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USING LABOUR MARKET INFORMATION

GUIDE TO ANTICIPATING AND MATCHING SKILLS AND JOBS VOLUME 1



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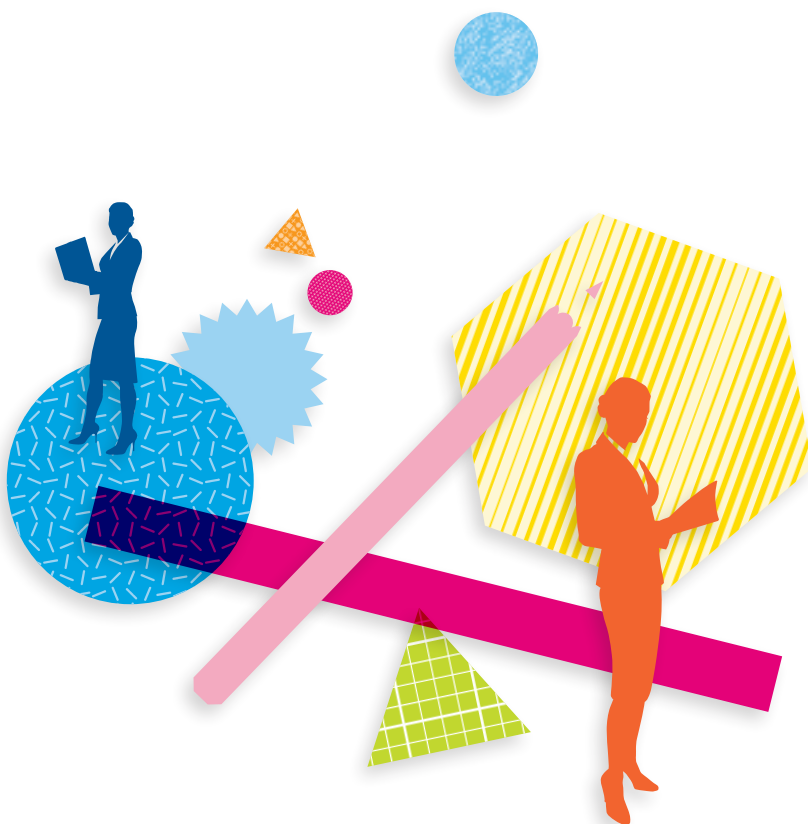
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Hana Řihová



FOREWORD

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

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

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

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

Such a strategy includes anticipating and delivering the skills that will be needed in the future. The ILO/G20 training strategy A skilled workforce for strong, sustainable and balanced growth (ILO, 2010), recognises anticipation of skills needs as one of the principal building blocks of effective skills development systems.

Skills matching is a complex and dynamic process involving multiple stakeholders making multiple decisions at different times: individuals and their families, as they make decisions regarding their own education and training; education, training and labour market policy makers, as they decide on the

configuration of education and training systems, employment policies and investments; training institutions, as they make decisions on the type and content of the training courses to be delivered; and employers, as they take decisions on how to train workers and use skills.

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

Given the complexity and dynamics of the process, perfect matching between skills demand and supply is neither feasible (especially in rapidly changing labour

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



markets and economies) nor necessary, given the fact that many people can do many different jobs and many jobs can be done by people with different skill sets. However, it is important for policy makers to be aware of the importance of reducing the risk of creating large skills gaps that undermine the employability of individuals and impede the productivity of enterprises and the growth of economies.

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

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

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

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

The six guides complement each other. They include both qualitative and quantitative approaches, and advocate strong social dialogue and institutions conducive to better understanding the skills needs of tomorrow. They target professionals, policy makers, researchers, social partners and experts who need an overview of how different anticipation and matching methodologies can generate reliable labour market information and how information and evidence can be analysed and used for the development of policy interventions or adjustments in education and employment strategies.

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

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

Chris Evans-Klock,
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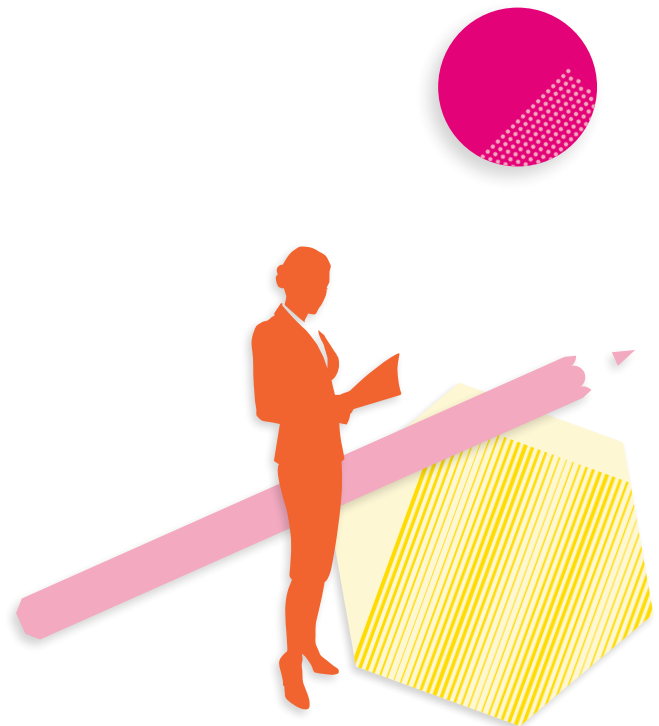
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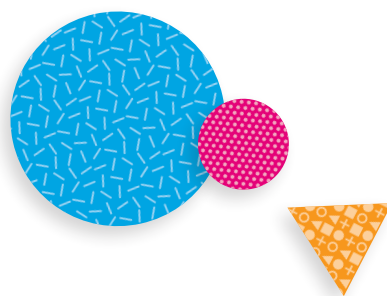
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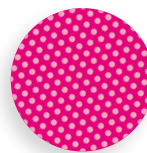
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EXECUTIVE SUMMARY



Every day people, companies and institutions in the labour market are making choices. What education should I or my child take? Is there a qualified workforce available in the region where our company is considering a new business? Do we need a better educated workforce to attract foreign investments? Is there a need to revise some education programmes? Do we need incentives to attract students into particular fields? People make such decisions based on information available at the moment; inevitably they act in a situation of imperfect information. Many are long-term decisions: people, institutions and companies are not preparing themselves for the current labour market but for several years in the future. Although we can never know for sure what will happen in the future, it is important to use the information we currently have to anticipate what skills will be needed.

The main goal of this guide is to provide guidance through labour market monitoring and analyses of skills supply and demand. It is an introductory tool for everyone who wants to understand how labour market information (LMI) can be used for better anticipation and matching of skills demand and supply. It provides advice and recommendations for policy- and decision-makers on how to respond to market signals and how to react to early warning messages driven by LMI. Technical analysts and professionals can use this guide as a source of inspiration on how LMI systems can be further developed and used for policy analyses and interventions.

Poor matching between skills supply and demand has many negative consequences for individuals and companies, and influences the national economy and society more generally. It has a negative influence on wages and job satisfaction, and causes hiring difficulties and lower productivity at company level.

It also lowers the competitiveness of the country and the returns from investments in education and skills development, and may bring additional costs in the form of unemployment benefits. The main drivers of change in skills supply and demand include demography, technology, global economic trends and migration. Other causes of skills mismatch include discrimination in the labour market, poor human resources practices of companies or insufficient wage adjustment mechanisms, limits in workforce mobility, or lack of information on job opportunities.

Use of LMI and development of early warning information systems can contribute to skills mismatch reduction. Development and use of LMI for better matching is described in five steps in this guide. The whole process needs to be supported by a coordinated institutional framework. Involvement of all important stakeholders is a key success factor in skills mismatch reduction. The most important institutional inputs to skills identification and anticipation come from government ministries (labour, economy, education and finance) statistical offices, public employment services, social partners (employers' associations and unions), education institutions, research institutions. Countries usually combine provision of information to individual actors with development of systems and platforms for social dialogue, where their representatives share their visions and develop strategies for mismatch prevention. These are built at national level in the form of human resources development, skills councils or similar institutions; cooperative platforms for social dialogue are often established at sectoral level.

The first step in the process includes formulating analysis aims, which may include employment, education, economy- or industry-related aspects. These aims should determine at which level the analysis will be performed (national, regional, sectoral), influencing



further choice of data, methods and channels for dissemination and use of the results.

Analysis of skills supply, demand and mismatch can use various data sources. These include statistics collected for various purposes (such as labour force surveys, enterprise statistics, data from public employment services or censuses), skill-specific data sources such as establishment skills surveys, tracer studies or qualitative information on skill needs and secondary data sources such as projections of labour supply and demand, or international databases of labour market and education indicators. A data audit should be conducted as a second step, to decide which data sources are available for monitoring and anticipating skills supply and demand in the country or which are most feasible to develop as a useful source.

Use of LMI requires the infrastructure for collection, analysis and dissemination of data as well as trained and experienced analysts who can work with them. In transition and developing countries, activities related to the use of LMI for better matching and anticipation of skills are often developed within the framework of donor-funded projects with the assistance of international agencies and using foreign experts. Sustainability of results is a critical issue; an important third step is to include capacity building as an integral part of the process. Such capacity building should include improvement to the statistical infrastructure, training of analysts and other staff in the relevant institutions, and building the trust of respondents and data users through data protection regulations.

The fourth step is the analysis itself. This includes formulation of research question and choice of method, data analysis and interpretation, and validation of results. Skills are difficult to measure characteristics. In some types of analysis (especially opinion surveys of

employers, employees or graduates) direct questioning on skills is used as well. Other types of analysis use different proxy variables to measure skills supply and demand; most often these include qualifications, occupations and tasks. The use of standard classification and the level of detail which is available is an important concern, which sets the framework for available indicators and the scope of the analysis.

Various possible indicators can be used for analysis of skills supply, demand and mismatch. Some can be used as alternatives dependent on available data sources; however, most are complementary, helping to understand different aspects of the labour market.

Several types can be distinguished: indicators which help understanding the context in which skills supply and demand meet, although they do not provide direct information on skills, such as population age structure, total employment by sector or total unemployment rates; basic skill indicators which provide core information to understand skills supply and demand and the level of skill mismatch, such as population by level of education, employment in sectors by occupation or unemployment levels by education; and indicators that help in understanding the structures of skills supply, demand and mismatch. These include more in-depth information on structures and other alternative measures, such as vacancies or skill gaps and shortages reported by employers, workers or graduates. If quantitative data is not available, similar information can be developed by qualitative methods, which should also help to validate and interpret the results of quantitative analysis.

Dissemination and use of the results of the analysis is the last step of the process. The main purpose of data collection and analysis is to provide actors in the labour market with information which they can use for their





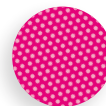
decisions. These may include policy-makers' actions for better matching in the labour market, individual education and career choices, and company human resources strategies. Although it can be presumed that access to information on skills supply and demand creates an opportunity for better choices, it has to be recognised that there can be other legitimate grounds for decisions. While individual career choices, policy visions and company strategies should be based on information, they are not determined by it.

To be used, LMI needs to be transformed into a form that is understandable and relevant to final users. There is a strong role for public sector in provision this information and further use in public policies. The main impetus for reducing and tackling mismatch comes from education policies, skills and human resources development strategies, and national employment policies. Information on skills demand, supply and mismatch should be transformed into appropriate actions in public policies. Identified problems should be critically analysed as part of policy formulation options to develop and implement most appropriate measures. In addition to education, skills and employment policies, labour market matching can be supported by national development plans, industrial policies or migration policies.

Internet websites are the most common information tools in communication with the general public. They are used to provide information on the labour market situation in a user-friendly form for people with no special knowledge of labour market analysis. Information on current situations and likely future development, often the product of sophisticated methodologies, are presented as graphics and simple indicators. The perspective of particular occupations is most often used, sometimes combined with qualification or field perspectives.

General provision of information through online tools should be accompanied by targeted provision by public employment services, career counsellors at schools, using LMI with their clients in an appropriate form, very often through face-to-face contact.

While provision of skills mismatch information to experts, individuals and policy-makers has been well developed in many countries, provision of relevant information to businesses remains a challenge. In human resources management, recruitment and hiring and workforce training, companies can benefit from information about overall labour market trends and skills and other characteristics of individual workers. However, the information available is often not detailed enough to be directly used by employers. LMI can be particularly important for a company considering entering a new market where they do not yet have experience. Provision of independent LMI may increase the willingness of employers to invest in the country as it enables them to evaluate opportunities and reduce risks.





Chapter 1.

Why matching skills supply with current and future labour demand matters

1.1. Introduction

Every day people, companies and institutions in the labour market make choices relating to human capital, careers and skills. The decisions respond to questions such as:

(a) individuals:

- (i) what education should I, or my child, undertake?
- (ii) if I lose a job, how hard it will be to find a new one?
- (iii) is it worth attending a retraining course; will it improve my chances of getting a better job?
- (iv) would moving to another region improve my chances of getting a job?

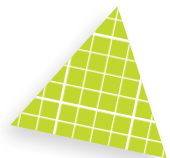
(b) companies:

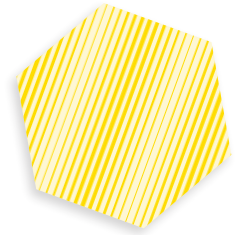
- (i) does the existing supply of employees reflect the needs of the business?
- (ii) should we focus on retraining our current staff or on hiring new employees to meet expected changes such as new production, technological innovations, organisational structure, retirements, outsourcing?
- (iii) what skills and competencies are, or will be, essential?
- (iv) is it worth our company hiring graduates?
- (v) is there a qualified workforce available in the region where our company is considering a new business;

(c) public institutions:

- (i) is there a need for special support for graduates from different education levels and fields in the public employment service (PES)?
- (ii) is there a need for retention measures for specific occupations?
- (iii) should the immigration authorities introduce work permits for foreigners, and for which occupations?
- (iv) is there a need for adult retraining programmes in some fields?
- (v) do we need better measures to ensure the quality of education; 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; which skills are more important to develop?
- (viii) do we need incentives to attract students into some fields?
- (ix) what are the key sectors for employment in the country?
- (x) is there the qualified labour force for further development of a particular sector?

Decisions are based on the information these actors have available at the time, which is usually imperfect. Many decisions are long-term: people, institutions and companies do not prepare themselves for the current labour market but for several years in the future.

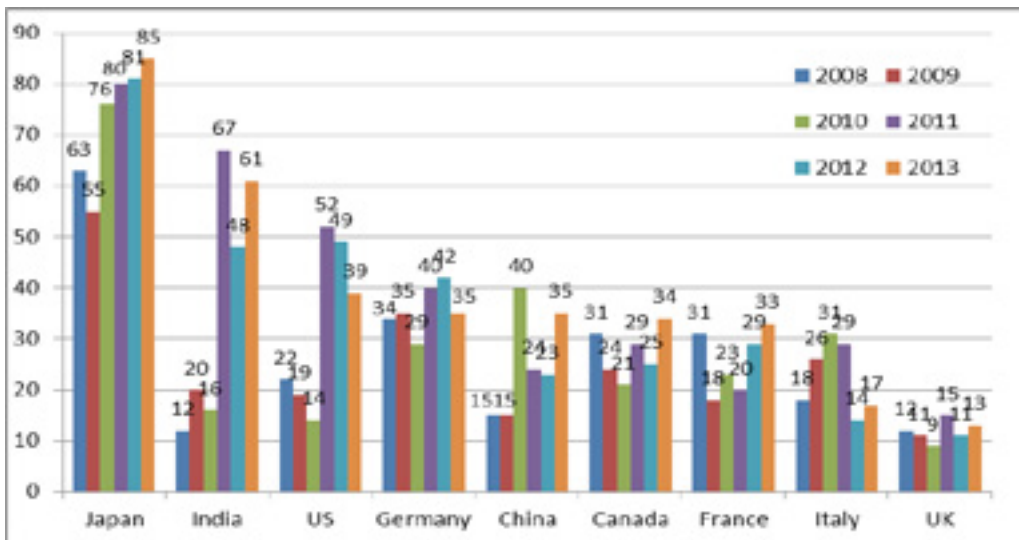




Although we can never know for sure what will happen in the future, it is important to use the information we currently have to anticipate what skills will be needed. In most countries there is at least some information about the skills supply and demand 'out there' which could be used for this purpose. The quality and detail of the LMI differs: often, even if there are primary sources of the information on skills supply and demand, they are not exploited enough and do not serve as grounds for the decisions.

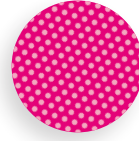
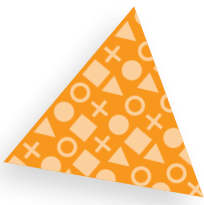
Although unemployment levels grew significantly during the economic crisis, and there was a large pool of unemployed people across the world, the skills shortage reported by companies did not disappear and decreased only slightly. In the largest global economies the mismatch, as perceived by employers, has been mostly growing. At the same time, rapid growth of participation in higher education, observed in many transition and developing countries, will not ensure employability of young people if the economy does not have the capacity to absorb and use their skills.

Figure 1. Percentage of employers having difficulty filling jobs



Source: ManpowerGroup, 2013a, p. 7.





The final decisions in the labour market are made by private actors, but the role of the public sector, governments and social dialogue platforms in skills anticipation, matching and provision of LMI is important. Better matching between skills supply and demand has positive effects not only for individuals but also for society and can be perceived as public goods to be reflected in public policies and investments. This has been recognised in strategies and recommendations at international level. The ILO *R195: human resources development recommendation, 2004: education, training and lifelong learning* emphasises that countries 'should develop their national capacity, as well as facilitate and assist in developing that of the social partners, to analyse trends in labour markets and human resources development and training' (ILO, 2004, paragraph 17). Among other types of information, data collection could include 'identifying, measuring and forecasting the trends in supply and demand for competencies and qualifications in the labour market' (ILO, 2004, paragraph 19). As collection of information is not enough and the information needs to be used to bring about the positive effects, the countries 'should use the information obtained through research to guide planning, implementation and evaluation of programmes' (ILO, 2004, paragraph 20).

Anticipation of future skills needs and LMI and employment services are two of seven building blocks of robust skills and training policies recognised by the

ILO's *A skilled workforce for strong, sustainable and balanced growth: a G20 training strategy* (ILO, 2011a). It points out that 'a number of methods are used to forecast future skills needs. These include forecasting occupational and skills profiles at various levels of disaggregation; social dialogue; labour market information systems and employment services; and analysis of the performance of training institutions, including tracer studies [...]. Quantitative analysis based on labour market information is good, but reliable only when complemented by qualitative information from employers and workers' (ILO, 2011a, pp. 21–22).

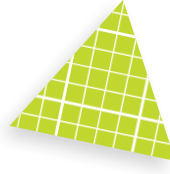
At the EU level the New skills for new jobs initiative sets out to 'promote better anticipation of future skills needs, develop better matching between skills and labour market needs and bridge the gap between the worlds of education and work'⁽²⁾. The initiative leads to practical measures adopted at EU level which include quantitative forecasts performed by Cedefop, analysis of emerging trends at sectoral level and the development of sectoral skills councils, ESCO (classification of European skills/competencies, qualifications and occupations) which will describe the most relevant skills, competencies and qualifications of occupations or the European qualifications framework, and continuous research with the ILO and the OECD. These measures build on long experience of some European and other countries and can be further used as inspiration for countries both in and outside Europe.

Box 1. Evidence-based policies

Good quality policy-making depends on high quality information, derived from multiple sources: expert knowledge; existing domestic and international research; existing statistics; stakeholder consultation; evaluation of previous policies; new research, if appropriate; or secondary sources, including the internet. Evidence can also include analysis of the outcome of consultation, costing of policy options, and the results of economic or statistical modelling.

Source: Nutley et al., 2000.

⁽²⁾ European Commission: Employment, social affairs and inclusion: *New skills for new jobs*, <http://ec.europa.eu/social/main.jsp?catId=822&langId=en>



The key goal of this guide is to provide guidance through labour market monitoring and analyses of skills supply and demand. The guide can be used to build a common knowledge base for experts and commissioners and also as a signpost to further information sources for everyone who wants to understand how LMI can be used for better anticipation and matching of skills demand and supply. The primary audiences are the transition and developing countries where the level of development of the statistical infrastructure might not be very high. Therefore the guide provides mostly basic types of analysis which can be done using available statistics; it also tries to provide a number of options and alternatives depending on data availability in the countries.

As part of a broader series of guides which focus on more specific topics and methods of skill needs identification and anticipation, this volume will mainly focus on how to exploit national data sources and tools, in particular through transforming them into labour market and education indicators. It also offers advice on how to improve data sources to make them more useful for informed decisions by individuals, companies and institutions in the labour market, including evidence-based policy-making. Detailed information on how to develop these information sources or how to use them in a context of specific institutions is the aim of other guides in the series. This guide provides links to them where relevant. It should be perceived as an introduction to analysis of skills supply, demand and mismatch and the use of LMI for better matching.

The guide has three sections. This first section briefly discusses the importance of skills matching. The main body of the guide is in the second section which describes, in five steps, using LMI for skills matching,

from setting institutional frameworks, through development of information on skills, to dissemination and use of results. The third section, in the form of three annexes, includes case studies on using LMI for policy formulation.

1.2. Consequences of skills mismatch

Perfect matching in the labour market cannot be achieved because actors in the labour market make their decisions in a situation of imperfect information and these decisions are influenced by a number of causes. Some discrepancies between labour supply and demand may also be positive because they enable social mobility and provide incentives for skills development and innovation. A perfect match is not always desirable, particularly when it is low-skills equilibrium (i.e. a low skilled person whose skills are matched to a low-productivity job). The equilibrium between supply and demand reached at low-skill levels prevents further development and results in constraints to country competitiveness and social prosperity.

Poor matching between skills supply and demand has many negative consequences, for individuals and companies, and can also influence the country's economy and society more generally.

If an individual does not possess the skills required in the labour market the most obvious risk is that they will face difficulties in finding an appropriate job. This may result in unemployment in the first place, possibly followed by the need to take a job other than that for which the person is qualified. Direct and indirect investments made to achieve a qualification and develop skills are not returned if people perform a job under their qualification levels or in fields for which they are not formally qualified. Such investments are also wasted in the long term because skills previously





obtained in the learning process become obsolete if they are not used. If a person performs a job for which they are not properly qualified it has a negative effect on wages, as does underutilisation of skills. Skills mismatch also has a strong negative effect on job satisfaction (Allen and van der Velden, 2001) and doing jobs under one's skill level can lead to loss of motivation to do a good job. Carrying out a job for which the person does not have proper skills results in lower productivity or lower quality of output. However, if the mismatch is not too great this may be a challenge for some people, resulting in an incentive for further development of their skills and extra effort.

The negative effects of skills mismatch for companies include hiring difficulties, low productivity or insufficient product quality because workers do not have the right skills for their jobs; there is also the need for investment in retraining/loss of original investment and loss of competitiveness. Employers see talent shortage as having a growing impact on businesses: the greater the shortage in a particular country, the higher is the perceived impact on business competitiveness (ManpowerGroup, 2013a). Companies cannot be seen as pure receivers of skills supply, as they are in many cases also providers of training in which skills are developed and a substantial amount of skill is built up through informal learning. Development of human capital is inevitably a shared responsibility of public and private sectors. 'A solution to this [talent shortage] is to hire for potential skills rather than existing ones' (ManpowerGroup, 2013b, p. 11).

All these problems of individuals and companies have consequences at the macro level. If a significant number of people become unemployed because their skills do not meet the demands of the market there is an impact on public finances (public costs of unemployment benefits) as well as broader social

consequences of unemployment such as social exclusion of families and even criminality. Lower workforce productivity threatens national competitiveness, and lack of qualified workers may hinder inward investment by international companies.

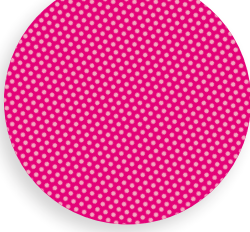
1.3. Determinants of skills mismatch

Skills mismatch can be perceived as a result of labour market and training market imperfection. Changes in supply and demand can cause mismatch as information about these changes does not reach the relevant people soon enough to adjust decisions and behaviour.

Changes in the demand for labour include both changes in numbers of jobs available in the labour market (quantitative changes) and the structure of skills needed to perform a job (qualitative changes). In the current globalised and rapidly changing economy there are multiple determinants of labour demand:

- (a) the business cycle, which influences total demand for labour but also influences sectors to different levels and so has an effect on the structure of the economy;
- (b) global trade, internalisation of the market and international division of labour;
- (c) changes in domestic consumption as a result of growing population income (focus on quality products) or other changes in consumption behaviour (changing age structure of population, demand for healthy products);
- (d) focus on some sectors as a result of international agreements (e.g. on renewable energy as a result of environment protection agreements);
- (e) technological development and innovations which change the nature of jobs.





The supply of labour is generally more stable than demand, and skills mismatch is often perceived as the situation when the supply side is not able to react to demand with enough flexibility. The main processes influencing the size and quality of skills supply are:

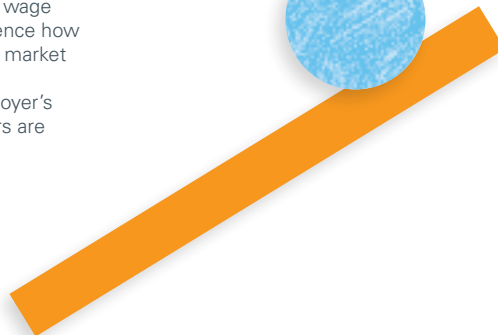
- (a) demography (population ageing in most developed countries, population growth and strong young cohorts coming to the labour market in developing countries);
- (b) structure and quality of the education system. Education needs to balance the current response to business demands with the provision of more generic and transferable skills which will positively influence graduate employability in the longer term and reduce vulnerability induced by structural changes in the labour market;
- (c) migration at international level as well as internally.

There may therefore be other determinants of the fact that skills supply and demand do not actually meet, besides changes in skills supply and demand. These are the results of imperfect information and of a broader social context of the labour market and include:

- (a) limits in workforce mobility. While national skills supply and demand may seem to be balanced, the two may not actually meet in regional and local labour markets because of limited workforce mobility;
- (b) company human resources practices. Human resources in companies covers hiring, the wage levels and conditions of work, which influence how potential supply and demand in the labour market result in employment. What appears to be a shortage of labour supply from the employer's perspective may occur because employers are

slow to recognise a shortage or are simply reluctant to respond to it by increasing wages' (NILS, 2013);

- (c) broader social aspects of the labour markets, such as gender or age discrimination, social stereotypes and prejudice, which prevent some groups of people from entering some types of occupation, and create difficulties in harmonisation of family and work life such as insufficient infrastructure (commuting difficulties) or lack of services for families;
- (d) lack of information on job opportunities. Absence of information tools and intermediary services may cause a labour supply and demand mismatch, even if both are, in theory, available in the labour market. In the longer-term perspective people decide about their education paths and companies about their business and human resources strategies and processes based on imperfect information. The better the information about the current situation and likely future of the labour market, the better the chances that their decisions will correspond. The role of intermediary services is crucial. For more details see volume 4 .





Chapter 2.

Using labour market information for matching and anticipating skills

Although mismatch cannot be prevented, there are several ways that better matching can be supported. These may include:

- (a) networking and cooperation between schools and companies (dual apprenticeship systems or other measures such as internships, involvement of professionals from business in lecturing, involvement of companies in the development of technical and vocational education curricula and training programmes, share of technology between companies and schools);
- (b) improving product market strategies;
- (c) removing barriers to mobility in the labour market;
- (d) development of infrastructure and supportive services to increase participation of some groups in the labour market (e.g. parents of young children, older generation);
- (e) reduction of discrimination in the labour market;

- (f) use of LMI for raising awareness about current and future skills supply and demand.

Murray (2010) recognises three types of LMI which can be used by different actors in the labour market: '(1) information about labour market trends (including projected future trends), both at the aggregate level and by region, sector, industry, and occupation; (2) information about specific job openings; and (3) information about the skills and other characteristics of individual workers. The first type of information can be used by individuals, businesses and policy-makers in order to form reasonable expectations about future labour market developments such as relative skill surpluses and shortages, regional differences in labour market performance, the characteristics of occupations (e.g. skill requirements), etc. The second and third types are used by individual jobseekers and employers in order to facilitate worker-employer matching at microeconomic level and to make career and training decisions' (Murray, 2010, p. iii).

Box 2. Labour market information and analysis (LMIA) system

'Three main functions of the LMIA system can be distinguished:

- (F1) The LMIA system is responsible for labour market analysis;
- (F2) The LMIA system is responsible for monitoring and reporting on employment and labour policies;
- (F3) The LMIA system provides a mechanism to exchange information or coordinate different actors and institutions that produce and utilize labour market information and analysis. [...]

LMIA systems consist of three main components:

- (C1) Collection and compilation of data and information;
- (C2) Analytical capacity and tools;
- (C3) Institutional arrangements and networks.'

Source: Sparreboom, 2013, pp. 258 and 259.

As stressed by Murray, the LMI should include both recent and projected trends. Various reactive measures may be adopted when the skills mismatch appears in the labour market, such as matching intermediation through employment services or implementation of migration policies oriented at attraction of foreign workers into occupations for which the local workforce does not have enough skills. Recognition of prior learning and validation of competencies gained through work experience and non-formal and informal learning may also be used. In an ideal world, however, this situation would be prevented before it arises. Anticipation of skills can be perceived as a preventive measure, providing an early warning of potential mismatch in the labour market and giving the actors (policy-makers but also companies, education providers and individuals) information to prepare for it. Acquisition of skills needs time, ranging from a few weeks of training up to several years in formal education, so the period between an individual's choice to enter education or training and entry into the labour market is long. Even longer is that between formulation of a new education policy and its labour market outcomes.

Early warning on what may happen in the labour market can influence the decisions of people and institutions such that some of the undesirable outcomes are prevented. According to Kinch (2013), an early warning system should meet the following requirements:

- (a) notifying in advance: problems with labour shortages should ideally be corrected before they actually arise;
- (b) accentuating topical problems: the system should be able to distinguish between problems of today and problems of tomorrow. The reason is that

topicality should stress the importance of prompt initiatives;

- (c) visibility: the system should be easy to read and easy to act upon;
- (d) continuity: the system should allow time series analysis in order to spot processes under way;
- (e) consistency: the system should allow for easy comparison over time and geography (Kinch, 2013, p. 50).

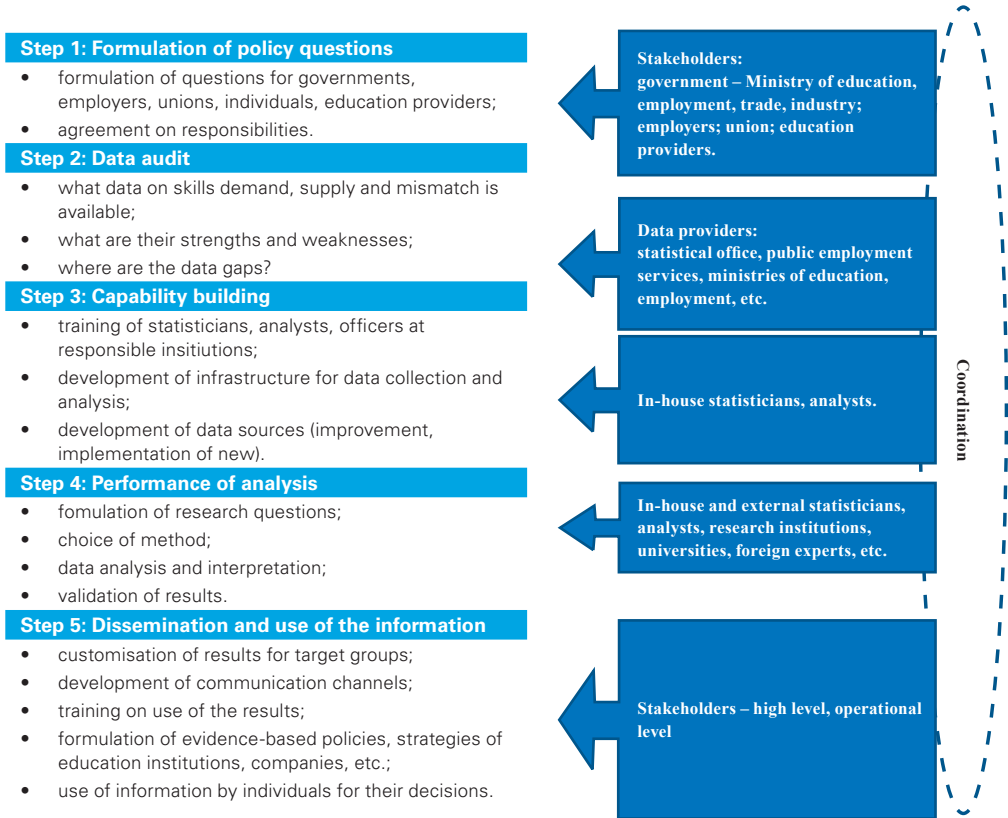
The main purpose of this second section of the guide is to provide guidance through the process of the development and use of LMI for better skills matching. It needs to be recognised, however, that use of the LMI is not the only way to reduce mismatch and that it also has significant limitations, such as an inability to provide information about the design of training courses and curricula due to statistical constraints. Although this guide recognises the importance of projected information, it does not focus on forecasting or foresight methods. For further information see volume 2.

The process of development and use of LMI is described in five steps shown in the following scheme. The whole process should be planned and developed as a sustainable activity. Although a one-off analytical exercise could be useful for understanding skills supply and demand in the country, only a regular LMI system can contribute to better matching. A necessary precondition of this is creating a conducive institutional framework, which is described as Step 0 in the following process and should cross all the other steps.

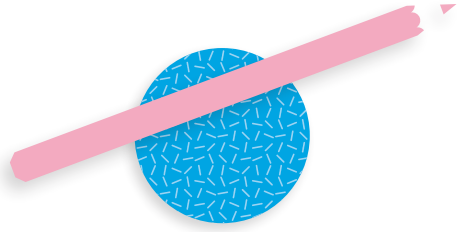




Figure 2. Steps in the use of LMI for matching and anticipation of skills



Source: Author.



2.1. Step 0: building a conducive institutional setting

The process of gathering, processing, analysing, interpreting and using data on skills requires an appropriate institutional setting. Arrangements may vary based on the country context but the most important actors in skills LMI systems responsive to skills identification and anticipation are:

- (a) ministries of labour/manpower, economy/industry/trade, education, finance, etc.;
- (b) statistical offices and other providers of data (e.g. statistical or analytical units at ministries);
- (c) public employment services;
- (d) social partners (employers' associations and unions);
- (e) education and training institutions (from different levels and forms of education: general/vocational education, higher education, public/private, initial/adult education);
- (f) research institutions (universities, research centres).

Building an institutional setting conducive to LMI use for better matching is a continuous activity which needs to support the whole process of LMI development and use. Although it has been defined as Step 0 it cannot be solved once and for all and should be reconsidered during all further steps.

Involvement of all important stakeholders is a key success factor in skills mismatch reduction. Countries usually combine provision of information to individual actors with development of systems and platforms for social dialogue where their representatives share their visions and develop strategies for mismatch prevention.

Institutional platforms for cooperation among stakeholders on skills needs identification, anticipation and matching are established at national level; they can include human resources development councils, national skill councils, workforce development agencies, and commissions for skills. Skills matching is a cross-cutting issue and the coordinating bodies are often independent government or tripartite bodies or inter-ministerial committees. Sometimes they work under the ministry of economy, labour or education; it is important, however, that they have some level of independence within the ministerial structure and that clear cooperation mechanisms with other ministries and social partners are defined.

