Anticipating changing skill needs:
A Master Class*

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Preface and acknowledgements

Abstract/Outline

Despite its grandiose title, the aims of this document are more modest – to provide a brief overview of Skills Forecasting across Europe and to point readers towards where they can find more information about the huge amount of work going on in this area. It is intended as a technical reference document to support the New Skills Network event to be held in Budapest on the 9th& 10th of June 2011.

Europe has seen dramatic changes in its employment structure over the past 60 years. While primary industries (including agriculture) and manufacturing are still important in economic terms, they account for an increasingly small part of total employment. Knowledge based activities and the application of intellectual and professional capacities are crucial for economic success, while caring for the environment and for an ageing population are becoming the most significant areas for new employment activities. The document summarises what this means for the future of education and work.

The *New Skills for New Jobs* agenda has emphasised the importance of trying to anticipate changing skill needs. Individuals making career choices, as well as education and training providers, need to form views about the kinds of education and training that will best serve in an increasingly uncertain environment.

Both individuals and the state are making substantial investments in human capital. But, as in every other area, investment in human capital does not necessarily guarantee a positive return. It is important to invest in the right areas.

Drawing on results from a major new programme of research funded by Cedefop, as well as a range of other research, this document considers the rationale for anticipation, how it is done, its limitations and how such information can be used to improve labour market outcomes. A key emphasis is on introducing relevant material and how to use it (aiming to answer questions such as "Where do I find information on future skill needs?" and "How can I use it?"). The document also summarises the key messages that such work delivers about the way the economy and labour markets at European level are changing, and what this means for the demand for skills, and the priorities for education.

There are, of course, many difficulties in trying to peer into the future. Recent events in financial markets, and their ramifications for the world economy, have exacerbated these problems. Nevertheless, it is argued that such work can help to inform all labour market participants about the possible worlds they may face. The rising demand for such information shows no sign of abating.

Such work can focus on the implications of structural changes in European economies and labour markets for the changing patterns of demand for and supply of formal qualifications. The review also touches upon the implications of this for the fields of study that students might follow, highlighting the importance of links between investment in education and skills, and productivity, innovation and economic performance, in an increasingly competitive world environment.

The document has 6 main sections covering:
1. The rationale for anticipation of changing skill needs;
2. Alternative approaches to anticipation of changing skill needs;
3. What information on anticipation of skills needs is available and where to find it;
4. Some key results focussing on a pan- European perspective;
5. The sectoral dimension, including detailed results and sectoral involvement;
6. Some implications for education and training, and in particular life-long learning.

A summary of the key messages are included at the end of each section.

Key words: Anticipation; Future Skills Needs; Education and training; Europe.

Contents

1. The rationale for anticipation

We live in a rapidly changing and uncertain world. The *New Skills for New Jobs* agenda has emphasised the importance of trying to anticipate changing skill needs in order to ensure that all labour market participants are as well informed as possible about the world that they are likely to face.

More recently a new flagship initiative "*An Agenda for new skills and jobs*" was initiated as part of the Europe 2020 Strategy.[1] It emphasises the need for better anticipating and matching of skills and labour market needs at an EU level, to be carried out in partnership with Member States, social partners and labour market and education institutions. Despite the similarities in names, the new initiative is much wider than the old agenda, and covers flexicurity, job quality and working conditions as well as job creation. Skills development forms one of the four main areas of the new flagship initiative.

Individuals, as well as education and training providers, have to make choices and decisions about the kinds of education and training that will offer the best returns. Peering into the future is not straightforward. Yet the rising demand for such information shows no sign of abating. Long lead times on investment decisions such as education and training mean that it is necessary for all those who are making such choices to assess future prospects carefully. This includes those concerned with macro level policy in these spheres, as well as individuals, organisations and institutions making more personal choices and decisions. Such work can help to fill information deficits and avoid future imbalances and mismatches.

Despite its rather grandiose title, the aims of this document are modest. These are to provide a brief overview of Skills Forecasting across Europe and to point readers towards where they can find more information about the huge amount of work going on in this area. This includes a discussion about the major new programme of research led by the Warwick Institute for Employment Research, funded by Cedefop (Cedefop (2010a)). It presents some key messages about changes in the economy and labour markets at European level, and what this means for the demand for skills and priorities for education and training. It focuses on the implications of structural changes in European economies and labour markets on the demand for and supply of formal qualifications.

It is important to emphasise that such work is not an attempt to plan the system from the top down. Rather it aims to inform all participants in the labour market and education and training arena, in order to help make markets work better. Some have argued that systematic anticipation of changing skill needs is unnecessary and impossible. Nobody can predict the future with certainty. But everybody can prepare or plan for it, including governments, employers, educational institutions and individuals. To do this involves some element of forecasting: either implicitly or explicitly. In this sense, not only is forecasting possible, it is also inevitable. The only meaningful questions are how should it be undertaken, by whom, and with what end in mind? The revealed preference of governments worldwide suggests that there is general acceptance of the case for carrying out such work as a "public good".

It is telling that the USA, one of the most capitalist economies in the world, devotes more resources to this activity than anywhere else. The US approach to the global skills challenge has been characterised by Hamilton (2010) as "hope and pray" (...hope that students graduate, and pray that they find a suitable job after they do!). But the US approach is backed up by huge investment in Labour Market Information, including forecasting, aimed at ensuring that students are well informed about the choices they face. Europe as a whole has some way to go to catch up, although there are many examples of good practice in individual member states.

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[1] [1] The 'New Skills for New Jobs' initiative was launched in 2008. The initiative is ongoing.

The experience of the USA and other countries across the world suggests that forecasting can provide a systematic analysis of the implications of a continuation of past and current trends and patterns of behaviour. It can help to map out different scenarios based on alternative assumptions that can form a basis for intelligent and informed debate and further research, as well as helping to inform individuals making career decisions.

It is also important to emphasise that, although there is strong evidence of causal links between investment in education, training and skills and economic success, (both at the whole economy level and for individuals), there is no guarantee of a positive return. It is crucial to invest in the right areas. This highlights the importance of understanding where the best opportunities will arise.

The rationale for producing regular and detailed projections includes:
- filling existing information deficits and prevent future labour market imbalances;
- informing various actors on future labour market needs, as an aid to their choices and decision-making in this arena;
- supporting policy-making at national and European level in the field of employment and social protection, lifelong learning, guidance and counselling and migration;
- answering key questions:
  - in which sectors and occupations will employment be growing?
  - for which qualifications will demand increase or decrease?
  - what about replacement needs?
  - how will this compare with supply?

While it is now generally agreed that in a market economy it is not possible to make precise predictions that can be used for detailed "manpower planning", the need to make strategic plans and choices which can influence and shape the future path taken by the economy and labour market is widely accepted. Such plans need to be guided by robust labour market information and intelligence (LMII), including a forward looking element. This needs to be based on regular, systematic and quantitative approaches to forecasting and scenario development.

The document emphasises the significance of such projections in informing individuals and helping to make labour markets function better. This is becoming increasingly important given the rising levels of migration flows between countries. Labour mobility between European countries is, if anything, likely to increase further. International labour mobility can help resolve labour market bottlenecks and deal with surpluses. Information on future skill needs in Europe can help, therefore, orientate, inform and guide individuals about future developments and opportunities.

Skills are a key part of the infrastructure of the economy, and the choices made by both policy makers, enterprises and individuals on investment in education and skills can help to determine the path the economy takes. These individual choices also need to be guided by good LMII. Compared to the efforts in other countries such as the work of the Bureau of Labour Statistics in the USA, Europe is investing relatively modest amounts in such work. Other countries, such as China, are also investing significant sums in such systems.

Key messages:
- *It is not possible to predict the future precisely but everybody can prepare or plan for it;*
- *Individual actors need to make strategic plans and choices and invest in the right areas;*
- *Such plans need to be guided by robust Labour Market Information and Intelligence (LMII), including a forward looking element;*
- *Anticipation is a key element in 3 of the EU Employment Guidelines;*
- *There is much higher investment in Anticipation by non-EU countries;*
- *The work needs to serve a range of audiences, including: stakeholders, social partners, practitioners and individuals – not just policy makers.*

2. Alternative approaches to anticipation

The terminology associated with the anticipation of changing skills needs is complicated and not very precisely defined. Box 2.1 sets out some of the most widely used terms. There are also many methods used for anticipation of changing skill needs, (for reviews see Wilson, *et al.* (2004) and Wilson (2008), and GHK (2008)[2]). The many different ways to attempt to peer into the future range from formal quantitative econometric models through to more qualitative approaches, including Delphi techniques and scenario development. In between are methods that include both quantitative and qualitative elements, including regional and sectoral observatories (and related in-depth studies) as well as surveys of different kinds. No single approach has a monopoly on truth. All have their strengths and weaknesses.

Box 2.1: Definitional issues - terms commonly used in Skills Forecasting

There are many terms used to cover the activity commonly referred to as forecasting. Reference to a dictionary[1] reveals that these are similar in meaning, and the definitions have a certain circularity:

- *Forecast = predict or estimate a future event or trend;*
- *Predict = say that something will happen in the future;*
- *Prophesy = say that something will happen in the future;*
- *Foretell = predict the future;*
- *Project = estimate or forecast something;*
- *Plan = prepare for an anticipated event;*
- *Anticipate = regard as possible , expect or predict;*
- *Guess = estimate without calculation or sufficient information to be sure of being correct.*

The earliest work in the skills area used the terms "manpower planning", and was in many respects very mechanistic. This has fallen into disrepute. The word manpower is now regarded as sexist, and the term planning has fallen out of favour because of the recognition that it is impossible to plan educational and training systems mechanistically and with great precision.

Most of those involved in such activity would agree that it is impossible to make precise **predictions** of what will in the economy and labour market.

 Those involved therefore emphasise that they make **projections**, based on certain assumptions (which ideally are explicit and transparent). These are undertaken using systematic and consistent methods rather than "**guessing**".

In the context of skills, the terms "labour market assessment", "anticipation" and "early identification of skills needs" have become popular. These encompass a range of methodologies, and deliberately avoid the implication that precise predictions or forecasts are possible. However, there is no generally agreed set of definitions, and the terms forecast, projection, anticipation, etc, are often used interchangeably.

[1] The New Oxford Dictionary of English (1998). Other dictionaries have slight variations.

