and other OECD member countries.

There is also a brief summary of key lessons from other countries' experience, based on the

literature. It covers institutional frameworks and statistical infrastructure, as well as more technical issues linked to the methodological approach and data needed to establish forecasting models and a system for regular analyses of future needs.

The focus is on quantitative approaches, although the ways in which quantitative and qualitative approaches can complement each other is also considered.

It is clear that 'best practice' worldwide relies mostly on quantitative methods that use large-scale, multi-sectoral models to produce a comprehensive overview of how structural economic and technological changes are affecting the demand for various skills. However, more qualitative methods can be valuable, too, wherever quantitative data are lacking. They can usually be implemented in a much shorter time. The development and use of quantitative models is a very resource intensive process, requiring substantial prior investments that can take many years to accomplish. However, at the end of the day, there is no substitute for robust quantitative information on the current situation and ongoing trends.

## 1.2 An Overview of Skills Anticipation Worldwide

### 1.2.1 Key Approaches: an Assessment of International Best Practices

Perceptions of what is desirable as well as what is practically feasible have changed substantially over the past 50 years. This section draws upon a number of previous reviews to highlight core messages for the South Mediterranean countries discussed in this publication.

From the earliest attempts, those engaged in skills forecasting work have adopted quantitative methods wherever possible, simply because quantitative results have been seen as the key output required by potential users of these results. The use of formal models has been advocated on various grounds as detailed below.

However, the merit of alternatives and more qualitative methods has also been recognized.

Data limitations are still a big constraint. What is feasible in different countries can be limited by the availability of a 'statistical infrastructure'. In the United States, for example, this kind of work goes 50 years back (Bureau of Labor Statistics, 2016). The sophisticated analysis conducted there was based on very substantial prior investments in conducting statistical surveys, establishing datasets, as well as developing extensive modelling capacity. In contrast, in countries with lower levels of investment, the data required for developing such quantitative models simply do not exist. In such cases alternative approaches have been devised. While these approaches can provide some insights, they are generally regarded as complements to the more fully-fledged model-based projections, rather than a substitute for them. This highlights the importance of investment in statistical and analytical infrastructure, considered in more detail in Section 1.3.

The literature review covering most of the world, makes it clear that countries have deployed a great number of different methods and approaches to anticipate the education and training needs of the future. No attempt is made here to provide a comprehensive description of all these studies; rather the emphasis is on highlighting some key insights, with some selected examples. Both quantitative and qualitative methods are included.

The main skills forecasting approaches adopted include:

- 1 Formal, national level, quantitative, model-based projections;
- 2 Opinion surveys of employers or other groups, including setting up 'observatories', focus groups, round tables and other Delphi style methods to reach a consensus view; these are generally more qualitative in nature, but may include some quantitative aspects;

- 3 Ad hoc sectoral or occupational studies, involving both quantitative and qualitative methods, that focus on the situation in particular areas, which may involve elements of both 1 and 2; and
- 4 Qualitative methods using *scenario development* exercises that are based on expert opinion.

In countries like the United Kingdom, LMII systems involve elements of all these approaches. Each has its own strengths and weaknesses.

Before describing the different approaches in more detail and comparing their strengths and weaknesses, it is important to consider some basic questions – such as for whom is this work intended and why is it needed.

### 1.2.2 Different Audiences, Different Requirements

There are many different audiences for skills analysis and forecasting, and their specific needs for labour market information and intelligence may vary. When assessing such needs and systems, one should always ask: for whom; by whom; how; why, what for; and when.

The main audiences include:

- Government, at national and regional level (policy makers);
- Stakeholders, including local bodies, industry training organizations, employers, education and training institutions and career guidance organizations; and
- Individuals making occupational choices.

The discussion here is general, but in many countries, it is young people (new labour market entrants) who are the key focus of the LMII system.

Different audiences may be seeking different kinds of information:

- Occupational demand - future employment levels by occupation/skill, often referred to as “expansion demand”;
- Replacement demand - job openings, replacing workers who are leaving;
- Education and training requirements - qualifications typically needed;
- Supply/demand balances; and
- Terms and conditions of employment (pay).

What is done, and how it is being executed, therefore depends at least in part on whom the actions are taken for and why. The different audiences may have very different requirements for both detailed and general content. Policy makers may be more interested in overall supply demand balances and the general areas where investment in skills are needed. Providers and individuals may be interested in much more detailed information about prospects in particular areas.

In some countries, such as in the United States, much of the work is done centrally by government departments or agencies (Bureau of Labor Statistics, 2016). In France, a similar approach has been adopted although the precise details have changed over the years.<sup>4</sup> In other countries, such as the United Kingdom, the government has generally chosen to fund the work but to distance itself from the execution. It has created various agencies, as well as outsourced the actual work out to academic or commercial research consultancies (Wilson et al., 2016a and Wilson et al., 2016b). Each approach has its advantages and disadvantages, as discussed later. Other countries in Europe and elsewhere have different mixes of involvement by the state and other institutions, but in all cases there is strong input from the government and related agencies.

### 1.2.3 Application of Social Science Methods

Many standard social science research methods, such as surveys, statistical and econometric analysis, participant observation, focus groups, can be used to peer into the future.<sup>5</sup> For example, market researchers ask about consumers’ purchasing intentions. This method has been extended to cover a much wider range of indicators helping people to better understand the past, present and possible futures. Such research provides insights, and affects perceptions and attitudes that people have about the future. Measures of statistical reliability and validity, as well as the use of triangulation techniques, common in social science research, are also widely employed in developing accounts of past and current conditions in the labour market, and beliefs and aspirations associated with these.

Computers have revolutionised the ability of analysts to develop ever more complex models, and have facilitated collection, access, analysis and dissemination of more detailed data. This has enabled empirical estimation of model parameters that represent relationships between specified variables. Simulations and quantitative computer-based models are invaluable in many areas of social science forecasting. They can result in a mechanistic approach towards developments of alternative scenarios, but have the merit of being grounded in real data. Other more qualitative methods tend to be more speculative. In scenario development, for example, the scenarios are seen not so much as outcomes but rather as catalysts for examination and discussion about a range of future possibilities. They are also capable of providing insights and uncovering previously hidden relationships that may have far-reaching consequences.

Quantitative modelling approaches tend to see the future as a set of key indicators and

<sup>4</sup> For the latest results, see France Stratégie (2016).

<sup>5</sup> Slaughter (1996).

driving factors to be analysed and projected. An important component of much futures work is focused on providing a normative view of possible alternatives. Behavioural models attempt to provide insight into what causes trends to bend, by embedding the models in a theoretical understanding of what drives behaviour and observed outcomes.

### 1.2.4 Typical Quantitative Modelling Approaches

Quantitative model-based methods include: (i) complex multi-variate time series-based behavioural/econometric models; and (ii) univariate models.

The latter can be further classified into: (i) simple extrapolation of past trends (mechanistic techniques); and (ii) more complex time series methods.

Extrapolative techniques are often used, especially where only very limited time series information is available. In many cases, only one or two observations are available on occupational structure and this clearly limits the sophistication of what can be done. Where more time series observations are available, much more sophisticated analysis is possible, which attempts to find replicable patterns in a time series that can be used to predict its future path. Such approaches are widely used in the business and financial world, although they are much better at predicting short-term changes than longer-term patterns. Unfortunately, history suggests that most linear or more complex trend patterns eventually come to an end and that they should therefore not be relied upon for medium- to long-term forecasting.

Behavioural analysis is an attempt to move beyond patterns in observed time series data and to provide some understanding of how it is that these patterns have arisen and, more importantly, why they may change in the future. Behavioural analysis draws upon disciplines such as economics and sociology for an understanding of what influences the behaviour of the key actors

in the economy and how this is reflected in the key economic and social indicators that can be measured.

Understanding such phenomena finds representation in so-called computerised 'models', which take the form of algebraic equations linking key variables. A model provides a simplified representation of reality that can help to understand the phenomenon of interest (in this case changing patterns of the demand for skills in the labour market). Most are familiar with the idea of engineers building models in order to test out their ideas. For example, testing model aircraft in wind tunnels. Models in the social sciences are rather more like a biological analogy than an engineering one where, for example, scientists have built models of dinosaurs in order to try to understand how they could fly. Social scientists attempting to understand how societies and economies work face problems such as: (i) lack of fixed laboratory conditions; and (ii) lack of good experimental data (they can only observe outcomes).

Social science models are typically built using quite sophisticated statistical and econometric techniques, and using data drawn from largely official sources, including national accounts and related estimates of employment based on employer and household surveys. A typical multi-sectoral macroeconomic model comprises many hundreds if not thousands of equations. Parameters are estimated using multivariate econometric techniques, based on error-correction and related time-series methods or University of Chicago economist James Heckmann's methods on cross-sectional data. The techniques used are designed to deal with various well known technical problems in estimation. While this work is rarely considered leading edge nowadays, it requires a high level of sophistication from the technical analysts doing the work.

Having built such quantitative models and used them to make projections, it is important to recognise what they can and cannot do. On the positive side, such projections can: (i) help to

make assumptions about the future explicit and transparent;<sup>6</sup> (ii) help to enforce systematic and logical thinking;<sup>7</sup> (iii) act as a focus for intelligent debate;<sup>8</sup> and (iv) provide a counterfactual model useful to anyone interested in possible future outcomes to assess policy impacts (i.e. what would have happened in the absence of the policy intervention).<sup>9</sup> However, they cannot provide: (i) mechanistic manpower planning; and (ii) precise indications of education and training requirements. Economic and social systems are not like engineering ones. Behaviour can react to situations to change outcomes in ways that are inherently much harder to predict than if human beings all behaved like automatons.

The typical quantitative modelling approach involves two key elements. The first is a multi-sectoral macroeconomic model of some kind, usually built around a Leontief input-output table, which takes into account the inter-linkages between sectors. Such models are usually estimated using complex econometric methods, although computable general equilibrium (CGE) models (where parameters are imposed rather than estimated) are also used in a number of countries.<sup>10</sup> Most skills forecasting in developed economies uses quite sophisticated methods, for example econometric and statistical techniques designed to overcome well-known problems such as simultaneity bias, autocorrelation, heteroscedasticity and many more.

These are described in detail in econometric and statistical textbooks.

An important outcome is consistent projections of employment levels by sector. Of course, in addition to providing projections of sectoral employment, such models are used for a wide variety of other purposes. Details of a typical multi-sectoral macroeconomic model are provided in Wilson et al. (2016 a and b).

The second key component is a module or set of modules that translate the outcomes from the multi-sectoral models into implications for the demand for skills. These elements vary considerably across countries.<sup>11</sup> They tend to be much less elaborate, and the analysis much less sophisticated, mainly due to the more limited nature of data available on skills.<sup>12</sup> In most cases, the focus is limited to occupational (or qualification) employment structures within sectors. The trends in such structures are normally analysed using very simple techniques rather than sophisticated econometric methods. Again, the typical approaches used are discussed in more detail in Wilson et al. (2016 a and b).

### 1.2.5 Reasons for Favouring a Quantitative Modelling Approach

Most reviews of international best practice in skills forecasting (e.g. ETF, Cedefop and ILO, 2016) suggest that using a national multi-sectoral

6 All views of the future make assumptions, some more explicit than others. The act of formally producing projections helps to force analysts to make these assumptions explicit, although they may choose to hide some of these assumptions. To produce projections, they have to make assumptions. If they make them explicit, this can help others to understand the projections. This process may also cause the assumptions to be called into question and they may be amended to produce alternative views.

7 Formally producing a projection as opposed to just guessing or relying on gut feelings forces the analyst to think about how the world and labour market work, what the key drivers are, what the repercussions of key links between different elements of the system might be, etc. Thus understanding may be incomplete or even incorrect, but trying to explain to the reader or user what we think is going on helps both to understand things better.

8 Forecasts should not be seen as an end in themselves but rather as a starting point for debate. They offer a considered view of what might happen next. Without some kind of firm statistical foundation all such debate is mere speculation.

9 Policy impacts on issues of interest, such as employment levels, unemployment, etc. Projections can be produced to show what might happen if current trends continue, which can be compared to an alternative future in which some policy intervention is introduced to change things.

10 CGE models are used in a number of countries for detailed economic and skills forecasting (e.g. Australia), but are more commonly used for macro level policy and scenario analysis rather than making projections.

11 For examples see the technical documents referenced, notably the Cedefop work.

12 It is a moot point whether this means they are less reliable or robust. Simple methods of projection are probably no less reliable, they just cannot answer more complicated questions. A sophisticated model might be able to predict a detailed time series profile of how the labour market will evolve over the next five years (year by year) whereas a simple one might just provide the final outcome five years ahead, but not the details for how you get there. The more sophisticated model tries to take more things into account, but there are also more things to go wrong.

macroeconomic model-based approach is the preferred option. Such models are regarded as essential for obtaining a robust and consistent sectoral employment scenario, which is the starting point for any comprehensive assessment of changing workplace needs.

The advantages of such an approach include:

- The sectoral and other detail it provides;
- It is typically comprehensive, covering the whole economy;
- Logical consistency;
- Imposition of accounting constraints;
- Recognition of economic constraints and influences;
- It helps to make underlying assumptions explicit; and
- Consistent scenarios across all sectors.

### 1.2.6 Problems and Pitfalls in Using Quantitative Modelling Approaches

Such methods do, of course, also present some disadvantages:

- Technical limitations, within fixed resource limits;<sup>13</sup>
- Limits to current understanding of the way labour markets work;
- The possibly limited relevance of the past (such models being based on an assumption of a continuation of past patterns of behaviour); this may be especially important in the context of countries subject to significant political and social disruption,

which is the case for a number of countries in the South Mediterranean region; and

- Resource costs of development and maintenance.<sup>14</sup>

The data requirements of quantitative modelling are also substantial. They include availability of long time series of consistent data on a range of economic and labour market indicators (especially on employment, skills and labour supply), as well as input-output tables. Sectoral employment data lie at the heart of any multi-sectoral modelling approach for assessing changing skills needs. Ideally these data should be linked to other economic indicators within a system of national accounts.<sup>15</sup> This requires many years of substantial investment.

There are also data limitations (often the data used to build models were not collected with modelling in mind). Most economic and labour market data are collected to aid tax collection and other government/administrative objectives. They are rarely if ever collected with the objective of being able to build economic or other models to be used specifically for skills assessment and forecasting.

Quantitative models should not, therefore, be seen as a panacea. Nevertheless, in most of the countries that do conduct regular national assessments of future occupational and skills requirements,<sup>16</sup> such models are regarded as an essential cornerstone. They are increasingly being adopted in developing, as well as developed, countries, as the availability of data and the capacity for model building improve.<sup>17</sup>

13 Obviously, with unlimited budgets, much better data can be collected and better and more complex models can be built. But as there are limits to our understanding there is no guarantee these models will be able to predict the future any better than simpler models. The limited relevance of the past is also particularly important for this group of countries, where there is so much political uncertainty.

14 These costs include those directly concerned with building and executing a skills forecasting project. This is distinct from the statistical infrastructure necessary to support such activity, which requires a much more long-term commitment from the government. Costs for the former are modest compared to the latter but can still be substantial (USD 100,000 per annum and up).

15 A fully specified multi-sectoral macro model requires masses of economic and labour market data on each sector. The details of the data needed are set out in various technical reports.

16 This includes most member countries of the OECD and the EU.

17 For a review, see ETF, Cedefop and ILO (2016) and Kreichel et al. (2016).

## 1.2.7 Other Quantitative Methods

Quantitative methods also include various non-model-based techniques, such as surveys of various kinds, intended to elicit robust data on matters of fact (current skill structures and trends) or opinions and perceptions. These can include:

- Surveys of employers and others to establish facts;
- Surveys of employers and others to test opinions and perceptions; and
- Skills audits.