The main role of the national body is to bring together government, industry, companies and education and training providers from both private and public sectors. The role of the bodies is to carry on (or fund and coordinate) research on national skills needs. They may be responsible for formulation and use of macro-economic models and national skills surveys. They are often in charge of formulating and implementing national priorities, visions and policies on skills and human resource development. In some countries they are responsible for administration of skills development or training funds.

Cooperative platforms for social dialogue are often established at sectoral level. They can be built around sectors of economic activities at different levels of detail as well as around occupations or a mixture of these. They can cover all sectors of the economy or only some of them. In countries with some tradition of industrial or trade associations, the sectoral institutional approach can build on existing institutional structures. The sectoral approach has the advantage of relatively ease in identifying stakeholders and turning identified problems and possible solutions into action. Sectoral





bodies should be based on the strong participation of industry (represented by chambers or associations rather than individual companies). Participation of trade unions and education providers (vocational education and training in particular) is highly recommended.

Mechanisms of cooperation between the national and sectoral level should be established. The national body can be a coordinating platform of sectoral councils across the economy. It can be responsible for cross-sectoral research, policies and actions. Similarly, depending on the country context, cooperative platforms for better skills matching can emerge both at national and regional level and their effective coordination is a challenging task in many countries.

For more information on institutional approaches to skills anticipation and matching, with a particular focus on sectoral approaches, see volume 3.

2.2. Step 1: formulating the analysis aims

The skills mismatch analysis can be done for a number of purposes. Before starting, the aims (policy questions) should be formulated and discussed with all stakeholders. While one labour market survey, set of data or forecast is often used for different purposes, the analysis and interpretation of the results should be done with respect to the specific purpose. The broader aim of the analysis will influence the further steps taken (such as choice of data and methods, focus, form of outputs).

Figure 3. Aims of the analysis

Employment-related

- 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;
- provision of information on labour market prospects in different occupations for career guidance and counselling and for job brokers.

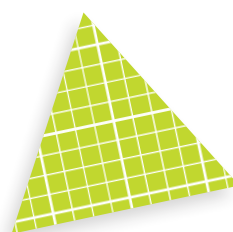
Education-related

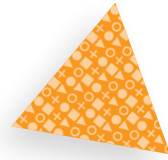
- support information for formulation of broader education policies: impact of demographic changes, prospects of graduates in different levels and fields of education;
- development or change of curricula;
- formulation of strategy of an individual education and training institution (e.g. university, vocational school, adult training centre).

Economy-related

- contribution to assessment of country global competitiveness;
- support of industrial and trade policies: identification of priority sectors, identification of skill gaps in sectors;
- identification of potential for investments: availability of human resources and their preparedness.

Source: Author.





Depending on the country context, the list could be further enriched. For some purposes (such as assessment of global competitiveness or general education policies) labour market data can provide valuable and relevant information; for others, their ability is more limited (as with the development of curricula or detailed information on retraining fields). The data analysis needs to be further supported by other methods, as will be discussed further in Step 4.

The decision on the level at which the analysis will be performed is another important issue. The two main dimensions of the decision are:

- (a) national x regional x local level;
- (b) sectoral, occupational or by educational field and level.

The main decision criteria are:

- (a) the level of centralisation of economic, labour market and education governance systems;
- (b) the level of heterogeneity (regional disparities, internal mobility of workforce);
- (c) the size of the country and regions (although this should not be the main criterion).

In a country with large regional disparities and low workforce mobility the appropriate level of analysis aimed at providing information for career guidance will be regional or local. In contrast, in a country with a national education system, the analysis supporting broader education policies should be national. The decision should be made considering the aims of the analysis and the country context.

In many countries skills analysis is performed at all levels mentioned. The regional or sectoral level can follow information on what is going on at national level

and use it as input for the analysis. At the same time, the more detailed information gained at regional or sectoral levels can feed into national analysis.

The attempts to prepare a national economy-wide analysis as a sum of individual regional or sectoral analyses have been proven not to work well. They are usually based on different methodologies and lack a broader perspective (for example mobility across regional borders can be treated differently, assessment of perspective of one sector suffers from not fully considering possible scenarios in other sectors).

This guide focuses on national and economy-wide levels. Although many parts of the guide can also be useful for analysis at other levels, these have their specifics, which are not discussed here in detail. At regional and local level the availability of data is usually restricted due to sample sizes; however, this has less heterogeneity and stakeholders may be easier to reach, which makes room for a range of qualitative and participative methods for skills mismatch identification and reduction. Analysis at sectoral level is discussed in detail in volume 3. On regional and local levels, the work of public employment services and direct cooperation between education institutions and employers may be more relevant, as discussed in more detail in volume 4.

2.3. Step 2: data audit

Countries which monitor their labour markets and skills mismatch regularly usually combine a number of different data sources. For most sources the primary purpose is other than skills mismatch identification and there is usually only a limited possibility of changing them. There is no single approach among data sources which would enable us fully to describe labour supply





and demand and their interaction; usually several sources need to be combined. In some cases, however, different types of data source can be used for the same or similar information and they can be used as alternatives.

Different types of data source are shown in this chapter along with different types of indicator which may use such sources. The level of development of each data source varies in different countries and a data audit should be conducted to decide which sources are the most useful for monitoring and anticipating skills supply and demand or which can be most feasibly developed to become such a source. The description of each data source includes questions relevant to each source to evaluate this.

There are also questions on data availability and quality in general (also mentioned in volume 3):

(a) Is the data source regular; is its sustainability assured?

(b) How long are the time series; are there significant breaks in series?

(c) Is the frequency sufficient?

(d) Are the data national, regional or local; do they allow such breakdowns?

(e) Are they economy-wide or sector-specific?

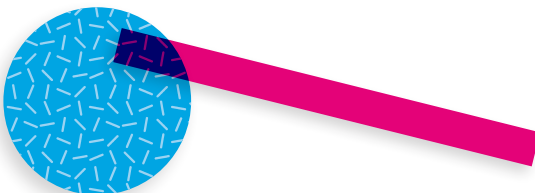
(f) Are the data available in an appropriate form to all relevant stakeholders (are they published in the breakdowns necessary, are the microdata sets shared, etc.)?

Skills analysis may use various types of data source. In the following description a distinction is made between standard statistics, useful for skills analysis but primarily established for other purposes, skill-specific data sources, and secondary data sources. The classification used is arbitrary; the main purpose is to show that skills related analysis does not necessary need to be based on statistics which are primarily developed for this purpose but should exploit the different data sources available in the country.

Figure 4. 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"> labour force (and other) household surveys; PES statistics on vacancies and job seekers; enterprise statistics; education statistics; censuses; other administrative data (tax, social security). 	<ul style="list-style-type: none"> establishment skills surveys tracer studies qualitative data on skills 	<ul style="list-style-type: none"> projections of labour supply and demand; international databases

Source: Author.





2.3.1. Standard statistics

2.3.1.1. Labour force (and other) household surveys

Household surveys are the most usual source of information on structures of the labour force. Many countries have some form of regular labour force household survey, which is more or less harmonised with surveys in other countries. The frequency of the surveys varies; for example, all EU Member States have a quarterly harmonised labour force survey (LFS). Labour force household surveys usually cover the whole population aged 15+ (15–65 or 75), and for each respondent provide information on:

- (a) socio-demographic variables (gender, age, family status);
- (b) variables which denote their status in the labour market (employed, unemployed, inactive) according to the ILO definition;
- (c) occupation (standard classification) and industry (sectors) for the employed;
- (d) level and field of education.

The LFS can also include other information, such as:

- (a) income;
- (b) length of current employment or unemployment;
- (c) last occupation;
- (d) participation in formal and informal education.

For more on methodologies of the LFSs worldwide (including examples of questionnaires and indicators from countries), see:

- ILO: *Labour force surveys*: www.ilo.org/dyn/lfsurvey/lfsurvey.home
- Eurostat: *EU labour force survey*: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/EU_labour_force_survey

To capture the trends in the labour force properly, at least yearly frequency is recommended. Quarterly or continuous surveys with regular sub-annual reporting are preferable, as they capture seasonal trends and allow timely monitoring of the impact on the labour market of changes in economic conditions. Although trends in labour force structures do not change as rapidly as, for example, rates of employment and unemployment, it would be very difficult to use data older than five years. This is also one of the reasons why censuses are not very often used as a source of information on labour supply and demand.

If a regular LFS is not available in the country, information on labour force structures can also be obtained from other household surveys which have wider or different primary purposes, such as more general social surveys and those measuring poverty.

Sample size is an issue in all sample surveys, especially if one wants to use them for detailed information on structures. In the EU-LFS, sampling rates in the different countries vary between 0.2% and 3.3% ⁽³⁾. The sample size and the level of heterogeneity of the population and economy influence how detailed breakdowns can be applied in the analysis.



⁽³⁾ Eurostat: *Employment and unemployment (LFS): introduction*, http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_unemployment_lfs/introduction

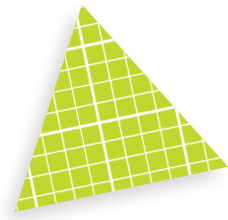


Table 1. LFSs: strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none">• provide structural information on individuals (age, gender, education, occupation);• have the potential to cover informal employment.	<ul style="list-style-type: none">• costly;• usually do not cover the population living outside households;• covering remote areas may be difficult; some countries include only the urban population;• large sample sizes are required to obtain robust data and enable detailed breakdowns;• political implications (difficulty in getting reliable information in countries with high ethnic or racial tensions).

Source: Author.

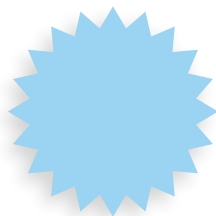
The labour force household survey is an essential, and one of the most appropriate, data sources for quantitative analysis of skills mismatch. Although it has limitations in the level of detail it can provide, in the majority of countries it is the most important source of

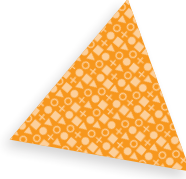
information on the structure of the labour market, and also has the potential to cover informal employment. Investments to develop and improve LFSs in countries which do not have a robust and regular survey are recommended.

Box 3. Guiding questions for data audit: labour force surveys

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

Source: Author.





2.3.1.2. Public employment service (PES) statistics on vacancies and job seekers

Public employment services always keep some form of records about their clients (job seekers) as well as about the vacancies they try to match them with. Information from vacancy and job seekers statistics can serve as useful information on current skills supply and demand, although they only cover flows of supply and demand and provide no information on their stocks (employment). The existing PES records are often underutilised. Their use for analyses of labour demand and supply requires some consistency in data:

- (a) standardised forms of recording information which enable statistical processing of the data;
- (b) mechanisms of merging data from local offices into one database (either an integrated IT solution or standardised processes of 'manual' reporting, such as through spreadsheets, ideally including mechanisms to avoid double counting);
- (c) further regular analytical work with the database and reporting of results (regular publishing of numbers of vacancies by occupation and of job seekers by education, age, gender).

Typically the information includes:

- (a) on vacancies: title of job, ISCO ⁽⁴⁾ code of occupation, type of contract, working hours, remuneration offered, industry and size of the company, place of work, required qualifications, number of vacancies per this position, qualitative information on duties and requirements;

- (b) on jobs seekers: qualifications, previous job, gender, age, date of registration at the PES (length of unemployment).

Even if these processes are applied, there is still a major drawback in using PES statistics as a source of information on labour demand and supply. They only cover those vacancies which are reported by the employers to PES and they only cover registered job seekers. Several studies have proved that, even in countries where reporting vacancies is mandatory for companies, many vacancies are not recorded. At the same time, the number of registered job seekers may differ from the real number of unemployed people because registration in PES is usually a condition of entitlement of social or unemployment benefits (Crnkovic-Pozajic and Feiler, 2011; Kuddo, 2010, as quoted in volume 4). PES data do not generally include the underemployed, who may be looking for a better job due to poor pay, short hours or skills mismatch in their current job(s).

Vacancies do not differ in numbers only but also in structure. Vacancies in PES tend to cover lower-end jobs, while highly qualified vacancies are filled by other channels (private recruitment agencies).

Several countries have made attempts also to cover vacancies advertised through other channels, particularly through private internet portals, to obtain a more plausible picture of overall trends in demand.

For more information on the use of data from PES see volume 4.



⁽⁴⁾ International standard classification of occupations.



Table 2. PES statistics: strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none">• use of existing data, no need for additional data collection;• administrative regional data, no sampling issues;• potential for high quality and detailed information on occupations, qualifications and skills in demand.	<ul style="list-style-type: none">• only flows, no information on stocks;• usually cover only a specific segment of the labour market.

Source: Author.

Data on vacancies and job seekers can be a useful tool for monitoring the current situation and short-term trends in the labour market. It is advisable to work on exploitation of the PES data when they exist in the country. However, they must be interpreted very cautiously, recognising that they only cover a segment of the labour market. Enriching PES data with

information from private advertisements can be helpful in countries with more developed infrastructures, where many vacancies are advertised through online portals. The higher the share of informal employment and vacancy filling through informal channels, the more the PES data are skewed.

Box 4. Guiding questions for data audit: vacancy and job seeker statistics

- What share, or which segment, of job seekers and vacancies do the PES statistics cover and which they do not?
- What information on vacancies and job seekers is available in the statistics?
- Do the statistics use a standard classification of occupations?
- Are the records from individual employment offices merged in one database; do they use an integrated information system?

Source: Author.



2.3.1.3. Enterprise statistics: structure of employment in enterprises, wage statistics

Many countries collect regular business statistics based on reporting from enterprises, either in exhaustive or sample surveys. These statistics provide information on production volumes, export and other topics. They can also provide some structural information on employment or wages and can serve as an alternative or complementary source of information to labour force household surveys. They are used as

a main source of employment structural data in some developed countries such as the US and the UK. However, obtaining data at enough level of detail requires large samples and developed statistical infrastructure both on the side of the institutions gathering the data (a robust registry of companies) and among enterprises themselves (a company database containing information on individuals, such as education). In countries with a large informal sector this can be almost impossible.

Table 3. Enterprise statistics: strengths and weaknesses

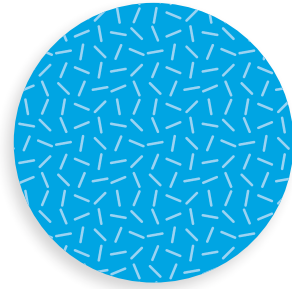
Strengths	Weaknesses
<ul style="list-style-type: none">• direct information from companies;• complementary source to household statistics;• can link employment trends to business trends.	<ul style="list-style-type: none">• require developed infrastructure at statistical institute as well as company level (human resources databases of companies, registry of companies);• do not cover the informal economy and informal employment;• often do not cover SMEs or some sectors.

Source: Author.

The usability of enterprise statistics depends very much on the level of development of statistical infrastructure in the country. Very often they cannot be used for assessment of skills supply, demand or mismatch as such but they may provide valuable contextual information on sectors, innovations and business performance. There may be a thin line

between the enterprise statistics described here and establishment skills surveys described below. While the first are more oriented on quantitative information (facts), the latter can also include important qualitative aspects (opinions). Some types of establishment survey, however, can include both aspects.





Box 5. Guiding questions for data audit: enterprise statistics

- What part of the economy do they cover (private/public, size of establishments, selected sectors/private x public sector, etc.)? Enterprise statistics usually do not cover informal employment and often only cover establishments above some minimum number of employees; sometimes the data provider, however, calculates some estimates for SMEs and/or the informal economy.
- What are the reporting units; enterprises and establishments?
- Is a breakdown by sector/region/size of company possible and at what level of detail?
- What topics are covered in the statistics?
 - economic performance indicators;
 - employment structures: what breakdown (occupation/education level and field/age);
 - wages: on company level or by individual characteristics of employees;
 - innovation.

Source: Author.

2.3.1.4. Education statistics

Administrative data on students and graduates are one of the main sources of skills supply flows. The best quality and most useful information can be obtained if the records take the form of a register allowing for tracking the students across the whole education

system to be able to calculate actual participation rates and transitions between different levels of education and different schools, etc. Even if this is not the case, and individual records are only kept by schools or other entities and then reported to a central institute, the education data can still be useful for measuring labour supply.

Table 4. Education statistics: strengths and weaknesses

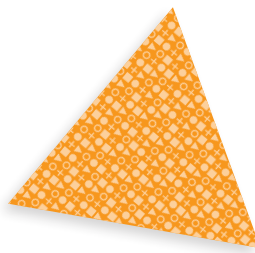
Strengths	Weaknesses
<ul style="list-style-type: none"> • use of existing data – no need for additional data collection; • no sample error – possibility of detailed breakdowns. 	<ul style="list-style-type: none"> • inform about potential supply; do not provide information on what is actually happening with graduates in the labour market.

Source: Author.

Skills supply analysis is very limited, if not impossible, without data on students and graduates and it is advisable that countries work on the development and exploitation of education. The main problems in data

use are in covering only part of the education system, overlaps between several sources of information and lack of information on education tracks (transitions between education levels/labour market entries).





Box 6. Guiding questions for data audit: education statistics

- Is it based on central registry or on reporting?
- Are all levels and all branches of the education system covered?
- Can a person be tracked through the whole education system?
- Can we avoid double counting (headcounts and studies)?
- Does the system distinguish between first and second degrees?

Source: Author.

2.3.1.5. Population census

A census is a comprehensive source of information on population in a country. Because of organisational demands and costs, it is usually done only once in 10 years and lengthy data processing means that it is a long time before figures become available for further analysis; therefore, a census cannot realistically be used directly for analysis of labour demand. It can, however, provide key information on skills supply on which the other sources may build – for example, the information on gender and age structures of the

population – and so is the key source for any demographic projections. A census is also used to ‘anchor’ other statistics in the country because official sample surveys very often use the census (plus administrative statistics on population flows) as the reference data to construct samples and weights. The reliability of some sensitive census information can be limited because it is not anonymous. According to the political context in the country, some information (such as on ethnicity) has to be interpreted cautiously and data from less official sociological surveys may be more reliable for these topics.

Table 5. Censuses: strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none">• comprehensive information on population size and basic demographics;• can provide data on small occupational groups and small geographic areas.	<ul style="list-style-type: none">• low frequency;• long process of administration before data are released;• usually not enough LMI;• key labour force concepts such as employment and unemployment may be measured with less accuracy than in the LFS;• quality of occupation, industry and qualifications coding may be poorer than in official household surveys;• political implications.

Source: Author.





2.3.1.6. Administrative data on tax and social insurance

Analysis of administrative data is an increasing trend, with sources such as the registry of economic subjects (enterprises), population registries, and tax and social insurance registries having potential value. Such administrative data may include information on enterprises (employers) and on individuals.

Due to legislation on the protection of individual data, the level of access to the population registry and the

possibilities of merging data on individuals and institutions from several databases vary among countries. These data may be used for various types of analysis:

- (a) structure of employment by occupation, age, industry;
- (b) structures of population and labour force by education;
- (c) wages by occupation, gender, age, sector, etc.

Table 6. Administrative data: strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> • use of existing data – relatively cheap; • no sample error – possibility of detailed breakdowns. 	<ul style="list-style-type: none"> • access usually subject to some kind of restriction (protection of personal data); • do not provide information on informal employment.

Source: Author.

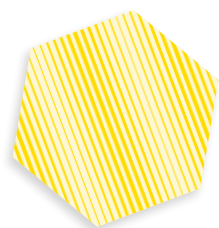
The availability, usefulness and accessibility of these data vary significantly among countries, influenced by the size of informal economy, tax legislation, data protection legislation and the development of the information infrastructure in general. In some countries

(such as the Nordic states) they are an important source of reliable information. If there is a possibility to use this information it is worthwhile because it does not require additional resources. In theory the data can provide detailed breakdowns, though data coverage is often an issue.

Box 7. Guiding questions for data audit: administrative data

- What is the level of access to the registry data?
- Does the form of the data enable analytical use; is there one database merged from local/regional entry points?
- Does the legislation enable merging databases from different sources; is there a primary key which enables it (identification number of person/institution)?
- What variables on individuals are available in the registry: age, education level, education field?
- What variables on companies are available: size, sector?
- What classifications are used?
- What part of employment/population/companies may not be covered by the administrative data?
- What reference periods do the data refer to and are the records kept up-to-date?

Source: Author.



2.3.2. Skill-specific data sources

2.3.2.1. Establishment surveys

Some countries have additional regular or ad-hoc sample surveys of establishments with a special focus on skills ⁽⁵⁾ or closely related aspects which can be used as proxies for skills. These surveys are in various sources called enterprise/establishment or employers' surveys. The surveys include:

- (a) skills needs;
- (b) skills gaps;
- (c) vacancies;
- (d) training activities (or human resource development strategies more generally).

They can be very useful in anticipating skills supply and demand and addressing more qualitative information about the skills needed by employers and the skills gaps they face.

In addition to national surveys, there are two initiatives which developed establishment surveys with a strong skill component in many countries under the umbrella of common or similar methodology. The results and data from these surveys are available online for many countries:

- (a) ManpowerGroup: *Ninth annual 2014 talent shortage survey*, www.manpowergroup.com/talent-shortage-explorer/
- (b) Worldbank Group: *Enterprise surveys: what business experience*, www.enterprisesurveys.org/

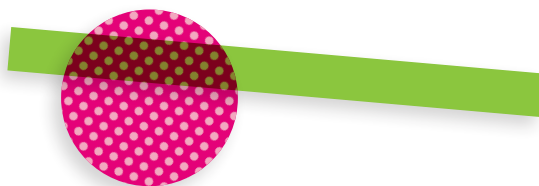
Table 7. Establishment surveys: strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> • opportunity to get direct information at company level. 	<ul style="list-style-type: none"> • more informative for the current situation than the future; • limited possibilities for obtaining information on individuals; • obviously no information on the population out of employment.

Source: Author.

Establishment surveys are a useful tool which should be part of the system for identifying skills demand and mismatch. They provide direct information from employers, which is their main strength, but also have constraints. Employers often do not have detailed information on skill needs, even the current situation; supervisors, who may actually have this information, are difficult to reach in a survey. The ability of employers to answer detailed information on future skills, employment and hiring is limited.

Before the decision to conduct an establishment survey, a detailed data audit on information provided by other sources should be done and the aims of the survey should be clarified. The costs of the survey and the burden on employers (which will also influence the response rate and quality of responses) should be considered. For detailed information on implementation of an establishment skills survey see volume 5.



⁽⁵⁾ These surveys are in various sources called enterprise/establishment or employers surveys. Here the term 'establishment surveys' is used to be consistent with the terminology used in volume 5.



Box 8. Guiding questions for data audit: establishment surveys

- What part of the economy does it cover (private/public, size of establishments, selected sectors, public and private)? Establishment skills surveys often do not cover informal employment, sometimes only covering establishments above a minimum number of employees.
- Is a breakdown by sector/region/size of establishment possible?
- What information does the survey provide?
 - share of employers facing skill shortages;
 - hard to fill vacancies/reasons;
 - occupations which are hard to find (skill shortages);
 - types of skills which the employers cannot find;
 - training needs.

Source: Author.

2.3.2.2. Tracer studies

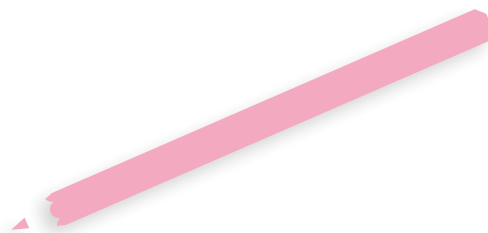
Tracer studies are different types of survey which follow graduates as they become established in the labour market. The most common topics of such studies are job search, transitions to first jobs, further careers, and relationships between study and work; they may also focus on regional and international mobility, work orientations and unemployment. They aim to relate respondents' early experience in the labour market to their qualifications and, in some cases, also to their study results.

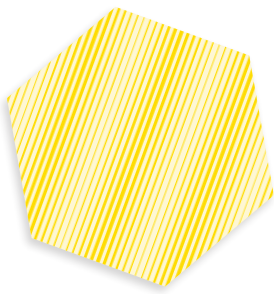
The survey design may have various forms: cross-sectional, panel or longitudinal. They track people starting or leaving education in a certain year at all levels or focus on people born in a specific year. They can be designed as sample surveys or cover all specified graduates; they can cover the whole education system or act as a small-scale tool of evaluation for education programmes. Readers interested in more details on different methodology options and the process of conducting a tracer study should see volume 6.

Table 8. Tracer studies: strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> • relatively low cost; • easy execution. 	<ul style="list-style-type: none"> • demand for detailed information about sample groups; • only cover early market experience, so findings may be biased.

Source: Author and Gasskov in ETF, 2013.





Tracer studies can be a useful tool for assessing the quality of skills supply and for understanding the relations between the worlds of education and work. If well grounded (in a proper register of students and graduates) they can be cheaper in comparison than other field surveys (household, enterprise) because of

easier identification of the target population. When interpreting them, however, it needs to be taken into account that they only cover early experience in the labour market and the answers may be biased. They are valuable but not an exhaustive source of information on skills mismatch.

Box 9. Guiding questions for data audit: tracer studies

- Does it cover the whole education system?
- Is it a sample or census survey?
- Are only successful graduates tracked or drop-outs as well?
- How long is the period of tracking?
- What types of information on the labour market situation of graduates does it provide: transition to first jobs; further careers; retrospective subjective evaluation of the usefulness of education; unemployment; work in/ outside field of study?
- What information from the education process does it include: school; field of study; study results?

Source: Author.

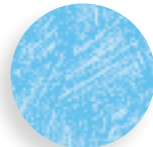
2.3.3. Qualitative data sources on skills

The above data sources are mostly aimed at getting quantitative (or quantifiable) information on labour or skills supply and demand. Such sources should always be accompanied by qualitative types of data, which can help to fill in the gaps where quantitative information is not available; they can also explain the context and add value to the numbers. The main data sources of qualitative information are:

- (a) literature reviews including reviews of general press and internet sources;
- (b) consultation with companies and other stakeholders;
- (c) different types of consultation with experts.

There are various ways of obtaining qualitative data, including interviews, literature reviews, Delphi surveys, workshops and scenario development. For more information how these methods can be applied to the identification of current and future skills needs see volume 2.

The following table shows some weaknesses and strengths of qualitative data sources compared to quantitative. However, it is not an 'either-or' decision; a good system of LMI and skills anticipation needs to use both types of information.



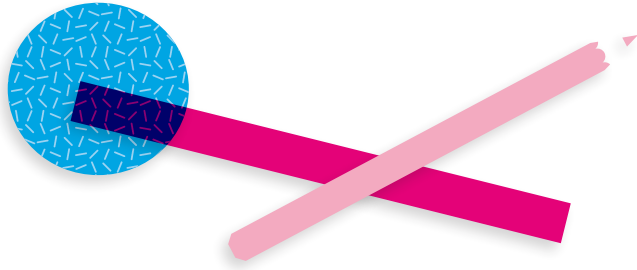


Table 9. Qualitative data sources: strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> relatively cheap and easy to implement compared to quantitative surveys; can be focused specifically on skills; can bring more understanding of the underlying causes and processes; as a secondary benefit, can facilitate engagement of the actors. 	<ul style="list-style-type: none"> subjective; risk of overemphasising marginal issues; partial, do not provide comprehensive information.

Source: Author.

Qualitative sources of information should be part of the process of skills mismatch identification. They can be used as alternatives to fill some gaps in the quantitative data but also to bring better interpretation and understanding to the quantitative results. The risk of subjectivity can be lowered by engaging various types of actors (typological representativeness), a well-designed process, and by independent facilitation. However, information based on qualitative techniques brings a risk of focusing on marginal issues which are perceived as very important while the overall picture may be different. When qualitative techniques are used there is always a need for some (quantitative) evidence as a background for discussion.

2.3.4. Secondary data sources

2.3.4.1. Projections/forecasts of labour demand and supply

Projections of labour demand and/or supply are not primary sources of data in the sense used above. They are products of developed methodologies and tools and they usually draw on the sources mentioned above

to produce information about future developments in the labour market. Part B in volume 2 describes how different projections can be prepared. The present guide summarises what information these methodologies usually gather and how they can be further used. In principle, however, they bring the same type of information for the future as their input data offers for the past.

Projections may focus on the demand or supply side of the labour market, or both.

The demand side is usually defined as employment by sector/industry/ occupation. Some projections also take so-called replacement demand into account, which is a result of exits from the labour force (such as retirement).

The supply side is usually proxied as population or labour force by qualification and/or education field; some models are based on stocks and follow the changes in these structures; others (which are more data-hungry) also try to measure flows, looking at numbers of school-leavers coming to the labour market.





Some projections also try to develop methods of comparison between labour supply and demand, plus different types of imbalance measure. This is not a straightforward exercise. Data on supply and demand may come from different sources: linking supply

measured by qualification and demand measured by occupation is not straightforward. Direct comparison between supply and demand is also difficult and is even more challenging when looking to the future.

Table 10. Projections: strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> • provide future-oriented information; • provide structural information on labour supply and demand. 	<ul style="list-style-type: none"> • may give a false impression of bringing 'precise information as to what the future will be'; • very data-hungry, need robust time series.

Source: Author.

Projections of future skills supply and demand are a valuable source of information for decision-making. They indicate likely future trends or model what would happen under several scenarios. They can be used as early warnings of future risks.

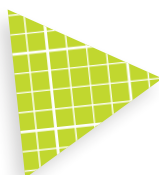
However, projections cannot be treated as precise information on what the future will be for several reasons. First, any projection can only be as good as

the input data, and a robust projection needs robust time series of data for the past. Second, they are based on past trends and cannot predict things which are not somehow reflected in the past. Finally, any projection is based on a number of assumptions; a quality projection should be accompanied by an explanation of these and any interpretation or use of the projection needs to take them into account.

Box 10. Guiding questions for data audit: projections of employment and skills

- Is projection of employment by sector/occupation available?
- Does the projection cover only the demand side or supply as well; how is the match/ mismatch between them modelled?
- What breakdowns are available?
- What is the time horizon?
- What data and methods are used (national accounts only or labour force structures as well)?
- Is it regularly updated?

Source: Author.





2.3.4.2. International databases

International databases are not a primary source of information, being built in most cases on national surveys and statistics. They can, however, bring added value and provide information which is not available nationally.

International agencies and statistical institutions develop various indicators and publish the data in a form which may be very useful and not available in the country. They also work on harmonisation and providing internationally comparable data.

Box 11. Links to relevant international databases

ILOSTAT

- A new ILO database of labour statistics which provides multiple datasets with annual and infra-annual labour market statistics for over 100 indicators and 230 countries, areas and territories, www.ilo.org/iloostat

ILO KILM

- A comprehensive database of country-level data on 18 key indicators of the labour market from 1980 to the latest available year, www.ilo.org/empelm/what/WCMS_114240/lang--en/index.htm

OECD

- Economic and labour market indicators, <http://stats.oecd.org/>
- Results of skills surveys (PISA www.oecd.org/pisa/, PIAAC www.oecd.org/site/piaac/)

Eurostat

- The Eurostat database contains various data for EU (and in some cases other) countries. Among other sources, it contains data from EU-LFS, surveys on vacancies and education statistics (both from administrative data and adult surveys), http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

Unesco Institute for Statistics

- A comprehensive database of international education statistics, www.uis.unesco.org/Pages/default.aspx

World Bank

- World development indicators, <http://data.worldbank.org/>

Cedefop

- Skills forecast for Europe, www.cedefop.europa.eu/en/about-cedefop/projects/forecasting-skill-demand-and-supply/skills-forecasts.aspx



Table 11. International databases: strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none">• easy and direct access to indicators;• well-described methodology of construction of indicators;• international comparison;• good starting point for national analysis.	<ul style="list-style-type: none">• less sensitive to country's specificities (may not include all breakdowns needed in the country context);• sometimes difficult to get information on the primary national data source feeding the database.

Source: Author.

International databases are a very useful means of gaining access to data. A developed infrastructure may sometimes make it easier to access national data through the international database than through the national statistics themselves. Such databases collect data from various sources, which may be both an advantage (no need to be aware of all the existing data sources in the country) as well as a disadvantage (it may be difficult to assess the quality of the original

data source and the methodological details). They are a very useful starting point for any analysis because they can provide statistics often already in the form of the indicators and presented in comparison with other countries. Their use is limited, however, when trying to understand more detailed country-specific issues (as when the country context requires breakdowns other than those generally available).

Box 12. Guiding questions for data audit: international databases

- Which indicators are available for the particular country?
- Are the classifications and breakdowns useful for answering country-specific questions?
- What are the original sources of information; what is the coverage and quality of them?
- What added value can the international comparison bring to the analysis; are there data available for countries relevant to the comparison?

Source: Author.





Box 13. Capturing the informal sector and informal employment in the data sources

In an ideal world we would have statistics and indicators which cover all workers and describe the skills-related issues in the whole labour market in a valid and reliable way. In most developing countries, where a sizable part of the workforce is based in the informal sector and a large share of employment in the formal and household sectors is also informal, data collection methodologies need to ensure that all workers are covered, or that adequate estimates can be provided on their numbers and characteristics. Household-based surveys are able to cover all informal workers, but when the sources on skills are list-based establishment surveys or administrative registers, estimates need to be produced on the excluded population.

Even when all informal workers can be covered, the validity of the resulting skills information should be questioned, as these workers will tend to obtain their skills through informal channels, not through formal education. They may be highly skilled, informally trained workers with no diplomas to show. As skill mismatch statistics and indicators are based on formal education information, inclusion of these workers will reveal the limitations of the statistics and indicators. There is no easy solution to the lack of valid measurement of informally acquired skills and no methodology is proposed in the ILO manual (ILO, 2013a). There is also no easy solution to the lack of worker coverage in establishment surveys and administrative records, when these sources are used. Estimating the excluded population often requires creativity and adjustments of methods to the country-specific situation. The following methods can be used to gather some information on skill supply and demand in the informal sector, although it can never be said that full systematic information is available.

- Various macroeconomic methodologies have been developed to estimate the extent of the informal sector and employment. They are built on relations between output, international trade, employment and labour productivity. They may also use other variables such as energy consumption. (For further information see United Nations, 2008; Friedman et al., 2000; OECD, 2002.)
- To cover all informal sector units, establishment surveys need to be based on area sampling that does not rely only on official registers. Other techniques include the use of yellow pages, random walk sampling methods and identification of addresses with higher electricity consumption. Informal entrepreneurs can also be identified through the data provided in household surveys (mixed survey approach). Information about informal employees in formal enterprises may be unreliable in establishment surveys, as formal companies will be reluctant to provide information on these workers because of the threat of legal consequences. (For further information see volume 5.)
- Non-random methods are another way to get information on skills supply and demand in the informal sector and employment. They may not have the capacity to provide precise estimates of their size but they can be very informative with regards to problems in this sector. Qualitative approaches may use the whole spectrum of methods described above, such as consultation with experts and interviews and focus groups with companies and workers.

More details on various methods of measurement of the informal sector and employment are provided in ILO, 2013a.

Source: *Guidelines for inclusion of skills aspects into employment-related analyses and policy formulation* (Říhová and Strietska-Ilina, 2014). The content of this box has been substantially enriched by Adriana Mata-Greenwood (ILO).



2.4. Step 3: capability building

Use of LMI requires the infrastructure for collection, analysis and dissemination of the data as well as trained and experienced analysts who can work with them. In transition and developing countries, activities related to use of the LMI for better matching and anticipation of skills are often developed within the framework of donor-funded projects with the assistance of international agencies and using foreign experts. The sustainability of the results of any project is a critical issue; an important step is to include capability building as an integral part of the process.

2.4.1. Improvement of statistical infrastructure

The development of the statistical infrastructure may include investments in the hardware and software needed for collection, processing of the data, establishing statistical and analytical units within different institutions, and creating new positions and/or changing existing job descriptions.