Table 2.1 gives a brief overview of some of the main approaches in regular use, including:
- Formal, quantitative models, including complex econometric models with behavioural content, as well as more simple minded extrapolation of past trends and more complex time series methods;
- Directly asking employers about their current skill deficiencies and what they expect in the future;
- Other more qualitative approaches, including focus groups, Delphi studies, and scenario development exercises;

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[2] See http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2008:3058:FIN:EN:DOC

- Sectoral studies, regional and other Observatories, which often use a combination of both qualitative and quantitative methods.

Table 2.1: Comparison of Alternative approaches to anticipation

Approach	Advantages	Disadvantages
Formal, national level, quantitative models based projections	Comprehensive (typically, covers all sectors) Consistent Transparent and explicit Quantitative	Data hungry Costly Not everything is quantifiable May give a false impression of precision/ certainty
Surveys of employers, etc, asking about skill deficiencies & skill gaps	Direct "user/ customer" involvement Easy to set up and carry out	May be very subjective and inconsistent Too much focus on the marginal and ephemeral
Focus groups/round tables, Delphi style methods; Scenario development	Holistic (considers a broader range of factors that just economic) Direct "use/customer" involvement	Can be non-systematic Can be inconsistent Can be subjective
Sectoral/ occupational / regional studies and /or Observatories (using both quantitative & qualitative evidence)	Holistic (for the sector) Partial (ignores other sectors) Strong on sectoral & other specifics	May introduce inconsistency across sectors

Source: adapted from Wilson *et al.* (2004).

Each approach also focuses on slightly different issues. This means some may be more suitable for meeting the needs of one audience rather than another.The pros and cons of the different approaches are summarised in the table. In many respects asking employers directly about their skill needs seems the obvious way to find out about future skill needs. In practice it appears that employers rarely have a very precise idea of what their future will be like and what this means for skills. However, surveys can however provide useful information about what employers do (which can provide a sound foundation for understanding where we are now). The direct question about the future produces much less useful information.

The Scenario Development approach is open ended, as indicated by the star shaped object in Figure 2.1. This contrasts with the more closed, inwardly focussed spiral, on the left hand side, that characterises many quantitative approaches, which tend to home in on the most likely future. This characteristic applies to quantitative methods such as econometric modelling but also to more qualitative ones such as the Delphi approach, which focuses on reaching a consensus of expert opinion. However, the dichotomy highlighted in the figure is exaggerated. Quantitative approaches can also consider more open ended possibilities. However, most quantitative projections concentrate on just one main scenario, since they are otherwise difficult to digest.

The Cedefop projections presented in Section 4 fall into this category. Some, but not all the work involves sophisticated econometric analysis. As in many individual countries, much less complex methods are used where the data are too weak to support econometric techniques, including the use of expert judgement.[3]

The DG Employment Sectoral Studies described in more detail in Section 5 are a combination of the classic qualitative scenario development approach, combined with a

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[3] The latter is a key aspect, for example, of the US Bureau of Labor Statistics approach to projecting changing occupational structure within sectors.

more hard-nosed quantitative element that exploits all available data on the sectors in a systematic fashion.

Figure 2.1: Quantitative Forecasting and Scenarios

Certainty   Uncertainty

Quantitative Forecasting,
Delphi studies   *Scenarios*
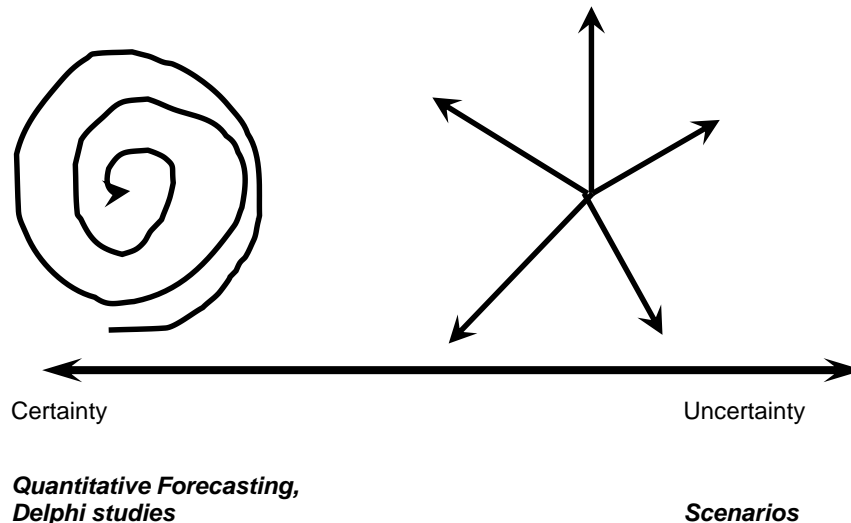
It is important to recognise what such anticipation exercises can provide and what they cannot do. Few (if any) forecasters would claim that their views are precise predictions, nor that they are inevitable. No method can predict the future with certainty. Nobody is able to predict precisely what the future will hold. But everyone can prepare and plan in order to avoid any undesirable outcomes and to make the most of the opportunities they face. The sum of these individual plans and choices will influence the future path taken by the economy as a whole.

Implicitly at least, everyone has to make certain assumptions about the future, even if they are simply that the world will remain unchanged. To do this involves some element of forecasting or projection, whether it is done implicitly or explicitly. In this sense some form of forecasting is inevitable; the only meaningful questions are how it should be done, by whom and with what ends in mind?

Given the dynamic changes going on in the economy and labour market as a result of technological change and other factors, an assumption of "no change" is unlikely to be a very robust strategy for coping with tomorrow's world. Ideally, these plans and choices need to be guided by robust labour market information and intelligence, including a prospective element. Many of the trends taking place are very robust. Information about these can help individuals to make better informed choices

The key question therefore is not whether an attempt should be made to anticipate the future, but rather how to go about it. Rather than relying on luck, or upon individuals' own (possibly ill-informed) judgements, those involved in producing projections argue that there is a case for the State providing such information, centrally, as a "public good", based on the application of transparent, systematic, impartial, scientific methods.

The use of quantitative modelling methods now lies at the heart of most systems for regular and systematic assessment of future prospects in the labour market, although

these are often supplemented or complemented by other methods, especially where data are limited to build more sophisticated models.

Many member States currently carry out such activities, but until quite recently there has been little done at a pan-European level. Wilson (2007a and b)[4] set out the case for trying to anticipate the changing need for skills at a pan-European level on a regular and systematic basis. The increasing integration of European labour markets and the growth in cross border mobility has simply served to strengthen the case.

It is important to understand that this is not all about top down, indicative planning. Nobody can make precise predictions that can be used for detailed educational and workforce planning. In a market driven economy participants require information about possible futures in order to make sensible choices. The world is a rapidly changing and uncertain place, and there are long lead times on investment decisions such as education and training choices. Governments, educational institutions, individuals, employers and employers all have to anticipate the future to avoid problems and optimise outcomes.

However, if used well, all the techniques set out above can help to provide a systematic analysis of possible futures. These may be the implications of continuation of past/current trends and patterns of behaviour, or a more open ended range of different scenarios, based on alternative assumptions. In either case, they provide a basis for intelligent and informed debate and choice.

Such information can be invaluable to a large range of different users, including: national and local governments and other public bodies (such as education and training providers); companies/employers; and careers advisors and the individuals they are helping to make career choices. The precise information that each of these groups may need may vary, but there are real economies of scale in doing such work so that it can meet a multiplicity of such needs.

Key messages:

- *Anticipation is carried out in many different ways, each of which has strengths and weaknesses;*
- *Different methods provide different results - no one method is sufficient by itself;*
- *Nobody has a crystal ball, and the future is not inevitable;*
- *There are many problems & pitfalls, particular results may therefore require careful interpretation;*
- *But many trends are likely to remain robust and can therefore help to inform individual choices;*
- *Forecasts need to serve a range of audiences, including: stakeholders, social partners, practitioners and individuals – not just policy makers;*
- *These different users may make different uses of the information, some taking it as given, others (especially policy makers)using it as an input into more strategic choices and decisions;*
- *There is a huge variety of different approaches - but regular, systematic, quantitative, model based forecasts are a key element.*

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[4] Wilson, R.A. (2007) *Anticipating Changing Skill Needs in Europe: The Case for a Major Improvement in Capacity*, (paper prepared in support of the Portuguese Presidency). Institute for Employment Research, University of Warwick: Coventry and Wilson, R.A. (2007b) "Trends in Employment Creation in Europe" . in *Perspectives On Employment and Social Policy Coordination in the European Union*. Ministério do Trabalho e da Solidariedade Social: Lisbon. paper prepared for the Portuguese Presidency Conference on Employment In Europe - Prospects and Priorities, Lisbon, 8-9 October 2007

3. What is available and where to find it

3.1 National level [5]
Most countries have anticipatory measures in place and others are building and developing systems for skills anticipation. Approaches vary, but all have one common objective: to improve the match between labour demand and supply. There is a clear shift from top-down, manpower planning towards informing all labour market participants about the knowledge and skills required, and changes of job contents, in different occupations.

To achieve this, countries have implemented a variety of activities, combining different methods and the efforts of many different institutions and projects. These range from the analysis of quantitative/qualitative trends in the labour market; through development of policy proposals to bridge the quantitative gap/qualitative gap; to fostering co-operation between firms and VET providers. However, the implementation of policy and practice, and programmes/actions to bridge the gaps identified in the results still remains the most difficult point.

Many countries carry out regular skills forecasts. Most long-term forecasts are done at national level, for example in Cyprus, France, Germany, Malta, Norway, UK, whereas short-term forecasts are undertaken more generally at regional or local level often through Public Employment Services (PES), for instance in Austria, Latvia, Poland, Slovenia.

Other countries are currently developing their forecasting methodologies such as Romania and Slovakia, including national strategies for skill anticipation, as in Bulgaria, the Czech Republic, Latvia and Poland.

Many countries, for example Bulgaria, Cyprus, Finland, Estonia, France, Germany, Hungary, Italy, Lithuania, Luxembourg, Poland, Slovakia and Spain, conduct employer surveys or annual labour market forecasts to inform VET provision planning. Cyprus, Finland, France, Malta, Norway and Portugal conduct sector skills needs studies. In many newer Member States information on skill needs is collected in one-off studies or projects. Some countries such as France , but also Germany, Latvia, Portugal, Romania, and Spain have multi-level schemes for policy making and research in anticipating skill needs, linking anticipatory activities at national, regional and sector levels.

Most countries acknowledge that methods to anticipate skill needs have to improve. Quantitative and qualitative anticipation methods and results are not always consistent. Regional anticipation systems also need improving. Most countries plan to develop models and improve methodologies. Norway and Sweden will broaden the tasks of existing bodies to include anticipation and identification of skills needs. Spain has already set up a national job market observatory network. Social partners also emphasise the importance of plans to establish national information systems, develop networks for skills assessment and to participate in wider EU studies.