The survey method to establish facts is a central plank of the United States system and can be regarded as one of its key strengths. Its Occupational Employment Statistics (OES) survey carried out on a regular basis by the Bureau of Labor Statistics (BLS) provides detailed factual information on current employment patterns.

In other countries, more reliance is placed on the opinions of employers. While this can provide useful information, it may not be a reliable indicator of current and especially future skills needs (see Wilson, 2010; and Mason and Wilson, 2003 for more detailed discussion).

### Measuring Changing Occupational Structure

Surveys of employers and surveys of households (labour force surveys) are both used to establish matters of fact, as well as to elucidate opinions. Both have their own advantages and disadvantages for these purposes. Surveys of employers are widely used to measure levels of economic activity and overall employment levels, as well as the structure of employment. In the arena of skills assessment and forecasting, they have also been used to capture employers' opinions and perceptions on current skill shortages and occasionally future skill needs.

In many countries, household surveys have become the norm for obtaining overall measures of occupational employment structure. However, they are far from ideal for this purpose. A substantial increase in sample size is often needed to deliver robust statistics at a detailed sectoral and occupational level. Such information is also subject to bias as it is based on self-reporting of occupational status rather than a classification of the actual jobs in which people are employed. In the United States, this information is gleaned from detailed surveys of employers, such as the Occupational Employment Statistics survey. This relies on factual information, including the number of people employed in actual jobs and the pay levels associated with those jobs.

The quality of information available on current occupational structure and ongoing trends within sectors is a major concern for many countries (e.g. Wilson et al., 2016c). The key issue is that the data available from the typical Labour Force Survey (LFS), upon which most countries rely for their estimates of skill demand, is neither statistically robust enough (due to inadequate sample sizes) nor reliable enough (due to biases from it being a household survey, often using proxy responses) to provide accurate information on employment patterns by occupation. This situation could be improved by carrying out larger and more consistent surveys of employers, as in the United States, but this is costly. Although there may be some merit in getting sectors involved in this process, there are substantial advantages in centralising this process (i.e. all industry-level surveys sponsored by the state). Advantages include economies of scale, as well as consistency across sectors. **Table 1.1** summarises the objectives of employer surveys, household surveys and a population census.



**Table 1.1 Objectives of employer surveys, household surveys and population census**

Tool	Objective
<b>Employer surveys</b>	Provide immediate information, including a useful measure of occupational structure <b>within</b> industries, as well as current recruitment problems and other skill deficiencies.
<b>Household surveys</b>	Often disaggregated by sector as well as occupation, can be useful for monitoring changes in occupational structure. This is often a cheaper option as such surveys are required for other reasons. Their limited sample size may raise questions about their reliability and suitability for trend analysis. This poses a problem with regard to analysing employment change over time, whether sectoral or occupational. One way of dealing with the problem of small sample size is to pool the data from more than one round of the survey. This can enable a more detailed occupation by industry employment matrix to be constructed than would otherwise be possible, but at the expense of information on changes over time.
<b>Population census</b>	Provide a more accurate picture, but these surveys are expensive and infrequent, normally only once every 10 years. Typically, a census does have considerable advantages when it comes to measuring the structure of employment, not least because of its much larger sample size. Another factor to consider, with regard to whether or not the census is the best option for sectoral and occupational forecasting, is the consistency of classifications used which can often distort time series changes.

## Replacement Needs

In addition to changes in overall occupational employment levels, so-called ‘expansion demands’, it is important to consider replacement demand. The latter arises from retirements, net migration, movement into other occupations and in-service mortality. Estimating replacement demand precisely is not straightforward. It requires the following information:

- Data on the age and gender structure of occupational employment;
- Data on the rates of outflow due to: retirement (and other reasons for leaving the workforce); emigration; inter-occupational mobility; and mortality.

Information on age and gender structure is required because many of the flows, especially retirements and mortality, are age and gender specific. Age structures vary significantly by occupation – for example, a higher proportion of managers than information technology (IT) professionals are likely to be nearing retirement age. Differences in age structure across occupations will clearly influence exits, with more older people retiring, and more younger people

changing occupations. Age structure also affects mortality. From the household survey/population census data, it is possible to analyse the demographic composition of each occupation. This makes it possible to estimate specific rates of retirement and mortality for each occupational class.

**Retirements:** For the purposes of modelling retirements, it may be helpful to consider the fraction of the occupational class that is aged 55 to 65 (say) in a given year and then to assume that some fraction of this group would retire each year. A fairly wide age category is usually chosen since the samples are quite small in most cases. It might also be possible to measure retirement flows over time, although this kind of approach could suffer because of the sampling errors being too large.

**Mortality:** To estimate replacement demand arising from deaths in each occupation it is possible to use age- and gender-specific mortality rates over the forecast period.

**Migration and Mobility:** The migration of skilled professionals has been an increasing source of concern in many countries over the

past few years. Skills migration is clearly a reality and must also be taken into account in the modelling, as these flows impact the supply and demand for higher-level human resources.

As an alternative to measuring such outflows directly, the Cohort Components methodology can be used to estimate replacement needs directly from LFS data.

However, the most important point to emphasize is that replacement needs must be taken into account. In a very simple situation, assuming a 40-year working life, and ignoring other complications, roughly 2.5% of the workforce can be expected to retire per annum in a steady economic and political situation.

## Other Measures of Skills

In addition to occupations, data are also needed on other measures of skill, including qualifications and key/generic skills. Occupational employment patterns are only one way of measuring skill. From the point of view of training and especially formal educational planning, the types of qualifications typically required are also important. Some (but not all) countries include a qualification dimension in their quantitative projections. For example, the United Kingdom produces detailed projections of the demand for and supply of qualifications. The Cedefop projections are more limited, differentiating just three broad levels of educational attainment. Canada has a much more detailed analysis, based on data and models developed over many decades. In the United States, occupation is the focus and there are no general projections of qualification as part of the BLS's main projections. In other countries, such as Norway, qualification is the key focus of attention.

Another aspect of skill that has received increasing attention in recent years in many countries moves beyond occupational job titles and formal qualifications to examine the kinds of skills people actually require in order to undertake the main tasks in their work.

These include job-specific skills, foundation skills (including literacy and numeracy) as well as transversal skills such as communication, team-working, leadership, etc. These have been variously termed key, core and generic skills. Generally, attempts are not made to project needs for these skills quantitatively, but many countries now devote considerable resources and effort to assessing how such needs are changing and their different patterns across sectors and occupations. For example, the O\*NET system of the United States provides huge amounts of detail about such matters, as well as some information on formal qualification requirements for around 10,000 different occupations. Germany has a similar system. These require massive and sustained investment over many decades. In other countries, such as the United Kingdom, more modest investments in detailed surveys of both employers and employees about the nature of the jobs they do provide some useful information. The OECD's Programme for the International Assessment of Adult Competencies (PIAAC) system provides similar data on an internationally comparable basis.

In many countries employment matrices by occupation cross-classified by qualification are created from household and labour force surveys, as well as census data. This provides a measure of typical levels of educational attainment for all the different occupations, even if the measure is rather crude. Even with only weak data for qualifications, it is probably worth developing some extension to 'replacement demand' estimates which would make some inferences about implications for qualifications. Alternatively, some supplementary information on 'typical' qualification structures in particular occupations could be provided to enable end-users to draw their own conclusions about how this might affect the demand for formal qualifications.

## 1.2.8 Qualitative Approaches

### A Variety of Techniques

It is clear from the general review of methods being used around the world, that formal, quantitative model-based projections are just one among a number of important elements in the tool-kit of those trying to anticipate the skill needs of a rapidly changing world.

In some cases, where the development of formal quantitative models is problematic due to data limitations or other issues, some form of qualitative approach may provide a useful first step in beginning to assess future skills prospects.

Based on the experience and practices of qualitative approaches adopted in various countries, the most popular and useful of these include:

- Ask employers (employer skill surveys);
- Delphi analysis (asking experts);
- In-depth sectoral case studies (involving interviews and other methods);
- Scenario development;
- Focus groups/ round tables; and
- Holistic modelling approaches.

### Ask Employers

In many ways, it seems that the most natural approach to finding out about future skill needs is to ask employers: What do they see as current skill deficiencies, and what future changes do they anticipate?

This approach was once popular in the United Kingdom. However, it soon became apparent that employers are not necessarily very well placed to provide robust answers to such questions. Their responses are more often than not inconsistent and misleading, especially when looking to the future. They may also be biased, as employers have an incentive to exaggerate their own problems and to try to encourage

governments to steer education and training systems in their direction without regard for greater economic or social considerations.

More recently, employer skill surveys are being used to assess current skill problems, but they are not viewed as reliable where future requirements are concerned. In any case, it is always necessary to guard against bias and exaggeration when aiming to serve the needs of particular interest groups.

ETF, Cedefop and ILO (2016) offer examples from a number of different countries and contexts.

### Delphi Analysis

The Delphi approach harks back to the Delphic Oracle of ancient Greece. In modern parlance, it has come to represent consulting expert opinion. In its most systematic incarnations, it involves the progressive and iterative administration of questionnaires designed to elicit the beliefs and judgments of a panel of experts in a particular field. The results from each round are then shared with the respondents, who may as a consequence choose to modify their responses.

Rowe and Wright (1999) argue that the Delphi method can access the positive aspects of group interaction, while minimising the negative attributes arising from political or social conflict or manipulation. They identify four features critical for any such approach to be categorised as 'Delphi': anonymity, iteration, controlled feedback, and the statistical aggregation of group response. In practice, standards for some studies do not always match these aspirations. A number of authors, including Bell (2005), Rowe and Wright (1999) and Stewart (1987), have been critical of the technique, arguing that it has few safeguards against incompetence and deliberate abuse. Stewart (1987) argues that the results 'may be the product of the creativity and ingenuity of a skilled practitioner or of the misconceptions and stumbling of an ill-informed novice, but there is no easy way to tell the difference! At the end of the day it is based on a selection of expert opinions.

## In-depth Sectoral or Regional Case Studies

Sectoral case studies refer to a category of work that involves in-depth assessments of particular sectors (or, occasionally, occupations). In some countries the emphasis is more on the geographical dimension, with the development of so-called 'regional observatories', which provide a forum to bring together stakeholders and experts in a regular and organized fashion. This includes monitoring changing skill needs at a more local level.<sup>18</sup>

In the United Kingdom, recent emphasis has been on setting up sectorally focused bodies. In other countries, such as Germany, these have been in existence for decades, although the German system also has a strong regional dimension, focused on *Länder* or *Bundesländer*. In France, the focus in recent years has been more on the geographical dimension and the development of regional observatories. The case study is not so much an approach as an object of analysis, involving an eclectic mix of methods and approaches, depending upon the interests and background of those carrying them out, as well as the data, information and resources available to them.

Employer skill surveys have often formed the cornerstone of detailed sectoral assessments, providing immediate results, either on matters of fact or perceptions, attitudes and opinions. These sectoral or geographical studies may include in-depth interviews with employers and others, and (where it is feasible) more systematic quantitative modelling methods. A range of different methodologies, and interaction with many different actors (employers, education and training providers and other stakeholders), may be explored in order to 'triangulate' a view of the key problems and likely future developments from various different perspectives.

This type of approach usually includes non-quantitative methods, such as focus groups, round table discussions and similar mechanisms. This allows the incorporation of 'soft' qualitative data into thinking about such issues, alongside the 'harder' statistical information upon which most quantitative analysis is based.

## Scenario Development

Scenarios are essentially stories about how the present might evolve into a possible future. They are narratives constructed within the context of a particular group and topic. They attempt to set out a consistent future that can be used to test assumptions about possible paths and actions that might help to generate or avoid them (depending upon whether they are desirable or not). Such scenarios can inform strategic thinking and inspire change.

They may be generated through highly codified and systematized methods. More often they are the product of a more speculative and subjective process. Scenarios tend to reflect the current concerns and direction of thinking of the participants. One of the difficulties in developing scenarios can be deciding which factors are important and identifying the key trends or drivers of future change. This can lead to a somewhat subjective perspective, unless the scenarios are firmly grounded in a sound assessment of reality, based on robust data.

Much of the value of scenario development is in the process itself rather than the final outcome. Those participating in their development and construction tend to be the main beneficiaries, rather than the wider audience who may read about the outcomes later. It is during the process of creating different scenarios that participants may find their assumptions about future events and opportunities challenged. Typically, analysts will develop between two and five scenarios to illustrate the key sensitivities (too many

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<sup>18</sup> The distinction between regional and local level is a matter of scale. In larger countries local areas may be as large in employment terms as regions in smaller countries. From a modelling or analytical perspective, the key issue is the sample size of surveys used to measure employment patterns in these geographical areas.

options can confuse rather than enlighten). It is important that the following criteria be satisfied in those scenarios: (i) plausibility (a scenario must fall within the limits of what might conceivably happen); (ii) consistency (the logical flow in a scenario must not undermine its credibility); and (iii) decision-making utility (the purpose is to tell today what might happen in the future, so we can act upon it) (ETF, Cedefop and ILO, 2016).

## Observatories

Sectoral and regional observatories have become a popular way to assess changing skill needs in a number of countries in recent years. They were initially developed to provide a systematic method of evaluating a range of conflicting and often more qualitative evidence, where robust quantitative data were more notable by their absence (Handley et al., 2003). Such an approach has been taken up recently in the United Kingdom at a regional level, for example the Regional Development Agencies (RDAs), as well as at a more local level. The approach has also been adopted by sectors. A number of industries have established observatories just to focus on their sector and its needs. They provide a framework for thinking about key issues as well as a forum for discussion among all the interested parties. Successful observatories share characteristics such as: (i) methodological credibility; (ii) combination of tools and approaches, in-house or outsourced data generation, analysis and interpretation; (iii) ability to evolve and adapt to new analysis, products and demands from target users; (iv) networking and alliances – with data generation bodies, social partners, state actors and other observatories; (v) adaptation of final products to users: readability and attractiveness, online access; and (vi) research independence combined with capacity to link research results with public policy dialogue and recommendations for action (ETF, 2016).

## Focus Groups, Roundtables

Another increasingly popular method is to organize ‘focus groups’ or ‘roundtables’, often with discussion focused on material submitted in advance, and possibly involving some kind of facilitator to prompt and structure the exchange. This approach was a feature of many early attempts to assess changing skill needs at a pan European level (predating the Cedefop work programmes). It has also been used in many individual countries, such as the UK’s EMTA ADAPT project<sup>19</sup> and the Merseyside Economic Assessment studies.<sup>20</sup>

### *Holistic modelling approaches*

Some analysts have attempted to develop less quantitative, more holistic approaches to assessing long-term futures and often focus on the broad notion of sustainable development and social cohesion rather than narrowly on skills. The Henley Centre study of the Future of Work in London is a good example.<sup>21</sup> Local competitiveness is viewed as a function of social cultural and environmental factors as well as purely economic ones. Both long and short-term drivers of competitiveness, thus broadly defined, are distinguished. These are proxied by around 50 different indicators to operationalize the concept. The model does not deliver precise predictions of changes in levels of economic activity. Rather it represents a policy tool for exploring long-term issues, developing various scenarios and strategies. Applying the model to London makes it possible to identify the different challenges facing each of its 33 boroughs, and to develop appropriate policy responses, including provisions for a changing job market.

## 1.2.9 Pros and Cons of Different Approaches

**Table 1.2** summarises the main advantages and disadvantages of the different methods of skills forecasting. This includes the quantitative

<sup>19</sup> EMTA (2001).

<sup>20</sup> Cambridge Econometrics (1994).

<sup>21</sup> Morrell (2001).

multi-sectoral macro modelling approach which lies at the heart of many countries' methods of anticipating changing skill needs. Each approach, however, has its strengths and weaknesses and the ideal is to triangulate the problem by using a variety of methods and allowing them to inform and support each other, rather than seeing them as mutually exclusive alternatives. No approach has a monopoly on 'truth' and no one approach on its own can provide a full and complete picture.