The steps needed largely depend on the findings of the data audit and the information identified as missing. Capability building should include steps to develop comprehensive, regular and sustainable national statistical programmes. These steps may include:

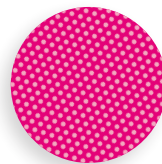
- (a) developing a company (economic subjects) registry;
- (b) consolidating administrative data on education:
 - (i) collecting data in one place to cover consistently the whole education system;
 - (ii) standardising the structure of the collected data;
 - (iii) further steps may include developing a schools or pupil/student registry to enable tracking of individual education pathways;

- (c) consolidating PES data:
 - (i) establishing a common information system;
 - (ii) developing a standard structure for reporting on vacancies (to relate vacancies to standard classifications);
 - (iii) assisting companies in coding occupations (keywords search tool);
 - (iv) cooperating with other job advertisement providers;
- (d) setting up regular LFSs:
 - (i) introducing international standards to LFSs (definitions of employment/unemployment, use of standard classifications);
 - (ii) improving the coverage and sampling framework of the LFS.

The development should not focus only on data collection but also further processing and publication.

The data audit may reveal significant data gaps which suggest that introduction of a new type of data collection is needed. However, a new survey brings significant costs and the burden on respondents should also be taken into account. Before the decision is made, alternative forms of obtaining the required data could be examined, which may include:

- (a) adding questions to existing surveys;
- (b) introducing ad-hoc modules to existing surveys (e.g. only for subsample/asked less frequently);
- (c) getting the information by merging several existing data sources (is direct cross-tabulation really necessary?);
- (d) use of data mining and big data analysis techniques ⁽⁹⁾ (e.g. information on vacancies);



⁽⁹⁾ Data mining is an analytic process designed to explore data (usually large amounts of data – typically business- or market-related – also known as ‘big data’) in search of consistent patterns and/or systematic relationships between variables, and then to validate the findings by applying the detected patterns to new data subsets.



- (e) getting similarly valuable information by qualitative techniques;
- (f) standardising the classification used in a survey (or develop cross-reference tables between different classifications).

After serious consideration of these other options to obtain the information there may be reasons to implement a new survey. The following guides provide more information on how different types of data sources may be developed:

- (a) establishment surveys: volume 5;
- (b) tracer studies: volume 6;
- (c) PES statistics: volume 4;
- (d) skill forecasts and foresights: volume 2.

2.4.2. Skills development

Trained staff in various positions are needed to sustain a system of labour market analysis in the country. In the primary phase, the recipients of the training should be the statisticians and analysts who will perform the analysis. Depending on the institutional setting agreed in Step 0, they may be based at different institutions (ministries, statistical offices, research institutions, consultancy agencies). In any institutional arrangements, however, in-house staff of the main responsible institution must also receive training.

Even if most of the work is contracted from an external body, there is still a need to have in-house experienced

staff who are capable of defining the terms of reference, taking over and quality assuring the results, as well as guaranteeing appropriate use of the results and continuity of follow-up activities. It is advisable to consider three main target groups for training:

- (a) statisticians and analysts responsible for data collection and/or analyses (detailed technical training);
- (b) operational level staff of the main responsible institution (focus on interpretation, less technical detail but including understanding of main methodological aspects);
- (c) high-level officials of the main responsible institution (raising awareness of how results can support policy formulation).

These levels may overlap, depending on the institutional arrangements agreed in the country.

Some training for the final users of the information (career advisors, education institutions, PES staff, employer associations, unions) is also highly recommended, though it is advisable to include it later as a part of the dissemination activities. In that phase use of the final results and products can be demonstrated.

The scheme below suggests an indicative long-list of topics for training; any training should be customised for the target groups in the particular country, considering the aims of the analysis, data availability and the skills and experience already held.



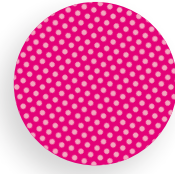


Figure 5. Skills development for analysis of skills supply, demand and mismatch: indicative list of training topics

<p>General aspects of quantitative data analyses</p> <ul style="list-style-type: none"> • statistical methods, work with sample data; • cleaning data; • missing values; • use of statistical software. 	<p>General aspects of qualitative methods</p> <ul style="list-style-type: none"> • choice of respondents/ participants (typology); • Delphic methods; • focus groups; • facilitation skills. 	<p>Surveys</p> <ul style="list-style-type: none"> • questionnaire development; • data collection methods (face-to-face, postal, CATI, CAPI, CAWI); • sampling; • administration of survey; • weighting; • use of classifications; • data confidentiality.
<p>Introduction in labour market analysis</p> <ul style="list-style-type: none"> • basics of labour economics; • basic concepts of labour market statistics (employment, unemployment, labour force, labour underuse). 	<p>Specifics of skills analysis</p> <ul style="list-style-type: none"> • skills measurement – qualifications, skills, occupational skill requirements; • indicators on skills supply, demand and mismatch – construction and interpretation; • measuring informality. 	<p>Skills forecasting</p> <ul style="list-style-type: none"> • macroforecasts • sectoral employment forecasts – econometric/ CGE/I-O models; • occupations and qualifications in models – expansion and replacement demand, stock/stock-flow models of skills supply, measuring imbalances.

Source: Author.

2.4.3. Trust building

Building of trust in the data is a necessary precondition for their acquisition and further use. Respondents need to trust that the information they provide will not be misused in order to be willing to provide accurate

information. Their motivation for answering can be further increased when they trust that the data will be used and that their answers are important and valuable.

The trust of the respondents should be ensured by data protection regulations, either based on legislation





(especially in administrative data and regular surveys conducted by public bodies) and/or by the transparent declaration of an ethical code related to data protection, adopted voluntarily by the survey organisation (especially in ad-hoc surveys of opinions). Regulation of data protection may take various forms depending on broader legislation and social context. It may range from very strict regulation of the use of data, which almost prevents combining data from different sources, to more open access to registries of population, but with clearly defined purposes for use. As the essence is transparency of the data collection, processing and use, the main issues that should be regulated are:

- (a) clear definition of the primary use of the data collection, ensuring that the data will be used only for the primary purpose (e.g. research);
- (b) obligatory versus non-obligatory participation, which needs to be considered with respect to the surveyed subject (companies x individuals) and type of the data. Obligatory surveys provide higher respondent numbers but may significantly suffer from inaccuracy of the answers;
- (c) anonymisation process, ensuring that the form in which the data will be publicly available will not enable the identification of individuals (cross-tabulations, in case of open access to primary data ensuring minimal observation in cells and/or suppressing some detail of selected variables);
- (d) secure data storage;
- (e) clearly defined conditions of secondary use of the individual data: by whom, for which purposes and under what conditions can the individual's (anonymised/non-anonymised) data be used;

- (f) if, and under which conditions and for which purposes, the data can be linked with other data sources.

It may be economically wise to use the same data for different purposes and to merge data from several sources, as it reduces both the costs and the burden on respondents. However, respondents need to be assured that the data they provide for research purposes will not be used for other purposes and that the information they provide will have no legal or other consequences for them, and it will not be used for marketing purposes.

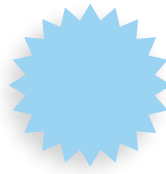
In addition to building the trust of the respondents themselves, other measures can be adopted to increase trust in the data users:

- (a) establishment of an independent entity responsible for collection, processing and publication of statistics; ensuring that there is no political or economic pressure on the statisticians to distort the statistics;
- (b) transparent procedures for data processing, publication of metadata (descriptions of survey designs, weighting procedures, questionnaires, indicator constructions, procedures for data cleaning and adjustments).

2.5. Step 4: analysis

Analysis comprises formulation of the research questions, choice of relevant method, data analysis, and interpretation and validation of the results.





2.5.1. Formulation of research questions and choice of method

The first step in the analysis is formulating the research questions and choosing the method most suitable for answering them. The decision should consider the following:

- (a) general aims of the analysis;
- (b) data availability;
- (c) alternative methods.

The following table highlights the possible research questions that may support the general aims of the analysis defined in Step 1, the information needed to answer the research questions, and the relevance of different quantitative and qualitative methods.

However, it should be recognised that neither the list of research questions nor the possible methods are exhaustive: both depend on the country context.

Formulation of research questions and the choice or development of analysis methodology always require customisation to the country's context and a certain amount of creativity from the analysts. This is why it is advisable to make these decisions only after the initial data audit and capacity building has been realised.

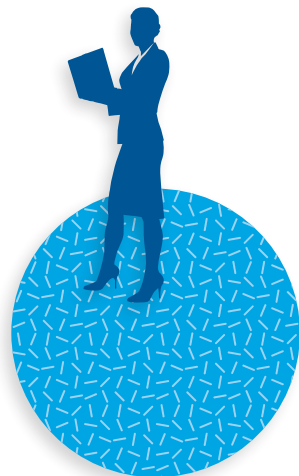
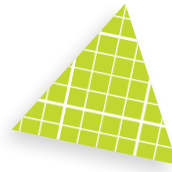


Table 12. Aims, research questions and data sources

Aims of analysis	Examples of research questions relevant to skills supply, demand and mismatch	Information needed	Possible quantitative data sources	Usefulness of data sources for answering the research questions	Alternative qualitative methods
Design of labour market policies	What are the most vulnerable groups in the labour market and what skills may improve their employability?	Employment/unemployment by gender, age, education level and field, ethnicity, etc.	<ul style="list-style-type: none"> • LFS; • PES; • tracer studies. 	High, especially if LFS with robust sample is available; other data sources may provide useful though partial information.	<p>Consultation with workers of PES, social workers and representatives of NGOs who work with vulnerable groups.</p>
	What are the prospective fields of retraining?	<ul style="list-style-type: none"> • occupations in which employment is increasing; • numbers of vacancies by occupation; • emerging occupations; • skills needed within these occupations; • core/transferable skills demanded in the labour market. 	<ul style="list-style-type: none"> • LFS; • PES; • establishment skills/vacancy surveys; • tracer studies. 	Quantitative information is useful for identification of broader trends (e.g. identification of sectors or segments of economy in which further qualitative research will be realised).	<ul style="list-style-type: none"> • Quantitative data sources should be accompanied by consultation with a smaller number of companies in selected sectors to provide more detail, capture recent trends in emerging occupations and skills and possible developments. • Content analyses of job requirements as described in vacancy advertisements could be used in addition to consultation.
	Influence of demographic changes on the labour market	<ul style="list-style-type: none"> • age structure in sectors and occupations; • replacement demand. 	<ul style="list-style-type: none"> • LFS; • enterprise statistics; • forecasts of skills supply and demand. 	Highly relevant.	Can be used to help interpretation of the results or scenario building of impacts of changes in retirement age.
Information on labour market prospects in different occupations for career guidance and counselling	What are the current and future occupations in demand?	<ul style="list-style-type: none"> • occupations in which employment is growing; • numbers of vacancies by occupation; • wages by occupation. 	<ul style="list-style-type: none"> • LFS; • PES; • establishment surveys; • forecasts of skills supply and demand; • wage statistics. 	Quantitative information is useful for identification of broader trends.	Combination with qualitative data is highly recommended to add detail and provide information on emerging trends. May include consultation with companies, experts, looking at trends in more advanced economies as well as forecasts and scenario development.
	What education level and field are most suitable for these occupations?	Cross-tabulations between occupation and field and level of occupation (e.g. in population, among graduates).	<ul style="list-style-type: none"> • LFS; • tracer studies. 	Very useful as an input to further discussion.	Consultation with employers and education specialists – similar to curricula development.

Aims of analysis	Examples of research questions relevant to skills supply, demand and mismatch	Information needed	Possible quantitative data sources	Usefulness of data sources for answering the research questions	Alternative qualitative methods
Formulation of education policies	In which occupations and fields can a lack of workers be expected?	<ul style="list-style-type: none"> participation in different levels and fields of education; participation of adults in education; occupations in which employment is increasing; employment of graduates. 	<ul style="list-style-type: none"> education statistics; LFS; forecast of skills supply and demand; tracer studies. 	Very useful because oriented on mid-term trends and the future while providing broader information for the general education policies.	Qualitative assessments by economists, education experts, companies is recommended or can be used as an alternative if quantitative data are missing.
Development of curricula	<p>What are the new emerging occupations in the labour market?</p> <p>How do the skills profiles of occupations change?</p>	<ul style="list-style-type: none"> New occupations in economy and by sector. occupations influenced by technological change; skill profiles of occupation and their trends. 	Establishment skills surveys.	Can provide general background information or identify on which sectors and occupations further analysis should focus but the usefulness is very limited due to the restricted detail available.	<ul style="list-style-type: none"> round tables and workshops with representatives of companies, workers and education providers – useful to establish working groups for each curriculum or their set; desk research of trends in sectors in more developed economies, monitoring of press; content analyses of requirements formulated in job advertisements.
Support of industrial policies	<p>Which are the country's priority sectors for employment?</p> <p>Does the sector face skills shortages currently or in the future?</p>	<ul style="list-style-type: none"> share of the sectors in total employment; growth of employment in the sector; share of decent jobs in the sector. participation in different levels and fields of education; employment of graduates by level and field of education and sector; occupations in which employment is increasing; skill shortage vacancies; skill gaps in the sector. 	<ul style="list-style-type: none"> national accounts; LFS. education statistics; LFS; forecast of skills supply and demand; tracer studies; establishment surveys. 	Highly useful information for further discussion	Needs to be qualitatively evaluated, linked to visions of the country and sectors.
				Very useful although the sample sizes may present a restriction to the detail available.	Qualitative consultation with companies, education institutions, consultation with other experts, development forecasts and scenarios are highly recommended for better interpretation of data, development of further detail and/or filling the data gaps.

Source: Author.



2.5.2. Selected issues of data analysis and interpretation

2.5.2.1. Basic concepts of labour statistics important for skill mismatch analysis

Analysis of skills supply, demand and mismatch largely draws on labour market statistics. For proper use of

data, therefore, it is useful to have some understanding of the basic concepts used in such statistics. A brief explanation of this concept is provided in the figure below. The definitions are adopted from Resolution I of the 19th International Conference of Labour Statisticians on statistics of work, employment and labour underutilisation (ILO, 2013b), where more detailed and precise definitions can be found.

Figure 6. Basic concepts of labour statistics important for skill mismatch analysis

Population

- In general, statistics of work should cover the resident population, comprising all persons who are usual residents of the country, regardless of sex, country of origin, nationality, citizenship or geographic location of their place of work. This includes usual residents who work outside the country (cross-border workers, seasonal workers, other short-term migrant workers, volunteer workers, nomads). In countries with a significant in-flow of short-term or temporary migrant workers, employment statistics should be supplemented to the extent possible with information about the employment characteristics of non-usual residents working in the national territory, so as to permit analysis of their situation and impact on the labour market.

Working-age population

- In principle, the national system of work statistics will cover the work activities of the population in all age groups. To serve different policy concerns, separate statistics are needed for the working-age population and, where relevant, for children in productive activities. The lower age limit of the working-age population should be set taking into consideration the minimum age for employment specified in national regulations, or the age of completion of compulsory schooling. No upper age limit should be set.
- In international comparison, the statistics on working-age population are often published for the population 15+ and/or 15–64 years, although the latter does not comply with the current standards.

Labour force

- The labour force is a sub-group of the working-age population covering persons in employment and in unemployment as defined further.



Employment

- Persons in employment are defined as all those of working age who, during one week, were engaged in any activity to produce goods or provide services for pay or profit. They comprise: employed persons 'at work', i.e. who worked in a job for at least one hour; and employed persons 'not at work' due to temporary absence from a job, or to working-time arrangements (such as shift work, flexitime and compensatory leave for overtime).
- Included in employment are persons currently in training if they are paid during the period, persons who work in their own economic units to produce goods intended mainly for sale or barter, even if part of the output is consumed by the household or family, and also persons who work for pay or profit payable to the household or family.

Labour underutilisation

- Refers to mismatches between labour supply and demand, which translate into an unmet need for employment among the population. Measures of labour underutilisation include, but may not be restricted to, time-related underemployment, unemployment and potential labour force.

Time-related underemployment

- Persons in time-related underemployment are defined as all persons in employment who, during the reference period, wanted to work additional hours, whose working time in all jobs was less than a specified hours threshold (usually worked hours or working-time norms) and who were available to work additional hours given an opportunity for more work.

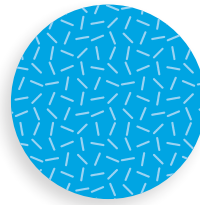
Unemployment

- Persons in unemployment are defined as all those of working age who were not in employment, carried out activities to seek employment during a specified recent period and were available to take up employment given a job opportunity.
- Some countries use administrative data on registered job seekers for unemployment measures. Although they may be a useful source of some information, they are not recommended for the general measure of the level of unemployment because they are influenced by national legislation related to unemployment benefits and other regulations and their changes. They do not cover the unemployed who are not motivated to register in the PES, but they cover some job seekers who are actually working but still register.

Potential labour force

- Potential labour force is defined as all persons of working age who, during the short reference period, were neither in employment nor in unemployment, carried out activities to 'seek employment' and were not 'currently available' but would become available within a short subsequent period established in the light of national circumstances (i.e. unavailable job seekers); or those who did not carry out activities to 'seek employment', but wanted employment and were 'currently available'.

Source: ILO, 2013b.



2.5.2.2. Variables used for skills measurement

The terms competencies and skills (?) refer to the capacities or abilities of individuals to perform various tasks. For the purposes of this guide we are concerned primarily with the capacity to perform tasks required for certain jobs, that is, occupational skills. Skills are therefore primarily characteristics of individuals. They may also be associated with jobs, where they are prerequisites for competent performance of tasks, and with education and training programmes and related qualifications, where they are taught and assessed. They may include both generic competencies such as literacy, numeracy or communication skills and job-specific competencies.

Skills characteristics are difficult to measure. At individual level the measurement of skills includes psychological tests and various forms of assessment (school grades and tests, assessment centres, worker evaluation). In some types of analysis (especially opinion surveys of employers, employees or graduates)

direct questioning on skills is used as well. Other types of analysis use different proxy variables to measure skills supply and demand. These may include:

- (a) Qualifications⁽⁸⁾; degrees, diplomas, certificates, acquired in education or training or in a system of recognition learning outcomes. In empirical analysis they are most often expressed as level and field of highest education attained;
- (b) Occupations⁽⁹⁾; sets of jobs similar in terms of tasks and duties. Standard classifications of occupations (ISCO or similar national classification) are most often used in empirical research;
- (c) tasks; activities performed in jobs. This may refer to various types, such as manual tasks, reading, writing, communication with colleagues or customers and work with computers, up to job-specific tasks.

The following scheme summarises how these types of measurement are used in skills analysis.

Figure 7. Most commonly used measurements of skills

Qualifications

- used mostly in quantitative analysis, particularly of skills supply: what skills the population/labour force has;
- to be a good skills proxy the qualification should be constructed not only as a level but also as a field of education.

Competencies/skills

- many methods try to get closer to measurement of skills. This includes both surveys and qualitative methods;
- it can be done by questioning on required or possessed skills types and levels or (exceptionally) even by testing of skills (PIAAC, etc.);
- the advantage is that we can get below the level of occupation and reveal how it changes internally. It may seem to be a most straightforward method for skills measurement but there are many concerns related to it, especially when trying to quantify;
- it can only be applied in data sources developed specifically for this purpose;
- the skills may sometimes not be easily understandable for employers. This is even more an issue when trying to measure their level;
- the results are very much influenced by the classification of competencies the researchers apply: if only general or also occupation-specific skills are included.

(?) There is a vast literature which distinguishes between competencies, skills and abilities in more detail. In this guide they are treated as synonyms.

(8) Qualifications refers to the formal outcome of education and training. A qualification generally signifies an official record of achievement such as a certificate or diploma recognising the successful completion of education or training, a test or examination: a qualification may also designate legal entitlement to practice a trade (Johansen and Gatelli, 2012).

(9) Occupation refers to the kind of work performed in a job. The concept of occupation is defined as a 'set of jobs whose main tasks and duties are characterised by a high degree of similarity'. A person may be associated with an occupation through the main job currently held, a second job, a future job or a job previously held (ILO, 2012b).



Occupations

- the most commonly used proxy of skills in the context of quantitative research questions on skills demand: how many skills will be demanded in the labour market;
- using occupation as a proxy of skills enables the utilisation of a range of official data sources originally collected for various main purposes in the skills analysis. This can be fully exploited if standard classifications of occupations are used;
- occupation can be a proxy measure for the skills required in the workforce, but does not measure whether job holders possess the requisite skills.

Tasks

- used as a proxy of skills in some establishment surveys;
- the main idea behind their use is to get closer to the employer's perspective and job reality. What a company really needs is not a number of occupations but a set of tasks to be accomplished. The division of these tasks between jobs and the aggregation of jobs into occupations may vary across companies.

Source: Author.

2.5.2.3. Use of standard classifications

Occupations, sectors and education are usually described using standard classifications. Such

classifications have a hierarchical structure which permits aggregation of more detailed levels into broader categories.

Figure 8. International classifications commonly used in skills analysis

ISIC – Sectors	ISCO – Occupations	ISCED – Education
<ul style="list-style-type: none"> • international standard industrial classification of all economic activities; • currently used is ISIC, Rev. 4 released in 2008; • United Nations. 	<ul style="list-style-type: none"> • international standard classification of occupations; • qualification – demanding hierarchy; • currently used version is ISCO-08 released in 2008; • ILO. 	<ul style="list-style-type: none"> • international standard classification of education; • levels and fields of education; • currently used is ISCED 1997, ISCED 2011 is to be implemented in forthcoming years; • Unesco.

Source: Information about these classifications systems can be found at:

- United Nations, Department of Economic and Social Affairs: ISIC Rev.4 (international standard industrial classification of all economic activities; revision 4), <http://unstats.un.org/unsd/cr/registry/isic-4.asp>
- ILO: ISCO, international standard classification of occupations, www.ilo.org/public/english/bureau/stat/isco/
- Unesco Institute for Statistics: ISCED, international standard classification of education, www.uis.unesco.org/Education/Pages/international-standard-classification-of-education.aspx



In official national statistics, these international standards may sometimes be used directly, or national standard classifications related to the international classifications may be used. Use of standard classifications brings many advantages to any empirical analysis:

- (a) harmonisation and comparison of data from different sources and which have originally been collected for various purposes;
- (b) comparing data with other studies at the national and international levels;
- (c) time series;
- (d) defining and identifying the target population for a particular study.

When research questions are mostly quantitative, analysts are highly recommended to use the standard classification of industries, occupations and education.

There are valid arguments for creating a tailored classification of occupations or sectors (mostly in more qualitative studies). This may occur especially when the analysis aims at specific issues which the standard classification does not reflect (such as an environmentally friendly sector) or focuses on emerging sectors and occupations:

- (a) the classification is always retrospective;
- (b) driven by time series; it is necessary to find a balance between sustainable time series and up-to-date reflection of changes in the labour market.

Researchers are recommended not to depend fully on standard classifications but work with them more flexibly. The analyst can:

- (a) modify ISCED to national education standards and/or frameworks;
- (b) use the detailed level of classifications available in the microdata and tailor aggregation to the needs of the analysis (for example, keep some occupations defined at a 1-digit level, with others in more detail);
- (c) use business language in surveys for talking to employers (such as the names of occupations used by business) but develop a correspondence table to link this to the results of statistical analysis;
- (d) use standard classifications for gathering data from official sources as a statistical background for the analysis, then enrich the interpretation with qualitative aspects (interviews with actors and stakeholders which follow the classifications less strictly).

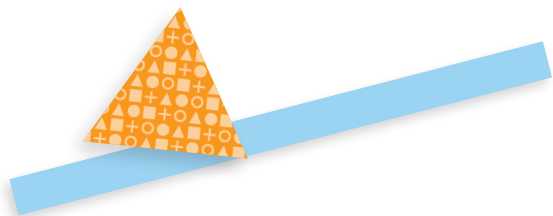
Level of detail

When using the classifications it is necessary to decide on the level of detail, considering the following issues:

- (a) what level of detail is available in the data source (at what level are the data actually coded in the dataset and what level can be published). This is influenced by the process of coding and also by legislation related to confidentiality of personal data;
- (b) what size of estimate is reliable enough considering the data source, particularly the sample size;
- (c) some categories at the most detailed level of the classification may be larger than some categories at higher levels. To allow flexibility in analysis and avoid loss of information, it is recommended on official statistics that codes should always be assigned at the most detailed level supported by the source data ⁽¹⁰⁾;

⁽¹⁰⁾ See for example: ILO, 2012b, pp. 55–58; United Nations and ILO, 2010, pp. 172–173.





- (d) what level of detail is needed to answer the questions of the analysis? The level of detail will be different if general policy information is needed, compared to the desire to provide information, such as for students on the chances of getting a job in different occupations or informing education providers how the design of a particular programme could be changed to respond more to employers' needs?

Link between national and international classifications

International organisations have developed, and already revised several times, standard classifications of economic activities, occupations and education ⁽¹¹⁾. Individual countries have different strategies on applying them in the national context.

Some countries developed their classification systems before or independently from the international classification. Correspondence tables between national and international classifications are necessary to be able to report and compare at international level. Other countries use the international classifications directly as their national system or modify them to the national conditions.

Coding and self-coding

Use of a standard classification means applying standardised procedures of how to perform coding (such as how to assign a particular ISCO code to a person who describes what they do in their job), plus it requires trained and experienced personnel. This is obviously the case with the producers of official statistics such as a national statistical office.

It is more problematic when using methods of data gathering where a subject (a person, company) has to classify themselves (as in select from a list of options).

The names of classification categories are not always self-explanatory and miscoding can occur.

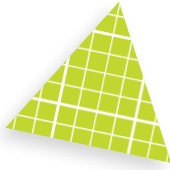
Some countries have developed various tools to help in assigning a code to a job (such as with the use of a keyword search), particularly with occupations. Employers can fill in the name of a position as used by the business and the tool offers them possible relevant occupation codes. This is used in establishment surveys (see volume 5) and when companies report their vacancies to the PES online (see volume 4).

This guide does not focus specifically on data gathering but more on use, so the detail of coding issues is not covered. Here are, however, a few examples of what can be hidden under the 'clear codes' in statistical data and why an analyst working with the data and interpreting them may be interested in how they are coded:

- (a) the highest education which the person obtained is usually assigned on the basis of successful graduation at the specified education level. Some countries, however, assume that if the person performs an occupation they are appropriately qualified for it and so have the required ISCED level even if they have not formally completed such education;
- (b) in some data sources, information about the qualifications held by a person may be used as part of the process of determining that person's occupation code. The use of information on qualifications to code occupation, or on occupations to code qualifications, will inevitably bias the relationship between data on these two concepts and limit its usefulness for measuring skills mismatch;



⁽¹¹⁾ Many other classifications exist on the international level but these three are the most relevant for labour market and skills analysis.



- (c) the company may produce a variety of goods but most surveys work only with the sector of main activity. Further, companies are sometimes coded as enterprises and in other cases as local units (based on the methodology of the survey and the structure of enterprise register in the country). This influences results;
- (d) jobs are not equal to occupations. An occupation is a set of similar jobs. In the real world a person may do a job related to different occupations; the variety largely depends on the size and organisational structure of the company. There are many hard-to-classify jobs, such as project managers, distinctive jobs within the company structure but possibly referring to a number of different occupations.
- (e) other processes in the labour market can limit the possibilities of direct comparison (for example extensive emigration can result in supply shortages, measured by numbers, and the numbers and types of graduates in different fields is not the actual supply which enters the local labour market).

It may be advisable to compute separate indicators in skills supply and demand and then evaluate qualitatively if there are significant discrepancies between them and current trends. Some indicators try to measure mismatches directly from the data. They can provide signals of an existing mismatch but have a limited ability to provide information on its structure. The following section presents the indicators of skills supply, demand and mismatch. Specific indicators on future imbalances can also be developed using forecast data; the methodology is discussed in more detail in volume 2, Chapter 10.

2.5.2.4. Comparison of skills supply and demand

Skills mismatch can only be identified by comparing skills supply and demand, as it is the result of their interaction. In empirical analysis, however, direct comparison is difficult because:

- (a) the data on skills supply and demand often come from different data sources;
- (b) standards for occupations and education classify different statistical units using different criteria. ISCED classifies educational fields and programmes based on their subject, while ISCO classifies jobs based on the skills level and specialisation required to perform them;
- (c) different measurements of skills are used in supply and demand data;
- (d) there is no 1:1 link between jobs and occupation;

2.5.3. Indicators of skills supply, demand and mismatch ⁽¹²⁾

There is a variety of possible indicators which can be used for the analysis of skills supply, demand and mismatch. Some can be used as alternatives, based on available data sources, but most are complementary, helping the analyst to understand different aspects of the labour market. The following table distinguishes between the context indicators, basic skill indicators and more in-depth indicators.



¹²² This section draws heavily on Rihova and Strietska-Illina, 2014; and on Johansen and Gatelli, 2012.



Table 13. Indicators of skills supply, demand and mismatch suitable at different levels of analysis

Level of analysis	Supply	Demand	Mismatch
understanding the context: <ul style="list-style-type: none"> ... not providing information on skills but necessary to understand the context in which skills supply and demand meet. 	Population by age.	Employment by sector (number plus structure).	Total employment/unemployment rates.
basic skill-focused analysis: <ul style="list-style-type: none"> 'need to have'; ... basic information to understand the skills supply and demand and level of skills mismatch; useful to have time series and/or international comparison. 	<ul style="list-style-type: none"> population/labour force by level of education; participation rates in different types of education. 	<ul style="list-style-type: none"> employment in sectors by occupation; age structure in sectors/occupations. 	<ul style="list-style-type: none"> unemployment by level of education; shares of over/under qualified people.
trying to understand skills mismatch: <ul style="list-style-type: none"> 'good to have'; optional choice based on data availability and policy/research questions. 	<ul style="list-style-type: none"> graduates by levels and fields of education; population/labour force by level and field of education; participation in adult TVET ⁽¹³⁾. 	<ul style="list-style-type: none"> more detailed occupational structure of employment; occupational structure in sectors; vacancies by occupation. 	<ul style="list-style-type: none"> Beveridge curve; subjective mismatch reported by workers/graduates; lists of missing skills reported by employers/workers; wage dynamics by occupation; lists of occupations which are hard-to fill/skill-shortage; share of hard-to fill/skill-shortage vacancies.

Source: Author.



⁽¹³⁾ TVET is an international term used to denote vocational education and training (VET). The two terms are used interchangeably throughout this publication.

2.5.3.1. Indicators on labour and skills demand

Table 14. Employment by economic activity (sector)

Indicators	<ul style="list-style-type: none"> share of each sector (economic activity) in total employment (%); change in number of employed persons by economic activity (%). 				
Data sources	<ul style="list-style-type: none"> national accounts; labour force surveys; enterprise statistics (more rarely as usually do not cover all companies in the economy). 				
Example and interpretation					
Employment by economic activity, Jordan, 1995 and 2006 (excluding the armed forces)					
Economic activity	Employment (000)		Change in employment (%)	Employment share (%)	
	1995	2006	1995–2006	1995	2006
Agriculture	49.5	27.6	-44.2	7.2	2.9
Mining and quarrying	7.8	6.1	-21.8	1.1	0.6
Manufacturing	96.0	114.2	19.0	13.9	12.0
Electric, gas and water supply	13.4	14.2	6.0	1.9	1.5
Construction	55.0	60.9	10.7	8.0	6.4
Wholesale and retail trade	116.4	179.1	53.9	16.9	18.8
Hotels and restaurants	12.4	23.8	91.9	1.8	2.5
Transportation	79.8	98.6	23.6	11.6	10.3
Financial intermediation	16.2	21.5	32.7	2.4	2.3
Real estate, renting and business activities	18.4	52.5	185.3	2.7	5.5
Public administration and compulsory social security	67.8	83.8	23.6	9.8	8.8
Education	93.6	154.8	65.4	13.6	16.2
Health and social work	27.2	54.8	101.5	3.9	5.7
Other community, social and personal services	35.6	62.5	75.6	5.2	6.6
Total employment	689.1	954.1	38.5	100.0	100.0

Source: Taghdisi-Rad, 2012.

Employment by economic activity provides information on expansion demand: numbers of jobs which are created (or disappear) as a result of development of the economy and changes in their structure. Although this does not tell us about actual skills needed for these jobs, it is the basic indicator which provides information on how demand in the labour market links to economic development.

The sectoral structure of Jordanian employment shows a shift towards employment in services, while employment in manufacturing is decreasing in terms of share as well as absolute numbers. The most dynamic sectors were real estate, renting and business activities, the health sector and hotels and restaurants, which contributed most to this growth. In absolute terms, most new jobs have been created in wholesale and retail trade, education and real estate, renting and business activities. It is, however, important to recognise that total employment is growing significantly and all the industries except agriculture and mining have grown in absolute numbers.

The sectoral structure of employment does not directly inform us about skills demand because this can vary within a sector, but it clearly suggests that labour demand increasingly comes from the service sectors. These generally require a higher educated labour force and place more emphasis on soft skills. The sectoral structure can also give some indication of which sectors could be examined further.

Methodology notes

Direct comparisons of numbers in demand and supply is difficult and there is a risk of creating a false impression of precision. Analyses of trends and comparisons of trends in a particular sector alongside development in total employment are more appropriate. The indicator is particularly useful if time series are available or even the projection of future employment in sectors. Different methods of anticipation of future demand in sectors can be applied, from simple extrapolation to sophisticated economic models.

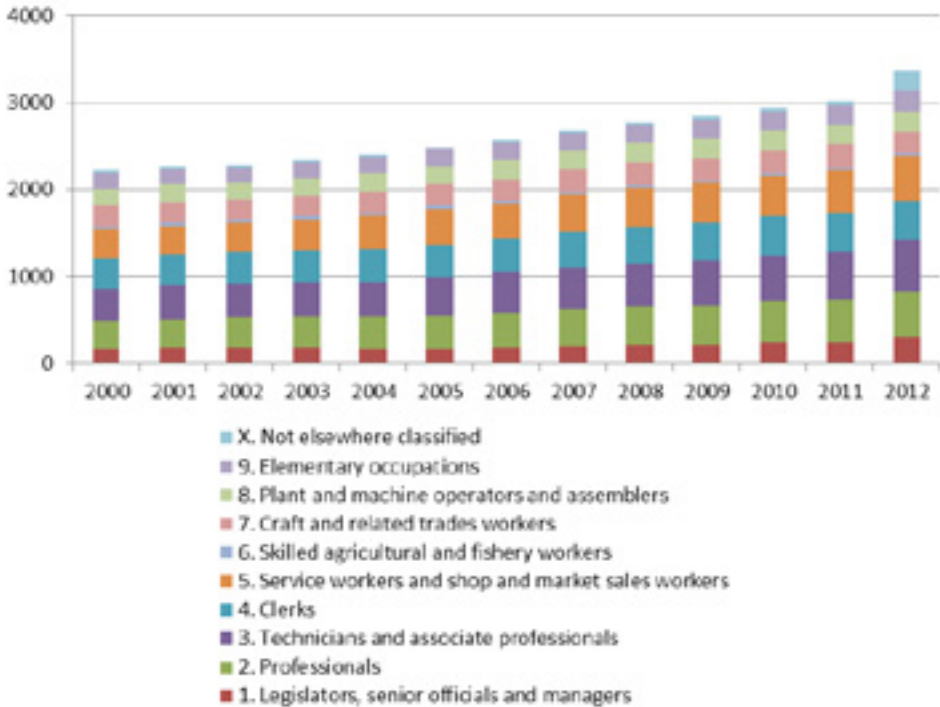
Depending on the data source, employment can be expressed in headcounts and/or full-time equivalents.

Table 15. Employment by occupation

Indicators	<ul style="list-style-type: none"> • share of each occupation in total employment (%); • share of each occupation by sector (economic activity) (%); • change in number of employed persons by occupation (%).
Data sources	<ul style="list-style-type: none"> • labour force surveys; • enterprise statistics; • establishment surveys.