Further and more detailed information about Member States' systems for skill needs anticipation can be found at:
- http://www.cedefop.europa.eu/EN/Files/WorkingPaper01_Oct2008.pdf or
- http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52008SC3058:EN:NOT.

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[5] This section is largely based on Cedefop´s latest policy report (Cedefop, 2010).

3.2 Pan-European level

The anticipation systems across EU countries, although having many similarities in features and development trends, are in fact quite different in many respects. The efforts in Member States, while broadly similar, differ in detailed methodology and in data sources used. They therefore do not produce comparable data at European level.

Developing anticipation systems at pan-European level is important for providing comparable data on future challenges across Europe. Cedefop (with the support of the European Commission) has produced since 2008 regular forecasts of skill supply and demand for the EU and each Member State up to 2020, including details by broad sectors, occupational groups and educational levels. The forecasts are updated every two years. The current results are summarised in Section 4. More details about the methodology can be found at: http://www.cedefop.europa.eu/EN/about-cedefop/projects/forecasting-skill-demand-and-supply/forecasting-skill-demand-and-supply.aspx.

To complement these quantitative forecasts, the European Commission has also published a series of studies on emerging competences and future needs. These cover 18 economic sectors, and provide a transversal analysis of the evolution of skills needs in the selected sectors, taking into account their global, national and regional contexts. Again the aim is to anticipate possible changes in jobs and skills needs up to 2020. These studies are discussed in more detail in Section 5. Full reports can be found at: http://ec.europa.eu/social/main.jsp?catId=784&langId=en.

To involve business in skills anticipation, Cedefop (with the support of the European Commission) is developing a European employer skills survey. More information is available at: http://www.cedefop.europa.eu/EN/about-cedefop/projects/employers-surveys/employers-surveys.aspx.

The current policy agenda favours further developments in this area, and many Member States are positive about developing a common approach, or a common European tool, for anticipating skill needs. A key problem is the diversity and differences in current methods, tools, statistics and definitions used. But most of the countries also mention different stages of economic development as a key issue. Nevertheless, countries recognise the need for a common approach which should consider the data limitations and local knowledge. It should complement rather than substitute for the activities at national level, as well as representing added value for Member States by pulling together existing analyses and research.

The European Commission is currently establishing the foundations for the EU Skills Panorama – an online tool which will aim at increasing the transparency of information about skills needs and occupation trends. The Commission plans to collect existing forecast and foresight exercises from Member States and international organisations, to analyse and present this information in a smart way which brings out value-added at European level. Depending on the institutional structure of the Member State, national and or regional levels will be considered. In addition to this online tool, a network of national (eventually regional) anticipation bodies will be created by 2012 to foster peer-learning and mutual exchanges in skills anticipation. This network will be associated with the development of the EU Skills Panorama, which in turn should support the discussions of the network. Cedefop with its expert network *Skillsnet* will continue to play an active role in this process, supporting the European Commission in improving the capacity to anticipate skill needs at EU level.

Key messages:

- *Most countries have some kind of system but they vary greatly in levels of sophistication and detail;*
- *There has been a shift in the objectives of identifying future skill needs from manpower planning to more general assessment of skills needs to inform all labour market participants;*
- *Systems are becoming more sophisticated and complex, and there is a clear trend to combine methods;*
- *The case for a pan-European system for skill needs anticipation is generally accepted and the Cedefop work has begun to fill this gap;*
- *But much more remains to be done, although various initiatives are in place to move things forward, including the EU Skills Panorama.*

4.   Some key results

4.1   Background – macroeconomic & sectoral change

The recession has had a major impact on the overall number of jobs. The latest Cedefop projections suggest that total employment is unlikely to return to its pre-crisis levels (of around 235 million in 2008) before 2020. Some 10 million jobs are estimated to have been lost as a result of the crisis. Nevertheless, some 7 million new additional jobs are projected to be created as the economy recovers from the current depressed levels. There are likely to be over 73 million job openings between 2010and 2020 jobs due to replacements (the need to replace those retiring over the next decade).

These broad figures disguise some significant changes in the structure of employment. These developments have been driven by the continued impact of globalisation and technological change. These will continue to alter the sectoral structure of employment and the demand for different types of skills. In general the recession has tended to accelerate these changes. Projected trends by sector are expected to continue along some well established paths. Primary industries (including agriculture) and manufacturing remain important in economic terms, but they are projected to account for an increasingly small number of jobs. Knowledge based activities and the application of intellectual and professional capacities are now seen as crucial for economic success. Rising employment shares are expected for knowledge based sectors and other services (especially caring for the environment and for an ageing population). Jobs are generally expected to become more knowledge- and skills-intensive (although there are some exceptions to this as discussed below).

By 2020 "non-market" services (which include health and education) are expected to account for almost 50 % of employment in Europe, while primary and manufacturing industries will account for fewer than 1 in 5 jobs. Business and related services are expected to account for the bulk of the new jobs. Significant job losses are likely in primary industries (especially agriculture) and in certain parts of manufacturing (especially those facing the most intense competition from low cost developing countries).

4.2   Implications for skills - changing occupational patterns

Occupational employment patterns are one of the key indicators of changing skill needs. The structural changes by sector outlined above have direct implications for the demand for skills because occupational employment patterns (percentage shares in total employment) within sectors are very different.. There are also strong trends in such patterns within sectors, which are generally reinforcing the sectoral structural changes observed. While the overall trends in occupational employment at the broad level are not quite as dramatic as those for sectors, they are unrelenting. Higher level occupations such as managers, professionals and associate professionals are expected to be the main beneficiaries of the recovery. Knowledge and skills intensive jobs are generally on the rise, both because of changes in sectoral employment structures in favour of service industries, but also because of changes occurring within sectors.

However, there are also some increases projected for occupations which are less skilled, including various service occupations (sales and social care) and some unskilled occupations too. As with sectors, there are significant job losses as well as gains, and indications that the polarisation of skill demand noted by some authors is likely to continue to be a feature. Not all the jobs will be "good" jobs. Job losses are focussed amongst agricultural, lower level administrative and clerical workers and craft workers.

It is important not just to focus on expected net changes in employment. While overall employment levels are projected to increase by around 7 million between 2010 and 2020, replacement needs (to offset retirement and other outflows from the workforce) over the next 10 years will be much more significant. In total some 80 million new job openings are

projected by 2020, and this benefits all occupations, including those where the overall trend in numbers is negative. Even for skilled agricultural and fishery workers (which are projected to experience one of the fastest rates of decline), replacement needs are sufficient to offset the projected decline in overall employment levels. This highlights the need to maintain education and training for skills in such occupations, despite their generally negative employment trends.

4.3   The demand for and supply of formal qualifications

The other main indicator of skills in the Cedefop analysis is formal qualifications held. The demand for skills, as measured by highest qualification held for those in employment, is also expected to show steady increases between 2010 and 2020. There are going to be many more jobs for the better qualified. Employment shares for those with low (or no) formal qualifications are projected to decline sharply, falling to below 15% by 2020 (less than half the value in 2000). In contrast, those with high level qualifications, which in 2000 accounted for just over 20% of all those in employment, are projected to see their share rise to around 35% by 2020. Overall, the number of jobs employing highly qualified people is projected to rise to over 1/3 of the total while the number of jobs requiring medium-level qualifications will account for 1 out of every 2 jobs. These trends continue those observed over the first decade of the millennium.

They also reflect what is happening on the supply side. Indeed it is interesting question whether they are more driven by supply rather than demand factors. Employment levels by qualification may be interpreted as representing the revealed preferences of employers for certain types of labour, as categorised by the qualifications they hold. But it is also clear that the changing patterns of supply, especially the strong trend towards undertaking and obtaining higher level qualifications, has driven up the average qualification levels of those in employment.   Typically, better qualified people are more likely to find and retain employment than those less well qualified.   The results suggest that many of those with high and medium level qualifications will be taking up jobs that have previously not necessarily required them. Whether this reflects rising job requirements in such jobs or excess supply of formal qualifications remains the subject of heated debate. There is some evidence that the returns to qualifications are holding up, and other evidence confirms that there are some real changes in job requirements for some occupations. Many jobs are becoming more demanding in terms of qualifications needed, but other evidence suggests over-qualification is becoming an increasing concern (see for example Cedefop (2009) and the discussion below).

There are many common trends across countries. On the demand side, there are broadly similar changes projected by sector, occupation, and qualification, including replacement needs. On the supply side increases in the numbers of those with high level qualifications and decreases in numbers with low level qualifications are a common feature. There have been strong cohort effects operating here (younger people are much better qualified), but the impact of this is moderating, as previous generations that were less well qualified drop out of the working age population as they reach retirement age. There are also some significant differences between countries, reflecting stage of economic development, and different industrial and occupational structures, with evidence of a process of convergence and catch up effects for some countries, although others still lag behind..

4.4   Mismatches, imbalances and concerns about over-qualification

The discourse of governments across the world in recent years has emphasised the key role of education and training in economic success, both at the level of the national economy and the individual. There is strong evidence of a positive correlation between education and economic performance, but demonstrating cause and effect is less straightforward. Studies by the OECD and many others have highlighted the links between skills and performance, (for a review see Bosworth, 2009). Much of the research at a macro level focuses on the "golden triangle" of education, research and development, and

innovation. Particular emphasis is often placed on Science, Technology, Engineering and Mathematics (STEM) subjects in this debate.

Just as in any other area, investment in human capital is no guarantee of future returns. It is important to invest in the right areas. A number of authors have emphasised the growing concerns about over- qualification and warned that policies to boost the supply of people with higher level qualifications may be misguided. It will not be so easy to gain all the high valued added jobs. Other countries such as China are not standing still. They are also moving into high value added areas and trying to secure good quality jobs for their citizens. Brown *et al.* (2010) argue that European policy makers are in dangers of selling young people a "pig in a poke", securing high level qualifications may no longer guarantee success in the labour market . There are real concerns about over-qualification, imbalances and mismatch.   It is not therefore just a question of boosting the supply of such skills. This needs to be matched by demand - a strong industrial policy is also needed to support the demand for skills. But it is very hard to pick winners, especially in large market economies.

The Cedefop results highlight the tendency towards polarisation in skills demand, with increases in employment amongst both skill and low skilled jobs. It also highlights pressures on many young people entering the labour market for the first time to find jobs in non-traditional areas of employment compared with previous graduates. Avoidance of such problems will require both better LMI but also other policies to encourage both employers and individuals to "raise their game" and to aim higher, in order to ensure that the demand for skills rises commensurately with supply (European Commission (2010)).