Even where forecasting is carried out using hard-nosed, quantitative methods, those involved usually stress that such projections should be seen as part of an ongoing process rather than the final word, and that the importance of also incorporating more qualitative insights should be recognized. None of today's forecasters claims that they can predict the detailed skill needs in different sectors with great quantitative precision. Rather, they suggest that they can provide the

various participants in the labour market, as well as policy-makers, with useful insights into how labour markets are evolving in response to various external influences. It is important to understand that achieving very precise forecasts is a chimera.

The key question to ask is not whether such projections are **accurate**, but whether or not they are **useful**. Our review suggests that national governments from all over the world, who support such activity with substantial funding, believe they are valuable indeed. It is also clear that such studies have a wide variety of different applications and users, including career counsellors, general labour market policy makers, and education/training planners. Most countries recognise that, properly designed and used, such studies help inform us about how economic and other forces are shaping the labour markets and associated skills, but are not precision tools.

**Table 1.2 Comparison of the pros and cons of different approaches for anticipating skill requirements**

Approaches	Advantages	Disadvantages
<b>Formal, national level, quantitative, model-based projections</b>	Comprehensive Consistent Transparent Quantitative	Data hungry Costly Not everything can be quantified May give a misleading impression of precision
<b>In-depth sectoral or occupational studies, using a variety of quantitative (model-based) as well as more qualitative methods</b>	Strong on sectoral specifics	Partial Can be inconsistent across sectors
<b>Surveys of employers or other groups, asking questions for forecasting and opinion about skills, skill deficiencies and skill gaps</b>	Direct 'user/customer' involvement	Can be very subjective Inconsistent Can too easily focus on the margins (i.e. current vacancies) rather than skill needs within the whole workforce
<b>Focus groups, roundtables Observatories Delphi style methods Scenario development</b>	Holistic Less demanding data requirements Direct 'user/customer' involvement	Non-systematic Can be inconsistent Can be subjective

It is also important to emphasise that the different approaches suit different audiences and purposes. Scenario development, for example, is ideal when the aim is to involve participants and to explore alternative possible futures. The process itself is often a critical output because participation is necessary to gain the full benefits. Scenario building works well in situations involving small numbers of policy makers trying to explore the risks and opportunities they are facing. In contrast, detailed quantitative projections may be ideal when the primary aim is to offer useful labour market information and intelligence to support large numbers of individuals making choices. Some kind of scenario development exercise would undoubtedly be a valuable addition to the skill projections already undertaken in the South Mediterranean countries.

## 1.2.10 A Developed and Successful LMIS: What it Takes

### Key Elements of a Developed LMIS

Many years of investment by government in basic data and related systems have established a solid foundation for assessing skill needs in the United States, the United Kingdom and most other countries with developed economies. Such systems have also been introduced and operated with success in many developing countries, including those in Latin America, Africa and South-East Asia. Although there is always room for improvement compared to best practice worldwide, in most cases individual countries have developed systems that suit their particular needs.

The key elements include:

- A well-established system of national economic accounts (essential for economic/ econometric modelling at a detailed sectoral level);
- Standard systems of classification for both industries and occupations that enable

measurement of changing structures over time;

- Reliable estimates of employment by sector based on censuses or large representative surveys of employers (including detailed breakdowns by industry and geographical area);
- Acceptable estimates of occupational and qualification structures based on purpose design surveys (such as the OES of the United States), population censuses or regular household surveys;
- Regular surveys of employers to assess current skill deficiencies and skill gaps; and
- Occasional surveys of employers and employees to ascertain generic skills within jobs.

Based on this foundation, governments are able to conduct regular forward-looking assessments, either by carrying out such exercises within government departments or related agencies or by subcontracting such work to the private sector or academic institutions. Either approach is acceptable provided it follows the best practice ideas set out here.

Governments can facilitate this work in a number of ways: by supporting analysis, model building and the production of regular quantitative projections. They can fund general research channeled primarily through universities (or other state-funded research institutions). For example, since at least 1975, and building on earlier investments in data system development, the United Kingdom has been supporting more applied research, including detailed national level employment projections. A combination of academic research as well as more commercially orientated work (funded by competitive tendering) has resulted in an impressive and on-going research programme focused on skills.

## Characteristics of a Successful LMIS

The characteristics of a successful LMIS include:

- A well-established statistical infrastructure, including a number of quantitative data bases, often the result of many years of investment;
- An established quantitative model-based framework, subject to peer review, to establish a track record and reputation for high quality, reliability, objectivity, independence and neutrality;
- An institutional framework which sets out clearly defined responsibilities and management structures;
- Cooperation of many institutions, including employers; and
- Good dissemination procedures, including providing access to the outcomes via the internet.

The most obvious examples of well-established systems are in developed economies like the United States and various European countries. The Czech Republic, a recent member of the European Union, might also serve as useful role model for the South Mediterranean countries.

## Problems and Pitfalls: What to Look Out For

- An overly complex LMIS (the KISS principle applies!<sup>22</sup>);
- Limitations of data (timeliness and limited sample size) – in many cases data are not collected primarily for the purpose of carrying out skill assessments (compared to best practice such as the regular United States surveys of employers which deliver a much finer and more precise estimate

of changing occupational structure within sectors);

- Problems with classification systems resulting from lack of standardisation in many countries;<sup>23</sup>
- Failure to recognise the common nature of many skill issues across both sectoral and geographical dimensions, with the result that too much emphasis is placed on detail for its own sake, making the surveys very large and expensive but adding little value;<sup>24</sup>
- Too great a focus on current skill shortages, which are often marginal and ephemeral phenomena and are by their nature difficult if not impossible to measure with precision;<sup>25</sup> and
- Limited resources in most countries compared with those available in countries that can be regarded as following 'best practice'.

As not every country has the means to develop sophisticated systems that countries like the United States have in place, ETF, Cedefop and ILO (2016) provide examples of good practice in many countries with more modest resources at their disposal.

In addition, it should not be forgotten that external circumstances can influence the development of a LMIS. For example:

- Lack of stability and continual institutional flux, often linked to political change;
- Devolution, leading to conflicts between government departments, or between institutions and key stakeholders;
- 'Empire building' at the expense of cooperation between partners; and

22 "Keep it simple stupid".

23 Often organizations are tempted to develop their own systems of classification. However, they often fail to recognise the complexities of developing such classifications nor do they appreciate the huge amounts of effort that have gone into developing current standards.

24 Different sectors and regions often face the same problems. It is not always necessary to disaggregate down to the lowest level to understand that.

25 Many short-term problems will solve themselves if markets are allowed to operate freely. If problems are more structural, then intervention to address the cause of the problem rather than the symptoms is needed.



- Inappropriate influence by lobbying on the part of particular organizations, such as employers' associations.

The important message is to encourage cooperation and partnership.

### 1.3 Sectoral Approaches

Wilson et al. (2016c) provide a comprehensive review of sectoral approaches for evaluating skill needs of the future. This encompasses a range of different tools and methodologies, both quantitative and qualitative, although the emphasis is often on the latter. Sectoral approaches are an important part of the 'toolkit' for greater economic development.

The case of Lebanon illustrates how a sectoral approach can substitute for a quantitative model-based analysis. It adds insight and subtleties that cannot always be quantified.

A clear message is that sectoral information matters because each sector may have very different activities and technological demands requiring different skill sets. Sectoral analysis therefore lies at the heart of most efforts to anticipate and address any skills gap, and is the focus of quantitative modelling described in the Country Reports. Germany, for example, has a very long tradition of employer engagement in the skills development process, closely linked to sectoral requirements. Other countries, like the United Kingdom and South Africa, have tried to emulate this success, but with mixed results. It is

evident from these experiences that it is difficult to replicate the benefits of systems that have developed over many years by simply imposing something from outside.

**Table 1.3** summarises some of the main methodologies in regular use with sectoral approaches. All have strengths and weaknesses, advantages and disadvantages. The methodologies include the collection of primary data and the various ways in 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. These may be focused on a particular sector or economy-wide, which enables comparison across sectors. Note that sectoral data are often collected for purposes other than anticipating changing labour market needs and this may limit their usefulness.

**Table 1.4** examines qualitative methodologies more generally that have been applied in a skills anticipation context. They are taken from the extensive review by Bakule et al. (2016).

The German system also places great importance on local involvement and engagement in skills forecasting and determining labour market needs. Other countries, such as France, have followed suit, setting up regional laboratories or observatories in recent years. This can help to understand the value of clustering of activities in particular localities.

**Table 1.3 Comparison of tools and techniques used in anticipating and matching skills needed**

Approach	Advantages	Disadvantages	Use in sectoral context
<b>Primary data collection <sup>(a)</sup></b>			
<b>Factual surveys directed at employers (or other groups such as households) containing questions about employment levels, pay, unfilled vacancies, for example</b>	<ul style="list-style-type: none"> <li>• Direct ‘user’ or ‘customer’ involvement</li> <li>• Focuses on how people behave, not what they say or perceive</li> <li>• They are a key part of the official statistical system, providing a consistent (using UN concepts) picture of the socio-economic situation</li> </ul>	<ul style="list-style-type: none"> <li>• Getting responses could be problematic</li> <li>• Need large samples to get robust data, therefore may be expensive</li> </ul>	<ul style="list-style-type: none"> <li>• Most useful for sectoral approaches if the surveys are economy wide and allow a breakdown by sector</li> <li>• Can provide comparisons across sectors and also reveal which sectors may compete for people with the same qualifications</li> </ul>
<b>Surveys of opinion directed at employers (or other groups) containing questions about skill deficiencies and skill gaps, for example</b>	<ul style="list-style-type: none"> <li>• Direct ‘user’ or ‘customer’ involvement</li> </ul>	<ul style="list-style-type: none"> <li>• May be subjective and inconsistent</li> <li>• May focus too much on the marginal and ephemeral</li> <li>• Respondents may not necessarily be knowledgeable about future skills needs</li> </ul>	<ul style="list-style-type: none"> <li>• Can be both economy wide and sector specific</li> <li>• Sector-specific surveys can focus on more sector-specific problems or even selected occupations in the sector, but they may lack information on the more general context</li> </ul>
<b>Interviews and related techniques</b>	<ul style="list-style-type: none"> <li>• May be able to address problems and concerns more subtly and in greater depth</li> </ul>	<ul style="list-style-type: none"> <li>• May be unrepresentative</li> </ul>	<ul style="list-style-type: none"> <li>• Very useful for sectoral approach, especially to address ‘key players’ in the sector (main employers, main vocational institutions)</li> </ul>
<b>Workshops</b>	<ul style="list-style-type: none"> <li>• Useful mechanism for exchanging views</li> <li>• Useful for validation of hypothesis and scenarios</li> </ul>	<ul style="list-style-type: none"> <li>• Can provide a partial view</li> </ul>	<ul style="list-style-type: none"> <li>• At the sectoral level the participants, who use a common language and often share common interests, can be brought together relatively easily for workshops</li> </ul>
<b>Other informal contacts</b>	<ul style="list-style-type: none"> <li>• Useful mechanism for exchanging views</li> </ul>	<ul style="list-style-type: none"> <li>• May be anecdotal and not grounded in reality</li> </ul>	<ul style="list-style-type: none"> <li>• Informal contacts and networking are an important background for sectoral platforms where information can be shared</li> </ul>

Approach	Advantages	Disadvantages	Use in sectoral context
<b>Analysis <sup>(b)</sup></b>			
<b>General synthesis and critical assessment of available evidence</b>			<ul style="list-style-type: none"> <li>Necessary for any analyses</li> <li>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</li> </ul>
<b>Formal, national-level, projections based on a quantitative model</b> <b>Uses econometric techniques or computable general equilibrium (CGE) or similar models <sup>(c)</sup></b>	<ul style="list-style-type: none"> <li>Comprehensive</li> <li>Consistent</li> <li>Transparent and explicit</li> <li>Quantitative</li> </ul>	<ul style="list-style-type: none"> <li>Data-hungry</li> <li>Costly</li> <li>Not everything is quantifiable</li> <li>May give false impression of precision</li> <li>May be impossible to implement in developing countries where a mature statistical system does not exist</li> </ul>	<ul style="list-style-type: none"> <li>Studies for specific sectors can gain information from model if it provides sufficient sectoral breakdown</li> <li>Information from sectors obtained by other methods can also inform model</li> </ul>
<b>Partial projections based on quantitative models, for example focusing on individual sectors or occupations</b>	<ul style="list-style-type: none"> <li>Transparent and explicit</li> <li>Quantitative</li> <li>Targeted</li> </ul>	<ul style="list-style-type: none"> <li>Not everything is quantifiable</li> <li>May give false impression of precision</li> <li>Partial analysis may be biased</li> </ul>	<ul style="list-style-type: none"> <li>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</li> </ul>
<b>Other foresight methods <sup>(c)</sup></b>			
<b>Scenario development analysis, taking many different forms</b>	<ul style="list-style-type: none"> <li>Holistic</li> <li>Direct 'user' or 'customer' involvement</li> <li>Focuses on uncertainty</li> </ul>	<ul style="list-style-type: none"> <li>Can be non-systematic</li> <li>Can be inconsistent</li> <li>Can be subjective</li> </ul>	<ul style="list-style-type: none"> <li>Very often used at sectoral level as the sector can define a reasonable scope for the scenario</li> <li>Sector may also determine which people and institutions are relevant to the scenario development process</li> </ul>

Approach	Advantages	Disadvantages	Use in sectoral context
<b>Case studies of particular sectoral, occupation or regional groups and/or observatories (using both quantitative and qualitative evidence)</b>	<ul style="list-style-type: none"> <li>• Holistic (for the sector)</li> <li>• Strong on sectoral and other specifics</li> </ul>	<ul style="list-style-type: none"> <li>• Partial</li> <li>• Potentially biased</li> <li>• Inconsistent across sectors</li> </ul>	<ul style="list-style-type: none"> <li>• These different methods applied in context of sectoral objectives</li> <li>• May be purely sectoral or cross sectoral, e.g. aimed at one occupation across sectors</li> </ul>
<p>(a) This can include surveys of employers and of households. These are undertaken with many different objectives; skills anticipation is rarely the main focus.</p> <p>(b) This can include analysis of general administrative data sets which focus on the economy and the labour market (such as national accounts or population census), as well as many purpose-driven data sources (such as the United Kingdom's national employer skills surveys and the O*NET database of the United States).</p> <p>(c) Further details on the nature of these methods, their performance and uses can be found in Bakule et al. (2016).</p>			

Source: Based on Wilson et al. (2016c).

**Table 1.4 Overview of foresight methods**

Method	Type	Country examples*	Suitability for skill needs anticipation	Usually used together with	Important features of method
<b>Back casting</b>	• Normative	–	+++	• Literature and statistics review	• Provides a clear path forward
<b>Brainstorming</b>	• Supplementary	Japan US	++++	• Expert panel • Delphi method	• Can reveal unexpected developments
<b>Cross-impact analysis</b>	• Exploratory	–	++	• Literature and statistics review • Delphi method	• Evaluates the probabilities of the occurrence of a set of events
<b>Delphi method</b>	• Exploratory	Brazil Germany Finland Japan Korea	+++++	• Literature and statistics review • Brainstorming • Scenarios	• Good for spotting the unexpected • Encourages stakeholder engagement
<b>Expert panel</b>	• Exploratory	Brazil Canada Germany Finland Japan Korea	+++++	• Scenarios • Brainstorming • SWOT analysis	• Eliciting expert knowledge • Helping to identify priorities
<b>Focus group</b>	• Supplementary	–	++++	• Scenarios	• Improving or generating ideas

Method	Type	Country examples*	Suitability for skill needs anticipation	Usually used together with	Important features of method
<b>Horizon scanning</b>	• Exploratory	UK	+++	• Scenarios	• Identifying future challenges and trends
<b>Literature and statistics review</b>	• Supplementary	Korea	++++	• Scenarios • Back casting • Delphi method	• Evidence based
<b>Morphological analysis</b>	Normative	–	++	Scenarios	Helps to break down a system Identifies important factors
<b>Scenarios</b>	Exploratory	Brazil Germany Japan Korea UK	+++++	Literature and statistics review SWOT analysis Science and technology road mapping	Good for spotting the unexpected Encourages stakeholder engagement
<b>S&amp;T road mapping</b>	Normative	Russia	+++	Scenarios Brainstorming Expert panel	Provides a clear path forward
<b>SWOT analysis</b>	Supplementary	–	++++	Scenarios Expert panel Delphi method	Lists factors with impact on issue

Notes: Based on the case studies considered in this publication, the more pluses (+) attributed, the more suitable the method is for anticipating future needs and trends (maximum five+).