Example and interpretation

Employment by occupation, Israel, 2000–12 (number of employees for each occupation in the civilian labour force)



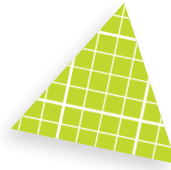
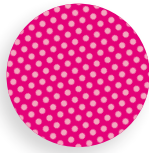
Source: ILO: *Ilostat database*, Annual indicators, employment by sex and occupation, www.ilo.org/ilostat retrieved on 12 January 2015.

Similar to the structure of employment by sector, the structure of employment by occupation provides information on expansion demand (demand created as a result of developments in the economy). The occupation composition of a sector can also change as a result of changes in the value chain or technological development. For example, if IT manufacturing in the country used to be assembly-based but at some point the international parent company decides also to locate their development centre there, the occupation structure within the sector will change significantly as new technicians and professionals enter the labour market. Hence the occupational structure of employment provides additional information.

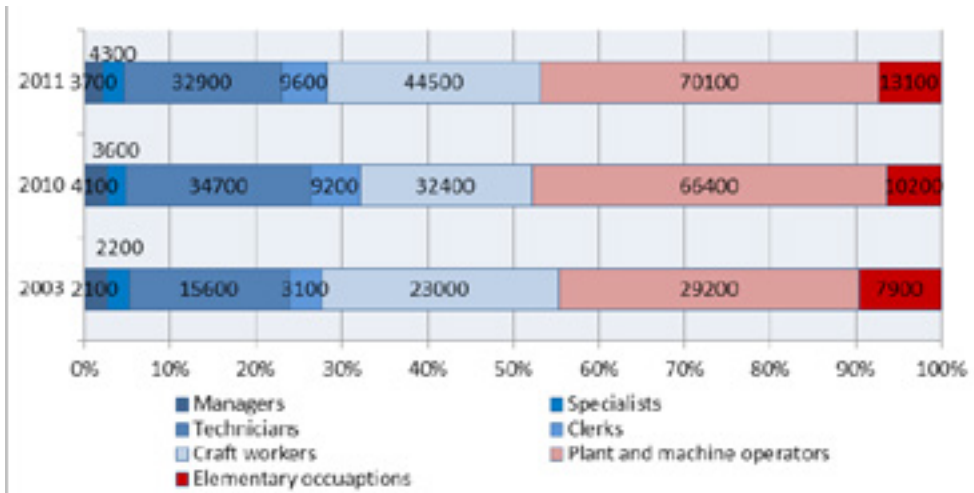
The example from Israel shows that ‘there is a wide distribution between the various skill levels. The evolution of the skill composition of the Israeli labour market over the past decade shows that there hasn’t been a significant change in the skill distribution’ (Nathanson, 2010, p. 28).

The most valuable indicator of expansion demand would be the occupational structure by sector, as shown in the second example from the Czech Republic.





Occupation structure in mechanical engineering, Czech Republic, 2003–11



Source: Czech statistical office, LFS.

The chart shows that total demand for workers in mechanical engineering has grown significantly in recent years. The largest share in this growth was demand for plant and machine operators, although the number of technicians also grew.

Methodology notes

The information which can be gained from the indicator depends on the level of detail available. 1-digit ISCO categories provide basic information on skill level demand in the labour market. More detailed data or further breakdowns by sector are needed to permit understanding of the structure of expansion demand. In any situation, the data are always aggregated to some level, and the inner trends for occupation aggregated in one group may differ.

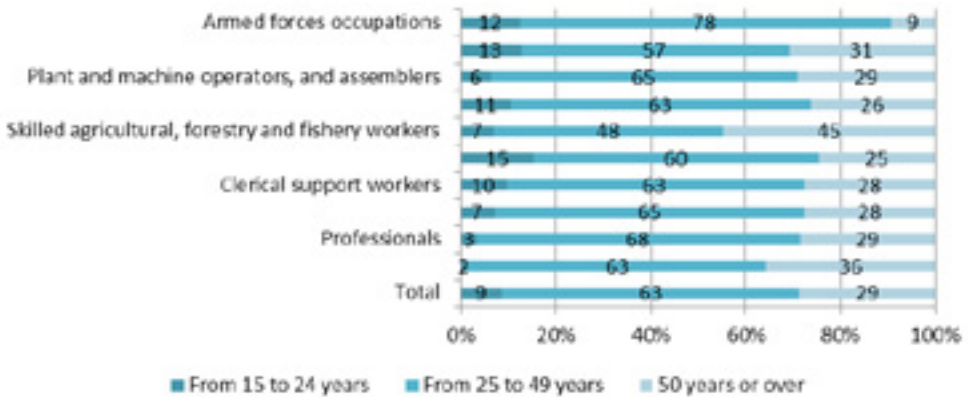




Table 16. Employment in sectors/occupations by age

Indicators	<ul style="list-style-type: none"> share of workers aged 50 and over in employment (by occupation/by sector) (%); ratio between the share of older and younger workers (by occupation/by sector) (%).
Data sources	<ul style="list-style-type: none"> labour force surveys; enterprise surveys (rarely, only if information on age is available).
Example and interpretation	

Age structure of employment by occupation, EU-28, 2012



Source: Eurostat, Employment and unemployment database, http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

Employment by age can be used to assess how the demand for labour will be influenced by demographic trends and where jobs will be created as a result of people leaving the labour market.

In addition to demand for labour as a reason for the growing number of jobs (expansion demand), other vacancies are generated by the fact that some of the current workers leave the labour force due to retirement, parental leave or other reasons. As a result, even the sectors and occupations with steady or declining employment trends can create replacement demand. The age structure of the labour force by sector or occupation can help estimate the size of replacement demand. In terms of the total numbers, this is often larger than the expansion demand.

The structure of the European labour force by age and occupation shows significant differences in age structure. A smaller share of people under 24 among professionals and managers is a natural phenomenon because these occupations require workers with higher qualification that can seldom be achieved before 24, or need some career path progress before a managerial post is achieved. The fact that 45% of agricultural workers are aged 50 or over can give us a warning on potential mismatch. Even though the total numbers of employment in agriculture are decreasing in Europe, the retirement of this high share of the workforce in the coming years will create significant demand for labour in agricultural occupations.

Methodology notes

It is important to keep in mind that replacement patterns are not straightforward and an experienced older worker cannot simply be replaced by a recent graduate. Also the real age when people leave employment is different from the statutory retirement age and changes over time. The share of older workers, or the ratio between older and younger workers, has to be considered as an indicator, not as a tool to measure the precise number of vacant jobs for the future.

Table 17. Vacancies by occupation

Indicators	<ul style="list-style-type: none"> • lists of top occupations by total number of vacancies; • lists of top occupations by vacancy rate (ratio of the number of job vacancies to total unmet (job vacancies) and met (occupied positions) labour demand); • lists of top occupations' unemployment-to-job ratio (number of unemployed persons divided by the number of job vacancies).
Data sources	<ul style="list-style-type: none"> • public employment services – administrative statistics; • establishment (vacancy) surveys.

Example and interpretation

2013 Job vacancy rate, average weekly hours worked and average hourly wage by occupation: Alberta (Canada) and economic regions

Alberta	Average weekly hours worked	Average hourly wage (USD)	Job vacancy rate (%)
Provincial total	36.9	26.58	4.4
Occupation			
Landscape and horticulture technicians and specialists	41.7	22.93	14.3
Drillers and blasters – surface mining, quarrying and construction	62.3	33.04	14.0
Food service supervisors	38.7	14.55	13.3
Non-destructive testers and inspectors	42.8	39.57	12.0
Automotive mechanical installers and servicers	40.4	21.04	11.9
Food counter attendants, kitchen helpers and related occupations	32.2	11.89	11.3
Hair stylists and barbers	34.8	17.61	10.8
Landscaping and grounds maintenance labourers	40.4	17.64	97.0
Inspectors in public and environmental health and occupational health and safety	42.5	36.7	97.0
Heavy-duty equipment mechanics	41.7	35.68	90.0
Oil and gas drilling, servicing and related labourers	54.0	26.25	88.0
Cooks	34.8	14.54	87.0
General farm workers	44.4	18.23	84.0
Motor vehicle body repairers	40.8	28.2	83.0
Contractors and supervisors, carpentry trades	46.0	35.69	82.0
Labourers in metal fabrication	42.7	20.96	80.0

Source: Government of Alberta, 2013.

Numbers of job vacancies by occupation provide information on the current situation and short-term trends in the structure of skills demand.

Methodology notes

The numbers of vacancies are a useful tool for assessing demand for labour in the short term but they cannot tell much about longer-term trends. Also, a higher number of vacancies in one occupation does not necessarily mean that there is a high number of these types of jobs in the economy. The number of vacancies is also influenced by the rate of fluctuation in particular jobs. If labour force turnover is higher (e.g. temporary jobs), the employer has to advertise the vacancy more often to find a worker, even for only one vacancy in reality.

The indicator which provides lists of vacancies by education is also highly sensitive to the classification used (the level of aggregation may change the results significantly). When interpreting the data it is advisable to look at the complete list of surveyed occupations and not just the 'top ten'.

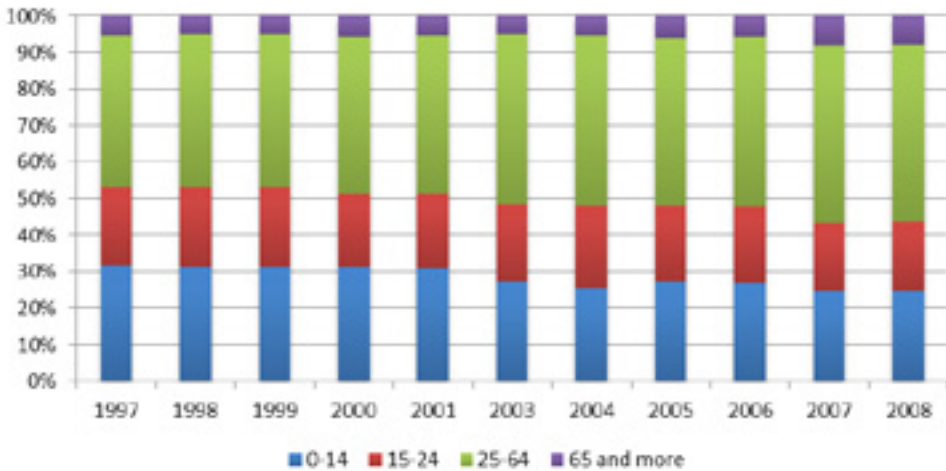
2.5.3.2. Indicators on labour and skills supply

Table 18. Age structure of population/labour force

Indicators	<ul style="list-style-type: none"> • share of young people in the total labour force; • share of older people in the total labour force; • dependency ratio (population aged 0–14 and 65+ to population aged 15–64); • old age dependency ratio (population aged 65+ to population aged 15–64); • young age dependency ratio (population aged 0–14 to population aged 15–64); • ratio between the population about to leave the labour force (55–64) and entering the labour force (15–24).
Data sources	<ul style="list-style-type: none"> • census plus other demographic data (life tables, demographic flows, etc.); • labour force surveys (secondary data source – age usually used as a sample weight).

Example and interpretation

Age structure of population, Peru, 1997–2008



Source: ILO: Laborsta database, <http://laborsta.ilo.org/>

The age structure of the labour force helps to indicate how demographic trends influence total labour supply. These trends are a relatively stable source of data on future supply and can be used as early warning information for education and labour market policies.

Although the numbers and shares of people in different age groups supply no information on skills, the indicator provides the key basic information on the extent of supply and the balance in the labour market. It sets the basic context in which the skills will be developed and used. If younger cohorts entering the labour market are larger than the older cohorts, there will very likely be general oversupply; the economy will face the challenge of using this pool of labour but the education system will also have to provide the right skills to a larger group of people.

If, on the other hand, the country faces population ageing, there is a higher risk of a general skills shortage. There will be a greater need not only to develop the right skills in the young population but also in the adult workforce to meet the demands of the labour market. Population ageing may also have consequences for a more open migration policy.

The example of Peru shows that the working-age population is currently growing. However, the trend will not last for long because the share of the population aged 15–24 is already stable while the share of children under 15 is decreasing and Peru will soon face the problems of population ageing. This may also have consequences for the skills supply and may increase the importance of adult education and training.

Methodology notes

The age structures of the whole population or just the labour force can be used. The labour force provides more relevant information for labour market analyses but is influenced by activity rates, which may be difficult to measure in developing countries.

Table 19. Population/labour force by highest education attained

Indicators	<ul style="list-style-type: none"> share of population aged 25–64 at each level of education (by field of education); share of labour force at each level of education (by field of education). 								
Data sources	<ul style="list-style-type: none"> labour force/other household surveys. 								
Example and interpretation									
Educational attainment of labour market participants, international comparison, 2007 (% total, male, female)									
Country	ISCED 0–1			ISCED 2–4			ISCED 5–6		
	T	M	F	T	M	F	T	M	F
Armenia	2.9	2.4	3.4	72.2	77.7	74.5	20.9	19.9	22.1
Azerbaijan	3.6	3.0	4.3	74.1	72.1	76.2	22.3	24.9	19.5
Belarus	0	NA	NA	76.8	NA	NA	23.2	NA	NA
Georgia	2.2	1.8	2.6	67.6	68.6	66.6	30.0	29.3	30.6
Moldova	18.3	NA	18.0	61.9	NA	60.3	19.8	NA	21.7
Ukraine	0.8	0.6	0.9	74.9	77.3	72.4	24.3	22.1	26.7

Notes: T, total; M, male; F, female; ISCED, international standard classification of education.
 Source: ETF, 2011, p. 59.

The structure of the labour force or population by education level and field can be used to describe the stocks of skills supply. What skills are currently available in the labour market?

The structure of the population by highest education attained provides information on the total skills available in the labour market. The structure of the level of education provides very basic information but can still be useful if there is some possibility of comparison (e.g. looking at trends over time or in comparison with other countries).

Looking at the example chart showing a comparison of the education structure of the labour force in six countries in Eastern Europe, we can observe large differences in skills supply. All the countries have a majority of secondary educated workforce, between 61% in Moldova and 78% in Armenia. The highest share of tertiary educated population is in Georgia which, at the same time, shows little differences between the education attainment of men and women. However, Moldova has 18% of population with only primary education or less, which is a high number in the international comparison.

If information on fields of education is available, the indicator provides a more complex picture of labour force skills. However, the data on fields of education are not always available from the household surveys and the field of education can be less relevant for people who gained their education a longer time ago. When comparing this indicator with the demand side it is important to accept that there is no one-to-one relationship between qualifications and jobs.

Methodology notes

The population aged 25–64 is usually used because 25 is the age when most of the population have finished initial education. Inclusion of younger ages may cause difficulties in interpretation because tertiary education students would be classified as secondary educated only, even though some proportion of them will attain a tertiary qualification in the future.

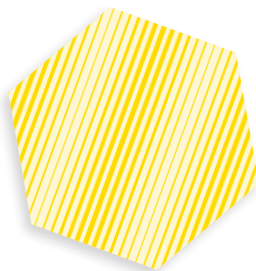


Table 20. Graduates by level and field of education

Indicators	<ul style="list-style-type: none"> percentage structure of graduates by level (and field) of education; percentage of graduates who do not continue to the next education level by level (and field of education); growth trends in numbers of graduates by level (and field) of education.
Data sources	<ul style="list-style-type: none"> administrative education statistics; tracer studies (for more advanced indicators taking into account the pathways after graduation).

Example and interpretation

Graduates in tertiary education by field of study and gender (000s and %), Croatia, 2005–09

	Total population				Female			
	2005		2009		2005		2009	
	000s	%	000s	%	000s	%	000s	%
Total population								
Education	1.6	8.4	1.4	4.4	1.5	13.0	1.3	7.0
Humanities and arts	1.8	9.0	3.5	11.0	1.3	11.3	2.7	14.6
Social science, business and law	7.5	38.2	12.7	40.1	5.1	44.3	8.8	47.6
Science	1.2	6.0	3.0	9.5	0.6	5.2	1.4	7.6
Engineering, manufacturing and construction	2.3	11.9	4.8	15.1	0.6	5.2	1.3	7.0
Agriculture	0.6	3.0	0.9	2.8	0.3	2.6	0.5	2.7
Health and welfare	2.0	10.3	2.2	6.9	1.5	13.0	1.6	8.6
Services	2.6	13.2	3.3	10.4	0.7	6.1	1.0	5.4
Total	19.5	100.0	31.7	100.0	11.5	100.0	18.5	100.0

Source: Based on Unesco figures cited in ETF, 2012, p. 43.

The breakdown of graduates indicates inflows to the labour supply and describes what new skills are offered by the people entering the labour market.

Although there is no one-to-one relationship between jobs and qualifications, the level and field of education which the person holds significantly influences their chances of accessing a narrow or broader range of jobs. Hence the breakdown of graduates provides some information on skills supply.

The level of education is an important indicator of skills supply but not sufficient. For example, having a large number of tertiary qualification graduates does not tell us anything about the number of doctors or engineers. The field of education is sometimes more important in terms of skills matching than the education level itself because the upgrade of skills from secondary to tertiary qualification in some fields may be easier than changing field on the same level of qualification.

The numbers and types of graduates do not provide precise numbers of labour supply. After leaving school, graduates can do many things other than entering the labour market: they can continue on to the next education level, they can start a family or they can migrate out of the country. To measure the actual supply we would have to know what share of graduates will continue on to the next education level and how many will drop out from the local labour market for other reasons (e.g. starting a family, migration). Making these estimates is possible but requires data sources that permit combining data from different education levels, avoiding double counting (e.g. masters degrees reached after bachelors or people graduating in more than one field) and ideally tracing the graduates. If this is not possible the breakdown of graduates should be compared with demand data in a more qualitative ways, looking at the general structure and trends.

The total numbers of graduates from tertiary education in Croatia have grown rapidly (by about a half between 2005 and 2007). About 40% of them are graduating in social science, business and law and this share is relatively stable, which means these fields are also growing most rapidly in terms of total numbers of graduates. Graduates in health and welfare remain at stable absolute numbers, which means their share among all graduates is decreasing significantly, mostly among women. The shares of graduates in science and engineering, manufacturing and construction are the fastest growing fields. Their importance is also growing among female graduates, although the growth of humanities is much faster here.

Methodology notes

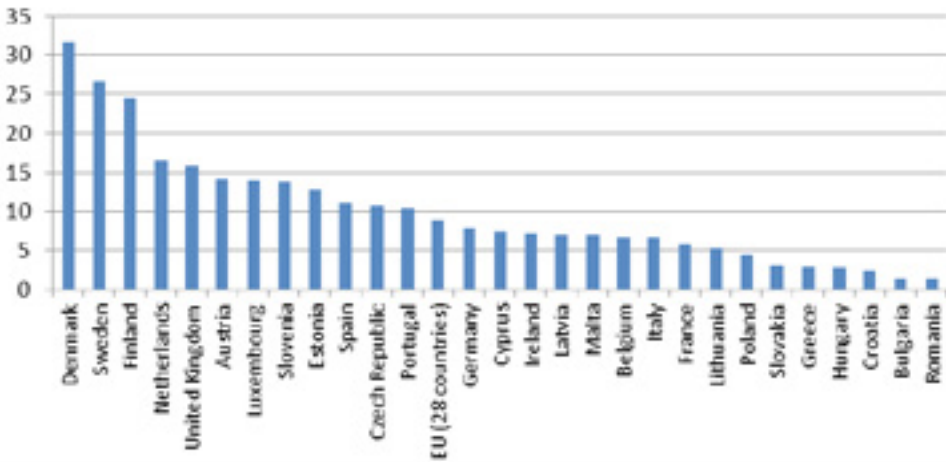
Participation rates in different types of education can be used as an alternative to this indicator. They are measures of potential skills supply and they can also be used to estimate what proportion of graduates will continue to the next education level and what will enter the labour market. Participation rates should, however, be accompanied by information on drop-out or completion rates to provide the information on the inflow of skills supply to the labour market.

Table 21. Participation of adults in education and training

Indicators	<ul style="list-style-type: none"> • participation rate in education of the adult population; • structure of adult participants by type and field of education and training.
Data sources	<ul style="list-style-type: none"> • labour force surveys; • establishment surveys (only for the employed population and work-related training); • administrative statistics (more rarely or just partial because the registers are usually not available for non-formal education and training).

Example and interpretation

Percentage of population aged 25–64 participating in lifelong learning, 2012



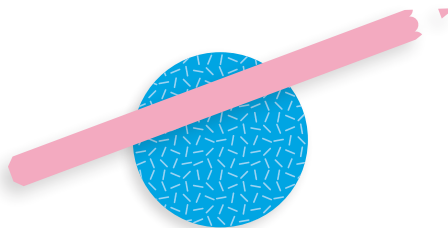
Source: Eurostat: statistics database: EU-LFS, <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdsc440&plugin=1>

The rates of participation in education and training provide information on the extent that and direction in which the labour force are adjusting their skills.

Adults participating in education and training are usually already in the labour market. Their education will not contribute to solving labour shortages in terms of quantity. However, it can contribute to adjusting skills supply in qualitative terms. By participation in education, the adult population can acquire new skills and perform better in their jobs or retrain for others. The rate of adult participation indicates the extent to which the adult population are adjusting their skills. More detailed information on the structures of adult education indicates the areas of increasing skills.

Methodology notes

The population aged 25–64 is usually used to measure the participation of adults in education as it is the age when initial education has ended. If students prolonged their periods of initial education it may have impact on the results.



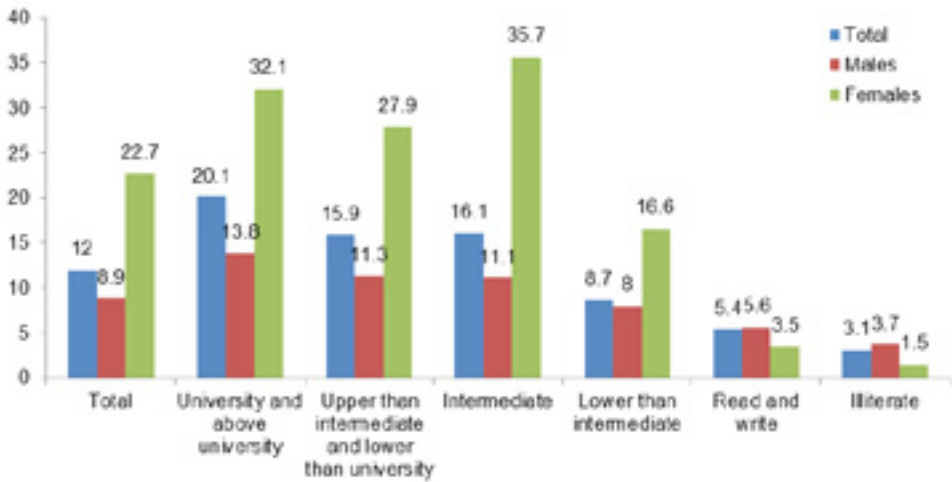
2.5.3.3. Indicators on skills mismatch

Table 22. Unemployment/employment rate by education level

Indicators	<ul style="list-style-type: none"> • unemployment/employment rates by level of education; • variance of relative unemployment rates (e.g. the ratio of the unemployment rate for secondary educated people to the unemployment rate of the tertiary educated); • unemployment of graduates by level and field of education.
Data sources	<ul style="list-style-type: none"> • labour force surveys; • public employment services – administrative data; • tracer studies.

Example and interpretation

Unemployment rates by education level, Egypt, 2011



Source: Central Agency for Public Mobilisation and Statistics, 2013

Unemployment rates could reveal mismatch issues, pointing to problems with a surplus of those with education for which there is insufficient demand in the economy, or problems with skills composition or quality.

In the analysis, it is important to pay attention to the difference in the situation where higher rates of unemployment are experienced by lower-skilled job seekers, and where the labour force with higher levels of educational attainment suffer from relatively higher unemployment rates (such as in the example of Egypt). Such mismatch may result from lack of job creation for better qualified people, or from the fields of education not meeting demand (such as too many social scientists and economists and not enough engineers), or from poor access to the labour market among women.

Methodology notes

In developing countries, especially in populations with low levels of educational attainment, unemployment rates have to be treated cautiously because the interpretation of inactivity, unemployment and sometimes work in the household or in agriculture can be misleading. The measures of underutilised labour (unemployment, time-related underemployment and potential labour force) can be used as an alternative if data on them are available.

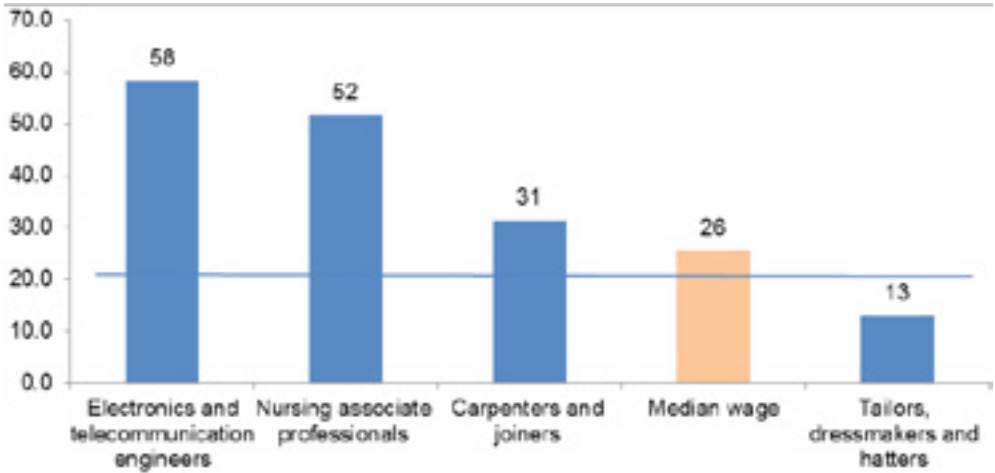
The variance of relative unemployment rates (for example the ratio of the unemployment rate for tertiary educated people to the unemployment rate of the secondary educated) can be used as a relative indicator which is less influenced by the economic cycle than unemployment per se.



Table 23. Wage dynamics by occupation

Indicators	<ul style="list-style-type: none"> relative increase of median wage by occupation.
Data sources	<ul style="list-style-type: none"> administrative wage statistics, tax registers; establishment surveys.
Example and interpretation	

% increase of median wage in enterprises by occupation, Czech Republic, 2005–10



Source: Trexima: ISPV, average earnings information system, <http://ispv.cz/en/homepage.aspx> [accessed 5.12.2014].

The indicator indicates what occupations are experiencing the most dynamic wage increases, which can be a signal of skills shortage in the labour market.

The indicator has an intuitive interpretation. It is based on the assumption that wages work as an adjustment mechanism to reach equilibrium in the labour market. As shown in the chart, the median wage in the Czech Republic grew 26% between 2005 and 2010. The wages of electronic engineers and nursing associate professionals grew twice as much, suggesting high demand for these occupations.

Methodology notes

Observations should be interpreted with caution because changes in wage levels can be influenced by other factors than adjustment to skills shortages (collective bargaining, legislation). Longer-term trends are more reliable than year-to-year difference. Some limitation also comes from the use of the median wage as the measure. This does not tell us anything about distribution of earnings: some occupations may provide lower median wage but in the context of other occupations may provide the chance for very high wages as well as the risk of low wages.

The wage also depends not only on occupation but on sector as well.



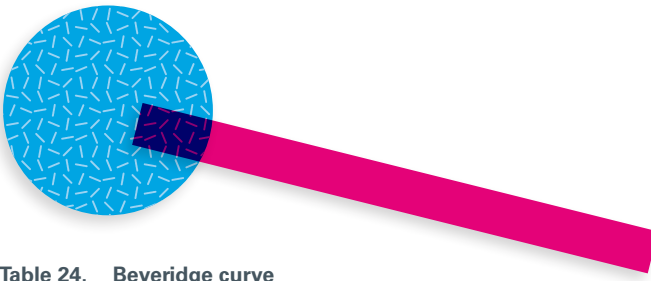
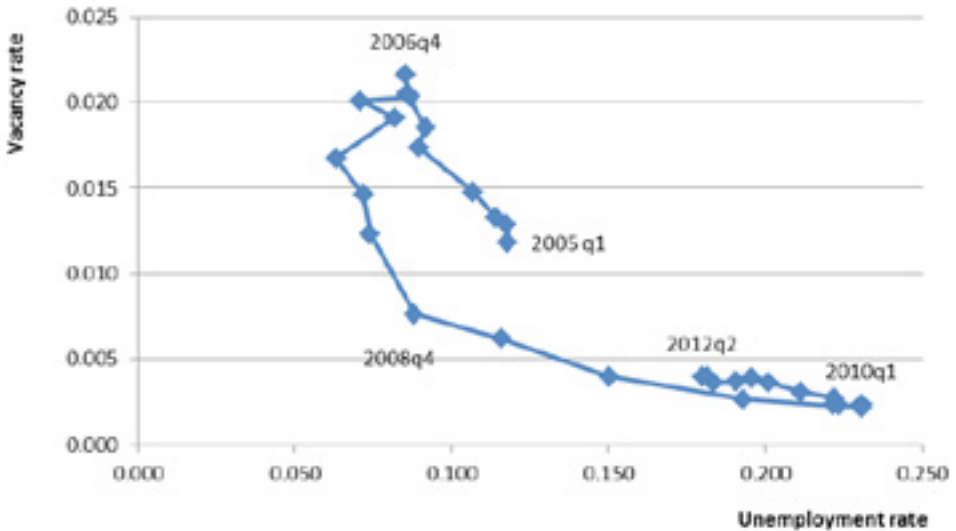


Table 24. Beveridge curve

Indicators	<ul style="list-style-type: none"> • changes of ratio between number of vacancies and job seekers; • separate Beveridge curves can be constructed for each occupation.
Data sources	<ul style="list-style-type: none"> • PES statistics – administrative registers; • establishment (vacancy) surveys plus household surveys (unemployed).
Example and interpretation	

Unemployment rate (including discouraged workers) versus vacancy rate, Latvia, 2005–12q2, seasonally adjusted



Source: Anosova et al., 2012, p. 5.

The Beveridge curve is the depiction of the relationship between the unemployment rate and the vacancy rate for several distinct points in time. It shows the dynamics of the matching process.

The further from the origin the curve is, the worse the matching process, reflecting that more vacancies are in the economy at the same time as unemployed. Shifts in the Beveridge curve farther from the origin can be a signal of growing skills mismatch because this would mean vacancies and unemployment are growing at the same time. This can be caused by a structural mismatch between labour supply and demand but also by the effectiveness of matching supporting services and geographic aspects. The example of Latvia illustrated that matching in the labour market improved in 2007 during the economic boom, and since then the movement has been following almost alongside the curve, which suggests no important changes in matching. On the other hand, movements along the curve are seen as changes caused by the economic cycle.

Methodology notes

The Beveridge curve can be a useful tool for indicating the mismatch but it should be interpreted cautiously and in the context of other labour market indicators. Unemployment rates and numbers of vacancies can be influenced by other factors than just labour-market matching processes, such as high fluctuation or legislation. Quality is also dependent on the data available; if coverage of vacancies is not reported to the PES, statistics are a big issue. If the data allow, the Beveridge curve can be constructed for individual occupations.

Table 25. Over/underqualification

Indicators	<ul style="list-style-type: none"> share of over/underqualified people by occupation; share of over/underqualified people by education.
Data sources	<ul style="list-style-type: none"> labour force surveys; establishment surveys.

Example and interpretation**Skills mismatch by occupation group, Philippines, 2010 (%)**

	No mismatch	Overqualified	Underqualified
Officials, managers	41	0	59
Professionals	99.6	0	0.4
Technicians and associate professionals	71.1	0	28.9
Clerks	13.7	79.8	6.5
Service workers and shop and market sales workers	38.3	37.2	24.5
Farmers, forestry workers and fishermen	16.9	8.7	74.5
Trades and related workers	36.3	18.2	45.4
Plant and machine operators and assemblers	42	24.7	33.2
Labourers and unskilled workers	62.8	37.2	0
Special occupations	31	69	0
All occupations	45.6	25	29.4

Source: PEPM, 2012 in El Achkar et al., 2013, p. 43.

The indicator compares the qualification/level of educational attainment of the worker with the skills level corresponding to the tasks of the occupation of his/her actual job based on ISCO qualification.

The corresponding levels of qualification are defined in the ILO key indicators of the labour market (KILM) as follows:

ISCO category	ISCED level	
1	5–7	education leading to higher than secondary degree – university or not university
2	6–7	education leading to university or postgraduate university degree
3	5	education leading to non-university degree but higher than secondary
4–8	2–3	lower and upper secondary education
9	1	primary education

Note: For the correspondence of ISCO 88 see <http://kilm.ilo.org/2011/download/kilm05EN.pdf>

This correspondence, however, is very rough and sometimes has to be adapted to the country context because the statistics often do not allow for distinguishing between primary and lower secondary education and/or between upper secondary and certain forms of post-secondary education.

The indicator provides indicative information and does not reveal all aspects of mismatches, which can be perceived both in terms of fields and levels of education. However, it can provide some information, as in cases where there is a high share of both under- and overqualification pointing to inefficient distribution of labour in jobs and to a possible structural mismatch in the labour market. Although the indicator is widely used because of the relatively easy access of data and it being reasonably simple to understand, it is also legitimately criticised by labour market statisticians because the level of this indicator does not only depend on the actual level of mismatch but also on the general level of labour force education attainment.

Methodology notes

The indicator as presented here provides a variant which can be constructed by using generally available statistics. However, there are various other ways of measuring over- or underqualification, such as self-assessment, assessment by employer of more sophisticated construction working with the real modus qualifications of the workers for definition of job qualification retirements. (For more information see e.g. Allen et al., 2013.)

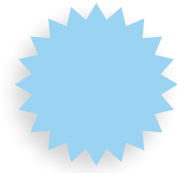
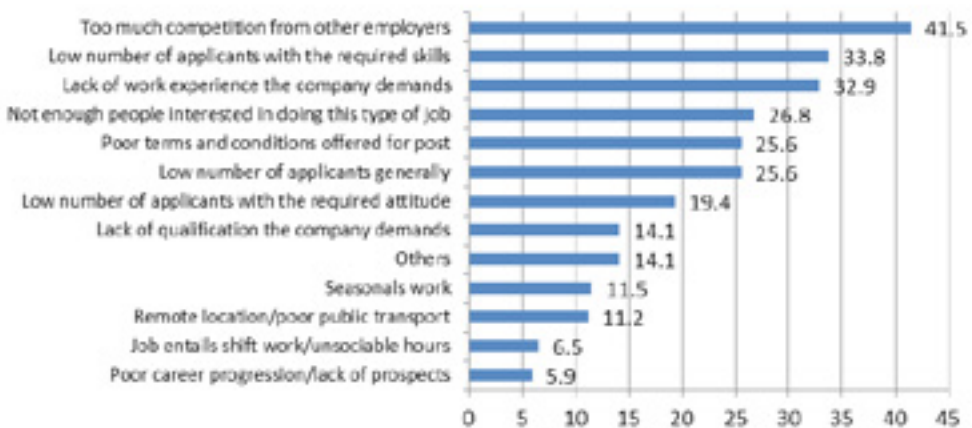


Table 26. Hard-to-fill/skills-shortage vacancies

Indicators	<ul style="list-style-type: none"> • share of hard-to-fill vacancies; • causes of hard-to-fill vacancies; • share of skill-shortage vacancies; • list of occupations which are hard-to-fill (top 10).
Data sources	<ul style="list-style-type: none"> • national establishment skills surveys; • international surveys – e.g. Manpower talent shortage survey.
Example and interpretation	

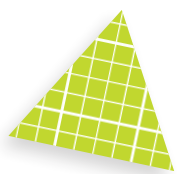
The indicator provides information on employers' perceptions of skills shortages, which they experience in the recruitment process.