4.5   Demands for particular qualifications and generic skills

The discussion so far has been quite broad brush. For both individuals and education and training institutions, greater detail is needed to help to guide choices and to try to avoid imbalances and mismatches. The work of Purcell *et al.* (2010) highlights the increasing diversity of Higher Education (HE) in the UK, and this is undoubtedly also a feature in most other countries. HE has changed from a "minority sport", only on offer to the elite, to something now aimed at the masses, with many governments aiming at 50% participation in HE in the foreseeable future.

A key focus of much recent debate has been about the importance of STEM (Science, Technology, Engineering & Mathematics) disciplines. Participation rates in higher and further education have been on a rapidly rising trend in most countries. However, in many countries, such as the UK, the numbers and quality of young people choosing to follow STEM educational routes through Further Education (FE) and HE, (and following this up by entering occupations and careers in science, engineering and technology), have been static or in decline in recent years. Such trends raise the question of whether or not the supply of STEM graduates is going to be adequate to meet the needs of a 21st century economy. Given the perceived importance of STEM personnel to economic growth and technological change, the falling shares of young people choosing to study STEM subjects has become a major cause of concern in many countries, including the UK (OECD (2006), CIHE (2009)).

Despite these negative supply trends, the proportions employed with STEM qualifications in sectors and occupations are generally rising. Studies such as Wilson (2008) examine how changes in the economy and labour market over the next decade might affect the demand for STEM graduates at first degree and postgraduate level. They suggest that the demand for STEM skills is rising on average faster than for other disciplines. This is due to changes in industry and occupational employment structure, which are tending to favour these disciplines, reinforced by rising shares within sectors and occupations. This is confirmed by other research, such as the DG Employment Sectoral Studies discussed in Section 5, as well as many national studies, including those by SEMTA (2009 & 2010) for

the UK. Other countries (such as China and India) are investing even more heavily in such skills.

In Europe it seems unlikely that the vast bulk of future employment will be concentrated in STEM sectors occupations. Not everyone needs to be a "rocket scientist". However, Europe does need a strong cadre of high quality STEM personnel. But there will also be a need for creative and other skills. Games, music, the media, cultural products and services account for very large parts of national output nowadays, as do many other less exciting service activities, but many of these are often dependent on a strong scientific /engineering foundation.

The studies by SEMTA (2009 & 2010) highlight that Advanced Manufacturing Technologies require a cadre of people highly qualified in STEM subjects. They also emphasise that the real need is for individuals with commercial and other generic skills and competences, as well as technical skills. The talk used to be about "rounded individuals". The emphasis now is on being "T"- shaped. The upright represents strong core technical skills. The cross of the T represents cross disciplinary skills and "sideways looking skills" such as communication, problem solving, team working, etc. STEM personnel need to understand business and innovation. In the UK especially, and perhaps in Europe more generally, it is felt by some that there is sometimes a lack of entrepreneurial edge to exploit new ideas commercially.

The SEMTA analysis also identifies the need for good support staff (technician level grades as well as professional scientist and engineers). These studies also highlight that it is often more a question of quality of people doing STEM rather than just quantity (numbers of people). The problem is in attracting the most talented students into STEM subject areas, which much of the research suggests is crucial to successful programmes of innovation and technological progress. Some commentators suggest that market signals and other signals are distorted and that they encourage many of the most able young people to go into other areas. This is in part a matter of media and cultural hype, (influencing perceptions of where the best and most important jobs are) but also other factors such as the huge pull of financial services, (and the associated huge city bonuses, which draw many potential STEM specialists into other areas).

The results of analyses such as Wilson (2008) suggest that the demand for those qualified in most STEM subjects will grow significantly. Such changing structural demand is also only part of the picture. The age profile of the STEM population means that there will also be a significant need to replace those leaving the STEM workforce (as older workers reach retirement age in the coming decade). This need to refresh talent (replacement demand) is at least as important as so called expansion demands arising from projected increases in employment levels for such workers. Together they are likely to lead to a substantial total requirement for almost all STEM categories over the coming decade. The analysis in Wilson (2008) does not enable a direct comparison with likely supply. However, if recent trends of young people away from STEM subjects continue, these results suggest that companies and organisations dependent on high quality STEM personnel will find it increasingly difficult to find the skills that they will need to operate and compete successfully. Such research reinforces the case for measures to try to reverse the negative trends on the supply side, and to encourage more and better students to follow STEM career paths.

4.6 Key findings

Changing patterns of demand for skills
Despite the crisis, the demand for skills is likely to continue to rise, with many trends being reinforced. There is likely to be a continuing rise in demand for many high level jobs requiring high level qualifications. But the share of better qualified people who may have to accept jobs requiring lower qualifications could increase. There are real concerns if recent

trends continue about polarisation, with significant increases in the number of some low level jobs.

On a positive note the results suggest that, across Europe as a whole, significant progress is being made towards the Lisbon targets. Europe is on track to raise its qualifications profile:

- more Europeans are acquiring high and medium qualifications;
- there are fewer low-qualified Europeans; and
- younger cohorts are the best qualified ever.

Overall, rising supply has therefore paralleled rising demand, and there is still evidence of high returns to education (in terms of both employment and wages). But there is no room for complacency, the rest of the world is not standing still – countries such as China are increasing their shares of high-level jobs. There are questions about whether or not the demand for skills in Europe will continue to grow at the same pace as supply, and provide good quality jobs for all. Rising demand for skills cannot be taken as given. It will probably need stimulation and encouragement from government for both employers and individuals to adopt high value added strategies and to raise their sights.

There are also important questions about: whether rising supply trends can be maintained if young people begin to find that labour market outcomes do not match their expectations; and the extent to which the actual skills being produced by the education and training systems match with the labour market need. Skills mismatches and imbalances remain a persistent phenomenon.

It is necessary to develop the right skill mix to:
- match and anticipate knowledge- and skills-intensive jobs; and
- manage transitions in the labour market.

Past success is not necessarily any guarantee of future returns. Countries and individuals need to invest in the right areas. Skills anticipation work can help to provide some pointers here but it cannot provide definitive answers. It should be seen as one tool in a large tool box of methods to help individuals and organisations understand the economic environment within which they operate and how it is changing.

Need for better systems for anticipation
Some form of regular and systematic anticipation of changing skills needs is an essential element to ensure a match between the changing demand for and supply of skills. But there are limits to the extent to which the educational and training system can be "planned" from the top down. A prime function of such activity should be seen as improving the information base upon which individual choices and decisions are made. This is not a plea for mechanistic, indicative planning, rather it is about helping to inform both individuals and organisations and institutions and make markets work better (the ideal is individuals making optimal choices with full information).

The Cedefop project has delivered the first comprehensive, pan-European skill demand and supply projections. These offer a sound foundation for further progress in anticipating future change, but much further work is needed. These next steps include:

- extension and improvements to models and methods;
- additional levels of detail, including implications for discipline/fields of study; and
- more indicators and issues to be covered and considered, including generic skills;

Much of this will be covered in the ongoing programme of work which will deliver updated, extended and enhanced projections in 2011.

There is also a general need for investment in much better quality data. Of course, this will all incur costs, but the costs of ignorance about such matters are even higher.

This is an ongoing process – not the end in itself– but just the beginning of an attempt to ensure that Europe's citizens are as well informed as they possibly can be about the economic, labour market and educational and training situation they face. It is important to bear in mind that the Cedefop projections represent just one possible future. The future is not fixed. If we don't like the look of it we need to take actions to end up somewhere better! We need to challenge both employers and individuals to aim higher.

Finally it is also important to remember that Education is about more than work and jobs. It is about giving people a real chance of influencing and shaping their lives: *"... learning and development is about much more than people's jobs and skills, important though they are. It is about ensuring they can enjoy life in all its dimensions and thrive in a world of change and risk. It is about their sense of themselves and the meaning they give to their lives – practically, intellectually, aesthetically, morally and spiritually. It is about their families, the communities in which they live, about what counts as the good life, and about what it means to be a citizen, ..."* Fryer (2010).

Key messages:

- *The impact of the crisis and subsequent recession has been severe and remains uncertain, but many trends continue regardless;*
- *Sectoral and technological change will have significant implications for skills;*
- *This is especially reflected in changing occupational patterns, but also in the demand for formal qualifications;*
- *The demand for and supply of formal qualifications are both rising steadily, and it is hard to separate out different influences;*
- *Mismatches, imbalances, and concerns about over as well as under qualification remain;*
- *It is possible to discern some trends in favour of STEM subjects, but the picture is complex*
- *Demands for generic and key /core skills will also be a significant feature;*
- *But education is not just about employment and jobs.*

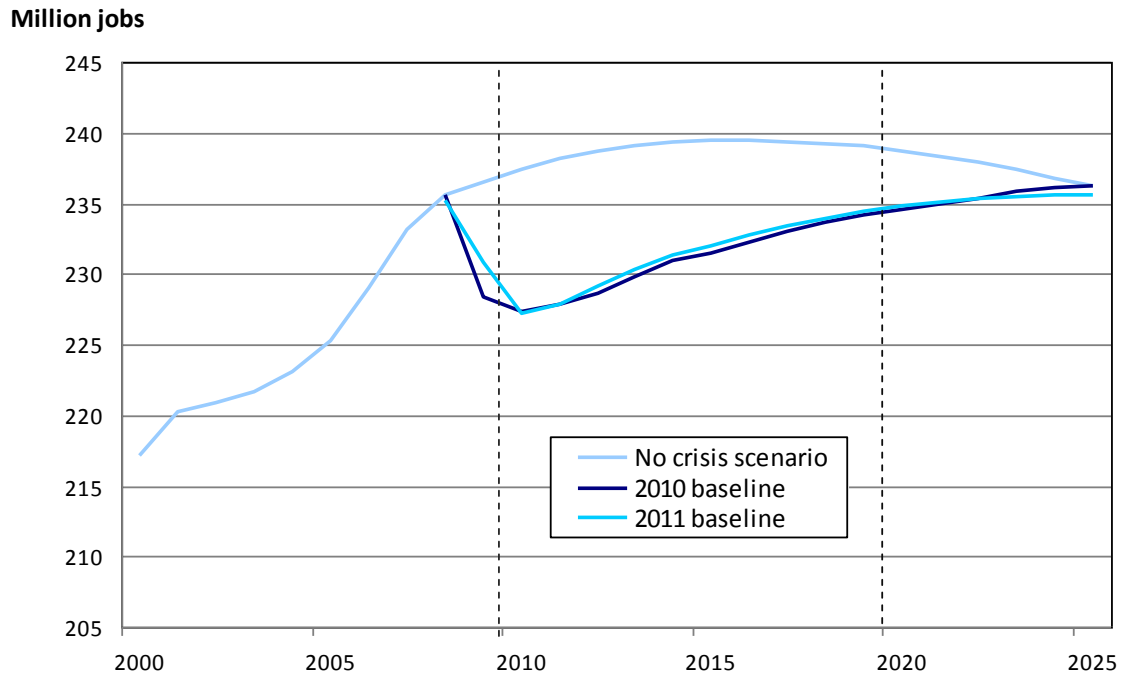**Figure 4.1: Impact of the recession on the employment in EU-27+ (2011)**