Source: Bakule et al. (2016) p. 57.

## 1.4 Lessons from the Czech Republic, Germany, the Netherlands and the United States

In 2017, Wilson et al. undertook a review of systems for anticipating change in the labour market in four key countries on behalf of the United Kingdom Government Office for Science. The analysis draws upon four separately prepared

country case studies for the Czech Republic, Germany, the Netherlands and the United States. It focuses on how this information is converted into useful labour market information and intelligence (LMII), and used to provide career advice and guidance (CAG) as well as assessing the value of such investments.

The review evaluated how good applications of LMII and CAG can help to improve labour market and economic outcomes.

The Czech Republic can be characterised as having an emerging system, rapidly moving towards an advanced level. Since joining the European Union in 2004, it has built on the experience of many other European countries in developing its own system. It demonstrates just how much can be achieved in a short time based on internal commitment and cooperation in combination with substantial external financial support from the European Union. The system is comprehensive, relying on a sound data foundation and quantitative forecasting skills but also recognising the role of other elements. The rationale for skills forecasting is now to inform labour market actors as opposed to detailed top-down planning that characterised the Communist era. Building up capacity in independent research has proven a long-term process that needs continuous support rather than ad hoc initiatives. Much of the work has been sub-contracted to independent academic research units. It showcases the benefits of active involvement of employers, other key stakeholders and end-users, especially for the development of Occupational Profiles (OPs). The engagement and cooperation of various stakeholders increases the quality, reliability and usefulness of the results (e.g. providing qualitative feedback to the quantitative outcomes). Adding a regional dimension is going to be an important step forward in ensuring such engagement in the future. The Czech case also illustrates the potential for innovation when starting from zero. For example, the Czechs are exploring the potential for making use of 'big data' (vacancy monitoring).

The Netherlands LMIS has achieved mature status in just a few decades by emphasising the importance of long-term funding to develop capacity, including a skills forecasting element. As in the other three countries, the Netherlands has focused on information for labour market actors as opposed to detailed top-down planning. Making quantitative projections of labour supply and demand have been

central concerns, along with the development of long-term capacity and maintenance of corporate memory. To achieve this, the Netherlands has concentrated its capacity development in an academic research unit based in Maastricht.<sup>26</sup> Although the emphasis is on quantitative projections, the system adopts a more qualitative approach for assessing the pattern of future demand for skills rather than seeking precise predictions of numbers of job openings.

Germany's LMII system is well established and carried out by government-funded research organizations. Quantitative analysis is used to inform labour market actors about projected market needs, not to offer data for detailed top-down planning on education and training requirements. There is a strong regional and sectoral focus with notable active involvement of the Public Employment Service (PES), as well other national and regional government agencies. The PES has developed the German equivalent of the O\*NET system of the United States. Like in the US, the German example illustrates the importance of sustained funding of the research base over many years. The development of a national information network (BERUFENET) that provides crucial input into career guidance has helped to ensure a better country-wide match between skills supply and demand.

The LMII system in the United States was established almost 70 years ago and demonstrates the benefits of sustained, long-term investment in skills forecasting. It aims to inform all labour market participants about employment trends, helping them to make informed choices. A key feature is the Occupational Employment Statistics (OES) survey offering reliable and highly specific data on different occupations. The US system provides both detailed quantitative projections and also qualitative analysis, among others. In particular, the O\*NET system highlights changing skills requirements within occupations but American

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26 The Research Centre for Education and the Labour Market (ROA) based at Maastricht University.

planners are skeptical about trying to match short-term skills or the value of employer vacancy surveys.

The Czech Republic, Germany, the Netherlands, the United Kingdom and the United States all demonstrate a very loose relationship between skills projections and policy. There are very few examples of a direct cause and effect link between a particular set of forecasts and policy action. Rather, forecasts are usually just one element in the diverse body of evidence used to drive practice.

## 1.5 Use of Skills Forecasting Results for Policy Action

This section considers the use of skills forecasting results for policy action by institutional, sectoral and individual stakeholders, including young people making career choices. Actual cases were presented and discussed at the regional workshop of the NET-MED Youth project held in October 2017. In France, such forecasts feed into

policy making of the Ministry of Education that has noted growing employment opportunities in the digital sector while observing a downward trend in 'declining' occupations. In Canada, skills forecasting has informed discussion of policy actions, such as the expansion or downsizing of temporary foreign worker programmes and university programmes, as well as employment policy responses, such as the Active Labour Market Programs (ALMPs). In the Netherlands, skills forecasting has been used to inform debate on various education and economic policies, for example concerning students interested in professional certification, accreditation of new academic programmes and higher professional education, and the relevance of diplomas to the labour market.

Reviews of forecasting work conducted in other countries have highlighted the ways it can add value to public policy and personal decision making. Table 1.5 summarises the general aims of skills forecasting.

**Table 1.5 General aims of skills forecasting**

<b>Employment related</b>
<ul style="list-style-type: none"> <li>• Support information for design of labour market policies (passive and active): identification of vulnerable groups, prospective fields of retraining, influence of demographic changes on labour market.</li> <li>• Provision of information on labour market prospects in different occupations for career guidance and counselling and for job brokers.</li> </ul>
<b>Education related</b>
<ul style="list-style-type: none"> <li>• Support information for formulation of broader education policies: impact of demographic changes, prospects for graduates in different levels and fields of education.</li> <li>• Development or change of curricula.</li> <li>• Formulation of strategy of an individual education and training institution (e.g. university, vocational school, adult training centre).</li> </ul>
<b>Economy related</b>
<ul style="list-style-type: none"> <li>• Contribution to assessment of a country's global competitiveness.</li> <li>• Support of industrial and trade policies: identification of priority sectors, identification of skill gaps in sectors.</li> <li>• Identification of potential for investments: availability of human resources and their preparedness.</li> </ul>

Source: Říhová (2016) p. 24.

**Table 1.6** highlights some of the questions that forecasting is trying to address. Individuals, companies, government and other institutions are continuously making choices relating to human capital, careers and skills. These choices and decisions revolve around questions like

those presented in Table 1.6. Their decisions are based on the information they have at the time, even though it is usually imperfect, especially since these decisions are often for the long term and made in preparation for the labour market situation several years ahead.

**Table 1.6 Key questions skills forecasting can help to answer**

Individuals	Companies	Public institutions
(i) what education should I, or my child, undertake?	(i) does the existing supply of employees reflect the needs of the business?	(i) is there a need for special support for graduates from different education levels and fields in the public employment service (PES)?
(ii) which areas of employment are likely to offer the best job prospects?	(ii) should we focus on retraining our current staff or on hiring new employees to meet expected changes in production, technology, organizational structure, retirements, outsourcing?	(ii) is there a need for retention measures for specific occupations?
(iii) if I lose a job, how hard will it be to find a new one?	(iii) what skills and competencies are, or will be, essential?	(iii) should the immigration authorities introduce work permits for foreigners, and for which occupations?
(iv) is it worth attending a retraining course; will it improve my chances of getting a better job?	(iv) is it worth our company's hiring graduates?	(iv) is there a need for adult retraining programmes in some fields?
(v) would moving to another region improve my chances of getting a job?	(v) is there a qualified workforce available in the region where our company is considering a new business?	(v) do we need better measures to ensure the quality of education, and what education level should be the priority?
		(vi) do we need a better educated workforce to attract foreign investments?
		(vii) is there a need to revise specific education programmes, in which fields and levels, and which skills should be prioritised?
		(viii) do we need incentives to attract students to some fields?
		(ix) what are the key sectors for employment in the country?
		(x) is there the qualified labour force needed for further development of a particular sector?

Source: Based on Říhová (2016) p. 26.



## 1.6 Conclusions

### Key Methodological Lessons Regarding Best Practice in Skills Forecasting

This review of best practice worldwide shows that multi-sectoral modelling methods are indispensable to provide a comprehensive, national overview of the changing demand for skills and should be the cornerstone of any systematic approach to assessing changing needs.

More basic methods (e.g. simple extrapolation of trends in occupational employment), rather than more sophisticated econometric modelling should be used for modelling occupational structure within sectors, while recognising the limitations of existing data but making recommendations for further improvements in data collection.

An explicit treatment of replacement demands should be included even if existing data fall short. Replacement demands, which recognise the need to replace those leaving the existing workforce as well as meeting any new demand arising from economic growth, are generally much larger in magnitude than any projected growth in employment levels.

Some limited analysis of the implications of change for qualifications and other matters might be useful, but the top priority should be to first establish good estimates of occupational employment patterns and trends.

Other more qualitative approaches (such as sectoral approaches or scenario development) are also relevant and useful as complements adding more detail and subtle insights, but are not substitutes for quantitative methods. However, where data problems or other issues make quantitative modelling difficult, qualitative approaches can provide an important first step in assessing the prospects for the labour market and skills.

The experience of the countries reviewed above and of other countries as well suggests that the development of quantitative models and systems for anticipating skill needs at a national level is

a major undertaking. Typically, it involves large investments in data, analysis and modelling that usually takes many years to develop.

The overall resource costs of such work vary enormously depending upon:

- The level of sophistication of the modelling work;
- The level of detail (including the various dimensions of employment covered); and
- The extent to which primary data collection is required.

However, costs can be kept down by building upon the lessons and experience of other countries. In particular:

- Making maximum use of existing models and databases;
- Avoiding unnecessary detail, e.g. not adding a spatial dimension which multiplies the data required by the number of geographic areas to be covered, or including modules to deal with qualifications or key/generic skills as a prime focus of attention; and
- Using existing data and not collecting new information specifically for the purpose of skills forecasting.

As **Part I** has highlighted, the state plays a key role in both the execution and use of systematic assessments of future skill needs. The importance of developing an ongoing dialogue among analysts, policy makers and other users cannot be emphasised enough. 'Reflective practice' and continuing professional development are also crucial. Projections should be seen as part of an ongoing process of public policy, monitoring and research on the state of the economy and the labour market rather than a one-off exercise to be carried out to reveal a fixed future. Forecasts are a means to an end, not an end in themselves. They make good servants but not good masters. Accuracy in social science forecasting is in many respects a chimera. The key issue is whether or not they are useful in helping users to understand the world and their options in the face of considerable uncertainty and risk about the future.

# **PART II**

South Mediterranean

Countries Context

***This section starts by presenting key findings of the situational analysis conducted in 2015, and then offers a critical review of the skills forecasting work conducted as part of the NET-MED Youth project. It should be noted that this was a very demanding project, which faced many difficult, and sometimes intractable problems. The individual country teams, as well as the External Expert Team, have approached this task in a constructive and innovative fashion. They have developed for the first time a common framework and a set of practical tools aimed at addressing the very real labour market problems. While there is undoubtedly room for improvement, this effort represents an important first step in developing useful labour market information and intelligence systems that will help to better cope with these problems in the future.***

## **2.1 Situational Analysis**

In 2015, a Situational Analysis Report for the NET-MED Youth project was produced by Wilson et al.. It reached the following conclusions:

### **Findings: Potential for Forecasting Model Development**

In most South Mediterranean countries, the basic data requirements for undertaking quantitative assessments of the labour market and future skill needs seem to be met, although there are often problems.

The main limitations relate to:

- 1** Problems in establishing a stable picture of likely future developments, given the political and other uncertainties faced by this particular group of countries;
- 2** The existence of a significant informal economy which makes accurate measurement of the overall scale and structure of employment difficult, as well as complicating the modelling process;
- 3** The important international flows of remittances that support the economies of many of the countries;
- 4** The general lack of well-established macro-economic models on which to build

projections (albeit with some exceptions, such as Jordan);

- 5** The lack of a focus in the modelling and forecasting work on the youth labour market, which is a prime consideration in the NET-MED Youth project; and
- 6** Insufficient access to relevant and detailed data required to build relevant quantitative models.

The first point underscores why the use of any kind of model or approach based on extrapolating from past trends is especially problematic in this South Mediterranean group of countries. The so-called 'Arab Spring' is just the latest manifestation of tensions in these countries with deep historical roots. They have often resulted in conflict both within and across national boundaries, which makes any kind of future gazing problematic. Establishing robust historical trends and patterns of behaviour is therefore much more difficult than it is in many European countries; this partially explains why the use of more qualitative methods for assessing future possibilities is favoured in this region. However, to be regarded as credible, the skills forecasting exercises still need to be based on the best quantitative foundations available.

The second limitation can be addressed by investing time and effort to understand, measure

and model the informal economy in South Mediterranean countries.

The third point can also be addressed by investing time and effort to understand and model the nature and significance of international remittance flows.

For point 4, there are various possibilities regarding types of models to be developed, as well as various options regarding how and by whom this should be done.

Point 5, concerning youth, can be addressed by developing new modules to extend the quantitative analysis to focus on young people. Assessing the supply side -- by focusing on the numbers of people who are economically active and trends in educational attainment and skill acquisition – should be fairly straightforward. However, progress is also possible on the demand side, by focusing on the breakdown of employment by age and unemployment.

Finally, regarding data availability and accessibility, the general conclusion from the Situational Analysis Report is that the basic data building blocks are available and accessible. Given the nature of the NET-MED Youth project, the point about the lack of detail is probably not that critical. The focus in the first instance should be on broad skills levels rather than detailed occupational analysis. In the longer term this problem can be addressed by investing in more detailed and robust data.

The main conclusion of the Report is that it is possible, in principle, to do something useful, despite limitations. And given the NET-MED Youth project's focus on capacity building, it recommends developing a country-centred, institutionalised hybrid approach that combines quantitative and qualitative methods.

It is also clear that to be successful, it is crucial to engage with the key stakeholders in each country. These stakeholders vary from country to country but necessarily comprise the main national statistical agency and one or more government departments with a responsibility in the relevant areas. Suggestions concerning the stakeholders that need to be approached in each country are summarised in **Section 4**. These national institutions and organizations must be enlisted and engaged as partners for further development work.

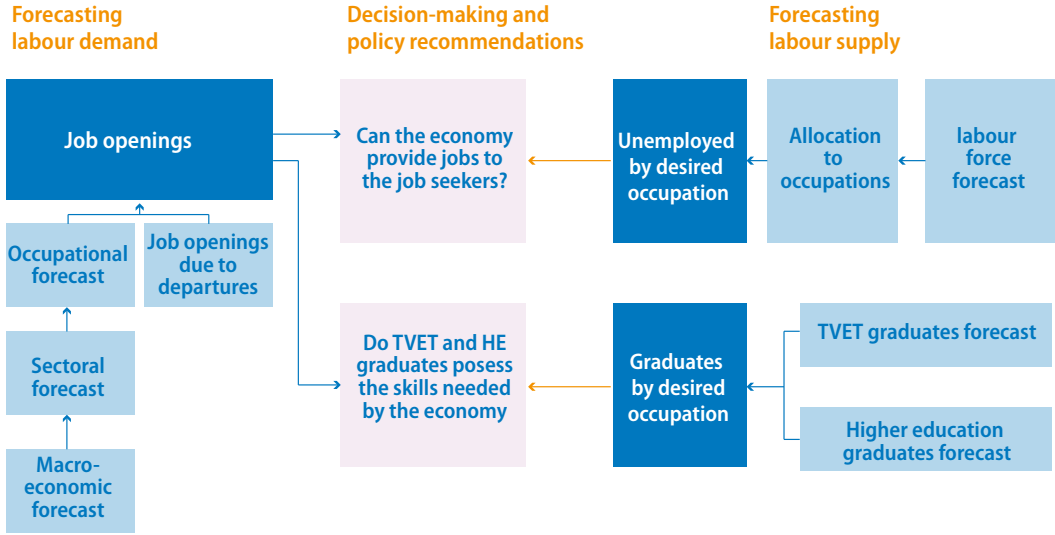
## 2.2 Progress and Pitfalls

A major difficulty encountered by all countries was how to select a focal point for the project that would be capable of supplying the essential data. Nevertheless, with the exception of Lebanon, all countries in the region were able to develop some kind of quantitative model-based approach to skills forecasting.<sup>27</sup> The models shared certain common elements, described in **Figure 2.1**:

- (a) projection of employment prospects in the main sectors or industries;
- (b) translation of these projections into implications for occupational employment;
- (c) assessment of replacement needs (to take account of job openings arising from retirements and other withdrawals from the workforce);
- (d) forecasts of supply of labour by occupation, encompassing both new entrants to the workforce and the unemployed; and
- (e) calculations of labour market imbalances comparing occupational demand with various indicators of supply.