Causes of hard-to-fill vacancies, Cambodia



Source: NEA employer skills needs survey 2012 in Bruni et al., 2013, p. 48.

The causes of difficulties in filling vacancies in Cambodia include too much competition from other employers, lack of applicants with the required skills and lack of experience, among the most important reasons. This shows that skills shortages are a major problem. Further disaggregation of skills-shortage vacancies by sector and occupation shows that the largest share of skills shortages lies with service workers in accommodation, professionals in construction, and clerks in finance. This is influenced by the general structure of employment in these sectors, and the indicators in the table below could be improved by adding information on the share of skills-shortage vacancies relative to the share of occupations in the sector in terms of total employment or total number of vacancies.





Share of skills-shortage vacancies, by major occupation type and sector

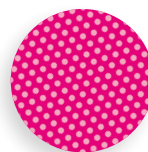
	Accom.	Constr.	Finance and ins.	Food and beverages	Garmets, apparel and footwear	Rubber and plastic	Total
Managers	2	5	5	1	0	0	13
Professionals	1	37	8	12	13	3	74
Technicians and associated professionals	4	5	23	9	13	1	55
Clerical support workers	28		38	5	5	2	78
Service and sales workers	109	1	2	1	0	0	113
Skilled agricultural, forestry and fishery workers	0	0	0	0	0	0	0
Craft and related trades workers	7	10	0	3	308	0	328
Plant and machine operators and assemblers	0	20	1	10	47	10	88
Elementary occupations	8	0	3	22	4 106	6	4 145
Total	159	78	80	63	4 492	22	4 894

Percentage composition by major occupation

Managers	1.3	6.4	6.3	1.6	0.0	0.0	0.3
Professionals	0.6	47.4	10.0	19.0	0.3	13.6	1.5
Technicians and associated professionals	2.5	6.4	28.8	14.3	0.3	4.5	1.1
Clerical support workers	17.6	0.0	47.5	7.9	0.1	9.1	1.6
Service and sales workers	68.6	1.3	2.5	1.6	0.0	0.0	2.3
Skilled agricultural, forestry and fishery workers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Craft and related trades workers	4.4	12.8	0.0	4.8	6.9	0.0	6.7
Plant and machine operators and assemblers	0.0	25.6	1.3	15.9	1.0	45.5	1.8
Elementary occupations	5.0	0.0	3.8	34.9	91.4	27.3	84.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: NEA employer skills needs survey 2012 cited in Bruni et al., 2013, p. 51.

The Manpower survey provides more qualitative information, listing the 'top 10 jobs' which are hard to fill. Similar information can be also gained by qualitative means instead of a large-scale survey.



Top 10 Jobs employers are having difficulty filling, 2012

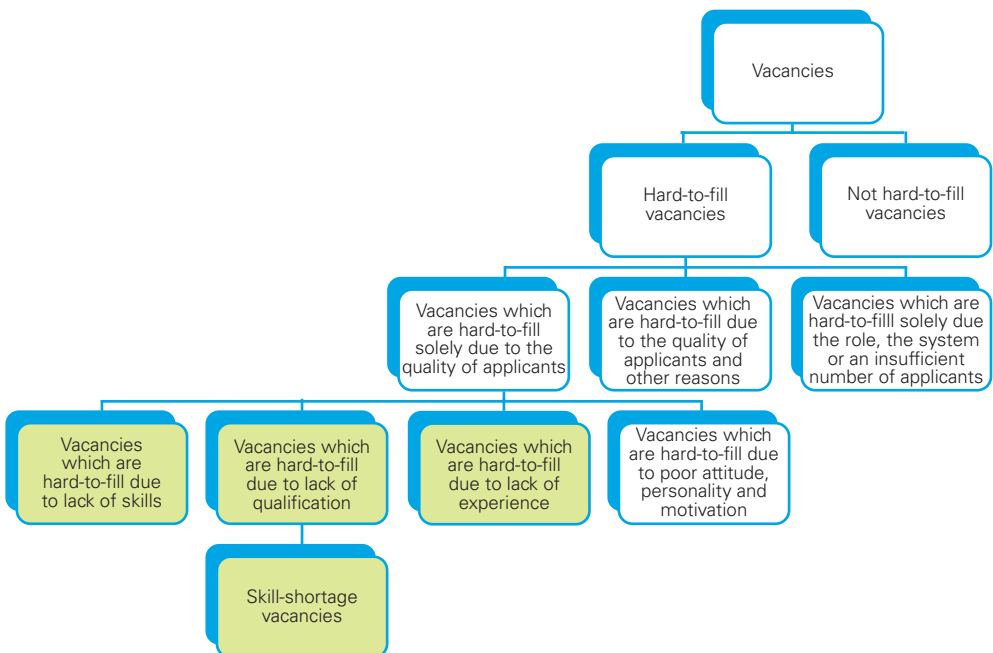
	Global	India	Ireland
1	Skilled trade workers	IT staff	IT staff
2	Engineers	Marketing/public relations/ communication staff	Nurses
3	Sales representatives	Engineers	Sales managers
4	Technicians	Sales representatives	Insurance staff (qualified brokers, clerks, etc.)
5	IT staff	Teachers	Engineers
6	Accounting and finance staff	Accounting and finance staff	Sales representatives
7	Drivers	Call center operators	Chefs/cooks
8	Managements/executives	Insurance staff (qualified brokers, clerks, etc.)	Drivers
9	Labourers	Secretaries, PAs, administrative assistants and office support staff	Restaurants and hotel staff
10	Secretaries, PAs, administrative assistants and office support staff	Researchers (RaD)	Mechanics

Source: ManpowerGroup, 2013a.

Methodology notes

The total number of vacancies is influenced by fluctuation of employees and other factors (such as seasonal effects). Therefore the indicator of hard-to-fill vacancies, as reported by employers, was developed to provide information about hiring difficulties. This still does not provide information about skills mismatch. The presence of hard-to-fill vacancies can reflect other problems (poor recruitment and human resources management policies, low wages, poor work conditions). A better version of the indicator shows specific skill-shortage vacancies. The following scheme describes the concept of skill-shortage and other hard-to-fill vacancies in the UK employer skills survey. Because the data usually come from employers' surveys, poor working conditions are not an appropriate question in the questionnaire: these can be revealed by referring to candidates' unwillingness to work in specified conditions or their overly high pay expectations.

Since such data can only be generated by directly asking employers (i.e. human resources or general managers in enterprises, firm owners), it is important to bear in mind the subjectivity of the responses. Combining this information with other sources and with discussions with stakeholders is therefore advised.



Source: UKCES, 2012, p. 51.

Table 27. Skill gaps reported by employers

Indicators	<ul style="list-style-type: none"> percentage of staff reported as having skill gaps; percentage of employers reporting skill gaps; lists of skills which the employers report as missing or insufficient in the current workforce/ among job seekers.
Data sources	<ul style="list-style-type: none"> Establishment surveys.

Example and interpretation

Density and distribution of skills gaps by occupation, England, 2011

	% of staff reported as having skill gaps	share of employment (%)	share of all skills gaps (%)
Overall	5	100	100
Managers	3	20	11
Professionals	4	11	9
Associate professionals	5	7	6
Administrative/clerical staff	5	13	11
Skilled trades occupations	5	7	7
Caring, leisure and other services	5	8	8
Sales and customer services	8	13	19
Machine operatives	6	7	8
Elementary staff	8	15	20

Source: UKCES, 2012, p. 72.

Share of employers seeing the following skills as a reason for the talent shortage

Technical skills deficiencies (hard skills)	
Industry-specific qualifications/certifications – professional	16
Industry-specific qualifications/certifications – skilled trades	11
Operating mechanical/industrial equipment	3
Computer/IT skills	3
Speaking/verbal skills	3
Foreign language	3
Employability skills deficiencies (soft skills)	
Interpersonal skills	6
Enthusiasm/motivation	6
Collaboration/team work	4
Professionalism (e.g. personal appearance, punctuality)	4
Flexibility/adaptability/agility	4
Ability to deal with ambiguity/complexity	3
Attention to detail	3
Problem solving and decision making	3

Source: ManpowerGroup, 2012.

The indicator provides qualitative information about skills which employers perceive as lacking in the labour market. While the skills shortages (hard-to-fill/skills-shortage vacancies) describe primarily the unavailability of skilled workers in quantitative terms, the skills gaps look at the quality. Two aspects can be described: the incidence of skills gaps in terms of the share of the workforce not having sufficient skills to perform their work (or alternatively the share of employers facing these gaps) or the list of skills which are missing.

In the first case the example from the UK shows that the skill gaps are perceived by employers mostly among the sales and customer service workers and elementary workers. In both, 8% of staff have skills gaps. Together they cover about a quarter of employment but almost 40% of all skill gaps in the labour market. This can give a signal to the education and training system that the most skills gaps are perceived at the lower non-technical qualification level. However, the indicator does not provide information on which skills the workforce lacks.

Some information on that aspect can be provided by the second indicator, which shows how many employers see each type of skill as a reason for the talent shortage. The Manpower survey suggests that they are industry-specific qualifications and, among soft skills, interpersonal skills and motivation.

Methodology notes

These lists do not provide information on the actual skills level of the workforce but about the gaps in the context of their jobs' demands. They are country specific (e.g. the demands on foreign languages in an English-speaking country may be lower than in a country with a not so widely used official language).

Table 28. Subjective mismatch reported by workers/graduates

Indicators	<ul style="list-style-type: none"> percentage of graduates who report working in a completely different field from that studied; percentage of workers who report that they need further skills development to perform their job/that they do not use the skills they have in their job; lists of skills which the workers are lacking/not using.
Data sources	<ul style="list-style-type: none"> tracer studies; household surveys.

Example and interpretation

The indicator provides subjective perceptions of the skills mismatch as reported by workers. Its advantage is that the workers have very specific knowledge about what they actually do in their job and what skills they need for that. This means that, under the limitation of sample size, the indicator can provide detailed information for specific occupations.

Education field of study mismatch in the first job (%), Kyrgyzstan

Education level of labour market entrant	Field of study required by employer				Total
	Exclusively my own field	My own or a related field	A (completely) different field	No specific field of education	
Initial vocational	33	28	15	24	100
Secondary vocational	38	20	11	31	100
Higher	51	21	12	16	100

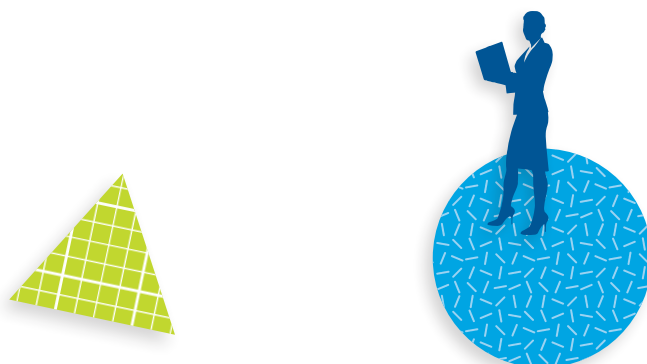
Note: The table refers only to those who have found a job after leaving education for the first time, excluding entrepreneurs (N = 1 263); missing data below 1%.

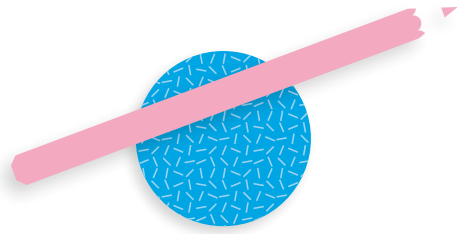
Source: Baumann et al., 2013, p. 43.

In considering the match between field of study and subsequent employment, it appears that people with vocational education (either initial or secondary) are more often found working in positions which are not directly connected to their field than those with higher education. For the latter group, the field of study seems to play a more significant role and these people are more often engaged in field-related activities.

Methodology notes

The percentage of underskilled workers measured in this way may be underestimated. Workers may adjust their perception to the actual skills they have, although a person with another set of skills might be more productive in the same job.





2.5.3.4. Indicators based on qualitative sources

Indicators which are based on qualitative data sources can be used to fill gaps in quantitative data or to better understand and interpret quantitative data. Information can be gathered using various qualitative methods such as literature review, focus groups, workshops and Delphic methods. Use of these methods for skills identification and forecasting is described in more detail in volume 2, part A.

Indicators based on qualitative methods do not provide exact information on levels, numbers of workers or vacancies. They can, however, provide very interesting information. The following list gives examples of 'qualitative indicators', although there may be many others depending on the objectives of the particular analyses. Some are similar to quantitative indicators already examined, the difference being that the qualitative indicators focus more on understanding the reasons behind the figures than on attempting to obtain information on levels and comparisons:

- (a) skills demand:
 - (i) priority sectors in terms of employment opportunities (Top 5);
 - (ii) priority sectors in terms of technology change;
 - (iii) lists of emerging occupations and emerging skills in occupations;
- (b) skill supply:
 - (i) levels and fields of study preferred by students (applicants);
 - (ii) observed patterns in regional and international mobility of workers;
- (c) skills mismatch:
 - (i) lists of hard-to-fill/skills-shortage vacancies;
 - (ii) lists of skills which the workers lack (in selected occupations, sectors) as perceived by employers;
 - (iii) lists of skills which the job applicants/ graduates lack (in selected occupations, sectors) as perceived by employers/PES workers.

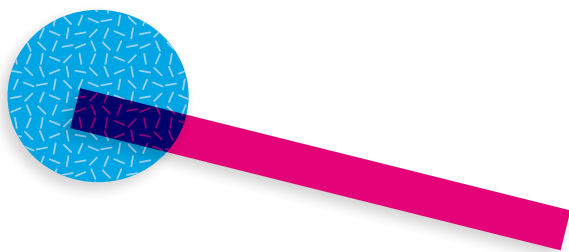


Table 29. Summary of indicators and possible data sources

	Standard statistics				Skill-specific data sources				Secondary data sources			
	LFS	National accounts	PES	Enterprise statistics	Education statistics	Census	Tax, social security admin data	Establishment surveys	Tracer studies	Qualitative data on skills	Projections of labour supply and demand	International databases
Demand												
Structure of employment by sector	***	***		**		*	*	*			***	***
Structure of employment by occupation	***			*		*	*	**			**	**
Structure of sectors/occupations by age	***			*		*	*	*			**	**
Vacancies by occupation			***					***		**		*
Supply												
Age structure of population or labour force	***					***	*				***	***
Structure of population/labour force by education	***										**	**
Structure of graduates	*				***				**			
Participation of adults in education and training	**				**			*				
Mismatch												
Unemployment rate by education level	***		**						**			
Proportions of unemployed versus employed at each education level	***		*									
Wage dynamics by occupation				***				*				
Beveridge curve	*			***				*				
Share of over/underqualified people	***					*						**
Hard-to-fill/skills-shortage vacancies								***		**		**
Skill gaps reported by employers								***		**		**
Subjective mismatch reported by workers/graduates	*							*	***			

Notes: *** Relevant and often used; ** relevant but less frequently used; * rarely used because of significant limitations in availability, coverage, sample sizes, etc.

Source: Author.



2.5.4. Validation of results

The results of the analysis should be validated, with the process including consultation with stakeholders and experts in focus groups, workshops and Delphi-like methods. This process may also include comparison of results with other studies including foreign and international.

Validation will help to evaluate the results and provide background qualitative information to support the interpretation of them. The discussion may also provide useful feedback on the focus of the analysis and help to design the information products which will be disseminated.

2.6. Step 5: dissemination and use of LMI

Step 5 focuses on the use of LMI for reduction of skills mismatch. The main purpose of data collection and analysis is to provide labour market actors with information they can use for making decisions to solve mismatch problems. These decisions may include implementation of policies for better matching in the labour market by policymakers, the offer of education and career guidance to individuals by educational providers or the national employment services, and companies making decisions to develop or adopt new human resources strategies.

Although it can be presumed that access to information on skills supply and demand creates an opportunity for better choices, it has to be recognised that there can be other legitimate grounds for decisions. Individuals can place more emphasis on their interests and aspirations than on getting the most demanding job. LMI is an important input for policy formulation, though providing information on actual and potential problems in matching does not provide a solution.

Policy visions, and company strategies, should be based on information but not determined by it.

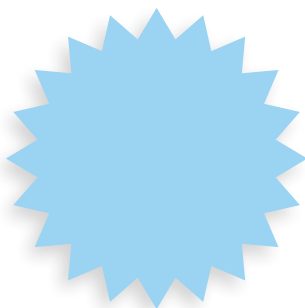
LMI needs to be transformed into a form which is understandable and of value to final users. The transformation of raw data into the indicators is only one step and the information on labour market demand, supply and mismatch needs to be further interpreted and translated into a form which is understandable for different types of users and relevant to their information needs.

There is a strong role for the public sector in this information provision and further use in public information. This section focuses on three main target groups of the LMI users: policy-makers, the general public and employers.

2.6.1. Use of LMI for better policy making

Approaches to reducing and tackling mismatch should be found in education policies, skills and human resources development strategies, and national employment policies. Information on skills demand, supply and mismatch should be transformed into appropriate actions in the education and training system. Identified problems should be critically analysed during policy formulation to develop and implement the most appropriate measures, which can include:

- (a) adapting or reforming education and training systems;
- (b) longer-term changes to the education system (such as measures to increase participation in primary and secondary education);
- (c) development of a national qualifications framework;





- (d) adjustment of curricula, especially for TVET that can adapt more quickly to structural and technological changes in the economy and respond to the challenges presented by an ageing population;
- (e) training provision/apprenticeship programmes for the unemployed (in highly demanded fields/skills with insufficient labour supply through labour market training);
- (f) improvement and development of education and career guidance (such as using labour demand and mismatch information and conveying such information to job seekers);
- (g) support company training;
- (h) support participation of adults in vocational education and training to deal with problems in structural changes in employment and population ageing;
- (i) develop systems for recognition and validation of informal training;
- (j) develop cooperative institutional frameworks for gathering, processing, analysing and interpreting current and future skills needs, and long-term sustainability of policies oriented to skills mismatch reduction, in addition to forming a national institution that deals with skills needs.

There are often multiple causes of the problems identified and so various complementary measures have to be adopted. Changing education policy is a first approach to mismatch but it cannot be seen as a panacea. Section 1.3 has described various drivers of change in skill needs and causes of skills mismatch; different policies can contribute to mismatch reduction. Any coherent policy approach should also take into account contextual factors that can influence the

success of better labour market matching, such as wage-setting mechanisms, improved working conditions, countering of gender and age discrimination, and aiding geographic mobility. In addition to the development of education and skills policies, it is important to ensure their consistency with other types of policies which can contribute to better matching. These may include:

- (a) national development plans;
- (b) migration policies;
- (c) sector development plans/industrial policies.

Policies for better skills matching should include a wide spectrum of stakeholders; a shared vision, with clearly defined responsibilities for policy implementation, is a key success factor. 'Participation of key stakeholders from education, economy and employment is fundamental to jointly analyse data and come up with a strategic vision for skills development, actions and roadmaps. In fact, data should also be used to facilitate dialogue and interaction between actors: knowledge creation on present and future skills demand and supply and skills gaps cannot alone support improved matching in the short/medium/long run. Countries need to make sure that policy-makers embed information in the decision-making process to reach actors in the education and training system (policy-makers, training institutions, learners) and in the labour market: examples can include national TVET or skills councils, sector skills councils, regional bodies with competencies on regional skills policies, cooperation initiatives between training providers and business and adequate vocational guidance systems' (Feiler, 2012).

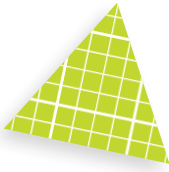
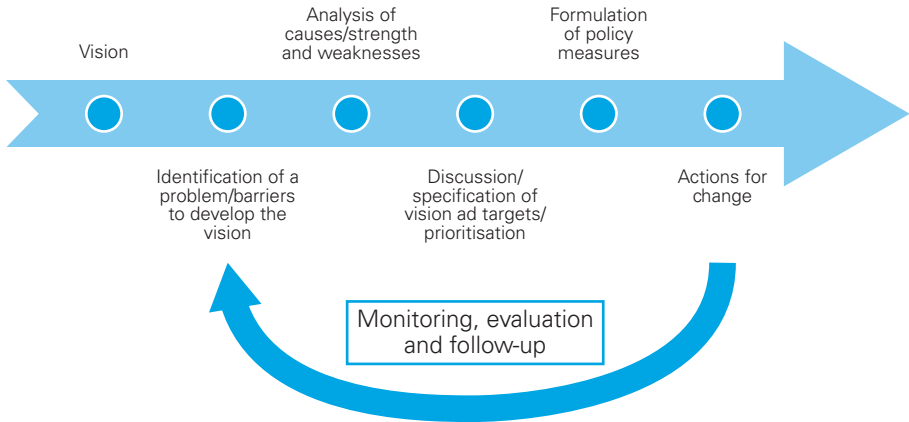


Figure 9. LMI in the context of the policy process



Source: Author.

In the policy cycle above there are two main stages when the LMI should provide an important input. First, LMI should be used for identification and definition of the problems. This is the main purpose of the indicators presented earlier. Second, the LMI can be used for policy monitoring and evaluation. However, it takes some time before the impact of policy actions can actually be captured by labour market indicators (in the case of measures aimed at formal education in particular). Therefore, impact indicators should be accompanied by other forms of monitoring indicators which can provide earlier information on the inputs, processes and outputs of the policy measures.

The process of formulating a policy for better matching of skills supply and demand within a framework of

assistance by an international organisation is described on the case study on Sri Lanka in annex 3.

General lessons learned from these examples suggest that:

- (a) identification of problems should be based on LMI which builds on empirical evidence and is supported by joint analysis and discussion of the main issues by stakeholders;
- (b) policy should focus on priority issues; solve the burning problems but also build on what has already been achieved and what can be a competitive advantage;



- (c) there are multiple causes of one problem and therefore multiple measures can contribute to their solution;
- (d) policy needs to build on a shared vision;
- (e) specific policies (education, skills, employment) should be interlinked and coherent with more general policies such as national development plans;
- (f) policy formulation and implementation requires the active involvement of various actors.

More information on the process of formulating and implementing policies relevant to skills mismatch reduction can be found in ILO, 2011b; 2012a; 2014a.

2.6.2. Provision of information to the general public

Individuals need LMI to make decisions about their career, education and training. Most have no special experience in working with data and statistics or with any such thing as classifications, samples and similar tools used to produce the LMI. Therefore, it is important to translate labour market information into a form close to everyday life and common language, making it easy to understand, user friendly and visually attractive.

Internet websites are the most common information tools in communication with the general public. They are used to provide information on labour market

situations in a user-friendly form that is understandable for people with no special knowledge of labour market analysis. Information on the current situation and likely future developments, often the product of sophisticated methodologies, is presented in the form of graphics and simple indicators.

Occupations form the most often used perspective, sometimes combined with qualifications or fields. Information can include:

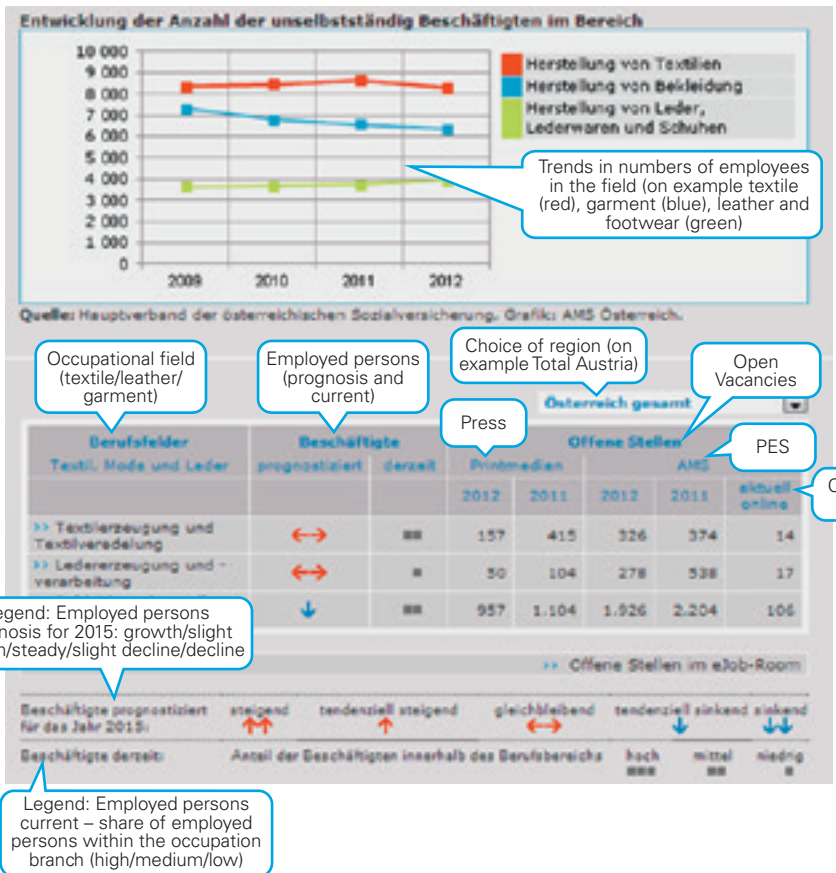
- (a) recent and expected future trends in employment;
- (b) numbers of vacancies available in the labour market;
- (c) selected structural information (such as share of men and women in the occupation, share of young or older workers);
- (d) earning levels and trends;
- (e) links to vacancies;
- (f) links to related training opportunities;
- (g) information on competencies required for the occupation;
- (h) a short verbal description of the situation in the labour market.

The website can also contain guidance on how to browse the information, for example a full text or systematic search or by top 10 occupations.

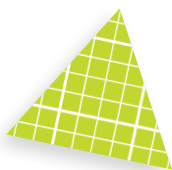




Example 1: Austria – Qualifikationsbarometer (AMS skills-barometer): trends in the occupational branch of textile, fashion and leather



Source: AMS Österreich: *Qualifikations-Barometer*, <http://bis.ams.or.at/qualibarometer/berufsbereiche.php>





Example 2: Ireland career directions



Source: Solas: *Employment by occupation – trends and outlook: professionals: accountants and tax experts*, <http://lmi.fas.ie/> [accessed 8.12.2014].

Box 14. Further examples of presentations of labour market information to the general public

US O*NET, www.onetonline.org/

Swedish employment service: *Yrkeskompassen*, www.arbetsformedlingen.se/For-arbetssockande/Yrke-och-framtid/Yrkeskompassen.html

Czech future skills, www.budoucnostprofesi.cz/en/index.html

European Commission: *EU skills panorama*, <http://euskillspanorama.ec.europa.eu/>





A website is a common and useful interface which can be delivered to a wide audience of users; it is also flexible and easy to maintain. In countries with a well-developed statistical infrastructure websites can take advantage of automatic uploads of some data from databases of various providers and other features. Internet access may be problematic in some areas, especially for members of the most vulnerable segments of society. It is the role of public

employment services and other service providers, such as career counsellors at schools, to act as intermediaries in conveying the LMI to their clients in an appropriate form, very often through face-to-face contact. More information on the role of public employment services in skills anticipation and matching is provided in volume 4. Counsellors need some information in a user-friendly form to be used in direct work with their clients.

Example 3: Czech Republic: occupation profile (information product for career counsellors)

Name of the occupation group: Engineering technicians
ISCO code: 3115

Employment development:	Occupation group size (cross-group comparison)	
Number of people employed (2011)	50 800	
Long-term employment development (2000–10)	Slight increase	Very large
Medium-term employment development (2005–10)	Stable	
Development in recession (2008–10)	Slight decrease	

Future employment prospects (2014) **Above average**

Labour market opportunities	How are these opportunities in comparison with similar occupations?	
Job vacancies (October 2010)	287	
Unemployment rate (October 2010)	4.8%	Similar
Share of hard-to-fill vacancies (October 2010)	0.06	Worse
Job seekers per one vacancy (October 2010)	8.9	Worse



Name of the occupation group:	Engineering technicians ISCO code: 3115
-------------------------------	--

Key employment sectors	
Metal processing industry	
Part of this group, jobs created by this industry (2009)	24%
The industry medium-term employment trend (2010–15)	Slight decrease
The industry long-term employment trend (2015–20)	Slight decrease
Automotive industry	
Part of this group, jobs created by this industry (2009)	21%
The industry medium-term employment trend (2010–15)	Stable
The industry long-term employment trend (2015–20)	Stable
Mechanical engineering industry	
Part of this group, jobs created by this industry (2009)	21%
The industry medium-term employment trend (2010–15)	Slight decrease
The industry long-term employment trend (2015–20)	Slight decrease

See details on
www.budoucnostprofesi.cz

Field of education recommended	
Prevailing field of education	Engineering
% of workers with different field of education (2010)	30%
Level of education (2010)	
Elementary education	0%
Upper secondary vocational education (ISCED 3C)	17%
Upper secondary education (ISCED 3A–4)	69%
Tertiary education (ISCED 5–6)	14%

See details on
<http://katalog.nsp.cz>

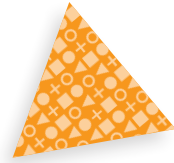
Earnings	
Wage median (2q 2010)	29 107
Wage growth compared with similar occupations (2005–10)	Similar growth
Wage comparison with employees on same qualification level (median wage for all employees on this level = 100)	124

See details on
www.ispv.cz

Graduates (recommended field of education)	
Number of graduates (2005–10)	Slight decrease
Forecast of graduates (2011–15)	Slight decrease
Unemployment rate of graduates (2010)	12.2%
Unemployment rate of graduates development (2009–10)	Significant increase

Age structure	Average for similar occupations	
% of young workers (less than 35)	31%	33%
% of older workers (55+)	15%	14%

Source: NÚV: *Koncepce dalšího vzdělávání [Conception of continuing education]*, www.nuv.cz/folder/34/ (Czech only), translated by the National Training Fund.



2.6.3. Providing information to business

While the provision of skills mismatch information to experts, individuals and policymakers has been well developed in many countries, the provision of relevant information to businesses remains a challenge.

Recruitment and workforce training in companies can benefit from information about overall labour market trends and skills and other characteristics of individual workers. However, the information available is very often not detailed enough to be directly used by employers.

The following evidence of employer LMI needs has been gathered in Canada.

- LMI is particularly useful to employers during times of labour market tightness, when unemployment is low and finding workers is difficult.
- Employers' expressed LMI difficulties are driven not only by the unavailability of some information, but also by the lack of clarity about what information is available and the difficulty of locating information.
- [E]mployers [...] expressed a need for more locally-based LMI, information on wages and benefits, and greater ease in finding and accessing LMI.
- Most employers preferred to access LMI via the internet. [...]

(Murray, 2010, p. iv)

In practice, LMI is much more used by large employers for whom the more general and global trends are more relevant than for SMEs. This is also influenced by the fact that the larger companies have specialised human resources positions experienced in working with LMI, which is neither viable nor possible for SMEs. At the same time, in many countries SMEs are the major employers, which raises questions about intermediary (PES) roles in the provision of LMI to these businesses. In Canada 'About 30 per cent of employers sought assistance in finding or interpreting LMI. Assistance was most commonly received from HR [human resources] consultants, followed by government web sites. Among small employers, about 40 per cent reported that they would have benefited from assistance in finding LMI' (Murray, 2010, p. 9).

LMI can be particularly important for a company considering entering a new market where they do not yet have experience. There are many considerations the company needs to evaluate, several related to available skills supply. Companies combine evaluations from publicly available sources with customised information provided by contracted consultants. Provision of independent LMI may increase the willingness of employers to invest in the country, as it enables them to evaluate opportunities and reduce risks. Companies are well aware of the problems with official statistics in many countries, and improvement of these, in terms of availability, reliability and transparency, is in countries' national interest, not only in terms of having evidence for public policy formulation but also in providing information to businesses who might be interested to invest there.



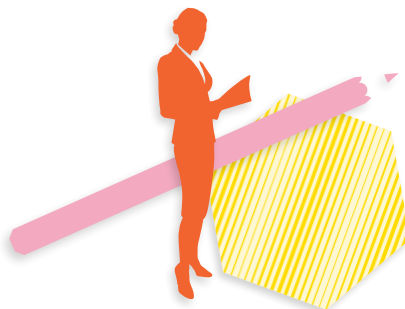
Example: Evaluation of attractiveness of locations used by institutions and consulting companies

Source	Main Components	Sub-components related to human capital	
Aon Hewitt	People Risk® Index <ul style="list-style-type: none"> • demographics • government support • education system • talent development • employment practices 	Demographics <ul style="list-style-type: none"> • working-age population size • immigration/emigration • workforce productivity • ageing population • availability of future workforce 	Talent development <ul style="list-style-type: none"> • quality of entry-level talent • quality of technical training • quality of management training • languages spoken • brain drain
		Government support <ul style="list-style-type: none"> • future workforce planning risk • terrorism and political risk • violence and crime rates • government relations • corruption 	Employment practices <ul style="list-style-type: none"> • bias and favouritism • labour relations • staff turnover • health care benefits
		Education system <ul style="list-style-type: none"> • literacy rate • capacity of education system • secondary school graduates • tertiary education enrolment • spending on education 	Equal opportunity <ul style="list-style-type: none"> • executive recruitment • occupational health and safety • redundancy restrictions • rigidity of personnel costs
Deloitte Consulting's Global Location and Facility Services	Location evaluation criteria – six dimensions <ul style="list-style-type: none"> • political/macro environment • operating environment • location attractiveness • human resources • infrastructure/ accessibility • incentives and taxation 	Human resources <ul style="list-style-type: none"> • general labour pool characteristics • availability of specific skill sets (e.g. job skills, language skills) • labour market flexibility 	<ul style="list-style-type: none"> • labour market practices (e.g. salary levels, local policies towards amenities) • average attrition rate and ways to mitigate it
Economist Intelligence Unit	Analysis of countries, industries or custom research <ul style="list-style-type: none"> • Economic risk • Financial risk • Political risk • Business risk 	<ul style="list-style-type: none"> • Labour law • Industrial labour • Wages and fringe benefits • Working hours 	<ul style="list-style-type: none"> • Part-time and temporary help • Termination of employment • Employment of foreigners
World Bank's Ease of Doing Business Index	Rates countries on 'employing workers indicators', which are not included in the overall Ease of Doing Business rankings but are reported in the annual <i>Doing Business</i> report	Employing workers indicators <ul style="list-style-type: none"> • rigidity of employment • difficulty of hiring • rigidity of hours 	<ul style="list-style-type: none"> • difficulty of redundancy • redundancy costs

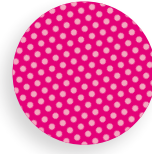


<p>World Economic Forum's Global Competitiveness Index</p>	<p>Basic requirements</p> <ul style="list-style-type: none"> • institutions • infrastructure • macroeconomic environment • health and primary education <p>Efficiency enhancers</p> <ul style="list-style-type: none"> • higher education and training • goods market efficiency • labour market efficiency • financial market developments • technological readiness • market size <p>Innovation and sophistication factors</p> <ul style="list-style-type: none"> • business sophistication • innovation 	<p>Higher education and training</p> <ul style="list-style-type: none"> • secondary education enrolment rate • tertiary education enrolment rate • quality of education system • quality of maths and science education • quality of management schools • local availability of research and training services • extent of staff training 	<p>Labor market efficiency</p> <ul style="list-style-type: none"> • cooperation in employer/ labour relations • flexibility of wage determination • rigidity of employment • hiring and firing practices • redundancy costs • pay and productivity • reliance on professional management • brain drain • female participation in the labour force
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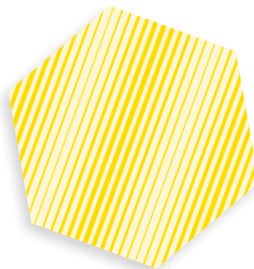
Source: Young, 2012.