Million jobs

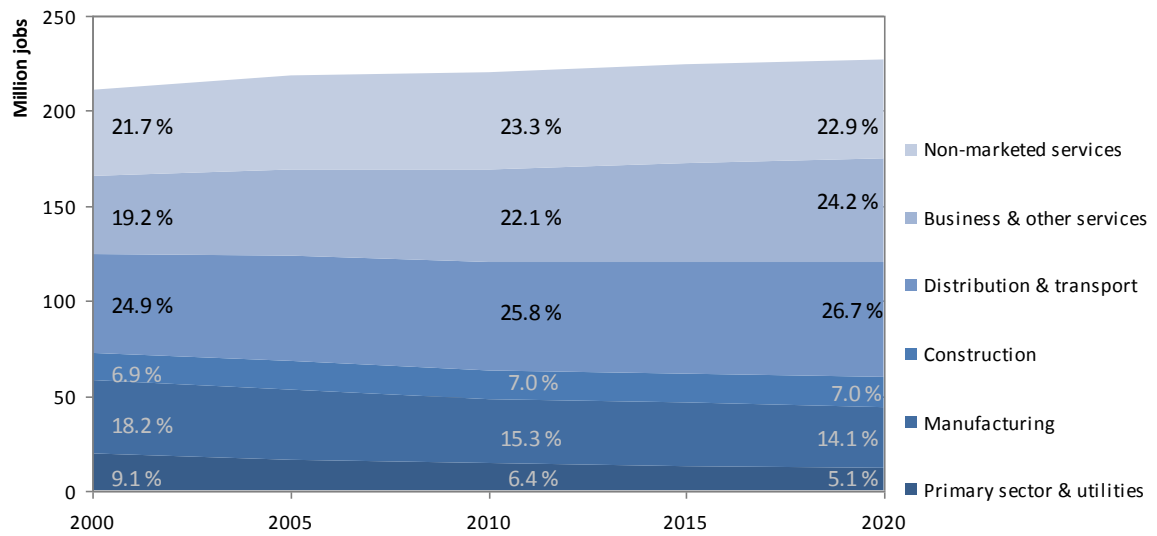**Figure 4.2: Employment changes by economic sectors in EU-27+**

Figure 4.3: Changes in employment structure by sector EU-27+

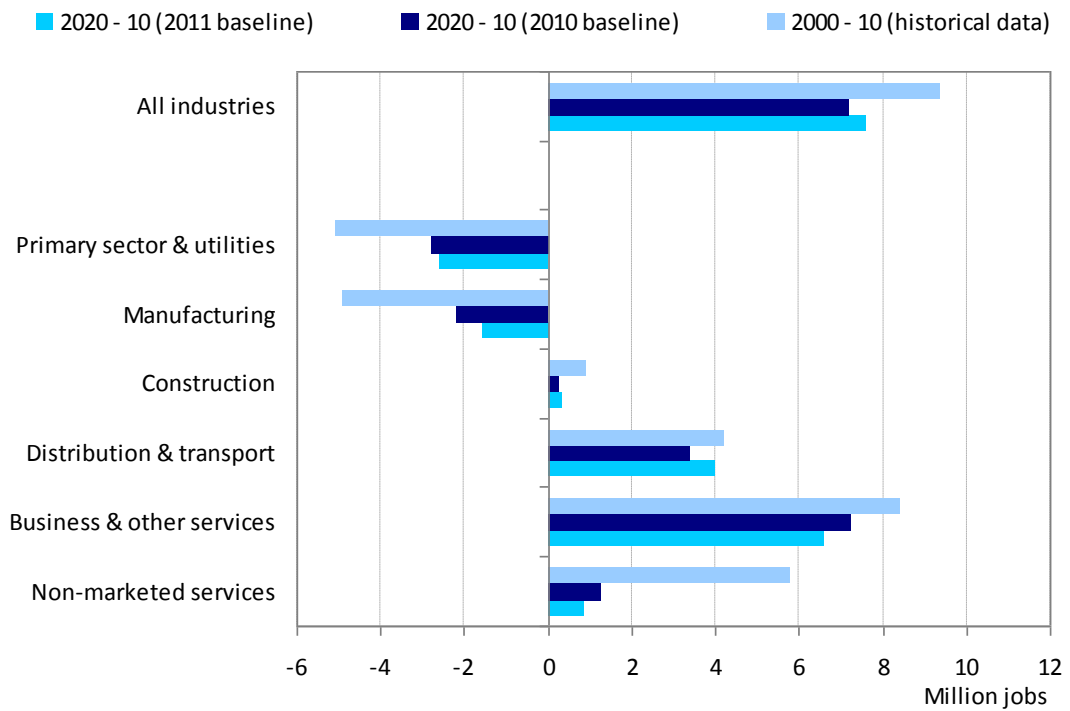Legend: 2020 - 10 (2011 baseline) ▪ 2020 - 10 (2010 baseline) ▪ 2000 - 10 (historical data)

Categories: All industries, Primary sector & utilities, Manufacturing, Construction, Distribution & transport, Business & other services, Non-marketed services

X-axis: Million jobs (-6 to 12)

Figure 4.4: Future demand by occupation in EU 27+ (Change between 2010-2020)

Legend: ▪ Total Requirement ▪ Replacement Demand ▪ Net Change

Categories: Legislators, senior officials and managers; Professionals; Technicians and associate professionals; Clerks; Service, shop and market sales workers; Skilled agricultural and fishery workers; Craft and related trades workers; Plant and machine operators and assemblers; Elementary occupations
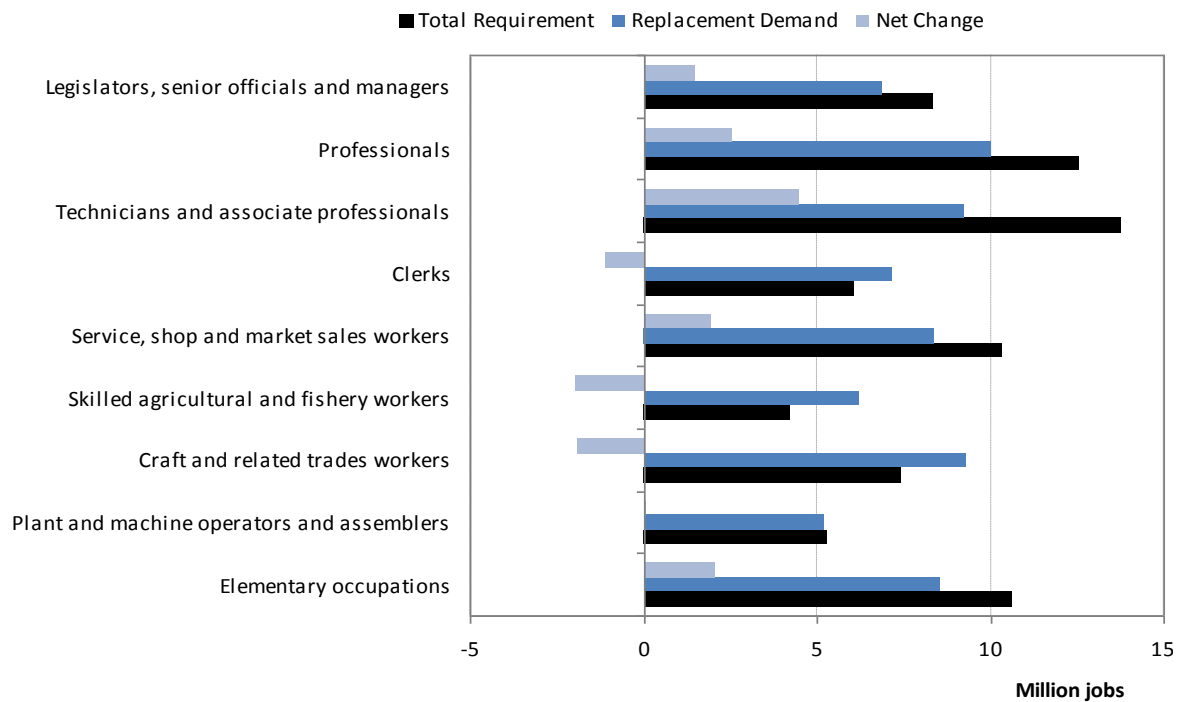
X-axis: Million jobs (-5 to 15)

Figure 4.5: Knowledge- and skills-intensive jobs on the increase (EU-27+)
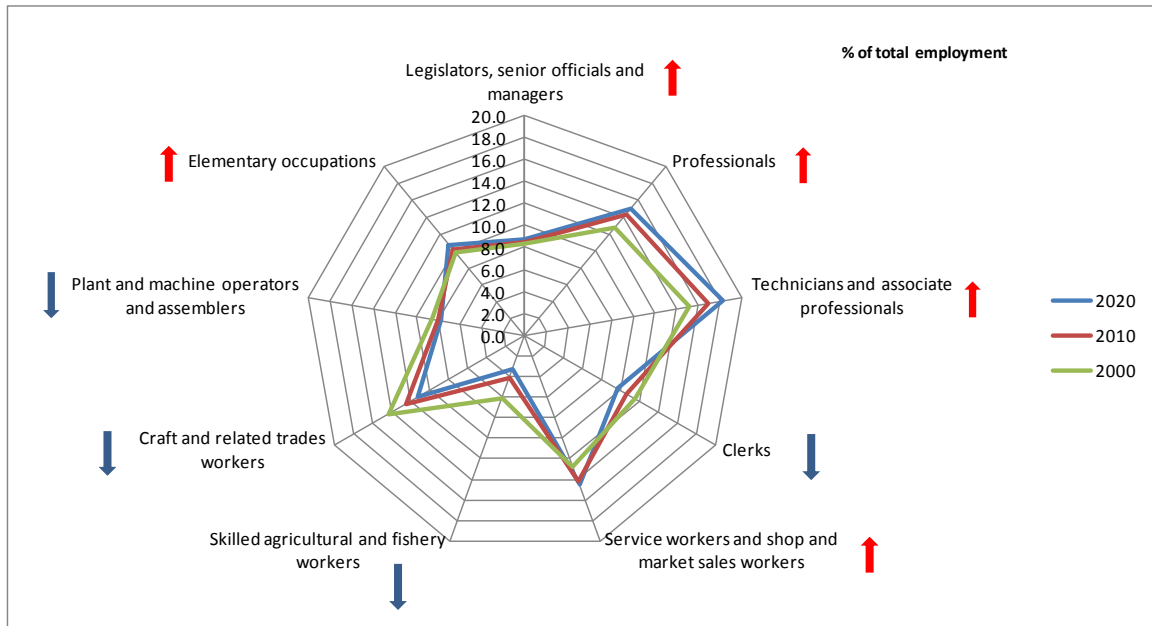