<sup>27</sup> This is described in the tradition of what is referred to as the Manpower Requirements Approach (MRA). This terminology is rather old fashioned, harking back to the days of mechanistic manpower planning exercises of the 1960s and 1970s. Manpower is seen by many as a sexist term (human resources being preferred). The term 'requirements' also seems to imply a mechanistic link between skills demand and the economy. This over simplifies the relationship. The preference now is to focus on anticipation of changing skill needs rather than predicting skills imbalances (see, for example, BLS (2017) and Cedefop (2017)).

**Figure 2.1 Skills forecasting model structure**



The first three elements (a, b and c) follow a standard approach, as pioneered by the United States Bureau of Labor Statistics, Cedefop and many others.<sup>28</sup> The other two elements (d and especially e) follow a less well-established path. They focus on indicators that some may regard as less reliable and robust. There is always a strong demand from policy makers for indicators of imbalance and mismatch. The overall objective of trying to ensure a good match between the demand for and supply of skills also seems self-evidently sound. However, achieving this is much easier said than done.

Given the data limitations faced in all of the South Mediterranean countries under review, the original project was probably too ambitious. A more modest objective of being able to provide broad brush indicators of demand and supply trends would probably have been more realistic and useful than the kind of detailed results currently being presented. These can give a misleading indication of precision and certainty, which poses a real dilemma.

On the one hand, providing enough detail is key to getting stakeholders interested and involved, particularly education and labour ministries that want information for planning TVET programmes, for example. On the other hand, concerns about data quality and reliability caution against presenting more detail than the data can support. Existing data should be exploited as much as possible, but limitations should be acknowledged when results are presented.

If the results give a different picture from the emerging reality, this will call the whole exercise into disrepute. Better to use scenario building than to rely on single point forecasting. There are important benefits to this approach: (i) it can provide an indication of margins of error; and (ii) complement the quantitative work. The latter can be based on the results from (i), and other information that already exists. UNESCO can help to support this effort, but it also needs an internal ‘champion’.

<sup>28</sup> See, for example, BLS (2017) and Cedefop (2017).

## 2.2.1 Developing Projections of Employment Prospects by Sector

The standard approach is to use a detailed multi-sectoral macroeconomic model. These models generally incorporate an input-output element to take account of the interactions between sectors. Ideally, such models also deal with the labour supply side, developing consistent projections of the economically active labour force broken down by age and gender.

**Table 2.1** summarises the position for the seven South Mediterranean countries. In Algeria, Jordan, Morocco and Tunisia, some form of a macro model forecast was available to drive the sectoral projections but this was generally not fully integrated. Jordan's model is the closest to a fully integrated model, with Morocco's not far behind. It includes treatment of replacement demands as well as labour supply. However, in both countries the supply models have not been updated nor do they provide an adequate level of detail. In most of the countries the models were used to generate projections of output (gross value added, GVA) by sector, with employment figures generated separately based on assumptions about labour productivity.

No macro model results were available for Israel, Lebanon or Palestine. Instead, economic prospects for sectors were developed using simpler statistical or other methods. In Lebanon, a qualitative assessment was made based on a sectoral approach.

Based on the GVA projections, forecasts of employment by sector were then made by assuming something about the future path of labour productivity, generally that future trends in productivity would be similar to historical ones. In the case of Morocco an econometric model based on error correction techniques was used.

Ideally such assumptions would be embedded in a fully specified macroeconomic model, which links employment to levels of economic activity, as well as other drivers such as prices and technological change.

In principle, a fully specified macroeconomic model enables the analyst to consider the sensitivity of the results in light of a range of policy interventions including, for example, ongoing reforms such as IMF policy packages which freeze civil servant recruitment. In practice, how well the model can capture the impact of such interventions depends on the level of sophistication of the modelling. All economic models are simplifications of reality based on current understanding (which may be less than perfect). In a number of countries, including the United Kingdom<sup>29</sup> and Germany,<sup>30</sup> the models used for skills forecasting have also been developed and used for policy analysis. In other countries, such as the United States, the Bureau of Labor Statistics (BLS) has shied away from such analysis, preferring to present a benchmark projection that is policy neutral.<sup>31</sup>

The scenarios in the United Kingdom and Germany were developed by the researchers responsible for undertaking the projections, sometimes (but not always) in consultation with the commissioning body. Stakeholders have occasionally been consulted but are generally not actively involved. Neutrality has been ensured to some extent by employing external consultants rather than the government bodies producing the projections themselves. This is in contrast to the approach in the United States, where the BLS is part of the Federal government, but it is regarded as a neutral observer.

29 Wilson et al (2016a).

30 Vogler-Ludwig, K., Düll, N. and Kriechel, B. (2015).

31 BLS (2017)

## 2.2.2 Implications for Occupational Employment

Once projections are developed, they must be translated into implications for occupational employment. Typically, this is done by examining occupational patterns of employment within industries (usually using information from labour force surveys). Table 2.2 summarises the approach adopted in the seven countries of the South Mediterranean region.

It is worth noting that the term *expansion demands* is generally used to refer to the projected **change** in occupational employment levels (it can be positive or negative). In the present series of UNESCO NET-MED Youth Country Reports the term is sometimes used to refer to the **level** of employment. This may confuse some readers.

In most cases there is information on the patterns of occupational employment within industries of the kind required, although this is rarely available on a sufficiently consistent basis needed to establish a long time series. For this reason, the data are used to construct average values of the occupational employment shares within industries over a few years. These values are then integrated into the forecast. Given that there is good evidence that such shares are trending over time, this is a strong and limiting assumption. Ideally a long and consistent time series of information on trends in occupational employment patterns is needed, although in many countries (including the United States) this is combined with more qualitative information, including expert judgement to reach a view about future patterns. In the absence of better data on trends, the assumption of fixed occupational employment shares within sectors provides nonetheless a useful starting point for thinking about the future.

Discussion of data quality (or lack of quality) in the Country Reports is rather cursory and deserves more attention. In most cases we are dealing with sparse matrices with many cells empty or with estimates that are subject to large margins of error.<sup>32</sup> These problems reflect statistical issues (inadequate sample sizes and biased responses) rather than the reality of the situation in the labour market. They also reflect the fact that there have been many structural breaks in the time series data in these countries due to political turmoil.

## 2.2.3 Assessment of Replacement Needs

The need to take replacement demands (RDs) into account when thinking about future skills needs is now well recognised. Many job openings arise not because employment levels are increasing but because there are many withdrawals from the current workforce as people retire or leave for other reasons.

This is recognised in all seven South Mediterranean countries. The preferred method used to generate the estimates of RDs in most cases is the well-established Cohort Component Approach (CCA).<sup>33</sup> However, in many cases simpler assumptions have been adopted. In Morocco, for example, a fixed rate of 3% is imposed across all categories, although this approach is currently under review and may be replaced by the CCA approach.

In the case of Algeria and Jordan, estimates have been made using the CCA, which differentiate RD rates across sectors but not occupations. In the Cedefop work, RD rates are differentiated by occupation and the same rates are used regardless of which industry a person is employed in. In the case of Tunisia and Palestine, for example, a similar approach is used, but with RD rates differentiated by occupation rather than

32 It is normal to observe sparse 'occupation by industry' matrices due to the different technologies being used in the various industries. Also, the production process in a given industry may not require all occupations.

33 CCA is an econometric methodology that requires data that are available in most labour force surveys showing detailed patterns of employment by age.

by industry. In principle, of course, RD rates will vary across both dimensions but the available data are rarely adequate to produce robust estimates at that level of detail. Given the focus on skills, the Tunisian/Palestinian approach seems preferable.

## 2.2.4 Forecasts of Labour Supply by Occupation

Attempts to project the labour supply by occupation are much less well established than forecasts of occupational employment. Box 2.1 sets out the general approach adopted, using Tunisia as an example.

### Forecasting labour supply by age and gender

Most skills forecasting exercises make some attempt to project overall labour supply, usually differentiated by age and gender. Often these are based on independently produced demographic projections. Analysis of the decision whether or not to be economically active (i.e. actively search for work or be employed as defined by the ILO) is a separate exercise. Ideally this analysis is conducted as part of the macroeconomic assessment, since the state of the economy is a key factor in such decisions; in other words, as part of the integrated macroeconomic model forecast.

The treatment of economic inactivity also links to the issue of how to treat the informal economy, which is an important factor in most, if not all, of the seven South Mediterranean countries. The boundaries between formal economic activity, inactivity and the informal economy are often very blurred.

The treatment of the labour force in the Tunisian case and most of the other NET-MED Youth countries is not integrated with the macroeconomic model. This poses a problem of inconsistency. Labour supply is not independent of the general state of the economy.

The approach adopted here is to develop projections of labour demand and supply independently and then to simply subtract the estimate of employment from the labour force. But in most countries, issues such as double-jobbing and statistical discrepancies between measures of the labour force and employment, mean that this calculation is far from straightforward. This is a major challenge for all countries and international best practice is therefore difficult to establish. Canada is one of the main exceptions, and is developing ways to compare demand and supply in detail.

### Forecasting supply by occupation (and /or qualification)

Canada also takes this further by focusing on the kinds of skills individuals acquire as they move through the education and training system.<sup>34</sup> However, work in most other countries has shied away from doing this, due to both practical and conceptual difficulties in measuring skills deficits (for further discussion see Annex A).

On the practical side, while there are generally masses of data available on the passage of individuals through the education and training system, these data are rarely in the form needed to build reliable models of skills supply.

A full set of demographic accounts would show how individuals progress through not just the education and training system, but through the full range of economic and social states (including employment in various jobs, unemployment, inactivity, etc.). While such data may become available in some developed countries shortly, with the huge improvements in data availability and accessibility that have resulted from the ICT revolution, they remain out of reach for most analysts at present. And while the use of administrative data as well as matching data from different surveys is imminent in many developed countries, it is not yet a realistic prospect in NET-MED countries, with the data available those countries being a patchwork of inconsistent and incomplete information.

34 Employment and Social Development Canada (2016).



For example, in Jordan it is recognised that a more sophisticated model could be produced to explicitly take into account other sources of labour supply, such as migrants, or to describe

the behaviour of dropouts and re-entrants into the labour market. However, current information available in Jordan does not allow for this level of detail.

## **Box 2.1 Treatment of skills supply: the Tunisian example**

In the general model framework used in the NET-MED Youth project, labour supply is defined as the number of people seeking employment with the skills required for a given occupation. Two questions follow: first, are training institutions producing graduates in the right areas of study and in sufficient numbers? and second, can the current stock of unemployed people satisfy the job openings likely to become available?

Two key variables must be estimated: the number of graduates entering the labour market and the number of unemployed people seeking work.

Tunisia's starting point was to forecast the working-age population and from that to estimate the number of people available for work (the active population). This is defined as the number of working-age people already employed and the number of working-age job seekers (unemployed). This forecast is usually produced by the statistics agency (INS) responsible for producing the country's demographic indicators. In Tunisia, the INS supplies both demographic and labour force projections.

As total employment is forecast by the demand component of the model (expansion demand), the total number of unemployed people can, in principle, be obtained by subtracting the number of employed people from the active population for each year in the forecasting period. However, generally, things are not quite so simple. Differences in the ways employment and the labour force are measured, double jobbing and various other factors mean that this is not a very reliable method. Projecting unemployment based on the difference between two large numbers is notoriously difficult.

Once the supply of labour in terms of the unemployed population has been forecast for a given period, it is allocated to potential occupations, based on the last position held. In Tunisia, the National Employment Survey (ENE) was used to measure these shares for 2011-2013 and the average values were then used in all projected years. The shares for each occupation were then multiplied by the forecast number of unemployed people in order to estimate the number of unemployed people per occupation.

The analysis then focused upon the flow of job seekers (graduates) from both TVET and HE. Initial technical and higher education systems produce skilled people who enter the working population. The number of new graduates is calculated based on enrolment and graduation data per programme in the technical training and higher education systems. Adjustments are then made to allow for the fact that not all graduates will be economically active. A fixed participation rate of 90% (66% for HE graduates at bachelor degree level) is assumed.

Although useful up to a point, this approach again begs questions about consistency of data in the absence of a fully specified set of demographic accounts. Although the data available from education and training are abundant, they are rarely comprehensive or consistent with other labour market information.

Another problem arises because it is also notoriously difficult to map the road from qualification to occupation.

## 2.2.5 Calculations of Labour Market Imbalances

This part of modelling takes analysis 'a bridge too far. While the desire of users, especially policy makers, for quick answers and simple solutions is understandable, pandering to such demands rather than emphasising the difficulties of attempting to ensure skills balance and matching is likely to lead to disappointment and frustration.

The present calculations require too many risky assumptions and fail to provide information that is both robust and reliable.

There are three main concerns:

- The measures of imbalance are the difference between two large numbers, both of which have large and uncertain error margins. Thus the difference will be subject to even greater uncertainty.
- The estimates of occupational supply are especially suspect, the mapping from TVET and higher education (HE) categories to occupations requires a host of very strong and questionable assumptions, and the consistency of the supply side information with data on employment is also open to doubt.
- The comparisons made between job openings (demand) and unemployment and the inflow of new entrants (supply) seem arbitrary and incomplete. For example, why not also include unfilled vacancies information which is often available in many countries? And why mix both those currently in employment and those who might be looking to change jobs in the same 'supply' basket?

This poses a real challenge. Unavailability of detailed results can easily lead to ministries' disaffection and a sense that the exercise is purely academic. On the other hand, promising too much based on unreliable data also risks disappointment and frustration for other reasons. It may be possible to meet some of these demands with tracer studies and use of certain selective models.

It is important to think about using the collected and presented data as part of a broader framework of a labour market information system, and to pinpoint additional existing information available in each country. It is also extremely important to start thinking about such matters early on. Even if the detailed projections cannot be very precise or certain, it is the process of thinking about future options and choices that is valuable.

Given the limited resources, the institutional difficulties encountered and the timeframe for implementation of the model, the results obtained in the various countries were in some sense the completion of a modelling framework rather than the production of a definitive set of projections that could be used as the basis for a usable policy making scenario. Under these circumstance, taking account of other relevant data and information such as qualitative and contextual information can fill in some of the gaps.

## Box 2.2 Skills match: an impossible dream?

On the surface, better matching skills demand and supply obviously seems to be a good thing. In reality, this is extremely complex and probably an unattainable ideal.

Lassnigg (2012) develops a conceptual framework for the analysis of skills match that includes the following basic elements:

- the practice of anticipation and matching at the individual as well as the meso and macro level including policies and interventions by the state and the complex involvement of educational and training institutions; and
- the important role of symbolic structures (systems of classification and measurement) at the institutional level, which are at the same time produced by the practices of the various actors and in turn also guide them, in making matching visible and thereby structuring reality and going beyond mere information.