ACRONYMS



Cedefop	European Centre for the Development of Vocational Training
ETF	European Training Foundation
G20	Group of twenty
ILO	International Labour Organization
ISCED	International standard classification of education
ISCO	International standard classification of occupations
ISCO-08	International standard classification of occupations, approved in 2008
ISIC	International standard industrial classification of all economic activities
KILM	Key indicators of the labour market
LFS	Labour force survey
LMI	Labour market information
LMIS	Labour market information system
PES	Public employment service
SWTS	School-to-work transition survey
TVET	Technical and vocational education and training
Unesco	United Nations Educational, Scientific and Cultural Organization
USD	US dollar
VET	Vocational education and training



REFERENCES AND RESOURCES



[URLs accessed 8.12.2014]

Cedefop, ETF, ILO. (2015). Guide to anticipating and matching skills and jobs:

Kriechel, B. et al. (2015). *Guide to skills anticipation and matching – volume 2: Developing skills foresights, scenarios and forecasts*. Luxembourg: Publications Office. Jointly published by Cedefop, ETF and ILO.

Wilson, R.A.; Tarjani, H.; Rihova, H. (2015). *Guide to skills anticipation and matching – volume 3: Working at sector level*. Luxembourg: Publications Office. Jointly published by Cedefop, ETF and ILO.

Andersen, T.; Feiler, L. (2015). *Guide to skills anticipation and matching – volume 4: What is the role of employment service providers*. Luxembourg: Publications Office. Jointly published by Cedefop, ETF and ILO.

Corbella, T.; Mane, F. (2015). *Guide to skills anticipation and matching – volume 5: Developing and running an establishment skills survey*. Luxembourg: Publications Office. Jointly published by Cedefop, ETF and ILO.

Schonburg, H. (2015). *Guide to skills anticipation and matching – volume 6: Carrying out tracer studies*. Luxembourg: Publications Office. Jointly published by Cedefop, ETF and ILO.

Allen, J.; van der Velden, R. (2001). Educational mismatches versus skill mismatches: effects on wages, job satisfaction, and on-the-job search. *Oxford economic papers*, Vol. 53, No 3, pp. 434–452. <http://dx.doi.org/10.1093/oeq/53.3.434>

Allen, J. et al. (2013). *Skill mismatch and skill use in developed countries: evidence from the PIAAC study*. Maastricht: ROA, Maastricht University. <http://digitalarchive.maastrichtuniversity.nl/fedora/get/guid:ae821ea-fbfc-4fee-9596-c933f4b594e8/ASSET1>

Andersen, T. et al. (2010). *Anticipating skill needs of the labour force and equipping people for new jobs. Which role for public employment services in early identification of skill needs and labour upskilling?* Report prepared for the European Commission.

Anosova, D. et al. (2012). *Latvian unemployment is cyclical*. Forum for Research on Eastern Europe and Emerging Economies. FREE policy brief series, December 2012. <http://freepolicybriefs.org/2012/12/10/the-latvian-unemployment-is-cyclical/>

Baumann, A. et al. (2013). *Transition from school to work in Kyrgyzstan: results of the 2011/12 transition survey*. Turin: European Training Foundation. [www.etf.europa.eu/webatt.nsf/0/F468B191CAD95B8BC1257BBE005530DF/\\$file/School-to-work%20transition_Kyrgyzstan.pdf](http://www.etf.europa.eu/webatt.nsf/0/F468B191CAD95B8BC1257BBE005530DF/$file/School-to-work%20transition_Kyrgyzstan.pdf)

Bruni, M. et al. (2013). *Skills shortages and skills gaps in the Cambodian labour market: evidence from employer skills needs survey*. Geneva: International Labour Office. ILO Asia-Pacific working paper series. www.ilo.org/wcmsp5/groups/public/asia/ro-bangkok/documents/publication/wcms_231862.pdf

Cedefop (2008). *Terminology of European education and training policy: a selection of 100 key terms*. Luxembourg: Publications Office. www.cedefop.europa.eu/EN/Files/4064_en.pdf

Cedefop (2010). *The skill matching challenge: analysing skill mismatch and policy implications*. Luxembourg: Publications Office.

Crnkovic-Pozaic, S.; Feiler, L. (2011). *Activating the unemployed: optimising activation policies in the Western Balkans and Turkey*. Turin: European Training Foundation. [www.etf.europa.eu/webatt.nsf/0/463ACFA279C80281C125798400494F93/\\$file/Activation_policies_Western_Balkans_&_Turkey.pdf](http://www.etf.europa.eu/webatt.nsf/0/463ACFA279C80281C125798400494F93/$file/Activation_policies_Western_Balkans_&_Turkey.pdf)





El Achkar Hilal, S. et al. (2013). *The Philippines employment projections model: employment targeting and scenarios*. Geneva: International labour Office. Employment working paper; No 140. www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_elm/---trends/documents/publication/wcms_213378.pdf

ETF (2011). *Labour markets and employability: trends and challenges in Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova and Ukraine*. Luxembourg: Publications Office. [www.etf.europa.eu/webatt.nsf/0/01507285AD527498C125797D0052AD32/\\$file/Labour%20markets%20&%20employability.pdf](http://www.etf.europa.eu/webatt.nsf/0/01507285AD527498C125797D0052AD32/$file/Labour%20markets%20&%20employability.pdf)

ETF (2012). *Croatia: review of human resources development*. Luxembourg: Publications Office. [www.etf.europa.eu/webatt.nsf/0/8EF018AE9B5BAD9FC12579F400651CDD/\\$file/Croatia%20HRD%20review.pdf](http://www.etf.europa.eu/webatt.nsf/0/8EF018AE9B5BAD9FC12579F400651CDD/$file/Croatia%20HRD%20review.pdf)

ETF (2013). *MATCH project: guide on tracer studies: preparatory phase*. Paper presented at the validation workshop in Thessaloniki, 5 July 2013.

Eurostat (2013a). *Employment and unemployment (LFS)*. http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_unemployment_lfs/introduction

Feiler (2012). *Anticipating and matching demand and supply of skills in ETF partner countries*. Torino: European Training Foundation. ETF Position paper.

Friedman, E. et al. (2000). Dodging the grabbing hand: the determinants of unofficial activity in 69 countries. *Journal of public economics*, June 2000, Vol. 76, No 3, pp. 459–493. [http://dx.doi.org/10.1016/S0047-2727\(99\)00093-6](http://dx.doi.org/10.1016/S0047-2727(99)00093-6)

Government of Alberta (2013). *2013 job vacancy rate, average weekly hours worked, and average hourly wage by occupation: Alberta and economic regions*.

<http://work.alberta.ca/documents/top-fifty-occupations-in-alberta-by-vacancy.pdf>

ILO (1997). *Private employment agencies convention No 181*. Convention concerning private employment agencies, adopted by the International Labour Organization at Geneva on 19.6.1997. www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C181

ILO (2004). *R195: human resources development recommendation*. Geneva: International Labour Organization. www.ilo.org/dyn/normlex/en/f?p=1000:12100:0::NO::P12100_INSTRUMENT_ID,P12100_LANG_CODE:312533,en:NO

ILO (2007). *Guide to private employment agencies: regulations, monitoring and enforcement*. Geneva: International Labour Organization.

ILO (2009). *ILO support for the role of public employment services in the labour market*. Paper submitted for debate and guidance at the Committee on employment and social policy, Geneva, on 9.10.2009. www.ilo.org/wcmsp5/groups/public/@ed_norm/@relconf/documents/meetingdocument/wcms_115454.pdf

ILO (2011a). *A skilled workforce for strong, sustainable and balanced growth: a G20 training strategy*. Geneva: International Labour Organization. www.ilo.org/skills/pubs/WCMS_151966/lang-en/index.htm

ILO (2011b). *Skills for employment policy brief: formulating a national policy on skills development*. Geneva: International Labour Office; Skills and Employability Department, Employment Sector. www.ilo.org/skills/pubs/WCMS_167172/lang-en/index.htm

ILO (2012a). *Guide for the formulation of national employment policies*. Geneva: ILO, International Labour Office, Employment Policy Department. www.ilo.org





ilo.org/wcmsp5/groups/public/---ed_emp/---emp_policy/documents/publication/wcms_188048.pdf

ILO (2012b). *International standard classification of occupations 2008 (ISCO-08): structure, group definitions and correspondence tables. Volume 1*. Geneva: International Labour Office.

ILO (2013a). *Measuring informality: a statistical manual on the informal sector and informal employment*. Geneva: International Labour Office. www.ilo.org/stat/Publications/WCMS_222979/lang-en/index.htm

ILO (2013b). *Regulation concerning statistics of work, employment and labour underutilisation*. Geneva: 19th International Conference of Labour Statisticians. www.ilo.org/global/statistics-and-databases/standards-and-guidelines/resolutions-adopted-by-international-conferences-of-labour-statisticians/WCMS_230304/lang-en/index.htm

ILO (2014a). *Guidelines for inclusion of skills aspects into employment-related analyses and policy formulation at a national level*. Geneva: International Labour Office.

ILO (2014b). *Guide to understanding the KILM*. Geneva: International Labour Organization.

Jaramillo, M. (2013). *Employment growth and segmentation in Peru, 2001–2011: country case study on labour market segmentation*. Geneva: International Labour Organization. Employment working paper; No 151. www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_232513.pdf

Johansen, J. and Gatelli, D. (2012). *Measuring mismatch in ETF partner countries: a methodological note*. Torino: European Training Foundation. Working paper. www.etf.europa.eu/webatt.

[nsf/0/8CD9C37301384D51C1257AAD0038145B/\\$file/Measuring%20mismatch_methodological%20note.pdf](http://nsf/0/8CD9C37301384D51C1257AAD0038145B/$file/Measuring%20mismatch_methodological%20note.pdf)

Kinch, T. (2013). *Anticipating and matching skills demand and supply, labour market signalling of the matching of skills*. Turin: European Training Foundation. ETF internal paper.

Kuddo, A. (2010). Unemployment registration and benefits in ECA countries. *ECA knowledge brief*, April 2011, Vol. 37. Washington, DC: The World Bank. http://siteresources.worldbank.org/INTECALEA/Resources/KB37_Unemployment_Registration_Benefits_ECA.pdf

Mangozho, N. (2003). *Current practices in labour market information systems development for human resources development planning in developed, developing and transition economies*. Geneva: International Labour Organization. EMP/Skills working paper No 13.

ManpowerGroup (2012). *Talent shortage surveys: research results*. Milwaukee: ManpowerGroup. www.manpowergroup.us/campaigns/talent-shortage-2012/pdf/2012_Talent_Shortage_Survey_Results_US_FINALFINAL.pdf

ManpowerGroup (2013a). *Talent shortage survey, 2013: research results*. Milwaukee: ManpowerGroup. www.manpowergroup.com/wps/wcm/connect/587d2b45-c47a-4647-a7c1-e7a74f68fb85/2013_Talent_Shortage_Survey_Results_US_high+res.pdf?MOD=AJPERES

ManpowerGroup (2013b). *The great talent shortage: awakening: actions to take for a sustainable workforce*. Milwaukee: ManpowerGroup. www.manpowergroup.com/wps/wcm/connect/3335c8e9-8b90-4496-adcc-af1e6ca28d6d/2013_Talent_Shortage_WP_FNL_US_hi.pdf?MOD=AJPERES



Murray, A. (2010). *The state of knowledge on the role and impact of labour market information: a survey of the Canadian evidence*. Ottawa: CSLS, Centre for the Study of Living Standards. CSLS research report; No 2010-04. www.csls.ca/reports/csls2010-04.pdf

Nathanson, R. (2010). *Growth, economic policies and employment linkages: Israel*. Geneva: International Labour Organization. Employment working paper; No 83. www.ilo.org/wcmsp5/groups/public/---ed_emp/--emp_policy/documents/publication/wcms_174581.pdf

NILS (2013). *A system for monitoring shortages and surpluses in the market for skills: additional relevant material not directly used for the indicators*. Canberra: AWPA, Australian Workforce and Productivity Agency.

Nutley, S.M. et al. (2000). *What works? Evidence-based policy and practice in public services*. Bristol: The Policy Press.

OECD (2002). *Measuring the non-observed economy: a handbook*. Paris: OECD. www.oecd.org/std/na/1963116.pdf

ihová, H.; Strietska-Illina, O. (2014). *Guidelines for inclusion of skills aspects into employment-related analyses and policy formulation*. Geneva: ILO.

Sparreboom, T. (2013). Labour market information and analysis systems. In: Cazes, S.; Verick, S. (eds). *Perspectives on labour economics for development*. Geneva: International Labour Organization, pp. 256–282. www.ilo.org/global/publications/books/WCMS_190112/lang-en/index.htm

Taghdisi-Rad, S. (2012). *Macroeconomic policies and employment in Jordan: tackling the paradox of job-poor growth*. Geneva: International Labour Organization. Employment working paper; No 118. www.ilo.org/

[wcmsp5/groups/public/---ed_emp/documents/publication/wcms_191243.pdf](http://www.wcmsp5/groups/public/---ed_emp/documents/publication/wcms_191243.pdf)

UKCES (2012). UK Commission's Employer Skills Survey 2011: UK Results. Retrieved from www.ukces.org.uk/publications/employer-skills-survey-2011

United Nations (2008). *Non-observed economy in national accounts: survey of country practices*. Geneva: United Nations. www.unec.org/fileadmin/DAM/stats/publications/NOE2008.pdf

United Nations; ILO (2010). *Handbook on measuring the economically active population and related characteristics in population censuses*. New York: United Nations. Studies in Methods, Series F, No 102.

Weber, T. (2011). Profiling systems for effective labour market integration. Thematic synthesis paper presented at the conference on *Profiling systems for effective labour market integration, Brussels, 11 and 12 May 2011*.

Young, M. (2012). *Strategic workforce planning across national borders*. Brussels: The Conference Board.

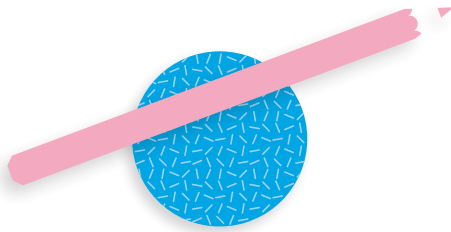
Websites

[URLs accessed 8.12.2014]

Cedefop: *Forecasting skill demand and supply*. www.cedefop.europa.eu/en/about-cedefop/projects/forecasting-skill-demand-and-supply/skills-forecasts.aspx

Czech future skills. www.budoucnostprofesi.cz/en/index.html

European Commission. Employment, social affairs and inclusion: *New Skills for new jobs*. <http://ec.europa.eu/social/main.jsp?catId=822&langId=en>



European Commission: *EU skills panorama*.
<http://euskillspanorama.ec.europa.eu/>

Eurostat: *Statistics* (Employment and unemployment database). http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

ILO: *Ilostat database*. www.ilo.org/ilostat

ILO: *ISCO, international standard classification of occupations*. www.ilo.org/public/english/bureau/stat/isco/

ILO: *KILM – Key indicators of the labour market*.
www.ilo.org/empelm/what/WCMS_114240/lang-en/index.htm

ILO: *Laborsta database*. <http://laborsta.ilo.org/>

ManpowerGroup: *Ninth annual 2014 talent shortage survey*. www.manpowergroup.com/talent-shortage-explorer/

OECD: *PIAAC – Programme for the international assessment of adult competencies: OECD skills survey*. www.oecd.org/site/piaac/

OECD: *PISA – programme for international student assessment*. www.oecd.org/pisa/

Solas: *Employment by occupation – trends and outlook: professionals: accountants and tax experts*.
<http://lmi.fas.ie/>

Swedish employment service: *Yrkeskompassen*.
www.arbetsformedlingen.se/For-arbetssokande/Yrke-och-framtid/Yrkeskompassen.html

Trexima: *ISPV, average earnings information system*.
<http://ispv.cz/en/homepage.aspx>

Unesco Institute for Statistics: *Data to make a difference*. www.uis.unesco.org/Pages/default.aspx

Unesco Institute for Statistics: *ISCED, international standard classification of education*.
www.uis.unesco.org/Education/Pages/international-standard-classification-of-education.aspx

United Nations, Department of Economic and Social Affairs: *ISIC Rev.4 (international standard industrial classification of all economic activities; revision 4)*.
<http://unstats.un.org/unsd/cr/registry/isic-4.asp>

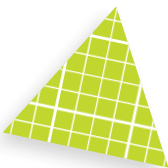
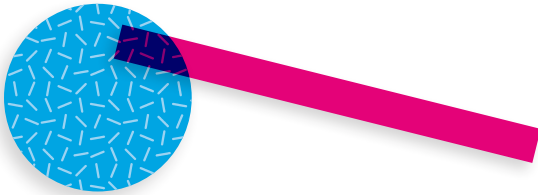
*US O*NET*. www.onetonline.org/

World Bank Group: *Enterprise surveys: what business experience*. www.enterprisesurveys.org/

World Bank. <http://data.worldbank.org/>

ANNEXES: CASE STUDIES

The case studies on Jordan and Ukraine are examples of how labour market information can be used and analysed in different country contexts. The case study on Sri Lanka is about the formulation of a policy for better matching of skills supply and demand supported by international technical assistance.



ANNEX 1.

Case study 1: Ukraine

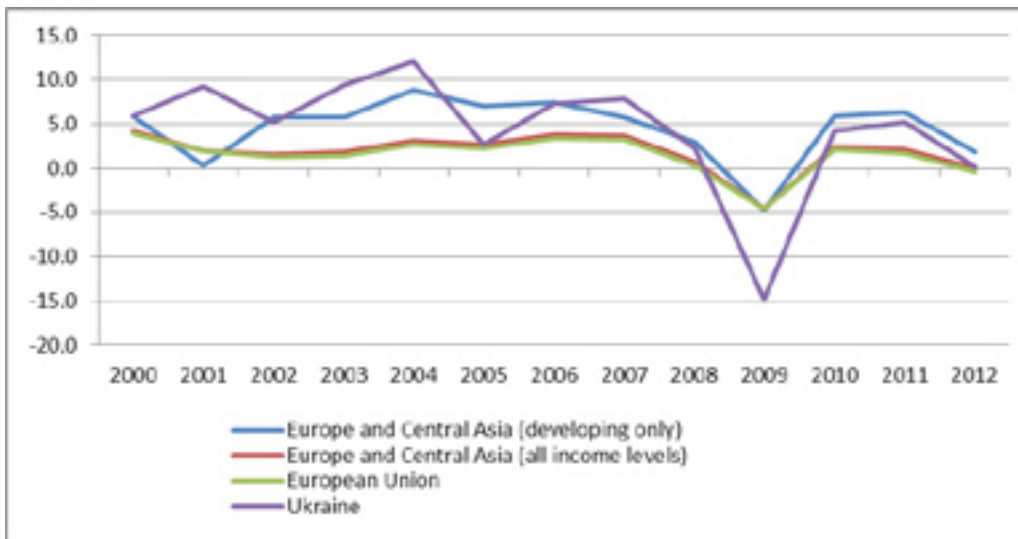
The case study is based on statistical data. Validation and discussion based on qualitative methods are recommended to formulate the final conclusions.

Economic context

The economy of Ukraine had been performing better than Europe and the Central Asia region's total average

until 2008, when the global financial crisis hit the country's economy seriously (Figure A1:1). In 2009, GDP fell by 15% with respect to the previous year. This is also explained by Ukraine's dependence on energy imports⁽¹⁴⁾ and the lack of significant structural reforms, which have made the economy vulnerable to external shocks⁽¹⁵⁾.

Figure A1:1. Annual GDP growth (%)



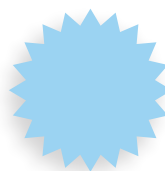
Source: The World Bank: *World development indicators 2014*, www.scribd.com/doc/222646575/World-Development-Indicators-2014 [accessed 8.12.2014].

The economy probably also suffered from having a large shadow economy (slightly above 45% of the

economy in 2007 (World Bank, 2014)) and informal employment (9.4% of non-agricultural employment in

⁽¹⁴⁾ CIA, Central Intelligence Agency: *The world factbook: Europe: Ukraine*, <https://www.cia.gov/library/publications/the-world-factbook/geos/up.html> [accessed 8.12.2014].

⁽¹⁵⁾ The World Bank: Countries: *Ukraine overview*, www.worldbank.org/en/country/ukraine/overview.



2009 (ILO, 2014)). The 2005 budget law made important improvements in hindering these aspects of the economy, but developing capital markets, fighting corruption and improving the legislative framework are still important challenges ⁽¹⁶⁾.

Skills demand

In 2012 the number of employed people in Ukraine was around 20 million (Table A1:1). Almost a quarter of them worked in the trade, hotels and restaurants sector. From 2000 to 2012 the employment trend in the industrial sector decreased in absolute terms. The

employment trend in the agricultural sector had also been decreasing until 2010, while in 2012 it showed a slight recovery. This might be explained by a net inflow of employed people from other sectors due to the economic crisis.

Before the economic crisis, the most dynamic area was the financial sector, where the number of employed more than doubled between 2000 and 2008. This sector, however, only employed a fraction of the population (less than 2%). Trade and business services also experienced a growth trend, even during the crisis (9 percentage points increase from 2000 to 2012).

Table A1:1. Employment by economic activity

	2000 (000s)	2008 (000s)	2012 (000s)	2000 (%)	2008 (%)	2012 (%)
Total	20 175.0	20 972.3	20 354.3	100	100	100
Agriculture, hunting and forestry. Fishing	4 367.0	3 322.1	3 506.7	22	16	17
Industry	4 598.3	3 871.4	3 303.6	23	18	16
Construction	903.6	1 043.4	902.2	4	5	4
Trade; repair of motor vehicles, household appliances and personal demand items. Hotels and restaurants	3 121.3	4 744.4	4 894.1	15	23	24
Transport and communications	1 355.0	1 465.8	1 361.3	7	7	7
Financial activity	166.1	394.9	324.3	1	2	2
Real estate transactions, renting, engineering and provision of services to businessmen	815.9	1 150.4	1 202.5	4	5	6
Public administration	1 198.6	1 067.5	1 079.41	6	5	5
Education	1 609.7	1 702.4	1 672.9	8	8	8
Health care and provision of social aid	1 379.6	1 369.9	1 309.9	7	7	6
Other types of economic activity	659.9	840.1	797.4	3	4	4

Source: State Statistics Service of Ukraine, www.ukrstat.gov.ua/.

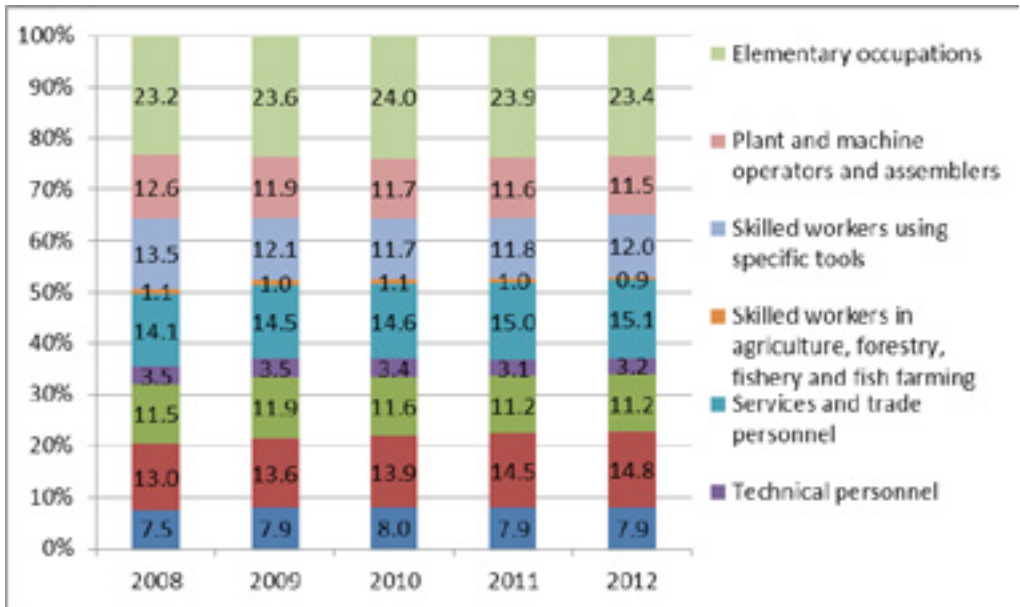
⁽¹⁶⁾ CIA, Central Intelligence Agency: *The world factbook: Europe: Ukraine*, <https://www.cia.gov/library/publications/the-world-factbook/geos/up.html> [accessed 8.12.2014].



Despite the highlighted trends by sector, the occupational composition of Ukrainian employment has remained almost stable (Figure A1:2). Almost a quarter of the total employed over the period have been working in occupations typically requiring only primary

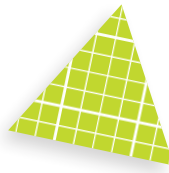
education (ISCO 1), while about 40% have been working in occupations requiring secondary or post-secondary non-tertiary education (ISCO 2-3) and about 35% in occupations requiring tertiary education (ISCO 4).

Figure A1:2. Employment by occupation, age group 15–70 (%)



Source: State Statistics Service of Ukraine, 2009; 2010; 2012; 2013.



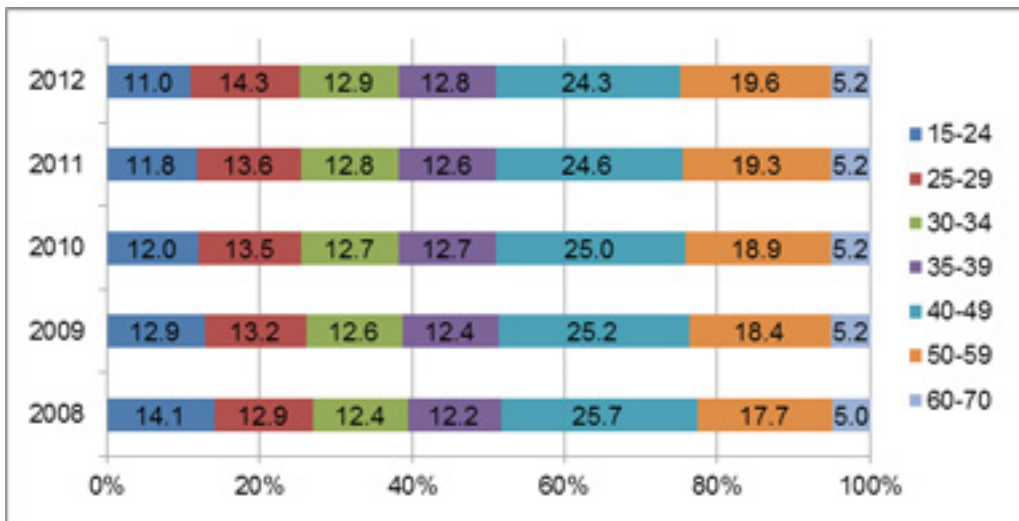


Skills supply

The labour force has been getting older (Figure A1:3). The share of the age group 15–24 in the labour force

has decreased by around 3 percentage points, while the share of workers over 50 years old in the labour force has risen by almost 2 percentage points.

Figure A1:3. Labour force (employed + unemployed) by age (%)



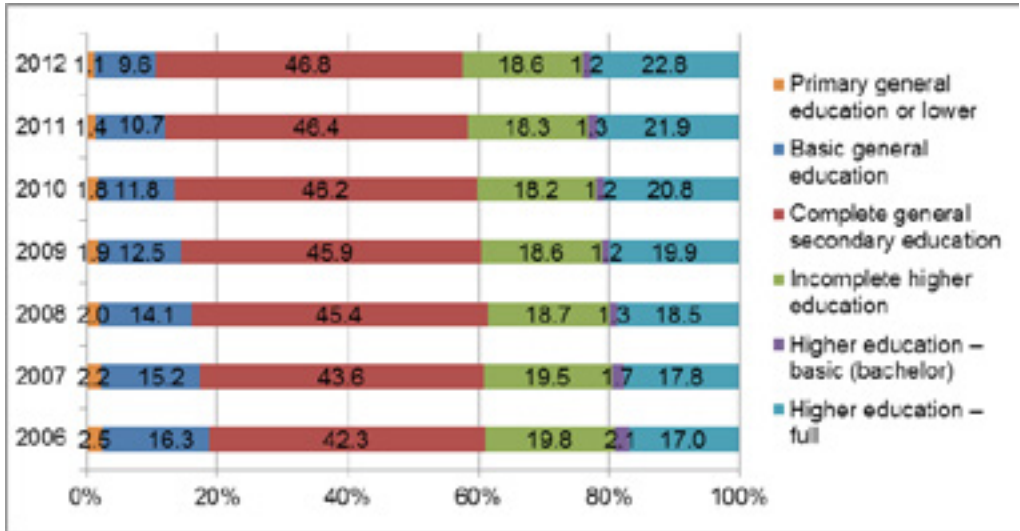
Source: State Statistics Service of Ukraine, 2009; 2010; 2012; 2013.

The educational structure of the Ukrainian population has been moving towards higher education attainment (Figure A1:4). In 2012 around 11% had basic or lower education compared to around 19% in 2006. The share of people with complete or incomplete higher education grew from around 39% to around 43% in the same period. The share of people having attained

full higher education grew faster, by around one third over the period examined. The share of people with incomplete tertiary education has remained stable at a high level. Although in part such a trend reflected the number of those still in higher education, it might have also been driven by a stable number of drop-outs.



Figure A1:4. Population by highest educational attainment, age group 15–70 (%)



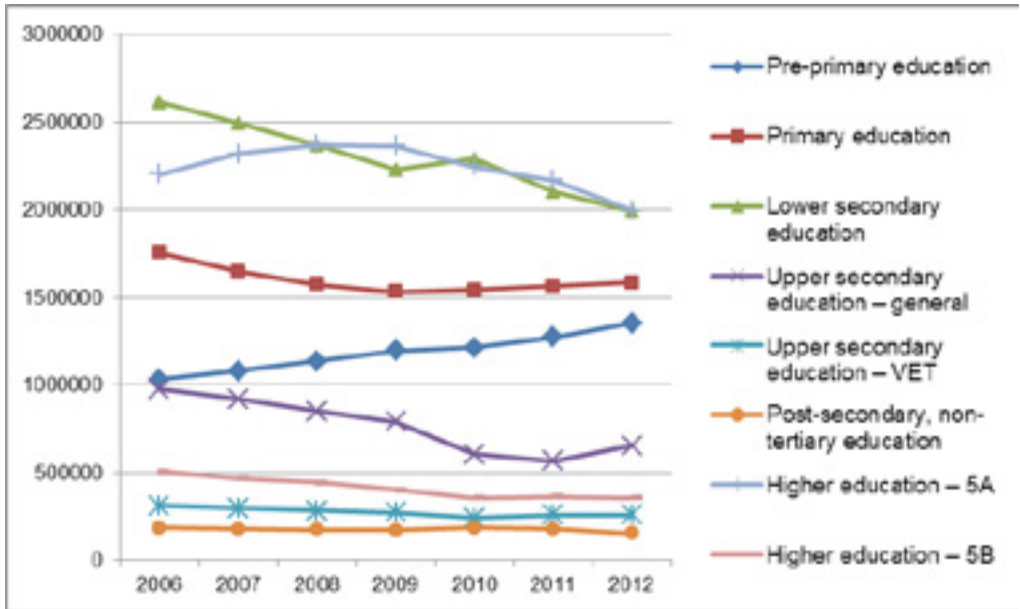
Source: State Statistics Service of Ukraine, 2009; 2010; 2012; 2013.

From 2006 to 2012, total enrolment in pre-primary education increased (Figure A1:5), which is an important precondition for stronger female participation in the labour market. While enrolment at lower-secondary level has been decreasing, in 2012 upper-secondary level enrolment reversed the trend. At upper-secondary level more students have been involved in general education than in TVET. While enrolment in TVET has been more stable, in general upper-secondary education it was in decline until 2011.

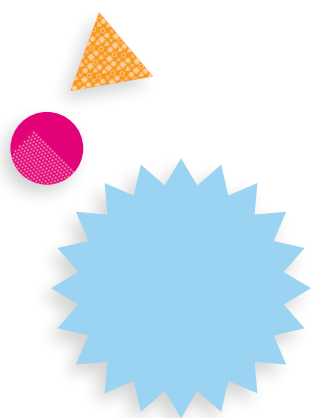
The enrolment rate in tertiary education has been following different trends according to the type of programme: for shorter programmes (ISCED 5B), the trend had been decreasing until 2010 and then became almost stable, while for longer programmes (ISCED 5A) it had been growing until 2009, when it started decreasing.

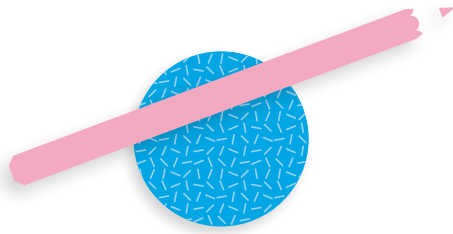


Figure A1:5. Enrolment in education (both public and private) by level and programme



Source: Unesco-UIS, http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=136&IF_Language=eng&BR_Topic=0 [accessed 17.3.2014].

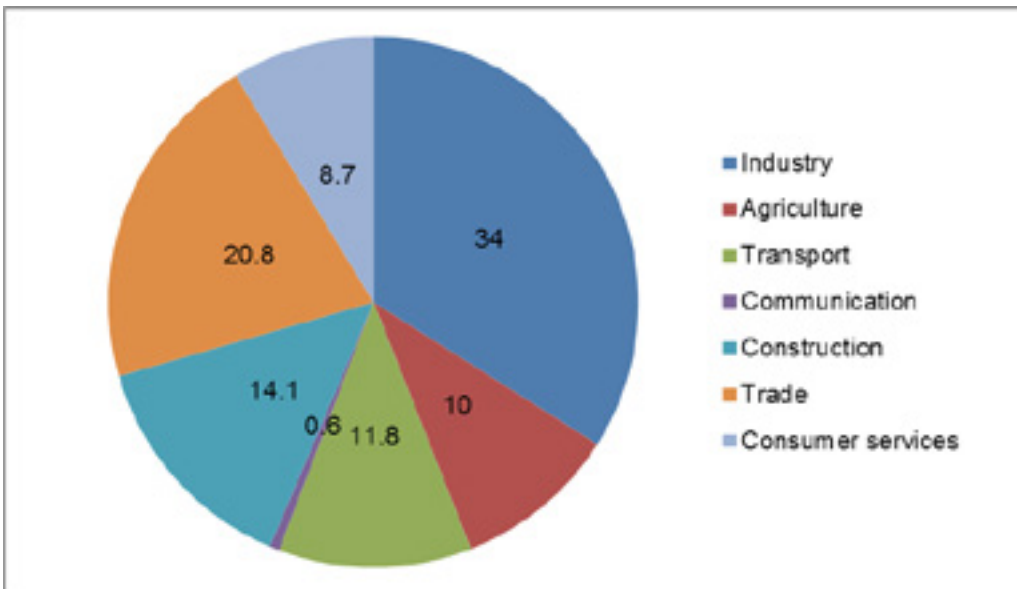




Among TVET students in 2011 (Figure A1:6) the most attractive fields were industry (34%) and trade (around 21%). It would be interesting to analyse the evolution

over time of participation in TVET by field of study with respect to the employment trends by sector, in order to observe any eventual correlation between the two.

Figure A1:6. Participation in TVET by field of study, 2011 (%)



Source: Ministry of Education and Science, 2014 data.





Skills mismatch

In 2012, the total unemployment rate reached 7.5%, the highest level in the region (Table A1:2).

Table A1:2. Unemployment rate (%)

	2012
Belarus	0.6
Moldova	5.7
Russia	5.5
Ukraine	7.5

Notes: Data for Belarus refer to age group 16–59 (men) and 16–54 (women); data for Moldova refer to age group 15–64; data for Ukraine refer to age group 15–70.