Figure 4.6: Future demand by qualification in EU-27+ (Change between 2010-2020)

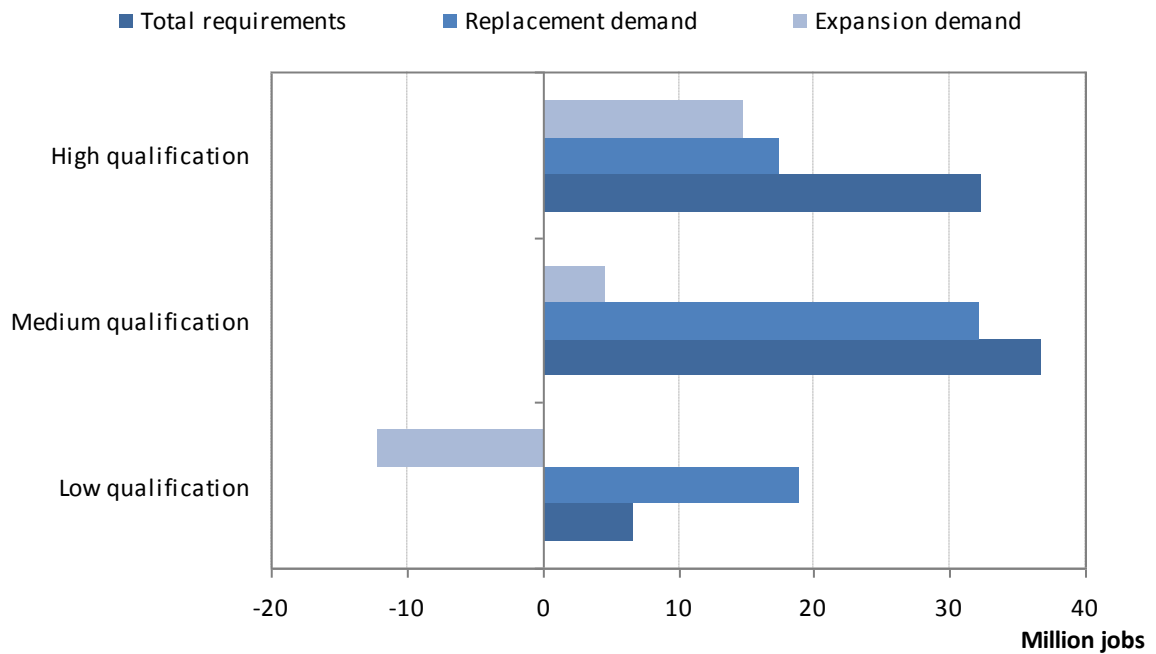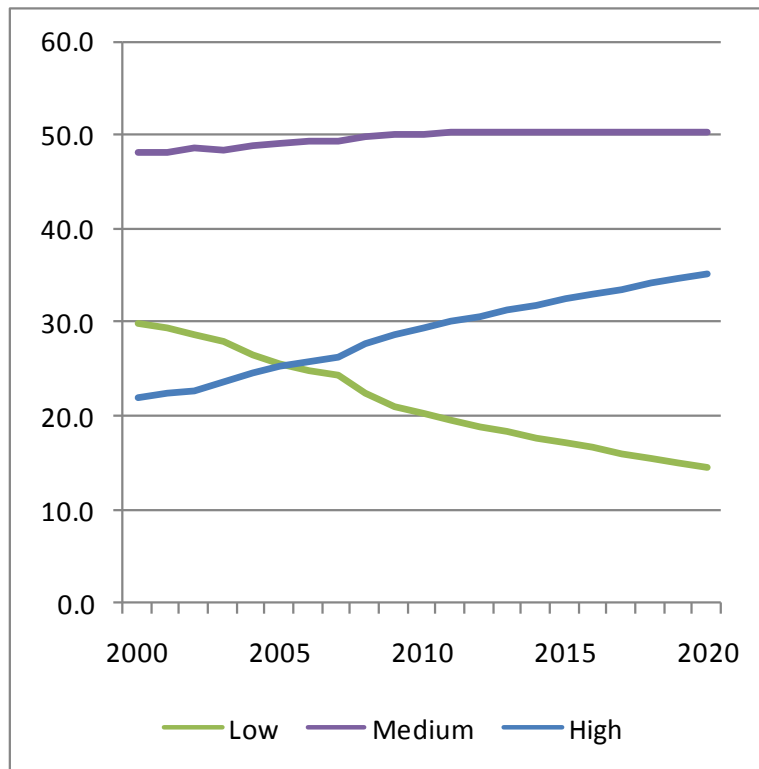**Figure 4.7: a greater % share of jobs for the better qualified (EU-27+)**

Figure 4.8: Supply trends by qualification – More people better qualified, EU-27+
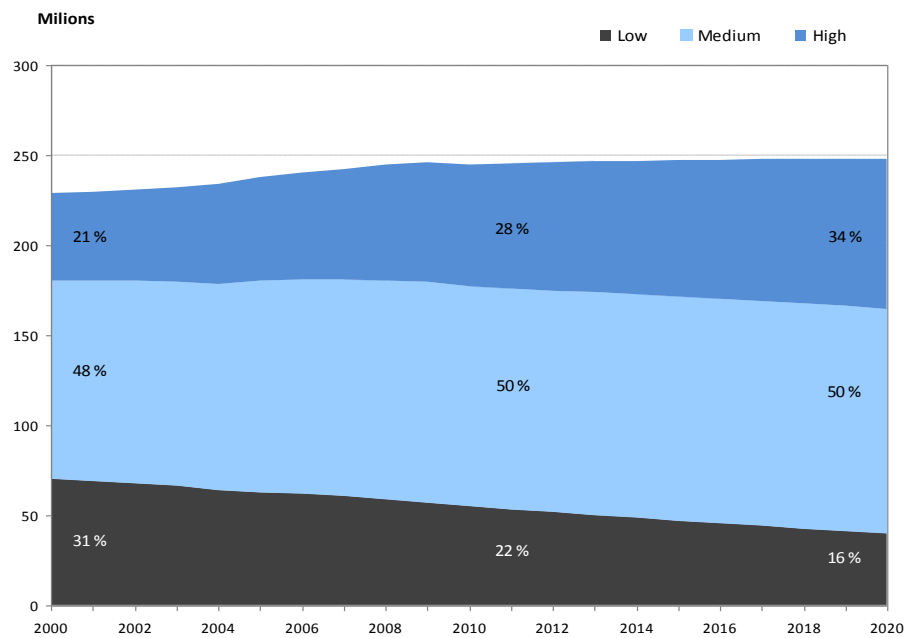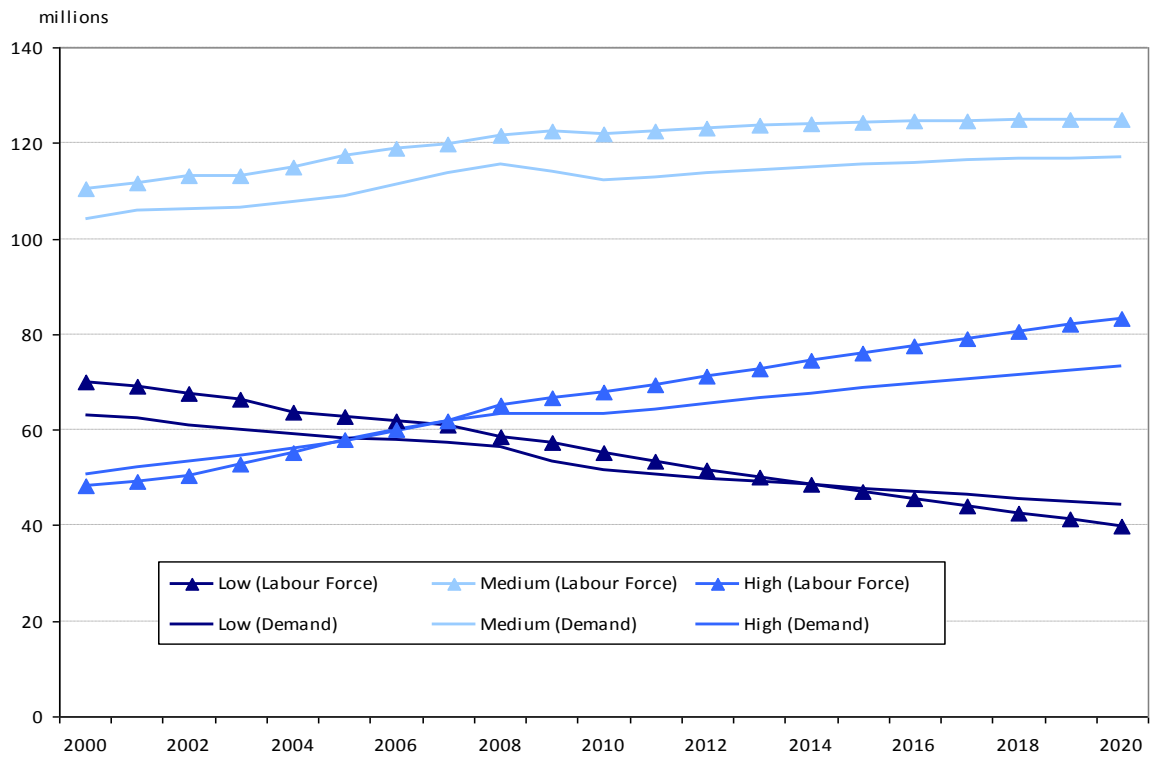
Figure 4.9: Comparison of supply and demand trends - Problematic! Imbalances are not mechanical

millions

Legend:
- Low (Labour Force)
- Medium (Labour Force)
- High (Labour Force)
- Low (Demand)
- Medium (Demand)
- High (Demand)

5. The Sectoral dimension

5.1 Sectoral and related studies

There are many examples of skills anticipation activities focussed on the Sectoral Dimension. In some countries, such as Germany, there is a long history of the active involvement of employers in skills development, including efforts to anticipate how such needs may change in the future. In others, such as the UK, there has been much greater emphasis in recent years in trying to ensure that the voice of employers is heard, including the setting up of new institutional structures such as Sector Skills Councils. In some other countries (such as France) the prime focus has been on the geographical dimension centred around "regional observatories", but the aim is to concentrate on the particular needs of employers in that local area (i.e. the sectors concerned).