There is much more involved than the simple process of trying to fit each and every individual (possibly round pegs) into particular jobs (maybe square holes). Matching has various elements and dimensions, including many different actors. At the individual level, it is about trying to find the best job now and in the future. All individuals possess a broad portfolio of skills, abilities, and other characteristics that can be deployed in many different jobs. Most jobs can be undertaken by people with a wide variety of skills and experience. Thus matching those two does not have a precise recipe. Jobs themselves also change over time, as do individuals and their skills.

In the short term, government departments responsible for unemployment and social

security will focus on trying to match the skills of those looking for work with the requirements of the job vacancies that employers are willing to fill.

In the long term, governments have an interest in ensuring that investments in education and training are reaping the highest possible return. However, solely investing is no guarantee for a positive return. The investment must be in areas that will need skilled workers in the future. In many countries there are worries about over qualification (are there too many graduates?), as well as whether students are following the relevant courses of study. Governments are also concerned with aggregate unemployment and unfilled vacancies and other indicators of skills shortages and surpluses at the level of the whole economy. They are looking at the ways these imbalances and mismatches may impinge on productivity and growth.

But what is the appropriate level of data aggregation? In much discussion, the emphasis is on the micro level (e.g. matching models in labour economics and career guidance and individual support in schools and other educational institutions as well as through public employment services). However, practices at more aggregate meso or macro levels are also important for institution building and policy intervention whether at regional or national level. And the geographical dimension should also be considered: the growth or decline of certain sectors often results in a skills mismatch in particular locations.

At the broadest level, matching is about ensuring that the investment in education and training is at the appropriate level.

**Table 2.1 Development of sectoral employment projections, by country**

<p><b>Algeria:</b> The Director-General of Foresight (DGP) has developed a macroeconomic projection of added value for 22 branches of activity. These projections are methodologically satisfactory and consistent with the model used (ARIMA). However, they do not use the same classification as the data provided by the NOS (4 branches of activities)</p> <p>The projection assumes that labour productivity for the 2016-2020 period (number of persons needed to produce one product unit) will increase in line with historical trends for each of the sectors and includes some qualitative analysis.</p> <p>The macro model is not fully integrated on either demand or supply sides.</p>
<p><b>Israel:</b> No access to an official macroeconomic forecasting model was possible, although such models do exist. The Technical Partner developed a model to project gross domestic product (GDP) forecasts by industry. Combining production and productivity forecasts, an employment forecast can be derived over the same projection period using a simple arithmetical calculation.</p>
<p><b>Jordan:</b> The Jordanian Occupational Projection Model (JOPMOD-2013), identified during the Regional Workshop as an example of good practice, was extended by the Ministry of Planning and International Cooperation (MoPIC) using the Manpower Requirement Approach (MRA) to integrate treatment of replacement needs with labour supply. Building on existing capacity and expertise, the methodology was fine-tuned to update and upgrade the model taking account of the information needs of final users, as well as available data and resources (JOPMOD-2017). It incorporates a multi-sectoral macro model element distinguishing 14 sectors.</p> <p>The macro model is the closest to a fully integrated one on both demand and supply sides but does not currently include an input-output element. Such information does exist but needs to be added.</p>
<p><b>Lebanon:</b> No suitable macroeconomic model exists for Lebanon. Through desk-based research and consultation, trends and challenges were identified to build a Sectoral Skills Forecast by sector. The compendium of sectoral studies allowed for an assessment of existing capacity to integrate labour market Information into a wider Labor Market Information System (LMIS).</p>
<p><b>Morocco:</b> The model uses a forecast of GDP for 20 activity sectors generated by the macroeconomic model PRESIMO, developed by the HCP (the PRESIMO model was already in existence before the present project). This is a neo-Keynesian model that uses annual historical data (1990-2016). It includes behavioural and accounting equations and is hosted on EViews. The model is broken down into one non-productive sector and two productive sectors. This is expanded to 20 sectors using fixed shares. A link between output (GVA) and employment based on an Error Correction model is then used to translate this into employment levels by sector (productivity).</p> <p>The macro model is not fully integrated on either the demand or supply side. Aggregate demand and supply indicators are integrated but not at the detailed level.</p>
<p><b>Palestine:</b> There is no macro model as such. The Palestinian Central Bureau of Statistics (PCBS) produced consistent projections of GVA/GDP, but these are not available to outside organizations. A bridge was built between SNA classification (used for GDP measurement) and ISCO classification used by the Labour Force Survey. Preliminary forecasts for 2016-2020 were achieved using trend regression and expert analysis at the regional (West Bank and Gaza) and industry levels (bottom-up approach). Final forecasts were achieved by benchmarking the results to the IMF economic growth scenario for Palestine (IMF scenario published in August 2016) while preserving the share of each industry in the total as calculated in the preliminary forecast.</p>
<p><b>Tunisia:</b> This projection was provided by the MDICI Directorate-General for Forecasting for the period 2016-2020, based on the Tunisian macroeconomic reference scenario. A 14-category classification system was developed to combine those used by MDICI (its own classification system with 24 categories) and by INS in the National Employment Survey (ENE) (NAT96).</p> <p>In the baseline scenario, employment by sector is forecast by assuming that labour productivity grows at the same pace as in 2005-2015.</p> <p>The macro model is not fully integrated on either the demand or supply side.</p>

**Table 2.2 Development of occupational employment projections (expansion demand), by country<sup>35</sup>**

**Algeria:** Using a breakdown of employees by sector of activity and occupation (2001 to 2015), an occupational matrix is created by cross-checking employment data with the number of employees per occupation for each industry. The coefficient matrix for the 2016-2020 period is assumed to be equal to the average of the 2013-2015 coefficients and constant over the entire period of the projection.

*Source:* NOS, Table No. 02.

**Israel:** Labour Force Survey and census data are used to design matrices providing employment data by occupation and industry for each projected year. The ratios representing the occupation coefficient matrix are calculated for time series and projected over the forecasting period. An average of several matrices can be used.

**Jordan:** There is an Occupational Matrix based on Employment by industry for 14 industries provided in the Jordanian System of National Accounts and Occupations (ISCO-08)

*Annual, 2010, 2013 and 2014, source:* DoS.

**Lebanon:** A list of occupations specific to each of the selected sectors was identified from the International Standard Classification of Occupations (ISCO-08), the International Labour Organization (ILO) classification which categorizes 436 unit groups organized in nine major (1-digit) categories as follows: (i) legislators, senior officials and managers; (ii) professionals; (iii) technicians and associate professionals; (iv) clerks; (v) service workers and shops and market sales workers; (vi) skilled agricultural and fishery workers; (vii) craft and related trades workers; (viii) plant and machine operators and assemblers; and (ix) elementary occupations.

**Morocco:** There is an industry-occupation matrix, with the number of workers in employment per activity (20 sectors) and occupation (national classification of occupations (2001) to 2 digits, i.e. 64 occupations). Annual centred average - three years used: 2012, 2013 and 2014

*Source:* HCP - national employment survey.

**Palestine:** Occupations are categorised using the ISCO-08 system, for a total of 43 occupations (at the 2 digits level). Quantitative information feeding these categories includes employment projections by industry and by occupation, and growth and replacement determinant factors. The average of 2012, 2013 and 2014 occupational structures (proportion of each occupation in total employment for each industry) was used to estimate the occupational structure of each industry. Total employment for each industry was allocated by occupation by multiplying total employment by the proportion of each occupation in each industry. The occupational structure was assumed to remain constant over the forecast period.

**Tunisia:** The occupations considered are classified according to the National Classification of Professions (NNP-1994), 115 categories in total. The first version of the model, the occupation matrix for the period 2016-2020, is assumed to be equal to the 2011-2013 average and constant over the whole projection period. The National Institute of Statistics insisted on using a 3-year moving average because of concerns about reliability.

<sup>35</sup> *Expansion demand* is generally used to refer to the projected **change** in occupational employment **levels** (it can be positive or negative). In the *Country Reports* the term is sometimes used to refer to the level of employment.

**Table 2.3 Development of supply side projections, by country**

<p><b>Algeria:</b> In Algeria, the Director-General of Foresight (DGP) has performed a projection of the economically active population by 2020 (demographic projections aggregated with a projection of participation rates). A prototype model to forecast labour supply for nine broad occupational groups is complete. This focuses on unemployment and the flows of labour supply (graduates from the education system, including those from vocational courses).</p>
<p><b>Israel:</b> Not yet developed, but independently produced demographic projections exist (Central Bureau of Statistics' Projections of Israel's Population until 2025), as do the data necessary to produce projections of activity rates as well as flows of TVET and higher education graduates.</p>
<p><b>Jordan:</b> The supply side of the model starts with an estimation of the pool of all people looking for jobs. Demographic projections by year and five-year cohorts are required for the forecast of the working age population. These are made outside the Skill Forecasting Model based on census data and are thus considered as exogenous. The size of the labour force within the working age population depends on the participation rates. Labour Force Survey data provide the necessary information to compute historical participation rates by age groups. Separate modules focus on TVET and HE graduates.</p>
<p><b>Lebanon:</b> Not developed. Supply issues were dealt with in a qualitative session in the course of developing the Priority Sector assessments.</p>
<p><b>Morocco:</b> This component of the model has not yet been fully developed in Morocco, but data exist to produce standard demographic and labour force projections. Data also exist to enable more detailed projections of flows of some graduate categories.</p>
<p><b>Palestine:</b> Annual Demographic Projections up to 2020 have been produced by the Palestinian Central Bureau of Statistics (PCBS). There is a participation rates forecast by age group (developed by the Technical Staff), and data have been validated by appropriate institution. Separate projections of TVET and higher education graduates.</p>
<p><b>Tunisia:</b> INS supplies both demographic projections by year and by age group and a projection of the active population until the year 2020. Separate modules focus on the flow of vocational and other graduates. Unemployment is derived by subtracting employment from the labour force</p>

## 2.3 Implications from the Skills Projections

In five of the seven countries, the methodologies developed have been used to produce an initial set of skills projections.<sup>36</sup>

**Table 2.4** provides a brief summary of the main messages. It is apparent that, in all five cases, existing problems are expected to be exacerbated. In most cases, the results indicate a problem of inadequate demand for high-level skills, combined with continuing rapid growth in labour supply, especially of young people, many of whom are acquiring high-level skills.

In all cases, the reports present quite detailed implications for skills imbalances and

mismatches. For reasons presented in more detail in the previous section, there are concerns about the quality and reliability of such detailed occupational information on skills imbalances.

Of course, it should be remembered that these preliminary results are taken from the first stage of model development and more work is required (including qualitative assessment) to consider these results as representative of the situation in any particular country.

<sup>36</sup> These were summarised in a series of unpublished UNESCO NET-MED Youth *Country Reports* made available to the author for the purpose of preparing this overview.

**Table 2.4 Implications from the initial projections, by country**

<p><b>Algeria:</b> Job creation is the main challenge facing Algeria. Nearly 400,000 new entrants into the labour market every year will outpace the numbers of new jobs (expansion demand) per year in 2016-2020. The occupations with the greatest labour surpluses are farmers, administrative employees, and intellectual and scientific occupations.</p>
<p><b>Israel:</b> Results not published.</p>
<p><b>Jordan:</b> Jordan's population has been rapidly expanding due to natural causes and forced migration. The rate of natural increase continues to remain above 2% per year, generating high numbers of new entrants to the labour market. Employment growth would require creating, on average, over 66,000 new jobs per year during the next decade to maintain unemployment rates at current levels. The main issue for most occupational groups appears to be insufficient job creation. According to the baseline scenario, around 50,000 jobs will be created a year during the forecasting period which is still less than the government's goal to achieve an 8% unemployment rate.<sup>37</sup></p>
<p><b>Lebanon:</b> Unlike the other countries, this summary is based on a qualitative assessment of prospects for five priority sectors. In each case, the context and general prospects for growth have been considered, including links to other sectors. Detailed insights into employment prospects for specific occupations have also been explored. Those where high growth potential is anticipated are highlighted as well as some areas where employment levels are likely to decline.</p>
<p><b>Morocco:</b> Results not published.</p>
<p><b>Palestine:</b> GDP growth will likely lead to stagnant per capita incomes and rising unemployment. Between 2016 and 2020, about 198,047 jobs are forecast (excluding replacement demand). Replacement demand will continue to account for nearly half of the total job openings. Labour force growth will progressively exceed job creation. The main issue is lack of job creation rather than skills mismatch.</p>
<p><b>Tunisia:</b> The baseline scenario forecasts strong economic growth paired with relatively weak productivity growth. The result is a rather optimistic scenario in which job creation (net expansion demand) exceeds the increase in the active population. The best prospects for graduates (greater demand than supply) are for: plant operators (chemical, metal and mineral products); mathematicians and statisticians; skilled animal husbandry workers; life sciences, health technicians and related occupations. The occupations presenting the least promising prospects are: secondary school teachers and university professors; architects and engineers; secretaries; and administrative and commercial business specialists.</p>

## 2.4 Involvement of Stakeholders

### Engaging Key Stakeholders

A core aspect of the project involved identifying and engaging key stakeholders, including government, education, labour and youth groups.

Generally, responsibility for the issues at the centre of the NET-MED Youth project was not focused on a single government department or agency. Finding a champion to take the lead role was essential in getting the project

started. Bringing it to a successful conclusion also required the active engagement of many stakeholders.

Especially important in this phase of the project were the organizations with responsibilities for data collection and modelling, as well as for policy development related to skills and economic development.

**Table 2.5** summarises the key stakeholders involved in each country. In 5 of the 7 countries, it proved possible to identify a lead organization

<sup>37</sup> It is worth noting that the projections produced for Jordan were made before the policy interventions following the recommendation of the IMF that employment in public services should be frozen. While this was not built into the current set of results, in principle it should be straightforward to develop a revised scenario taking this into account.

prepared to take on the role of coordinator to work closely with the External Expert Team to develop a suitable methodology and to produce initial projections. In 4 cases, this was based on a quantitative approach. In the remaining

two cases, it was not possible to complete the production of the model and produce projections. However, in both cases (Israel and Morocco), the feasibility of such work was established.<sup>38</sup>

**Table 2.5 Key stakeholders, by country**

**Algeria:** The Ministry of Finance’s Directorate-General of Foresight (DGP), the Algerian institution responsible for examining development policies, was identified as a National Partner Institution to develop the skills forecasting model.

The DGP identified (and then gathered together and liaised with) other key institutions including: the Ministry of Labour, Employment and Social Security; the Ministry of Vocational Training and Education; the Ministry of Higher Education and Scientific Research; the Ministry of National Education and the National Office of Statistics.

**Israel:** The main challenge was that no National Partner was identified following the first field mission (10-14 April 2016). A Technical Partner was recruited to conduct appropriate consultations with national stakeholders involved in skills forecasting and macroeconomic modelling to identify the most suitable national institution. Following a meeting with key national institutions (Ministry of Economy, Office of the Prime Minister, Ministry of Finance, Central Bureau of Statistics) to present the project and the suggested skills forecasting model, the Ministry of Labour, Social Affairs and Social Services’ Direction of Employment Regulation (formally under Ministry of Economy) agreed to be responsible within the NET-MED Youth project as the National Partner Institution. A technical focal point was identified (Ms. Rony Schnitzer, principal economist).

**Jordan:** The Ministry of Planning and International Cooperation (MoPIC) was identified as the National Partner Institution to implement the skills forecasting activity.

The Jordanian Occupational Projection Model (JOPMOD-2013), identified during the 2015 Regional Workshop as an example of good practice, was built by MoPIC using the Manpower Requirement Approach (MRA) in 2013. Building on existing capacity and expertise, a methodology was fine-tuned to update and upgrade the model using the information needs of final users, as well as available data and resources (JOPMOD-2017).