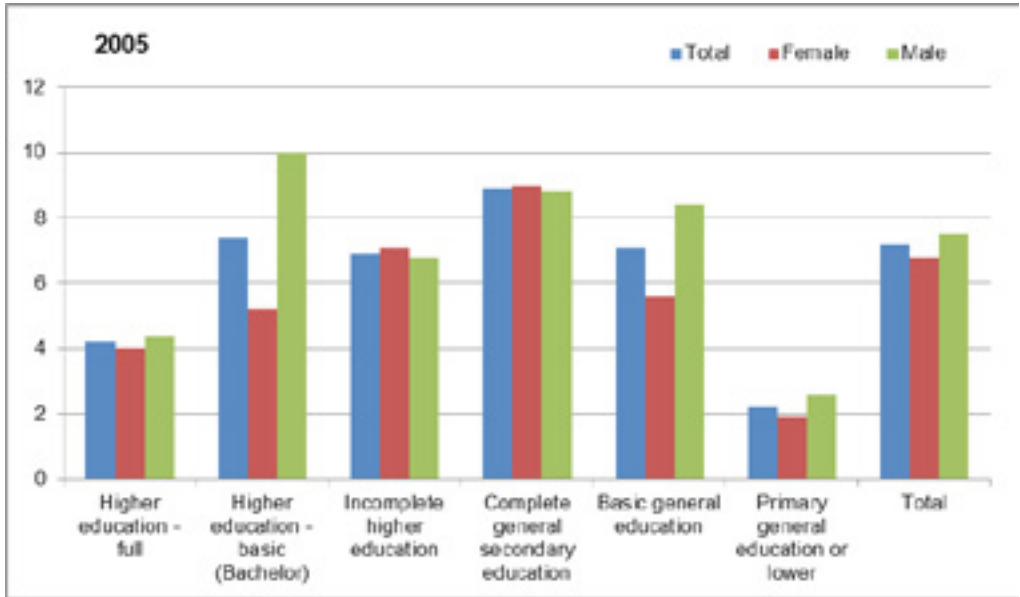
Sources: Belarus: National Statistical Committee, 2013; Moldova: National Bureau of Statistics: *Labour force survey*, <http://statbank.statistica.md> [accessed 14.2.2014]; Russia: Federal State Statistics Service: Economic activity of the population of Russia, www.gks.ru/bgd/regl/b12_61/Main.htm [accessed 3.12.2013]; Ukraine: State Statistics Service of Ukraine, 2013.

The comparison of unemployment rates by education in 2005 and 2012 (Figures A1:7 and A1:8) indicates possible growing mismatches at higher-education level, which has registered the most significant changes. While in 2005 the unemployment rate of the population with bachelor degrees was lower (around 7%) than for general secondary education (around 9%), in 2012 it was significantly higher (almost 13%) than for people at all other levels of education, which remained almost stable over time. Nevertheless, only between 1

and 2% of the population has participated at this level of education over the period considered (State Statistics Service of Ukraine, 2009; 2010; 2012; 2013).

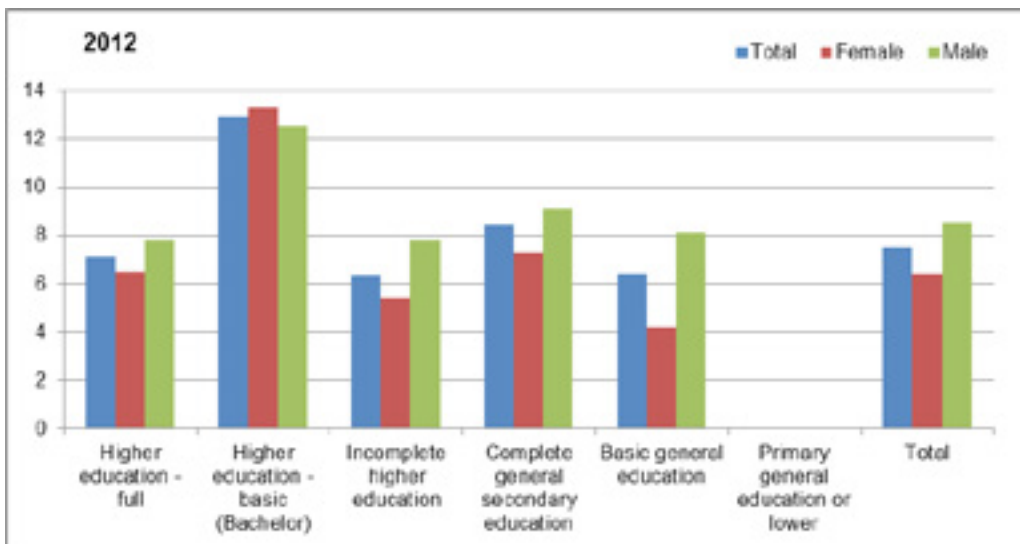
The unemployment gap between the population with full tertiary education and lower levels of education has narrowed. This might be explained by the relatively quick rise of people with higher education which the labour market has not been able to absorb at the same pace or by the lack of labour market relevance of higher education curricula.

Figure A1:7. Unemployment rate by education and sex (2005), age group 15–70 (%)



Source: State Statistics Service of Ukraine, 2013.

Figure A1:8. Unemployment rate by education and sex (2012), age group 15–70 (%)



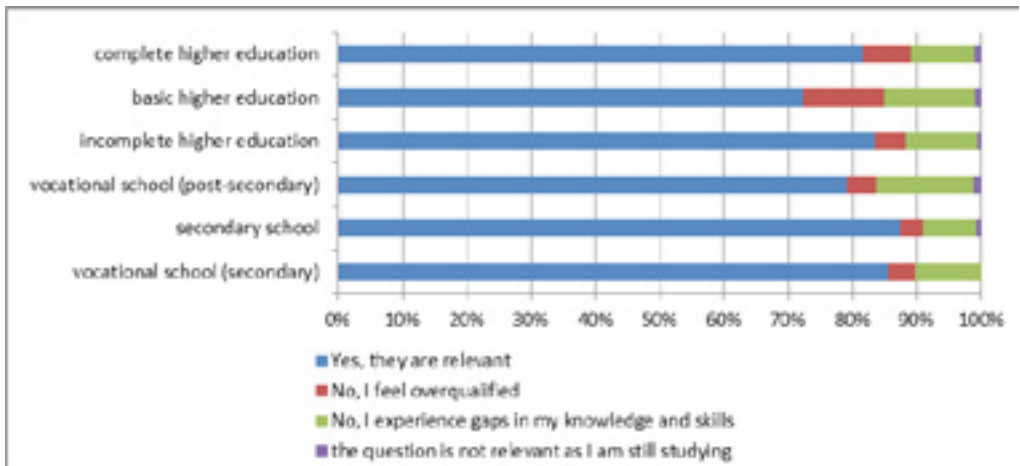
Source: State Statistics Service of Ukraine, 2013.



In 2013 around 80% of young people in Ukraine thought that their education and training were relevant for their current jobs (Figure A1:9). Among those who felt some type of mismatch, experience of skills gaps or need for additional training was more frequent than overqualification. People with complete and incomplete

higher education did not much differ in this respect from people with secondary education. The highest share of those more strongly perceiving a skills gap was among people with vocational post-secondary education, while those with basic higher education (bachelor degree) were feeling overqualified.

Figure A1:9. Subjective mismatch as perceived by education level (2013), age group 15–29 (%)



Note: Data refer to people aged 15–29 who are employed and are not currently enrolled in education.

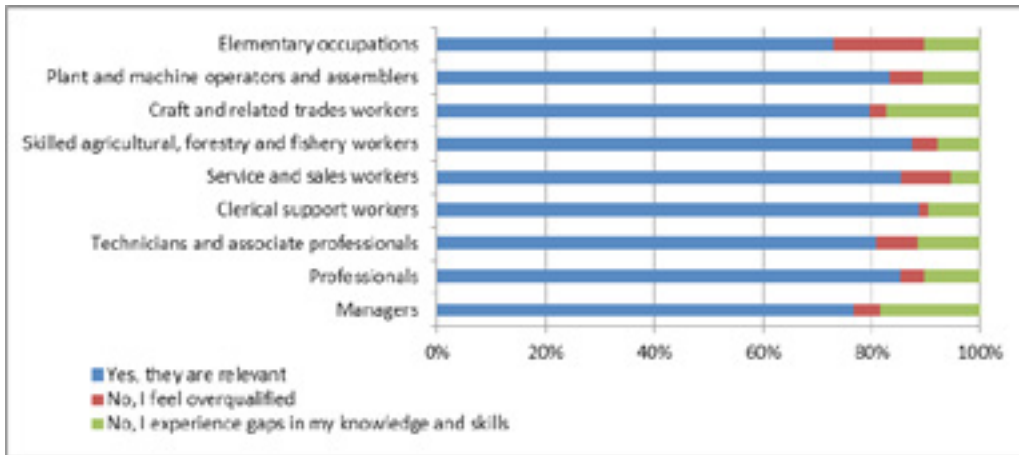
Source: Own calculations based on ILO SWTS.

From the occupational perspective (Figure A1:10), the highest share of people who felt the presence of a skills gap was among managers and craft workers.

In the case of the craft workers, the data point to possible problems in vocational education.



Figure A1:10. Subjective mismatch as perceived by occupation (2013), age group 15–29 (%)



Note: Data refer to people aged 15–29 who are employed and are not currently enrolled in education.

Source: Own calculations based on ILO SWTS.

References

ILO (2014). *Laborsta*. http://laborsta.ilo.org/informal_economy_E.html.

National Statistical Committee of the Republic of Belarus (2013). *Statistical yearbook of the Republic of Belarus*. Minsk: National Statistical Committee of the Republic of Belarus. http://belstat.gov.by/en/bgd/katalog-publikatsii/public_compilation/index_94/

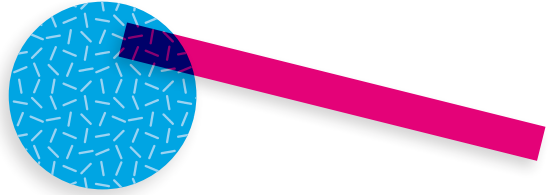
State Statistics Service of Ukraine (2009). *Economic activity of population in Ukraine: 2008*. Kiev: State Statistics Service of Ukraine.

State Statistics Service of Ukraine (2010). *Economic activity of population in Ukraine: 2009*. Kiev: State Statistics Service of Ukraine.

State Statistics Service of Ukraine (2012). *Economic activity of population in Ukraine: 2011*. Kiev: State Statistics Service of Ukraine.

State Statistics Service of Ukraine (2013). *Economic activity of population in Ukraine: 2012*. Kiev: State Statistics Service of Ukraine.

The World Bank (2014). *Ukraine special focus: a roadmap for urgent macroeconomic and structural reforms*. Washington: The World Bank. www.worldbank.org/content/dam/Worldbank/document/eca/ukraine/ua-focus-april-2014-en.pdf



Websites

[URLs accessed 8.12.2014]

CIA, Central Intelligence Agency: *The world factbook*,
<https://www.cia.gov/library/publications/the-world-factbook/geos/up.html>

National Bureau of Statistics of the Republic of Moldova: *Labour force survey*,
<http://statbank.statistica.md>

Federal State Statistics Service of the Russian Federation: *Economic activity of the population of Russia*, www.gks.ru/bgd/regl/b12_61/Main.htm.

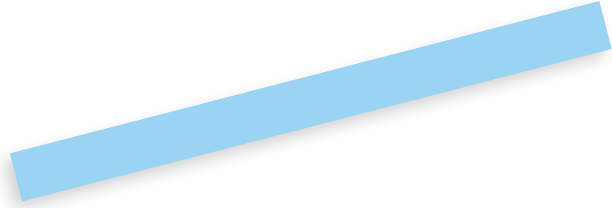
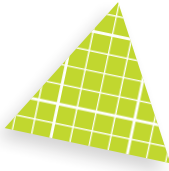
State statistics service of Ukraine, www.ukrstat.gov.ua/.

The World Bank: Countries: *Ukraine overview*,
www.worldbank.org/en/country/ukraine/overview

The World Bank: *World development indicators 2014*,
www.scribd.com/doc/222646575/World-Development-Indicators-2014

Unesco-UIS: *Create a dataset*,
http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=136&IF_Language=eng&BR_Topic=0





ANNEX 2. Case study 2: Jordan

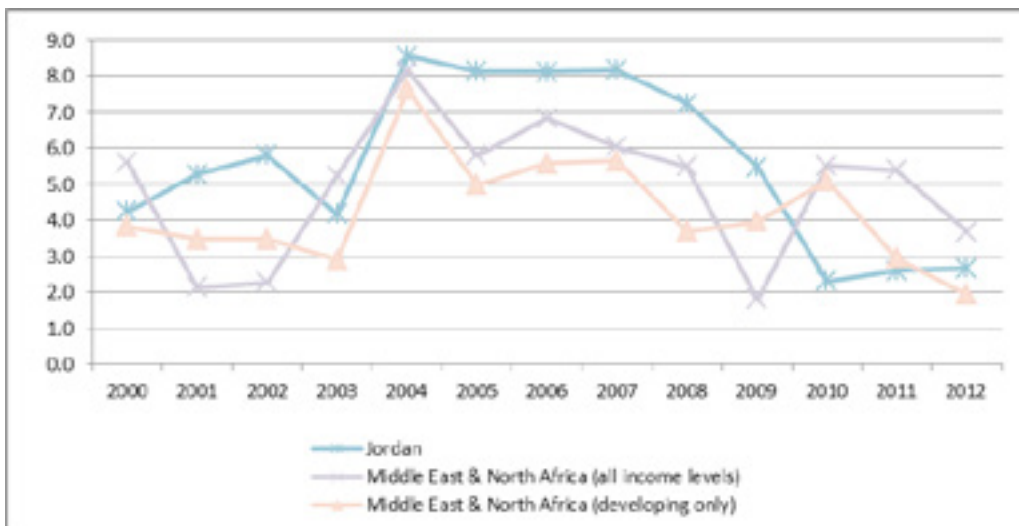
The case study is based on statistical data. Validation and discussion based on qualitative methods are recommended to formulate the final conclusions.

Economic and labour market context

Between 2004 and 2007, the Jordanian economy grew at around 8% with respect to the previous year, after

which its growth started to slow (Figure A2:1). However, it never fell into recession: after having reached the lowest growth rate in 2010 (2.3%), it slightly recovered, although at a slower speed than before 2004 (less than half). Jordan is vulnerable to external shocks due to its energy import dependency⁽¹⁷⁾.

Figure A2:1. Annual GDP growth rate (%)



Source: The World Bank: *World development indicators 2014*, www.scribd.com/doc/222646575/World-Development-Indicators-2014 [accessed 8.12.2014].

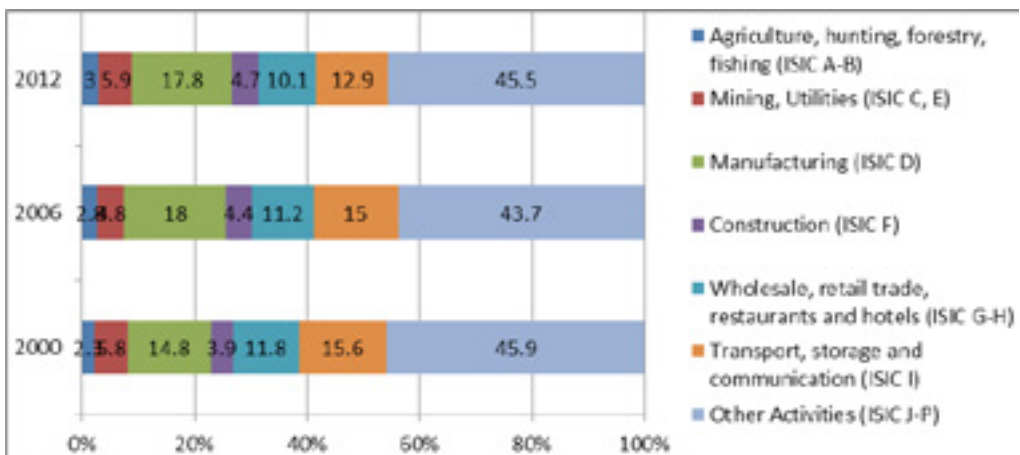
⁽¹⁷⁾ The World Bank: Countries: *Jordan overview*, www.worldbank.org/en/country/jordan/overview [accessed 8.12.2014].



More than two-thirds of the Jordan gross value added (GVA) in 2012 was produced by services (Figure A2:2). Other activities, including public administration, education and financial intermediation, created around 45% of total GVA, followed by manufacturing (18%), transport, storage and communication (around 13%). Agriculture created only 3% of total GVA, due to the country's climate and lack of water in particular ⁽¹⁸⁾.

During 2004–07, manufacturing was the most rapidly growing sector at about 10% average annual change (Figure A2:3). The recession substantially hit the manufacturing sector, which grew annually by around 3% on average over 2008–12. The sector most affected was construction, whose annual average growth rate fell from almost 10% (2004–07) to around 1% (2008–12). After 2008, services also have undergone slower growth, to around 3% per year on average.

Figure A2:2. Structure of gross value added by economic activity, Jordanian dinar at current prices (%)



Note: Data refer to ISIC Rev. 3.1.

Source: Own calculations based on United Nations: *National accounts main aggregates database*, <https://unstats.un.org/unsd/snaama/selCountry.asp>.



⁽¹⁸⁾ The World Bank: *World development indicators 2014*, www.scribd.com/doc/222646575/World-Development-Indicators-2014.

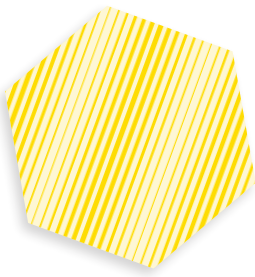
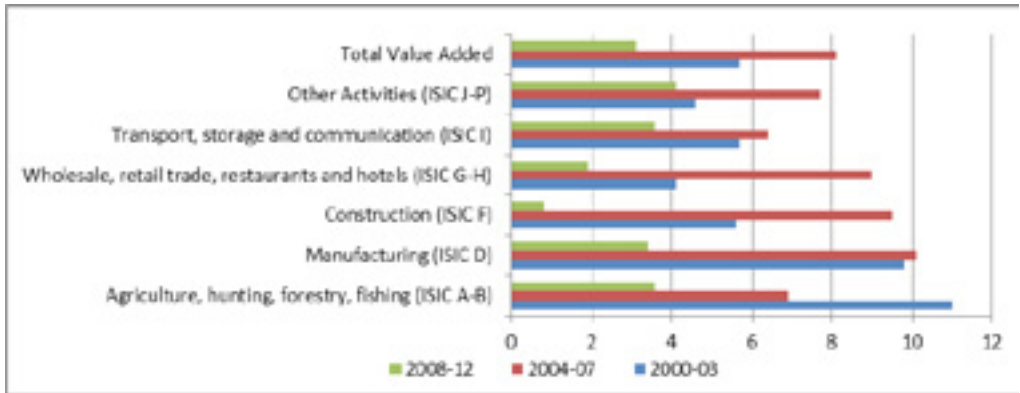


Figure A2:3. Value added annual average growth rate by economic activity (%)



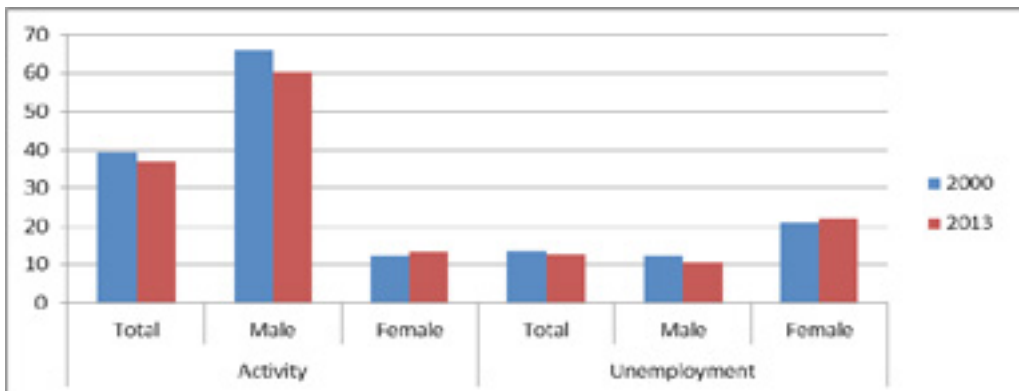
Note: Data refer to ISIC Rev. 3.1.

Source: Own calculations based on United Nations: *National accounts main aggregates database*, <https://unstats.un.org/unsd/snaama/selCountry.asp>.

The Jordanian labour force in 2012 reached around 1.7 million people⁽¹⁹⁾. Activity rates for people aged 15+ in 2013 are quite low, but with substantial differences by sex (Figure A2:4). The female activity rate did not reach 15%, almost the same as the 2000 level, while for

males it has been four times higher (60%), with a contraction of about 5 percentage points between 2000 and 2013. The unemployment rate has been quite restrained, but in 2013 the level for females (around 20%) was almost double that for males (around 10%).

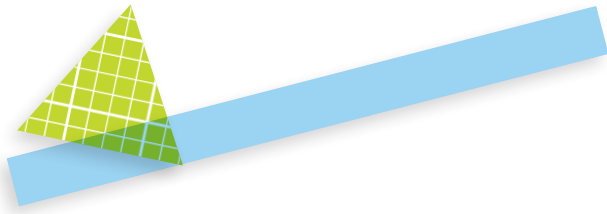
Figure A2:4. Activity and unemployment rates by gender, age group 15+ (%)



Note: Data refer to refined activity rates, which are calculated as the ratio between labour force and population aged 15+.

Source: Department of statistics, 2014.

⁽¹⁹⁾ The World Bank: *World development indicators 2014*, www.scribd.com/doc/222646575/World-Development-Indicators-2014.



Skills demand

In 2013, around a quarter of the employment in Jordan was concentrated in public administration and defence (Table A2:1). The share of the public sector in total

employment has grown only slightly with respect to 2010 (+2 percentage points). 'Wholesale and retail trade' and 'manufacturing' have absorbed around 16% and 10% respectively of employment in Jordan.

Table A2:1. Employment by economic activity (%)

	2010	2013
A – Agriculture, forestry and fishing	2.0	2.0
B – Mining and quarrying	0.9	1.0
C – Manufacturing	10.4	9.9
D – Electricity, gas, steam and air conditioning supply	0.8	0.6
E – Water supply; sewerage, waste management and remediation	0.2	0.2
F – Construction	6.4	6.4
G – Wholesale and retail trade; repair of motor vehicles and motorcycles	16.1	15.7
H – Transportation and storage	8.3	7.6
I – Accommodation and food service activities	2.2	2.5
J – Information and communication	1.8	1.6
K – Financial and insurance activities	1.6	1.9
L – Real estate activities	0.4	0.6
M – Professional, scientific and technical activities	2.2	2.3
N – Administrative and support service activities	1.5	1.3
O – Public administration and defence; compulsory social security	24.1	26.2
P – Education	12.1	12.1
Q – Human health and social work activities	5.1	5.0
R – Arts, entertainment and recreation	0.5	0.3
S – Other service activities	2.5	2.2
T – Activities of households	0.4	0.3
U – Activities of extraterritorial organisations and bodies	0.4	0.3
Total	100.0	100.0

Note: Data refer to ISIC Rev 4.

Source: Department of statistics: *statistics by sectors*, www.dos.gov.jo/dos_home_e/main/.

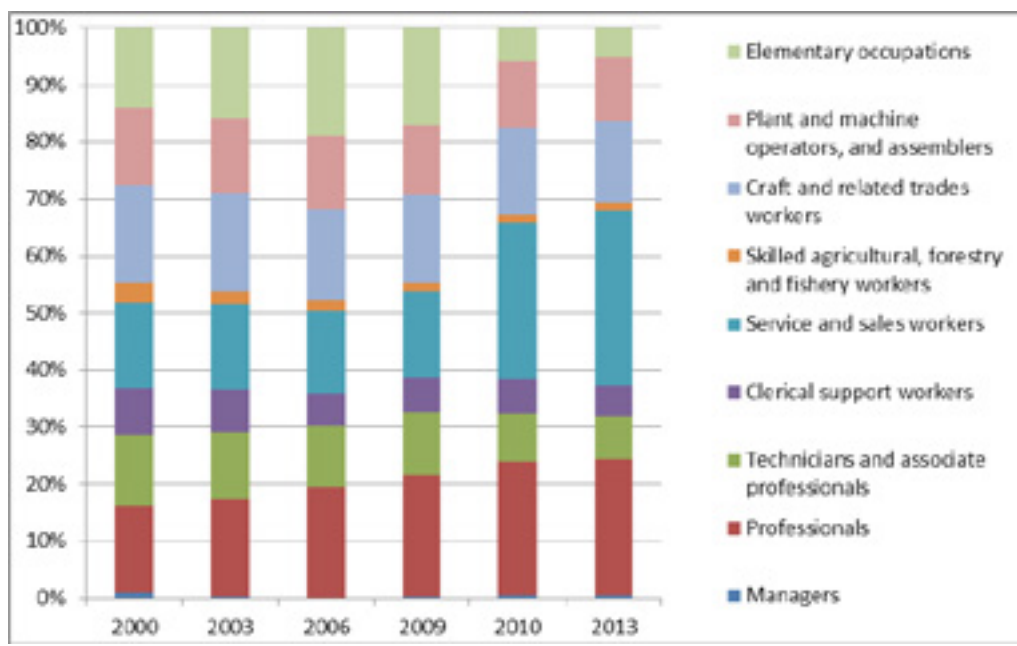


The occupational structure of employment has developed over time (Figure A2:5), suggesting adjustments in skills demand. While the share of the employed working in occupations typically requiring only primary education (ISCO 1) has fallen almost 75%, that of those working as service workers (ISCO 2-3) has almost doubled. Among those occupations requiring higher education (ISCO 4), only professionals registered a positive trend (about 5 percentage points).

The occupational distribution of employment in recent years has been significantly different between men and

women (Figure A2:6). Around 70% of employed women have been working in professions requiring completion of tertiary education (ISCO 3-4), compared to around 25% of employed men. Around half of employed men have been working in professions requiring secondary education completion (ISCO 2), compared to around 20–25% of employed women. While the share of employed women working in elementary occupations (ISCO 1) has not substantially changed over time (between 5 and 10%), that for men has decreased to almost a quarter (from around 20 to around 5%).

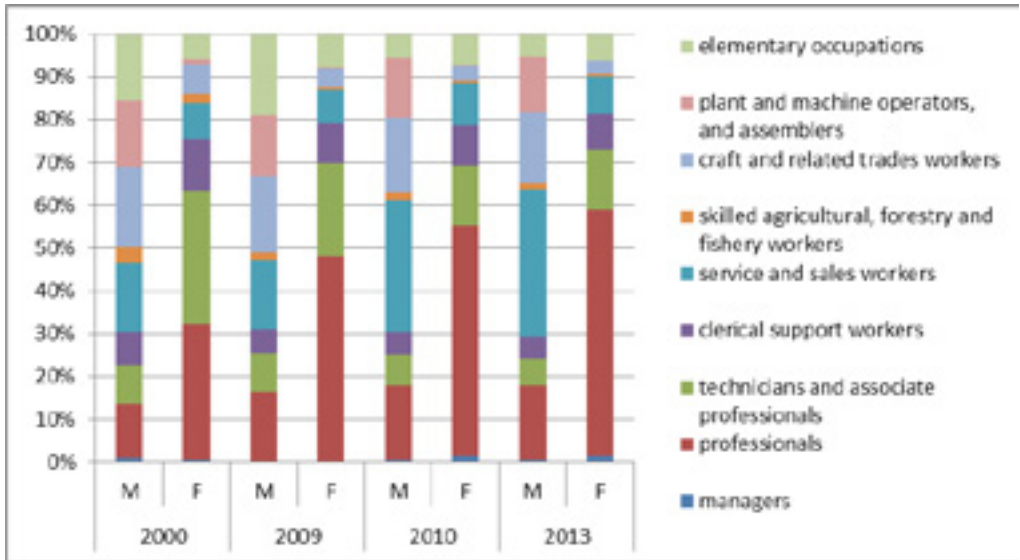
Figure A2:5. Employment by occupation, age group 15+ (%)



Source: Department of statistics, 2014.



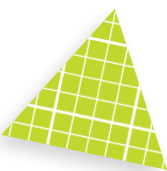
Figure A2:6. Employment by occupations and sex, age group 15+ (%)



Source: Department of statistics, 2014.

Quite a high level of rigidity in occupational structure over time can also be observed in some sectors. Figures A2:7 to A2:10 show the occupational structure of selected sectors absorbing a high share of employment or whose share has been growing in recent years. The share of qualified occupations inside the sectors has not significantly changed, with the

exception of the 'public administration and defence'. As shown in Figure A2:8, up to 2009 the share of highly skilled workers in the sector has been significant, while starting from 2010 this has substantially decreased. Such a trend might be explained by the introduction in 2010 of the ISIC Rev 4 classification, which grouped the employed differently among sectors.



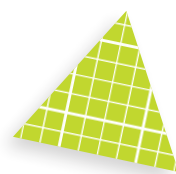
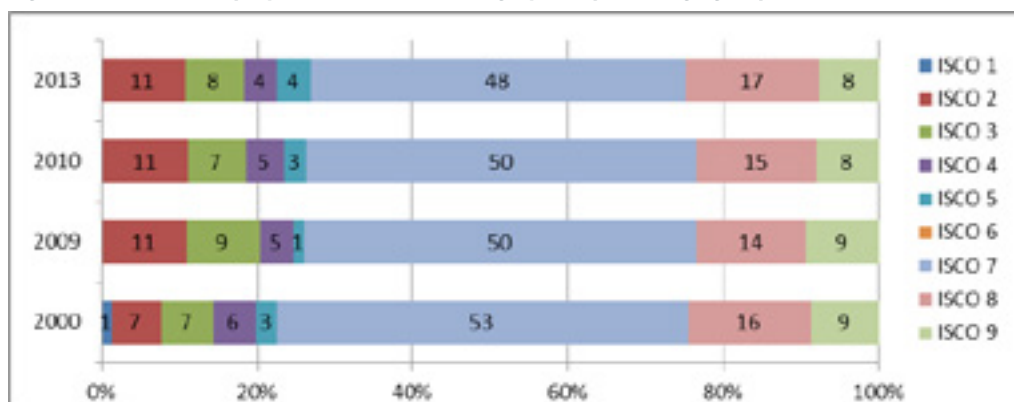


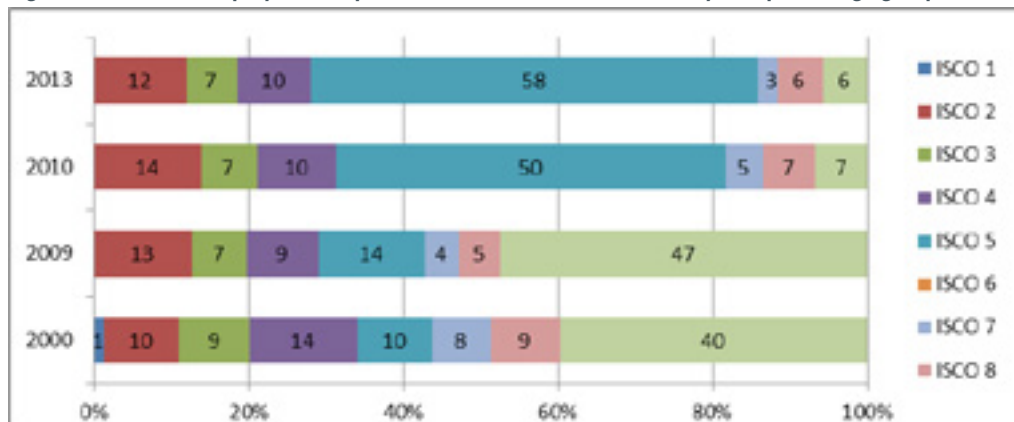
Figure A2:7. Employment in manufacturing by occupation, age group 15+ (%)



Note: Change of classification – ISIC Rev 3.1 until 2009, ISIC Rev 4 since 2010.

Source: Department of statistics: population and housing: surveys: *employment and unemployment*, www.dos.gov.jo/dos_home_e/main/.

Figure A2:8. Employment in public administration and defence by occupation, age group 15+ (%)

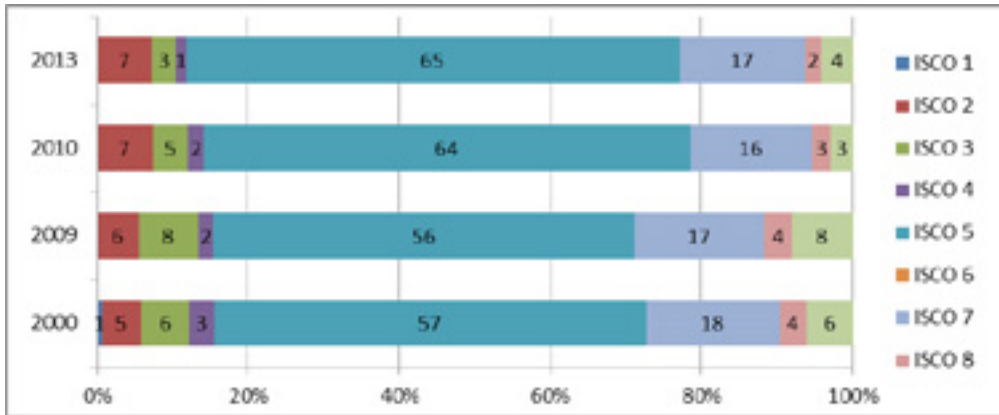


Note: Change of classification – ISIC Rev 3.1 until 2009, ISIC Rev 4 since 2010.

Source: Department of statistics: population and housing: surveys: *employment and unemployment*, www.dos.gov.jo/dos_home_e/main/.



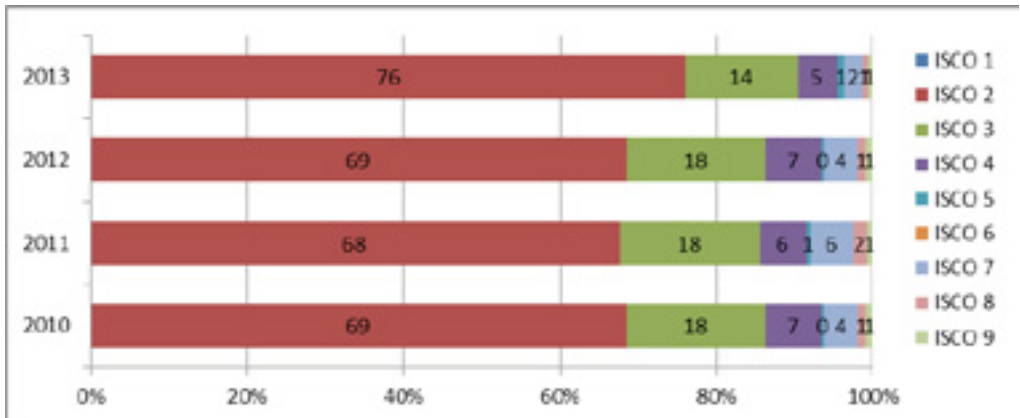
Figure A2:9. Employment in wholesale and retail trade by occupation, age group 15+ (%)



Note: Change of classification – ISIC Rev 3.1 until 2009, ISIC Rev 4 since 2010.

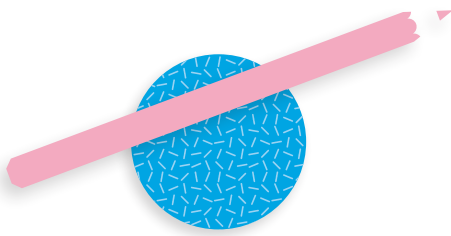
Source: Department of statistics: population and housing: surveys: *employment and unemployment*, www.dos.gov.jo/dos_home_e/main/.