Many of these initiatives have lead to attempts to anticipate changing skill needs in the future, using the full range of methods and approach set out in Section 2. At a pan-European level the European Commission has lead the way by commissioning a set of detailed sectoral studies using more qualitative methods.

5.2 The DG Employment Sectoral Studies

The DG Employment Sectoral Studies were undertaken as part of the *New Skills for New Jobs* initiative. They comprise a series of 18 sector-based studies that look at emerging and future skill needs up to 2020.[6] In contrast to the modelling based quantitative projections described in Section 4, they adopted a "scenario development" type approach.[7] This methodology has been developed in order to perform comprehensive sectoral analyses and foresights on emerging competencies across the EU.

The results of these studies have been discussed and validated by panels of experts from industry, academia and various sector organisations including workers' and employers' representatives, all of whom have a strong interest and expertise in the sectors concerned and in related skills issues. The results and recommendations from the studies are intended to form a useful guide for the attention of European, national and regional actors enabling them to adapt their choices and actions to promote the strategic management of human resources and to foster stronger synergies between innovation, skills and jobs.

The studies have been published under the general title of *Comprehensive Sector Analysis of Emerging Competences and Economic Activities in the European Union* (commissioned by the DG Employment, Social Affairs and Equal Opportunities).[8] It is important to note however that much of the work on the sectoral studies was undertaken before the financial crisis of 2008 and the subsequent impact on the world economy. Only 3 of the studies explicitly address the impact of the crisis.

All the DG Empl studies comprise three main parts. Part I analyses recent sector trends and provides a clear and concise overview of the most important developments, summarising the current state of play in the sector, with an emphasis on innovation, skills and jobs. The findings of Part I of the studies combine original data analysis (using Eurostat structural business statistics and labour force survey data), with results from an extensive literature review of existing research evidence, including a review of the previous round of quantitative projections produced by Cedefop and described in Section 4.

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[6] For details see: (http://ec.europa.eu/social/main.jsp?catId=784&langId=en). Two of them – *Automotive sector* and *Defence industry* were pilot studies to test the approach

[7] The so called European Foresight Methodology (EFM) designed by Prof. Maria João Rodrigues, with support from the European Commission.

[8] Eleven of these studies were executed by a core consortium led by TNO (Netherlands Organization for Applied Scientific Research), two by Economix, one by Alphametrics, one by IKEI and one by Oxford Research.

The prime function of Part I is to provide the foundation and building blocks for Parts II and III of the study. Part II is future-oriented and examines possible sectoral developments and more specifically developments in skills and jobs over the period to 2020. The core of Part II consists of developing plausible future scenarios and assessing their implications for jobs, skills and knowledge. These implications are analysed for various job functions.

Finally, in Part III, a range of main strategic options ('choices') to meet the possible future skills and knowledge needs is reviewed, including implications for education and training. All the studies conclude with a number of recommendations for the sector (individual firms, sector organizations, and sector partners), education and training institutions and intermediary organisations, and last but not least, policy-makers (at various levels, ranging from the EU to the local level).

In most of the studies 3 or 4 alternative scenarios are developed for the future. Rather than wishful pictures ('dreams', 'crystal ball gazing') of the future, the aim is to build scenarios founded on plausible developments in the drivers and trends observed, derived in a logical and deductive way. Rather than predictions or forecasts based on a model, the outcomes in the scenarios are based on expert opinion. The bandwidth between the most extreme scenarios can be interpreted as indicative of the degree of uncertainty, indicating possible paths for flexible anticipation. The star diagram in Figure 2.1 above illustrates the general approach adopted in this set of studies, focussing on the open ended possibilities facing many sectors.

Table 5.1: The DG Employment Sectoral Studies

Lot	Description	NACE Rev.2	NACE Rev.1.1	Awarded to
1	Textiles, wearing apparel and leather products	13-14-15	17-18-19	Economix
2	Printing and publishing	18-58	22	TNO
3	Chemicals, pharmaceuticals, rubber and plastic products	20-21-22	24-25	TNO
4	Non-metallic materials (glass, cement, ceramic,...)	23	26	TNO
5	Electromechanical engineering	27-28	29-31	Alphametrics
6	Computer, electronic and optical products	26	30-32-33	TNO
7	Building of ships and boats	30.1	35.1	IKEI
8	Furniture and others	31-32-33	36	TNO
9	Electricity, gas, water & waste	35-36-37-38-39	40-41	TNO
10	Distribution, trade	45-46-47	50-51-52	TNO
11	Tourism including hotels, catering and related services	55-79.1	55-63.3	Oxford Research
12	Transport	49-50-51-52	60-61-62-63	TNO
13	Post and telecommunications	53-61	64	TNO
14	Financial services (bank, insurance and others)	64-65-66	65-66-67	Economix
15	Health and social work	86-87-88-75	85	TNO
16	Other services, maintenance and cleaning	94-95-96-97-98	90-91-93-95	TNO

Notes: For details see: http://ec.europa.eu/social/main.jsp?catId=784&langId=en. This table excludes two further pilot studies for the Automotive sector and the Defence industry which were carried out to test the approach.

There is not time or space to provide even a brief summary from all the studies here. An over view can be found in Wilson *et al.* (2010), which highlights the nature of the scenarios developed and the main implications in terms of expected future developments for each sector. Much of the focus in these studies is on the knowledge and skills required to carry out jobs rather than the occupations and formal qualifications emphasised in the Cedefop quantitative projections (see Table 5.2 for details).

Table 5.2: Knowledge and Skills Categories Used in the Sectoral Studies

Knowledge	
Applying integrated production system software	Legislative / regulatory knowledge (environment)
B2B IT platforms	Modelling & Simulation
Cross media platforms	New multimedia knowledge and script writing
Database (publishing), design, management	Product development
Digital rights protection	Product knowledge
Digital workflows	Programming and mark-up languages
Environmental management	Quality control skills
Environmentally friendly production methods	Software (digital workflows & cross media)
E-skills	Strategic management
Financial knowledge	System architecture knowledge
General Management	Systems integration
Health and Safety	Supply chain management knowledge
Imaging	Technical knowledge
Intellectual Property knowledge	

Skills			
Social skills	Team working skills Social perceptiveness Communication Networking Language Intercultural	*Problem solving skills*	Analytical skills Interdisciplinary Initiative Multi-skilling Creativity
Management skills	Strategic and visionary Coaching and team building Collegial management style Change management Project management Process optimizing Quality management	*Self management skills*	Planning Stress and time management Flexibility Multi-tasking
		Entrepreneurship skills	Understanding suppliers customers Business development Marketing skills Trend setting / spotting

Some general conclusions may be drawn from the sector studies about changes in knowledge and skills. All sectors will be forced to focus increasingly on more flexible communication with customers, a higher degree of flexibility in satisfying customer needs will be demanded and there will be an increased need to use on-line technologies. This is why *E-skills Knowledge* and *Technical Knowledge* will be among those knowledge categories where the most robust increase in requirements is expected. A major increase in the importance of *Legislative/Regulatory Knowledge* is related to the necessary expansion into foreign markets.

As regards *Social Skills*, good *Communication Skills* will be required in particular. The skills most demanded in the *Problem Skills* category will be *Analytical Skills*. The most important *Entrepreneurial Skills* include *Understanding Customers* and, in terms of *Management Skills*, the authors of sector studies consider *Process Optimizing Skills* to be the most important for the future development. However, it is the *Self-Management* category that will see the largest increase in importance – primarily a high level of *Flexibility* and also *Stress and Time Management*. Box 5.1 provides a taste of the more detailed insights available for particular sectors (in this case focussing on Textiles).

Table 5.3 provides another example focusing on emerging tasks and competences in the Hotels and Restaurants sector. One of the striking features here is that this makes no direct reference to the many occupations that might be regarded as central to this sector such as cleaning, catering, waiting, serving and security!

Box 5.1: Example of Impact on skills in *Textile Industry* sector:

The preferred new competences will be in three areas:
- The "technical" section of textiles and apparel production will require more specialists. In addition to textiles and apparel engineers, chemists, physicians, and computer professionals will be at the top of recruitment lists. Innovation is the main target, demanding creativeness and unconventional thinking. Crossing borders of professions will be important for success.
- The "traditional" section will appreciate high specialization on craft-related production knowledge. Not only will fashion designers be required to provide knowledge of sound historical roots of European clothing. Craftsmen will revitalize old production technologies, and repair and reusing will become important.
- Finally, all occupations will have to extend ecological competences, which will be considered vital in all parts of production, marketing and business management. The focus of technological development is on eco-products and eco-technologies which demand highly skilled "eco-engineers" and "eco-fashion designers" with a sound knowledge of both past and future technologies.

Due to the expansion of production-related activities, the change of occupational structures will not result in a higher share of highly educated people. In contrast, intermediary skills will be extended with a good knowledge of production processes and ecological impact. Low-skilled education and training levels will be less important.

Table 5.3: Emerging tasks and competencies in the Hotels and Restaurant sector

Main occupational function	Emerging tasks and competencies
General Management	• International financial management, yield management, etc. • Diversity management • Knowledge about ICT
Marketing and sales	• Global corporate branding • Exploring new, individualised market segments • Employer branding
Financial and administrative	• International financial management, yield management, etc.
R&D	• Developing new individualised hospitality experiences • Developing and applying ICT and internet solutions
Logistics	• International supply chain management • Online supply chain management
Production/service management	• Managing individualised customer needs • Diversity management • ICT skills: using ICT and internet solutions
Quality	• Developing new quality standards • Applying international standards and certifications
Production/service	• Language skills • Intercultural competencies • Multiskilling and flexibility • ICT skills: using ICT and internet solutions

Source: Oxford Research 2008

5.3 Greater sectoral involvement in Skills anticipation.

Sector studies constitute a major instrument for identification of skills needs in the future labour market. Many countries (e.g. Cyprus, Czech Republic, Finland, France, Malta, Norway, Portugal) carry out *ad hoc* sectoral or occupational studies. These are usually strong on sectoral or other specifics but might be partial and inconsistent across sectors, areas, etc. Sectoral studies or other sectoral cooperation mechanisms, such as sectoral councils, should ideally be part of a coordinated multi-level scheme.