Data were made available by the Department of Statistics (DoS) overseeing the census and Labour Force Survey, the Vocational Training Corporation, and the Ministry of Higher Education and Scientific Research (MoHESR).

**Lebanon:** With a mandate to develop evidence-based employment policies and programmes, the National Employment Office (NEO) was identified as a suitable National Partner Institution to implement the skills forecasting activity of the project. In this case a more qualitative approach focused on key sectors was adopted.

The National Expert Team in Lebanon played a big role in developing and implementing this approach concentrating on five priority sectors. Youth organizations, national and international, education, training and research institutions, all validated the selection of the priority sectors and the consultation methodology. Business people from the selected sectors were also consulted and involved.

**Morocco:** The Moroccan model (PRESIMO model) is built on data provided by the HCP, the Ministry of National Education and Vocational Training (MENFP) and the Ministry of Higher Education, Scientific Research and Management Training (MESRSFC). Other data required to develop the model were provided by the External Expert Team.

38 In Morocco, concerns about confidentiality in some of the key data sets prevented the completion and publication of a set of detailed quantitative results. In Israel, problems of data access also prevented the completion of the model building. In both cases, capacity building sessions were held with the national team which demonstrated the feasibility of producing such results, in principle.



**Palestine:** The Palestine Economic Policy Research Institute, or Ma'had Abhath As-Syasad Al-Iqtisadiya Al-Filastini (MAS), an autonomous non-profit establishment based in Ramallah, was identified as the National Partner Institution to implement the skills forecasting activity.

The National Expert Team is a group of stakeholders, set up under the NET-MED Youth project in each beneficiary country, including youth organizations and national and international institutions. The National Expert Team played an important role in the development of the skills forecasting model by identifying its information needs, and in discussing and validating the forecasting assumptions suggested by MAS. These activities provided the opportunity to build capacity towards adopting the model and taking up its results in a gradual manner.

The Palestinian model is based on data collected from PCBS, the Ministry of Education and Higher Education, and the Ministry of Labour.

**Tunisia:** The National Employment and Qualifications Observatory (ONEQ), a Tunisian employment statistics institution, was identified as the national partner to take responsibility for the development of the skills forecasting model.

The National Expert Team (NET), set up through the NET-MED Youth project, was a group of partners consisting of youth organizations and other national institutions. The NET played a lead role in the development of the model by determining the information needs and validating the projection assumptions put forward by ONEQ. The activities carried out with the partners helped not only to strengthen national capacities for a better understanding of the model and its results, but also to encourage fact-based decision-making for education, training and employment programmes and policies in Tunisia.

The Tunisian model is structured around data from the National Institute of Statistics (INS), the Ministry of Development, Investment and International Cooperation (MDICI), the Ministry of Vocational Training and Employment (MFPE) and the Ministry of Higher Education and Scientific Research (MESRS).

## Involvement of Young People

The general approach was discussed with all interested stakeholders, including groups representing young people in all seven countries. In some cases, this was followed up by presenting the initial results and engaging in more extensive dialogue (Algeria, Jordan, Lebanon, Palestine and Tunisia).

There is not much evidence in the Country Reports of what impact (if any) this process had on the participants or on subsequent policy. However, the Palestinian report suggests that this has been a useful exercise, albeit one that requires further effort to ensure sustainability.

Two of the presentations during the Regional Seminar emphasised the importance of skills projections for young people. Heba Alatshan, of Palestine Education for Employment

(PEFE), outlined how the project had enabled representatives of young people in Palestine to get involved and to articulate their views as part of the skills forecasting process (as well as benefitting from hearing about the results from the projections themselves).

Didier Fouarge's (Research Centre for Education and the Labour Market - ROA) presentation at the Seminar also focused on the impact of skills forecasting for career guidance choices in the Netherlands, providing an interesting example of international good practice.

Generally, young people are not much involved in the process of generating projections in most other countries, even though they are a target group for the work being done on skills forecasting.

# **PART III**

Lessons Learned on Skills

Anticipation, including from

International Experience

### 3.1 Innovative Thinking

The discussion in Part III provides a brief review of the literature on skills anticipation worldwide. It is clear that (subject to the caveats made in the previous section), the work conducted as part of the NET-MED Youth project has generally followed a well-trodden path.

In most of the countries a quantitative approach has been successfully adopted, making the most of the data available. The Country Reports suggest that those participating in the project all found that the process added value to existing modelling and/or analytical capacity. In Jordan, the project has been used to extend and improve an existing model. In Algeria, Morocco and Tunisia, the project has helped to build some capacity for this kind of work within existing government departments and agencies.

An important outcome of the project was involving various ministries and institutions to join together to improve the policy making process. Despite delays and difficulties in completing the project, all participants agreed that it was a very worthwhile effort.

Sharing data among the various institutions and stakeholders was deemed another useful outcome, as there had been little cooperation before.

The work carried out by the NET-MED Youth project is not innovative in a strict technical sense and was probably overly ambitious. But a considerable amount has been achieved with modest resources. This was the first time such work was conducted at regional level, and it shows what is possible with cooperation and partnership.

It also provides encouragement to share and compare experiences in order to learn from others facing similar problems. Such agreement is not always forthcoming. In both Israel and Morocco, there was difficulty obtaining access to detailed data. The role of the European Union

and UNESCO as facilitators and in providing seed money is also highlighted.

There is scope for improvement in the quantitative modelling:

- Use of more and better data, especially on occupational employment structure;
- Integrated macro modelling, including:
  - (i) consistent treatment of labour demand and productivity; (ii) incorporation of a full 'input output' analysis linking sectors; and (iii) consistent treatment of labour supply;
- Further work on the supply side to integrate information on flows through the education and training system with the labour market;
- Reassessment of treatment of imbalances and mismatches;
- Treatment of the informal economy; and
- Treatment of remittances.

Other lessons learned include:

- The absence of well-established trends in the formal economy and labour market (due to political and other uncertainties), continues to make forecasting especially difficult;
- The need to recognise the significance of the informal economy (and the difficulties in measurement and modelling this implies);
- The need to take adequate account of international flows of remittances which are a key element of support for the economies of many South Mediterranean countries (including aid payments);
- The need to deal with the problems arising from mass migration across national borders (both in terms of data and modelling as well as the political and other strains these flows impose);
- The significant differences in labour market prospects for men and women; and
- The need to extend existing analysis to focus specifically on the youth labour market.

## 3.2 Use of Complementary Methodologies

There remains considerable scope to refine and improve the approaches to address these issues. For one, qualitative approaches are a valuable complement to the quantitative model-based on work carried out to date. Lebanon's experience in this domain could be extended to other countries.

International reviews such as the guides published by the European Training Foundation (ETF), Cedefop and ILO (2016) emphasise the

value of 'triangulation', using a variety of different methods and allowing each approach to be informed by the other to obtain a view of what the future may hold. Unfortunately, there is no simple recipe for how to combine quantitative and qualitative methods.

Scenario development is also a well-established alternative to quantitative projections. It deals with uncertainty and development of strategies which are robust regardless of circumstances (whatever the future may bring). Box 3.1 sets out some key features of the scenario development approach.

### Box 3.1 Role of scenario development

#### Scenario development is:

- systematic - aims to generate a strategic conversation or dialogue
- helpful for participants (and others) to plan strategies for the future, taking account of uncertainties
- valuable for wide consultation and incorporation of a range of expert opinion
- not convergent - emphasises uncertainty and alternative strategies
- not a derivative of quantitative forecasts nor a substitute
- holistic: covers all angles, supply and demand

#### Scenarios are:

- an internally consistent view of what the future might be
- not a forecast but a series of possible future outcomes
- able to take into account uncertainty: (i) technological change; (ii) industry restructuring; and (iii) changes in politics and society
- a means to an end - not the main outcomes

#### Scenarios are useful:

- when there is uncertainty
- when there is complexity
- when there are many interested parties

#### Developing scenarios involves identification of:

- key trends
- drivers of change (behavioural linkages)
- uncertainties

#### It is useful to build scenarios in order to:

- identify strategies to achieve desirable outcomes (achieve 'goods' avoid 'bads')
- test strategies (contexts and drivers)
- use evidence to consider future action

#### There are risks and problems associated with scenario development:

- wrong assumptions: each scenario has a probability of zero to occur
- fixed future: adopting scenarios as wishful thinking
- fixed policies: robust strategies are middle of the road; missing unpredicted opportunities and threats
- linear policy thinking
- inadequate understanding of real socio-economic relationships

Scenario development methods do not require any particular data. The technique draws on whatever information is available to those taking part in the process. It can draw upon the results of quantitative analysis and modelling, but is essentially an alternative to that approach.

### 3.3 Use of Skills Forecasting for Policy Action in the South Mediterranean region: a Summary

The NET-MED Youth project has provided some good attempts to develop quantitative skills forecasting, as well as some other methodologies, in South Mediterranean countries. As discussed in Part III, this effort was ambitious given the quality of the data available and the technical and conceptual problems in defining and measuring skill shortages in the region. Yet the preliminary results of skills forecasting can be of value to enrich policy debate on strengthening national systems for skills needs assessment and anticipation. In all countries, the External Expert Team organized capacity development exercises to engage with various groups representing young people in order to demonstrate the potential usefulness of skills forecasting results to them, as well as begin to open up a dialogue with them about the issues they perceive as crucial in their own countries and how the situation might be improved. In the meantime, as also discussed in Part III, the value of 'triangulation' should be widely shared by using a variety of different methods (including both quantitative and qualitative methods, such as scenario development) in order to obtain a view of what the future may hold and thereby better inform education and training policy making. Since there is no simple recipe for how to combine quantitative and qualitative methods, the specific methods of 'triangulation' should be discussed in view of the context of each country and the existing labour market information and intelligence.

### 3.4 Conclusions and Recommendations

Based on the current review, a number of conclusions can be reached.

The NET-MED Youth project Country Reports set out a range of possible incremental improvements that could be made. These are all sensible suggestions, although as noted in Part III in particular this author has some reservations about the emphasis on detailed quantitative estimates of future skills imbalances and mismatches.

More generally, it is clear that improvement in most areas will require quite substantial investments in data and/or modelling/research, in addition to institutional developments/reforms. A key message is that this is NOT all about top down planning.

The main areas for improvement include:

- Undertake new primary data collection to fill existing gaps; and
- Carry out new model development work (which is usually dependent on the prior investment in new data).

In particular, this should involve:

- Further investment in basic data;
- Further development of modelling and analytical capacity;
- Exploration of other tools and approaches to skills anticipation;
- Further efforts to encourage cooperation and partnership between key government departments and agencies as well as other stakeholders (this may require the development of new institutions or institutional reform); and

- Development of mechanisms for dissemination of outcomes and results, including methods to engage with the main users and incorporate their feedback.

Some kind of scenario development work is strongly recommended while further exploration of sectoral approaches in parallel with the existing quantitative modelling work could add important insights into the main opportunities and threats (in economic and labour market terms) facing each country. However, one problem with sectoral approaches arises when this encourages policy makers to demand precise quantitative forecasts for planning purposes which may not be realistic.

The current review has discussed the complementarity between the existing skills forecasting models and other possible methodologies and approaches used for skills assessment and anticipation. There are many ways to anticipate the future – the Lebanon case study shows that qualitative, sectorally focused approaches can add value. However, there is no substitute for a sound quantitative assessment and this should remain the top priority.

Getting high level support early on is vital to enable successful completion of the work, as is availability and access to key data sets. The minimal requirements have been met in most of the seven countries considered here, but further progress will require new investment.

The importance of communication and cooperation between departments and agencies is also important, especially where conflicts of interest prove difficult to resolve. Agreements should be formalised as relying on individual non-formal commitment can be a major risk if participants do not fulfil their commitments.

Engagement with users is also much easier talked about than achieved in practice. This is an on-going process that requires continued effort and commitment, ideally embodied in particular institutions and related systems. It needs a champion, somebody to take responsibility, who can offer stability and long-term commitment, including resources.

Finally, regarding translation into policy making, this publication has provided some examples from wider international practice, as well as considering the ways in which lessons can be learned from the experience of the South Mediterranean countries themselves.

## Developing a Comprehensive Labour Market Information and Intelligence System

### A.1 Importance of Technical Support from the Government: Statistical and Analytical Infrastructure

National governments provide technical support for anticipating skill needs in a number of ways. Based on a review of experience worldwide,<sup>39</sup> the key elements are:

- The development of standard systems of classification (industry, occupation and qualifications);
- The introduction of regular national surveys of households and employers;
- The development of means of access to these datasets electronically;
- Investment in general economic modelling techniques; and
- Direct support (financial and otherwise) for regular skills assessment exercises; and
- Development of relevant institutional infrastructure to ensure that a) all this information and data are converted into useful and relevant intelligence about what is going on in the labour market; b) directed to take advantage of any opportunities that present themselves or to pre-empt any obvious threats or problems; and c) there are measures to make certain that all relevant stakeholders are appropriately represented and informed.

### A.2 Key Requirements

#### Classification of industries, occupations and qualifications

A standard system of classifying industries and occupations, both over time and across different data sources, is essential to any systematic attempt to assess future skill needs. Until recently, this has not been a top priority in most countries. However, things have improved, making more systematic approaches feasible and there is now a gradual move towards harmonisation with the international standards set by the ILO.

There have also been attempts to standardise the classification and treatment of qualifications, but many serious difficulties of comparison still remain.

#### Development of regular national surveys of employers

Sectoral information lies at the heart of the multi-sectoral models used in employment projections. Good sectoral information (especially output<sup>40</sup> and employment) is therefore essential. In the United States, the United Kingdom and much of northern Europe, the government conducts good quality censuses or surveys of economic activity, which form the basis of input into the national accounts. In other countries, such data are of much lower quality and reliability (if they

<sup>39</sup> This Annex draws on Wilson et al. (2017) and Říhová (2016).

<sup>40</sup> Measures of the real level of activity in the economy (i.e. taking into account inflation or prices), such as value added (GVA).

exist at all on a regular basis). This significantly constrains these countries' efforts to develop very sophisticated models.

### **Surveys of households population censuses, labour force surveys)**

Most countries conduct regular but infrequent population censuses of their population. For many years this was the only source of detailed information on the occupational structure of the employed workforce. Such data sets remain a cornerstone for any analysis of changing occupational structure.

More recently labour force surveys (LFS) have become much more commonplace. These are effectively mini-censuses although they are usually completed voluntarily rather than as a legal obligation. In the European Union, member states are obliged to conduct an LFS survey on a regular basis and with a fairly standard set of questions. The gradual improvement in the LFS, and in particular its recent increase in sample size, mean that it is now the prime source of data on occupational employment in the United Kingdom. However, the LFS is still limited in its ability to provide accurate data for small geographical areas. Compared to the huge United States survey of establishments conducted on a regular basis by the BLS, the LFS (which many countries rely upon) provides a very fuzzy and erratic picture of trends in occupational structure. However, as always, considerations of cost are crucial and few other countries have been prepared to match the data collection resources of the United States.

### **Other surveys and databases**

Most countries have a range of other surveys conducted on a fairly regular basis, which collect relevant data. These include surveys of earnings, as well as various aspects of employment labour supply. This has improved the ability of researchers to monitor trends. However, with one or two exceptions (such as the Netherlands), these surveys still remain inadequate compared

to the much larger Occupational Employment Statistics (OES) survey conducted by the BLS in the United States, which provides a much more accurate picture of skill mix within sectors.

The vast improvements in information technologies (IT) have also resulted in an explosion in the development of databases and primary data collection exercises at local level. Many of these are intended to assess current positions but many also look forward into the future. These include major skills audits of local areas to supplement and update the information from official sources, as well as surveys of employers, intended to assess their skill needs. Often such work is subcontracted to specialist survey institutes and labour market consultancies. Although this increase in availability of relevant LMII is to be applauded, there are many problems related to inconsistencies in methodology and definitions, which make LMII much less useful than it might otherwise be. There is a strong case for a more coordinated approach that takes advantage of economies of scale and benefits from synergy and cross-fertilization.