Figure A2:10. Employment in professional, scientific and technical activities by occupation, age group 15+ (%)



Note: Change of classification – ISIC Rev 3.1 until 2009, ISIC Rev 4 since 2010.

Source: Department of statistics: population and housing: surveys: *employment and unemployment*, www.dos.gov.jo/dos_home_e/main/.

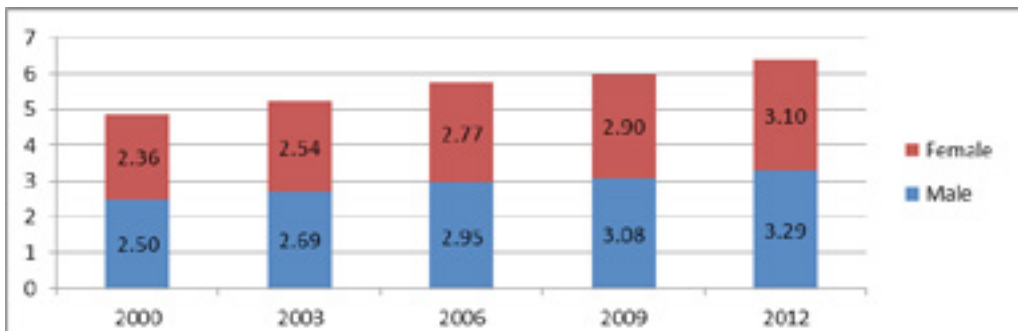


Skills supply

The total population of Jordan has grown significantly in recent years, from around 4.9 million in 2000 to around 6.4 million in 2012 (Figure A2:11). The growth

has been driven by demographic trends (increased life expectancy, reduced child mortality⁽²⁰⁾) but also by high immigration flows into the country (in 2013, immigrants made up 40.2% of the total population (United Nations, 2013)).

Figure A2:11. Total population (million)



Note: 2012 data do not include Syrian refugees.

Source: Department of statistics: *statistics by sectors*, www.dos.gov.jo/dos_home_e/main/.

The population of Jordan is very young. In 2012, about 60% of the total population was less than 25 years old (Figure A2:12). The pressure from such large young cohorts entering the labour market might cause an imbalance between employment demand and supply in the coming years.

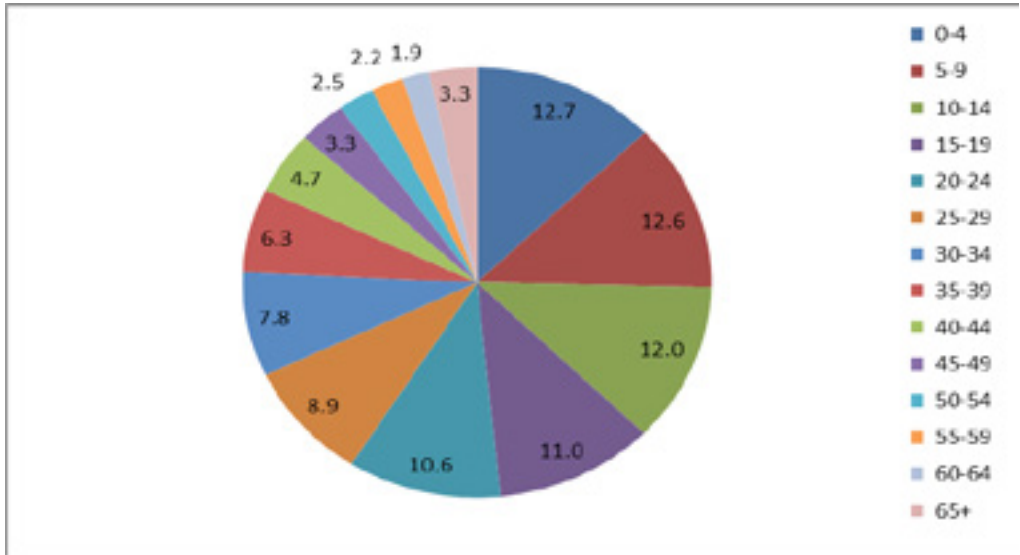
The share of the population with a bachelor or intermediate diploma has been growing rapidly, moving from 17% in 2000 to 23% in 2013 (Figure A2:13). In contrast, in 2013 almost 60% of the population in Jordan had basic or lower education. In 13 years, the share of illiterate people declined from 11% to 7%.

The gender gap in educational attainment persists, but it has been shrinking. The share of female illiterates decreased from 17% in 2000 (almost three times the share of male ones) to 10% in 2013 (two and a half times the share of male ones). In the same period, female tertiary educational attainment more than doubled, from 6% to 14%, reducing the gender gap from 5 to 2 percentage points.

There is no gender gap for educational attainment at secondary level. In 2013, the share of the population with a vocational apprenticeship was limited to 1% among males, half of the share in 2000.

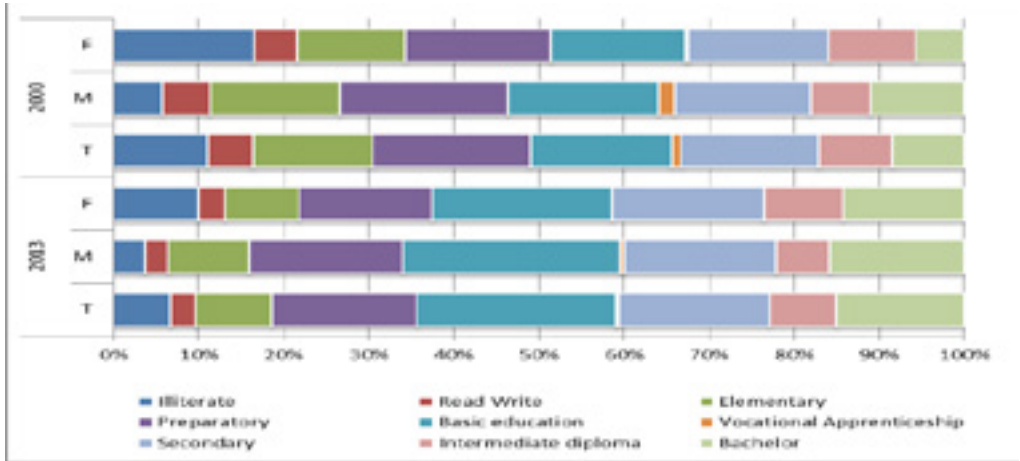
⁽²⁰⁾ The World Bank: *World development indicators 2014*, www.scribd.com/doc/222646575/World-Development-Indicators-2014 [accessed 8.12.2014].

Figure A2:12. Population by age group, 2012 (%)



Source: Department of statistics: *statistics by sectors*, www.dos.gov.jo/dos_home_e/main/.

Figure A2:13. Educational attainment of population by sex, age group 15+ (%)



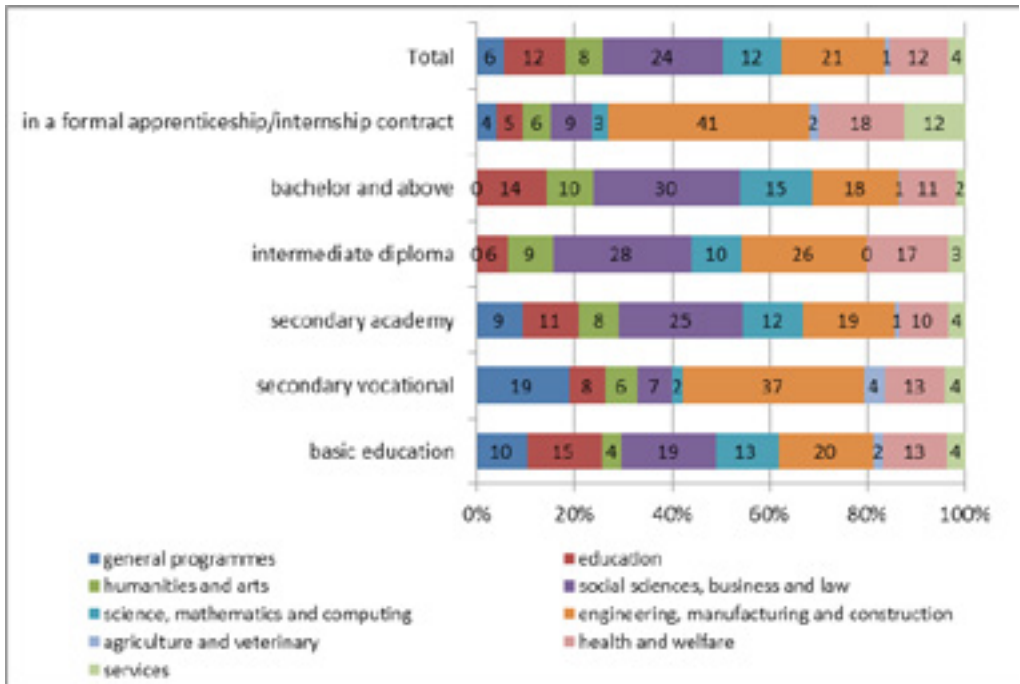
Source: Department of statistics: *statistics by sectors*, www.dos.gov.jo/dos_home_e/main/.

According to the 2012–13 ILO school-to-work transition survey (SWTS), at tertiary and at general secondary level ‘social sciences, business and law’ (respectively, 30% and 25%) and ‘engineering, manufacturing and construction’ (18% and 19%) have been the fields of study with the highest share of enrolled students

(Figure A2:14) among people aged 15–29. At vocational secondary level and among people ‘in a formal apprenticeship/internship contract’, ‘engineering, manufacturing and construction’ has been the most popular field of study by far (respectively, 37% and 41%).



Figure A2:14. Enrolment in education by level and field of education (2012–13), age group 15–29 (%)



Note: Data refer to people aged 15–29 who are employed and are not currently enrolled in education. The survey took place in the period December 2012–January 2013.

Source: Own calculations based on ILO SWTS.

Skills mismatch

Although the gender gap in educational attainment has been greatly reduced, it remains significant in terms of employment status among the population aged 15–29 not enrolled in education (Figure A2:15). In the period covered by the 2012–13 ILO SWTS, males were much more active in the labour market than females.

The highest rate of inactivity for males, scored by those with a less than elementary and secondary vocational education (around 10%), is far lower than that for females with the same educational attainment (100% and around 70%). Males with a vocational education and training diploma made up the highest share of the employed (around 90%). Among males with intermediate diplomas and bachelor degrees the



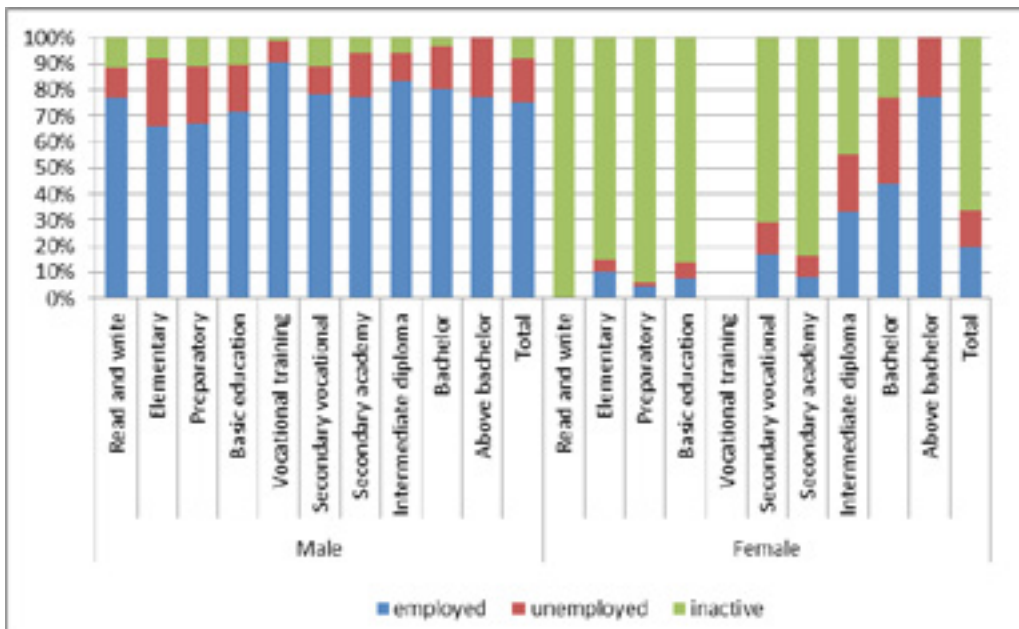


share of the employed has also been relatively high (around 80%); the lowest shares have been among males with basic, preparatory and elementary education (65–70%). The highest shares of the unemployed (more than 20%) have been among males with elementary and advanced tertiary educational attainment, followed by those with a preparatory education level (around 20%).

The share of active females with less than intermediate diplomas has been below 20%, with the exception

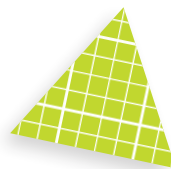
being those with a vocational secondary diploma (around 30%). Within this group, between one third and one half of those who are active are unemployed. The share of active females has been much higher for those with intermediate (around 55%) and bachelor diplomas (around 75%) and has reached the same level as males only for those with advanced tertiary educational attainment. The share of unemployed females with intermediate and bachelor diplomas (respectively around 20% and 30%) is almost double that for males at the same education level.

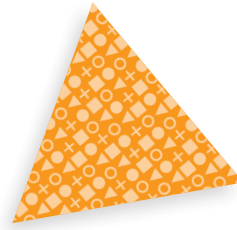
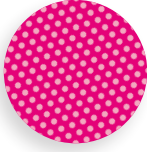
Figure A2:15. Labour market status of people not enrolled in education (2012–13), age group 15–29 (%)



Note: Data refer to people aged 15–29 who are employed and are not currently enrolled in education. The survey took place in the period December 2012–January 2013. The above bachelor category is not reliable because of the small number of respondents in the category.

Source: Own calculations based on ILO SWTS.

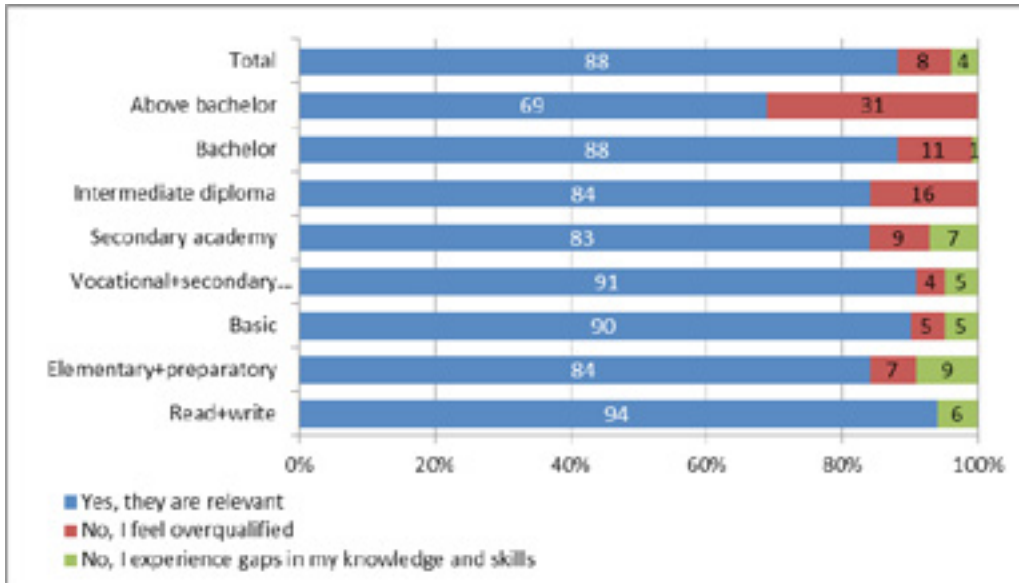




Skills mismatch has been subjectively perceived as rather low by employed people aged 15–29 (Figure A2:16). On average, around 90% of the population believe they hold relevant skills for their job, with the exception of those holding an advanced tertiary

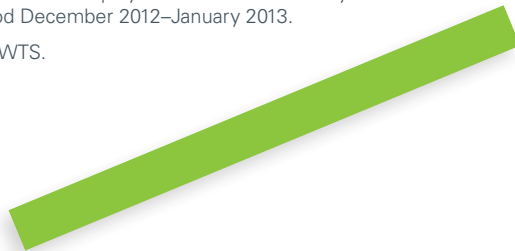
diploma; almost one third of these declared themselves overqualified. Among those perceiving a skills mismatch, overqualification is on average stronger than skills gap (8 versus 4%).

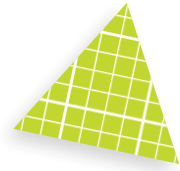
Figure A2:16. Subjective skills mismatch perceived by employed people by level of education (2012–13), age group 15–29 (%)



Note: Data refer to people aged 15–29 who are employed and are not currently enrolled in education. The survey took place in the period December 2012–January 2013.

Source: Own calculations based on ILO SWTS.

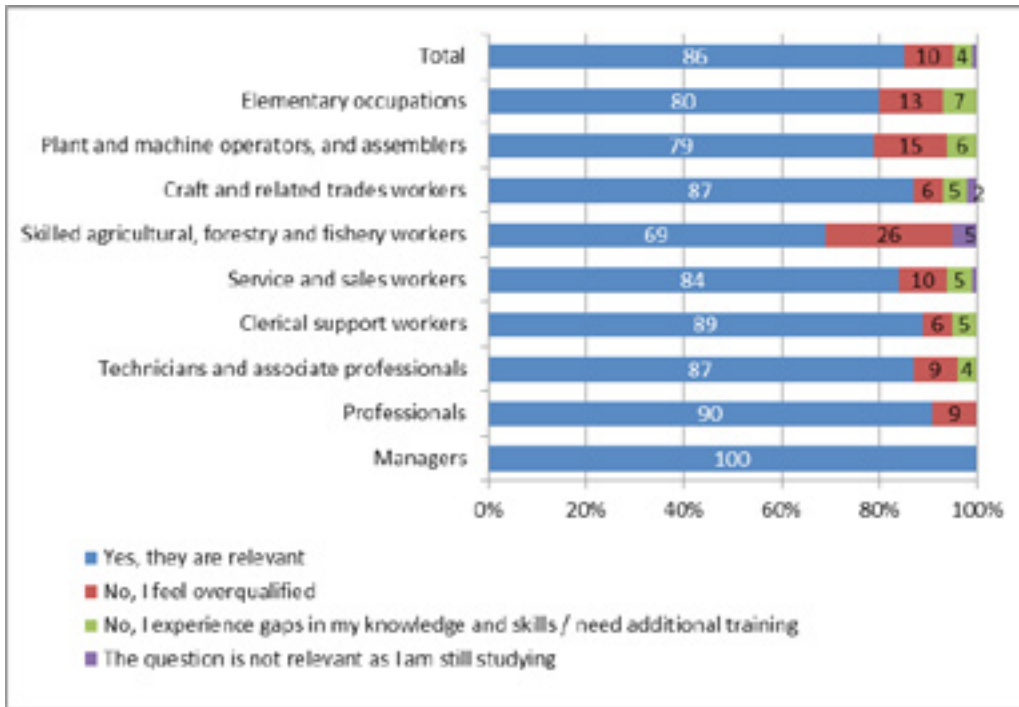




Almost 90% of the population aged 15–29 across all different occupational status did not perceive skills mismatch, except ‘skilled agricultural, forestry and fishery workers’, 26% of which declared themselves

overqualified (Figure A2:17). The total share of those experiencing skills gap (4%) is less than half of those declaring themselves overqualified (10%).

Figure A2:17. Subjective skills mismatch perceived by employed people by occupation (2012–13), age group 15–29 (%)



Note: Data refer to people aged 15–29 who are employed and are not currently enrolled in education. The survey took place in the period December 2012–January 2013.

Source: Own calculations based on ILO SWTS.





References

Department of statistics (2014). *Jordan statistical yearbook 2012*. Amman: Department of Statistics. www.dos.gov.jo/dos_home_a/main/yearbook_2012.pdf

United Nations (2013). *International migration 2013*. New York: United Nations, Department of Economic and Social Affairs, Population Division, <http://esa.un.org/unmigration/wallchart2013.htm>

Websites

[URLs accessed 8.12.2014]

CIA, Central Intelligence Agency: *The world factbook*, <https://www.cia.gov/library/publications/the-world-factbook/geos/up.html>

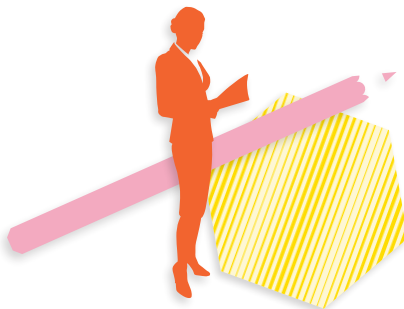
Department of statistics: population and housing: surveys: *employment and unemployment*, www.dos.gov.jo/dos_home_e/main/

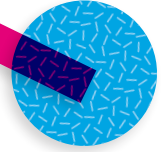
Department of statistics: *statistics by sectors*, www.dos.gov.jo/dos_home_e/main/

The World Bank: Countries: *Jordan overview*, www.worldbank.org/en/country/jordan/overview

The World Bank: *World development indicators 2014*, www.scribd.com/doc/222646575/World-Development-Indicators-2014

United Nations: *National accounts main aggregates database*, <https://unstats.un.org/unsd/snaama/selCountry.asp>





ANNEX 3. Case study 3: policy formulation for better skills matching in Sri Lanka

Context

The Mahinda Chintana vision for the future (Government of Sri Lanka, 2010) is a key national development policy document in Sri Lanka. It was first introduced in 2005 and revised and updated in 2010. It deals with a wide range of topics related to national development, and a significant part is related to human resources development, employability and skills demand and supply.

Identification of skills demand

The strategic sectors which will create the employment opportunities identified in the vision include:

- (a) ICT;
- (b) tourism;
- (c) infrastructure.

Identification of these key sectors has a justification in quantitative employment projection and strategic vision. As a consequence, the development of science, technical skills and language skills were recognised as priority areas.

Strengths and problems in skills supply for the vision

It was recognised that Sri Lanka has strengths on which it can build to fulfil this component of the vision. The proportion of students completing basic education was over 91% in 2009, above many countries in the South and South-East Asian regions. Learning outcomes in primary education in first language, mathematics and English increased significantly between the years 2005 and 2009, which means there

is a good basis in primary education on which further technical training and science and technology education can build.

There are, however, also significant weaknesses and barriers that need to be overcome to fulfil the vision. They include:

- (a) non-availability of teachers in specialised subjects such as mathematics, science and IT;
- (b) many students enter the labour force after completion of general secondary education without any proper skills development programme;
- (c) the capacity of the state university system is limited; no more than 17% of those who qualify for university education can gain admission to universities;
- (d) the bulk of students enrolled in public universities are following courses in 'soft' areas such as arts and management. Striking a balance between these arts subject areas (60%) and scientific and technical subjects which are more directly linked to the economic needs of the country is an issue (Aturupane and Millot, 2009). New intakes already show a trend towards science and technology, which gives an opportunity to further support this orientation in the strategy (Wijewardena, 2013).





Table A3:1. Public universities' student distribution by disciplines, 2006

Disciplines	Enrolments	Share (%)
Arts	21 786	34
Management, commerce and law	14 802	23
Science, engineering, architecture and computer science	17 253	27
Medicine, dentistry, veterinary	6 398	10
Agriculture	3 736	6
All	63 975	100

Source: Aturupane and Millot, 2009.

Formulation of objectives and actions

The objectives related to the development of skills included different parts of the education system and workplace training programmes. They can be found across different chapters of the vision:

- (a) integrating technology learning as a part of basic education;
- (b) implementing new programmes satisfying the requirements of technical skills for emerging new economic sectors;
- (c) maintaining highly skilled training through a system of accreditation;
- (d) improving language learning;
- (e) preparing students for the job market or further studies through career study programmes;

- (f) ensuring the availability of trained and qualified teachers for all schools;
- (g) diversification of curriculum for students to have options;
- (h) establishing a modern university of science and technology as a partnership project;
- (i) linking technical and vocational training with general education and higher education;
- (j) promoting innovation, research and development;
- (k) providing necessary infrastructure and cutting-edge technology to the universities and other higher education institutes to improve the quality and relevance of degree programmes.

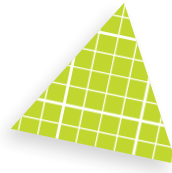
Strategies and targets were formulated in response to these objectives (an example includes selected relevant objectives).



Table A3.2. Selected strategies and targets from the Mahinda Chintana vision

Strategy	Target/outcome 2020
<p>Improve the quality of basic and secondary education</p> <ul style="list-style-type: none"> review and diversify existing curriculum; further strengthen teaching and learning of English as second language at school level; develop science and mathematics teaching methodologies; develop laboratory facilities of 1 000 schools and provide science mobile laboratories for 3 140 schools; establish a 'model ICT learning environment' within the special programme of improving 1 000 schools; through provision and replacement of ICT equipment; implement educational software development programme; implement special programmes to improve soft skills – team work, communication, leadership and entrepreneurial ability of students. 	<ul style="list-style-type: none"> improved GCE O level pass rate from 52% to 65% by 2020; improved GCE A level pass rate from 60% to 75% by 2020; improved minimum laboratory facilities for all schools will be ensured; all schools comfortably adopt ICT for academic and administrative purposes; extended ICT as a technical subject for GCE O level; established proper science and mathematics education in all secondary schools; improved soft skills of students.
<p>Teacher development</p> <ul style="list-style-type: none"> establish an effective framework for (a) improving the subject content knowledge, pedagogical skills and motivation of teachers and (b) the employment and deployment of teachers according to the educational requirements of the system; conduct training programmes for all teachers; train 1 000 young men and women in the plantation sector who have the required qualifications to teach key subjects in the Tamil medium. 	<ul style="list-style-type: none"> improved knowledge and skills of teachers; deployment of adequate number of teachers to teach the main subjects, such as English, mathematics, science and IT.
<p>Introduce new market-oriented and internationally recognised degree programmes.</p>	<ul style="list-style-type: none"> employable graduates with the right skills; improved entrepreneurial ability of trainees.
<p>Strengthen the online management information system connecting all training institutions and industry partners.</p>	<p>Improved coordination between training institutions, industry partners, instructors and trainees.</p>
<p>Develop national competency standards and national quality standards for teaching and assessment of relevant training programmes.</p>	<ul style="list-style-type: none"> uniformity in national standards of training institutions and training courses; established national competency standards; all technical education and vocational training institutions adhere to national vocational qualifications from level 1 to level 7.
<p>Establish prior learning assessment centres to provide proper qualification for the people who do not have formal vocational and technical training but seek assessment in line with the NVQ system.</p>	<p>Establish two prior learning assessment centres in Colombo and Galle.</p>

Source: Government of Sri Lanka, 2010.



Consistency with other strategies

Additionally, more specific policies and strategies were introduced to tackle issues raised in the Mahinda Chintana vision for the future. Some of them had already been implemented before the introduction of the vision:

- (a) the national human resources and employment policy for Sri Lanka;
- (b) education sector development framework and programme;
- (c) the science, technology and innovation strategy.

While the national policy was agreed and was based mostly on official statistics, further more detailed analyses of skills supply and demand were prepared at provincial level in selected sectors. They included more detailed information on occupation structures in priority sectors in the region as well as a survey on employers' perceptions of skills demand and recruitment.

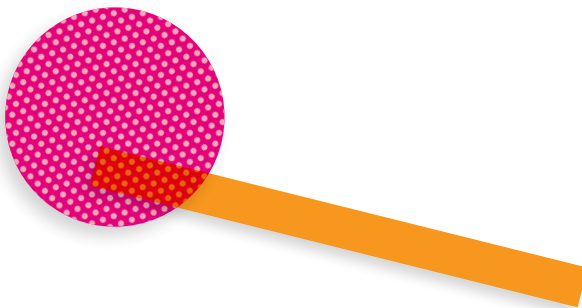
References

Aturupane, H., Millot, B. (2009). *The towers of learning: performance, peril and promise of higher education in Sri Lanka*. Washington, DC: World Bank.
<http://documents.worldbank.org/curated/en/2009/07/11137864/towers-learning-performance-peril-promise-higher-education-sri-lanka>

Government of Sri Lanka (2010). *Sri Lanka: the emerging wonder of Asia: Mahinda Chintana: vision for the Future*. Colombo: Department of National Planning.

Secretariat for Senior Ministers (2012). *The national human resources and employment policy for Sri Lanka*. Colombo: Secretariat for Senior Ministers.

Wijewardena, W.A. (2013). Sri Lanka's human skills gap: dangerously looming over the country's future growth prospects. *Colombo telegraph*, 11 April 2013.
<https://www.colombotelegraph.com/index.php/sri-lankas-human-skills-gap/>

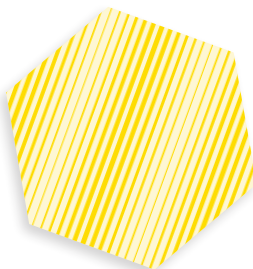


KEY TECHNICAL TERMS

Anticipation	Denotes various qualitative and quantitative methods aimed at identifying future skill needs. Volume 4 considers only short- to medium-term anticipation, while long-term anticipation using forecasting or foresight methodologies (usually for more than five years) is covered by volume 2.
Competency	The proven or demonstrated individual capacity to use know-how, skills, qualifications or knowledge to meet usual and changing occupation situations and requirements (Unesco, TVET glossary: www.unevoc.unesco.org/tvetipedia.html?tx_drwiki_pi1%5Bkeyword%5D=glossary).
Employability	Refers to the combination of factors which enable individuals to progress towards or get into employment, to stay in employment and to progress during their career (Cedefop, 2008). It includes portable competencies and qualifications that increase an individual's capacity to make use of the education and training opportunities available to secure and retain decent work, to progress within the enterprise and between jobs, and to cope with changing technology and labour market conditions (ILO, 2004).
Employment service provider	This refers to employment service providers in terms of public and private employment services whose main task is to aid job matching (see volume 4).
Forecasting	Quantitative forecasts produce information on quantitative aspects of future labour markets through statistical projections, econometric models or similar methods. Quantitative forecasts use data about the present and past to estimate future developments (Andersen et al., 2010). Forecasts may include alternative quantified scenarios based on various assumptions (see volume 2).
Foresight studies	Foresight studies are typically multi-disciplinary, mostly qualitative approaches. These are systematic future intelligence-gathering and medium- to long-term vision-building processes that aim to identify opportunities and areas of vulnerability to assist present-day decision-making. The key feature of foresights is their action orientation. Foresights may assume alternative futures in the form of scenarios (see volume 2).
Job	A set of tasks and duties performed, or meant to be performed, by one person, including for an employer or in self-employment (ILO, 2012b).
Labour market information	Any information concerning the size and composition of the labour market or any part of the labour market, the way it or any part of it functions, its problems, the opportunities which may be available to it, and the employment-related intentions or aspirations of those who are part of it (Mangozho, 2003).
Labour market information system (LMIS)	A labour market information system consists of a set of institutional arrangements, procedures and mechanisms that are designed to produce labour market information (ILO, 1997).
Matching	Matching denotes approaches and actions that aim to increase the employability of the workforce and reduce skills shortages, including filling jobs with qualified job seekers. This term is broader than job referral or placement.
Mismatch	An encompassing term referring to different types of skill gaps and imbalances such as over-education, under-education, overqualification, underqualification, over-skilling, skills shortages and surpluses, skills obsolescence and so forth. Skills mismatch can be both qualitative and quantitative, referring both to situations where a person does not meet the job requirements and where there is a shortage or surplus of persons with a specific skill. Skills mismatch can be identified at individual, employer, sector or economy level (Andersen et al., 2010).



Occupation	An occupation is defined as a set of jobs whose main tasks and duties are characterised by a high degree of similarity. A person may be associated with an occupation through the main job currently held, a second job or a job previously held (ILO, 2012).
Private employment agencies (PREA)	Any natural or legal person, independent of the public authorities, which provides one or more labour market services such as job brokering, counselling services or any other assistance to job searching. This term includes temporary work agencies as per the definition below (ILO, 2007). See volume 4.
Profiling	An assessment of the employability of job seekers performed by PES counsellors, often using IT and dedicated statistical tools. The rationale for profiling is to make labour market integration more effective by better targeting services and scarce resources. Profiling is frequently used to diagnose individual strengths and weaknesses as part of personal action planning in order to anticipate the risk of long-term unemployment. The overall purpose of profiling is to optimise the effectiveness and efficiency of PES services for job seekers (Weber, 2011). See volume 4.
Public employment service (PES)	The core functions of public employment services include job search assistance and placement services; collection, analysis and dissemination of labour market information; development and implementation of targeted labour market programmes and services; the administration of unemployment insurance benefits, where applicable; and other regulatory services such as oversight of private employment agencies (ILO, 2009). See volume 4.
Qualification	A formal expression of the vocational or professional abilities of a worker which is recognised at international, national or sectoral levels. An official record (certificate, diploma) of achievement which recognises successful completion of education or training, or satisfactory performance in a test or examination.
Skill	A term often used with very different meanings. In this guide, skill is understood as having the ability to carry out mental or manual activity, acquired through learning and practice, where skill is an overarching term which includes knowledge, competency and experience as well as the ability to apply these in order to complete tasks and solve work-related problems.
Skills shortage	Used in this guide as a quantitative term to describe a situation in which certain skills are in short supply, for example where the number of job seekers with certain skills is insufficient to fill all available job vacancies.
Skill gap	Used as a qualitative term to describe a situation in which the level of skills of the employee or a group of employees is lower than that required to perform the job adequately, or the type of skill does not match the job requirements (Cedefop, 2010).
Temporary work agency	A private or not-for-profit company that directly employs workers and hires them out to work in other enterprises under the supervision of the user (ILO, 2014b). See volume 4.



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This guide is a part of the ETF, ILO and Cedefop series of guides on skills anticipation and matching. All the guides follow a common structure, although they vary in level of detail, technical content and case studies. The ETF, Cedefop and the ILO worked closely together to develop the guides, usually with one agency/organisation taking the lead and the others providing inputs, case studies, comments and reviews. All guides have undergone extensive validation and peer review; they were also discussed in detail in international expert seminars in which academic representatives, anticipation and matching experts, and potential end-users from across the world provided comments and feedback on content and usability. Experts and staff of the three organisations also peer reviewed the guides before their publication.

Better understanding, and more efficient use, of LMI are among potential preventive measures to reduce the risks of skills mismatch. The aim of this publication is to provide guidance through labour market monitoring and analysis of supply and demand as follows: formulation of aims of the analysis, data audit, capacity building, performance of analysis, and dissemination and use of LMI in the context of better matching.

This guide describes relevant methods, approaches and components for interpretation of LMI as well as the conditions and the operations of the labour market. It includes various measures, recent and projected trends, and restrictions and challenges to be considered in analysing LMI.

As a part of the series of guides which focus on more specific topics and methods of skill needs identification and anticipation, this will mainly focus on how to exploit the data sources and tools available in the country, in particular through transforming them into labour market and education indicators. It also offers hints on how to improve data sources to make them more useful for informed decision making by individuals, companies and institutions in the labour market, including evidence-based policy making. Detailed information on how to develop these information sources or how to use them in a context of specific institutions is the aim of other guides in the series; there are links to them where relevant.

This publication is a helpful introductory tool for everyone who wants to understand how LMI can be used for better anticipation and matching of skills demand and supply. It provides advice and recommendations for policy and decision-makers on how to respond to market signals and how to react to early warning messages driven by LMI. Technical analysts and professionals can use this guide as a source of inspiration on how LMI systems can be further developed and used for policy analyses and interventions.

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