### **Development of means to access data electronically**

Most governments are increasingly making data available electronically, via the internet and other channels, although this is often tempered by concerns about confidentiality. In the UK, for example, the National Online Manpower Information System (NOMIS) has been used for many years to make detailed LMII available. Increasingly, the internet is also making detailed economic and labour market data available to analysts.

### **Support of economic modelling**

Many governments support economic and related research of a very general nature, including econometric modelling. Some of this is done in academic institutions, some is done by commercial consultancies or within government departments and agencies.



For example, the BLS is responsible for the main United States occupational projections and related analysis (BLS, 2016). However, even here, the macroeconomic model projections are bought from a commercial organization. In the Netherlands and the United Kingdom, responsibility has been subcontracted to academic or commercial consultancies, although

this work is supported by central government finance. In all cases the current systems have been progressively developed over many decades, and their strength is the direct result of many years' prior investment.

**Table A.1** provides a brief summary of the main datasets needed for skills forecasting.

**Table A.1 Data sources for analysis of skills supply, demand and mismatch**

A. Standard statistics useful for skills analysis	B. Skill-specific data sources	C. Secondary data sources
<ul style="list-style-type: none"> <li>• Labour force (and other) household surveys</li> <li>• PES statistics on vacancies and job seekers</li> <li>• Enterprise statistics</li> <li>• Education statistics</li> <li>• Censuses</li> <li>• Other administrative data (tax, social security)</li> </ul>	<ul style="list-style-type: none"> <li>• Establishment skills surveys</li> <li>• Tracer studies</li> <li>• Qualitative data on skills</li> </ul>	<ul style="list-style-type: none"> <li>• Projections of labour supply and demand</li> <li>• International databases</li> </ul>

Source: Říhová (2016) p. 26.

# References

- Bakule, M., Czesaná, V. and Havlícková, V. (2016). *Developing skills foresights, scenarios and forecasts - Guide to anticipating and matching skills and jobs Vol. 2, Part A*. Cedefop EFF/ILO Guides. <https://www.etf.europa.eu/en/publications-and-resources/publications/developing-skills-foresights-scenarios-and-forecasts-guide>
- Bell, W. (2005). *Foundations of Futures Studies*. Transaction Publishers, New Jersey.
- Bosworth, D. (1993). 'Skill Shortages in Britain'. *Scottish Journal of Political Economy*, Vol. 40, No. 3, pp. 241–271, August 1993.
- Bureau of Labor Statistics (2016). *Employment Projections and Occupational Outlook Handbook*. United States Department of Labor. Washington, DC: Bureau of Labor Statistics (BLS). <https://www.bls.gov/ooh/>
- U.S. Bureau of Labor Statistics (2017) *Occupational Outlook Handbook*. Available at: <https://www.bls.gov/ooh> (Accessed: 20 November 2019).
- Cambridge Econometrics (in association with the Institute for Employment Research) (1994). 'Merseyside Objective 1 Status: Economic Analysis of EC Indicative Allocations', a report for MELU, the Merseyside Task Force and Partners, April 1994. Cambridge Econometrics, Cambridge.
- Cedefop (2017) *Skills forecast*. Available at: <https://www.cedefop.europa.eu/fr/publications-and-resources/data-visualisations/skills-forecast> (Accessed 20 November 2019)
- Dickerson, A. and Wilson, R. A. (2017). 'How should we consider future skills demand?' Paper presented at the Department for Education Skills Demand Workshop (18 July 2017), Church House Conference Centre, Westminster. <[https://warwick.ac.uk/fac/soc/ier/research/forecasting/future\\_skills\\_demand.pdf](https://warwick.ac.uk/fac/soc/ier/research/forecasting/future_skills_demand.pdf)> (Accessed 19 November 2019)
- Employment and Social Development Canada (2016). *Imbalances Between Labour Demand and Supply (2015-2024)*. Canadian Occupational Projection System. Online: <http://occupations.esdc.gc.ca/sppc-cops/c.4nt.2nt@-eng.jsp?cid=61&preview=1>
- EMTA (Emerging Markets Traders Association (2001). EMTA Manufacturing Labor Market Observatory, EMTA, Watford.
- European Training Foundation (ETF) (2016). *Labour market and training observatories*. ETF, Turin. [http://www.etf.europa.eu/webatt.nsf/0/F8E652156F4C0E9FC12580E60049A5CE/\\$file/Observatories.pdf](http://www.etf.europa.eu/webatt.nsf/0/F8E652156F4C0E9FC12580E60049A5CE/$file/Observatories.pdf)
- European Training Foundation (ETF), European Centre for the Development of Vocational Training (Cedefop) and International Labour Organization (ILO) (2016). *Developing skills foresights, scenarios and forecasts: Guide to anticipating and matching skills and jobs Volume 2*. ILO, Geneva.
- France Stratégie (2017). 'French occupational outlook by 2022'. Presentation at an International Expert Workshop, held in Paris on 28 March 2017. See also: 2017 <http://www.strategie.gouv.fr/publications/metiers-2022-prospective-metiers-qualifications>
- Frontier Economics (2009). *Refining the top-down methodology to identify shortages in skilled occupations*. Report for the UK Migration Advisory Committee (MAC), London.
- Green, F., Machin, S. and Wilkinson, D. (1998). 'The meaning and determinants of skill shortages', *Oxford Bulletin of Economics and Statistics*, 60(2): 165-187.
- Greig, M., Glancey, K. and Wilson, P. (2008). *A review of labour shortages, skills shortages and skill gaps*. Report by York Consulting LLP for the UK Migration Advisory Committee (MAC), London.

- Handley, D., Leney, T. and Wilson, R. A. (2003). *The Anticipation of Training Needs for a European Network: the UK Experience*. UK contribution to a Leonardo Athernet Project co-ordinated by CESOS, Qualifications and Curriculum Authority/IER, University of Warwick, October 2003.
- Hogarth, T., Shury, J., Vivian, D. and Wilson, R. A. (2001). *Employers Skill Survey 2001: Statistical Report*. Department for Education and Skills: Nottingham.
- Holt, R, Sawicki, S. and Sloan, J. (2010). *A theoretical review of skill shortages and skill needs*. Evidence Report 20, UK Commission for Employment and Skills, London.
- Kriechel, B. (2013). *Identifying and analysing imbalances in the Pan-European skills supply and demand forecast*. Deliverable #8 in Cedefop Framework Contract No: 2011- FWC11/AO/RPA/AZU-VKVET/skills-forecasts/003/12 Cedefop, Thessaloniki.
- Kriechel, B., Rašovec, T. and Wilson, R. A. (2016). "Skills Forecasts." Part B of the ETF, ILO and Cedefop guide on *Developing Skills Foresights, Scenarios and Forecasts – Guide to Anticipating and Matching Skills and Jobs Vol 2* Luxembourg: Publications Office of the European Union.
- Lassnigg, L. (2012). *Anticipating and matching demand and supply of skills*. Synthesis of national reports. European Training Foundation: Turin (see: [http://www.equi.at/dateien/Skills\\_matching\\_synthesis\\_re.pdf](http://www.equi.at/dateien/Skills_matching_synthesis_re.pdf))
- Lindley, R. M. et al. (1978). *Britain's Medium-Term Employment Prospects*. The Group, Coventry.
- Lindley, R. M. (ed.) (1980). *Economic Change and Employment Policy*. Macmillan, London.
- Mason, G. and Wilson, R. A. (eds.) (2003). *Employers Skill Survey: New Analyses and Lessons Learned*. DFES, Nottingham.
- Mavromaras, K., et al. (2013). *A System for Monitoring Shortages and Surpluses in the Market for Skills. Final Report to the Australian Workforce and Productivity Agency (AWPA) by the National Institute of Labour Studies (NILS)*. NILS: online at: [https://www.skills.tas.gov.au/employersindustry/industryresources/workforce-planning-and-development-resources/A\\_system\\_for\\_monitoring\\_skills\\_imbalance\\_and\\_surpluses\\_in\\_the\\_market\\_for\\_skills.pdf](https://www.skills.tas.gov.au/employersindustry/industryresources/workforce-planning-and-development-resources/A_system_for_monitoring_skills_imbalance_and_surpluses_in_the_market_for_skills.pdf) (accessed 19 November 2019)
- Meagher, G. A., Wilson, R. A. and Yerushalmi, E. (2014). *Modelling skills mismatch – further development of the MLME*. Paper presented at the Cedefop Skillsnet conference in Thessaloniki, September 2014. Coventry: Institute for Employment Research, University of Warwick. Online: [https://warwick.ac.uk/fac/soc/ier/research/completed/pefm/of2\\_mlme\\_cge\\_imbalances\\_mismatches.pdf](https://warwick.ac.uk/fac/soc/ier/research/completed/pefm/of2_mlme_cge_imbalances_mismatches.pdf)
- Migration Advisory Committee (MAC) (2008). *Skilled, shortage, sensible: The recommended shortage occupation lists for the UK and Scotland*, UK Migration Advisory Committee, London.
- \_\_\_\_\_. (2010). *Skilled, shortage, sensible: Review of methodology*, UK Migration Advisory Committee, London.
- \_\_\_\_\_. (2013). *Skilled Shortage Sensible: Full review of the recommended shortage occupation lists for the UK and Scotland, a sunset clause and the creative occupations*. UK Migration Advisory Committee, London. See: <https://www.gov.uk/government/publications/recommended-shortage-occupation-lists-for-the-uk-and-scotland-full-review-with-sunset-clause-feb-2013>
- Morrell, J. (2001). *How to Forecast: A Guide for Business*. Gower, Aldershot.
- Richardson, S. (2009). 'What is a skill shortage?', *Australian Bulletin of Labour*, 35(1): 326-354.
- Říhová, H. (2016). *Using Labour Market Information - Guide to Anticipating and Matching Skills and Jobs Vol. 1*. See: [http://www.etf.europa.eu/web.nsf/pages/Vol\\_1\\_Using\\_labour\\_market\\_information](http://www.etf.europa.eu/web.nsf/pages/Vol_1_Using_labour_market_information)
- Rowe, G. and Wright, G. (1999). 'The Delphi technique as a forecasting tool: issues and analysis', *International Journal of Forecasting*, 15, (353-375).
- Shah, C. and Burke, G. (2005). 'Skill shortages: Concepts, measurement and policy responses', *Australian Bulletin of Labour*, 31(1): 44-71.
- Slaughter, R. (1996). *New Thinking for a New Millennium*. Routledge, London.
- Stewart, T. R. (1987). 'The Delphi technique and judgmental forecasting', *Climatic Change*. 11(1-2) pp. 97-113, Springer, Netherlands.
- UNESCO NET-MED Youth Country Reports (2017): 'Skills Forecasting in the Mediterranean Region', elaborated by the Consortium for International Development in Education (CIDE Inc., Montreal)

*National Comprehensive Report and Country Roadmaps:*

- Algeria
- Israel
- Jordan
- Lebanon
- Morocco
- Palestine
- Tunisia

Veneri, C. M. (1999). 'Can occupational labor shortages be identified using available data?'; *Monthly Labor Review*, 122(3): 15-21.

Vogler-Ludwig, K., Düll, N. and Kriechel, B. (2015) *Arbeitsmarkt 2030 - Die Bedeutung der Zuwanderung für Beschäftigung und Wachstum : Prognose 2014*. W. Bertelsmann Verlag, Bielefeld.

Wilson, R. A. (2009a). *The Extent to Which Employer Data on Employment and Skill Issues in the UK are Fit for Purpose (Contributing to the Debate: Assessing the Evidence Base on Skills and Employment in the UK)*. Paper presented at a Skillsnet workshop on 'What can we expect from Employer Skills Surveys?' organized by Cedefop, Milan, May 2009.

\_\_\_\_\_. (2009b). *The Extent to Which Employer Data on Employment and Skills in the UK are Fit for Purpose*. LMI Think-piece paper produced for the UK Commission for Employment and Skills. See: <http://www.warwick.ac.uk/go/ier/publications/2009/ness20fitness20for20purpose20lmi-thinkpiece-rob-wilson.pdf>

\_\_\_\_\_. (2010). *Lessons from America: a Research and Policy Briefing*. UK CES Briefing Paper Series, UK Commission for Employment and Skills, Wath upon Dearne: UKCES. Online: <http://dera.ioe.ac.uk/2193/> [accessed: 7 July 2017].

\_\_\_\_\_. (2013). 'Skills Anticipation – the Future of Work and Education', *International Journal of Educational Research*, 61: 101–110.

Wilson, R. A. et al. (2012). 'Forecasting skill supply and demand in Europe: Overview and Synthesis'. Report prepared for the European Centre for the Development of Vocational Training (CEDEFOP), tender No. AO/RPA/AZU-TODUN/European-skills-forecasts/009/08, Thessaloniki.

Wilson, R. A., et al. (2015). *An Assessment of the Feasibility and Usefulness of Developing Skills Forecasting in the NET MED Youth countries*. Situational Analysis Report, produced on behalf of UNESCO: Institute for Employment Research, University of Warwick, Coventry.

Wilson, R. A., et al. (2016a). *Working Futures 2014-2024: Main Report*. UK Commission for Employment and Skills: Wath upon Dearne. Online: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/513801/Working\\_Futures\\_final\\_evidence\\_report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/513801/Working_Futures_final_evidence_report.pdf) [accessed: 20 November 2019].

Wilson, R. A., et al. (2016b). *Working Futures 2014-2024: Technical Report*. UK Commission for Employment and Skills: Wath upon Dearne. Online: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/513962/WF\\_Technical\\_\\_Report\\_for\\_web\\_final.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/513962/WF_Technical__Report_for_web_final.pdf) [accessed: 20 November 2019].

Wilson, R. A., et al. (2016c). *Overview of 2015/16 Projections*. Institute for Employment Research, University of Warwick, Coventry. Online: <https://warwick.ac.uk/fac/soc/ier/research/completed/pefm/projectionsoverviewyear34.pdf>

Wilson, R. A., et al. (2017). 'Labour Market Anticipation: Lessons from around the world'. Online: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/608083/Labour\\_Market\\_Anticipation.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/608083/Labour_Market_Anticipation.pdf) [accessed 27 September 2017].

Wilson, R. A., Tarjáni, H., and Rihova, H. (2016). *Working at Sectoral Level - Guide to Anticipating and Matching Skills and Jobs Vol 3*. [http://www.etf.europa.eu/web.nsf/pages/Vol\\_3\\_Working\\_at\\_sectoral\\_level](http://www.etf.europa.eu/web.nsf/pages/Vol_3_Working_at_sectoral_level)

Wilson, R. A., Woolard, I. and Lee, D. (2004). *Developing a National Skills Forecasting Tool for South Africa*. South African Department of Labor: Pretoria. (including Annexes).

Zurn, P., Dal Poz, M., Stilwell, B. and Adams, O. (2002). *Imbalances in the health workforce*. Briefing paper, World Health Organization, Geneva.



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# Skills forecasting in the South Mediterranean region

## Approaches and lessons learned from pilot projects

South Mediterranean countries are facing high youth unemployment and are concerned about structural imbalances in their labour markets. They have expressed increasing interest in developing evidence-based employment policies in order to tackle the structural skills mismatches that characterize their economies. In response, UNESCO is supporting the development of national capacity to undertake labour forecasting in the South Mediterranean area. Based on the outcomes of the employment component of the Networks of Mediterranean Youth (NET-MED Youth) project, and in the framework of the Youth Employment in the Mediterranean project (YEM), both funded by the European Union, this publication draws upon the work done since 2014. It includes five skills forecasting models and its results from seven South Mediterranean countries, targeting priority actors in charge of the development and supervision of national skills-related policies and plans. The publication also builds on an international perspective to benchmark and compare the work carried out in the Mediterranean area with other initiatives around the world.

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