In France, for example, observatories are established in each sector. The Council of strategic analysis (CAS) at national level works on anticipating trends affecting jobs and qualifications. This enables the State, the professional branches and the regions to specify their employment and training policies. There is a strong emphasis in the 2007-13 State-Region agreement on anticipating economic changes and developing qualifications. Examples of such involvements and activities by public authorities (national, regional, councils) and social partners are shown in table below.

Table 5.4: Skills needs anticipation by public employment services involving relevant stakeholders in France

Level	Initiator	Main Focus	Example of initiative
National	Prime Minister, Ministry of employment, Ministry of education	Recruitment, sector development	Prospective studies contracts (CEP); State of sectors; Actions to be taken
Regional	Employment and training observatory (tripartite, funded within 2007-13 State-Regional Councils Contracts)	Analysis, forecast for school training, CVET and training within enterprises	Regional employment and training observatories (OREF); 2009 periodic analysis of quantitative and qualitative development of sector activities and professions
Sectoral	Industry branch joint observatory; set up of professions and qualifications forecast observatory (OPMQ) in 2004	Forecast on development of branch professions at regional, national and European levels	Observatory of automobile trades entrusted since 2004 with all related studies following a diagnostic and forecasting approach

In the Czech Republic, the development of sector studies, focusing on the future of the labour market, has been a relatively new activity, and therefore pilot studies were implemented to test and elaborate on various methodological approaches. These were successful in testing a qualitative approach to the exploration of future labour market needs, and the results have been integrated in the web-portal "Czech future skills".

These are just two of many possible examples that could have been drawn upon for individual countries. These may all be given further impetus by proposals to develop Sector Skills Councils at a pan-European level. [9]

The DG Employment Sectoral Studies work complements the Cedefop model based quantitative projections, and there is considerable scope for further harmonisation and interaction between the two methods. This might include exploiting the Sectoral Studies more to focus on likely development in detailed occupational change *within sectors*, and then combining this with the Cedefop quantitative multi sectoral analysis. This would have some elements in common with the kind of approach used in the US by the BLS, which places more stress on expert views of detailed future occupational change rather than

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[9] See
http://www.europeunit.ac.uk/sites/europe_unit2/documents_and_publications/e_newsletter/new_skills_new_jobs_pla.cfm

statistical, model based. projections. There is also greater scope for the development of linked quantitative scenarios looking forward to 2020, using the Cedefop quantitative multi-sectoral approach, in order to provide more consistent assumptions to underpin any new scenario development work at sectoral level.

While sectoral cooperation is not a panacea, it is regarded as a key aspect of trying to anticipate changing skill needs at both national and pan-European level. There are, of course, problems and limitations, not least the perception that many sectoral boundaries are becoming more blurred.

Key messages:

- *The sectoral dimension is at the heart of understanding changing skill needs. Some kind of active involvement by employers in particular is essential to ensuring that all labour market participants understand the changing nature of jobs;*
- *In many countries this is reflected in the setting up of Sectoral bodies (Sector Skills Councils, Sector observatories, etc);*
- *The Sectoral Studies commissioned by DG Employment and the Cedefop quantitative skills projections represent two important elements in attempting to meet these needs, albeit aimed at slightly different audiences;*
- *Although they have certain limitations in terms of coverage and timeliness (in particular they were undertaken before the financial crisis) the DG Empl Sectoral Studies provide many useful insights into the future nature of skills demands from employers;*
- *Such work complements the Cedefop projections, and there is considerable scope for further harmonisation and interaction between the two methods.*

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6. Implications for education & training and life-long learning[10]

It is widely recognised that transferring and implementing anticipation results into policy and practice is a big challenge. To draw out implications of skill needs analysis for education and training, and in particular for Life-long Learning (LLL) is a complex activity. Yet this is at the core of attempts to redefine national education and training systems, and qualification and occupational definitions and standards. Many countries have a long tradition, and well established institutional routines in updating such standards, involving all relevant stakeholders. In that context the existing agencies and labour market actors at different levels (national, sector, local and training providers) are all playing a major role to ensure relevance to the labour market.

Developing and updating standards goes beyond the mere response to labour market immediate requirements. It is largely embedded in a strategy to improve the inner structure and transparency of qualifications systems in a broader VET modernisation agenda. Some individual countries are more specifically linking the updating of occupational standards to the initiating or further development of their national qualifications frameworks. A related issue is the establishment of classifications /definitions of occupations and related profiles. The importance of occupational standards is underlined by their integration in the education and training systems. Some countries use the design of provision as direct way to integrate skill needs change into this process.

Others countries have emphasised the need to integrate changing skill needs into guidance, by developing information and communication activities that take account of national or regional labour-market trends.

Most countries recognise that there are many obstacles in integrating changing skill needs into implications for education and training generally, and for LLL in particular. The main ones quoted by Member States are: the lack of accurate and robust data; the need for developing good methodologies for anticipation; and the necessity for a broad stakeholder involvement.

Few countries believe that a simple mechanistic application of anticipation results to decide education and training priorities is possible. Some Member States mention inconsistencies in methodological approaches applied across various studies, and varying quality in methodological soundness in those studies, as well as limited evidence-based measures in place to validate study outcomes and how these should feed into IVET and CVET provision.

As noted earlier, the old fashioned idea of mechanistic "manpower planning" has been rejected. But this does not mean that it is not important still to try to anticipate the way things are changing. However, such work should be regarded as providing broad guidance rather than precise predictions. As emphasised in the introduction, it is notable that the USA , one of the most market orientated economies in the world, devotes more resources to skills anticipation activity than anywhere else. This is not based on the idea of trying to predict precisely where training efforts should be focused. Rather, the aim is to provide detailed LMI, including forecasts, to all labour market participants (potential students, as well as education and training providers) to ensure that they are well informed about the choices they face. It is left to individuals and education and training institutions to make their own choices and decisions rather than imposing things from the top down.

The problem of inadequate data relates back to problems with data collection processes, which are still not ideally suited to providing the kind of detailed information that is needed to help markets work efficiently. Many policy makers are still more concerned with trying to control and micro manage educational and training systems, rather that helping to ensure

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[10] This chapter is largely based on Cedefop´s latest policy report (Cedefop, 2010b).

that they work effectively. Education and training systems need the capacity to cope with rapid changes, but this may be best achieved by allowing decisions to made at a more micro level rather than trying to do everything from the top down.

There is a strong case for providing detailed information to aid individual decision making, so as to enable individuals to make the best informed choices. Good careers guidance and advice is not prescriptive; individuals need to be informed about options and possibilities. Similarly, while policy-makers at the highest level need to take a view about priorities and trends, they need to leave room for education and training providers to make their own choices and decisions.

One often quoted major obstacle to identifying and delivering the skills needs of the economy is achieving a high quality of partnership across all the agencies and bodies involved in analysing and delivering economic development. Another is managing the balance between the priorities at national, regional and local levels.

Ideally it is desirable to embed forecast activities into a wider context by involving the various stakeholders (including teaching staff, employers, etc).However, in most Member States there are no clearly articulated views among employers about what kind of employees they need in the future, and what skills are necessary for further developments of their companies. Another problem is the lack of overall national strategy on the development of the economy in most countries. Therefore, there is often no agreement on what sectors are the most important for future development, nor on what the necessary skills are.

Achieving consensus and agreement is obviously desirable, but may not be possible in detail. If there are differences of view this may be helpful rather than a problem, highlighting areas of uncertainty. Such information should be made available to all users with suitable "health warnings", in particular that they should not be taken literally, nor as prescriptive.

Some policy makers see the need to consider and allow individual choices as sometimes in conflict with not channelling individuals into education and training on the basis of forecasts, but this is to take a too mechanistic view of the process. The projections should not be seen as telling individuals making career choices, nor education and training providers, what course of study they should follow or put on. Rather such information is just some of many pieces of data that need to be taken into consideration in making such choices and decisions.

Integrating likely developments in changing skill needs into LLL in the long term requires a more proactive engagement by providers, anticipating emerging developments and not waiting for problems to arise. It is necessary to get a better grasp of emerging sectors and skills, and changes in existing occupations. This requires improved systems and methods to anticipate skills, in partnership with key labour-market stakeholders. To capture these trends and requirements in occupations, sectors and across traditional boundaries, existing occupational and education/training standards (which define what is to be expected from the holder of a certificate or diploma) need to be reassessed regularly (in collaboration with relevant stakeholders).

Although the necessity to integrate the changing skills needs of the labour market into LLL is recognised and accepted by all stakeholders and partners, developing new qualifications takes time and resources. When integration is lagging behind, sectors react quickly and lead the work on further training of their staff themselves.

Work-based learning can help to bridge the gap between the worlds of education, training and work, and to develop competence-based qualifications. Work-based learning/apprenticeship is a key feature of VET policies and provision in most countries in Europe. However, the picture is mixed. The evidence revived in Cedefop (2010b) shows that some countries report very weak links between the worlds of education and labour (CZ). In some other countries work-based learning/apprenticeship is becoming a priority or is being strengthened (e.g. FR, IS, NL, LIE, MT, CY). New foci of work-based learning include

infrastructure/capacity building is important in others (e.g. DK, CY, FI, MT), while regionalisation (e.g. FR, NL) and flexibility in contractual agreements (e.g. DK, FR) are also important. There is general agreement on the need for more flexible systems that enable people to move between general and vocational education and combine work and learning throughout life.

Anticipation based on a common terminology for knowledge, skills and competence, both in the labour market and in education/training, would help to provide better and more focused information on future skill needs, and improve the matching of skills supply and demand. Educational offers could be designed with a more specific focus on labour market needs in Europe. The European Taxonomy of Skills, Competencies and Occupations (ESCO), which is being developed by the European Commission, should make labour market and skill research more comparable, and help to foster internationalisation of research in this area. For international comparison ISCED and ISCO are indispensable, but when one wants to go into more detail regarding skills and competencies, no international standards are currently available and most studies build upon *ad hoc* classifications. ESCO should improve both national and international skills/qualifications research, and contribute to achieving better synergy between employment and education and training policy.

There are a number of European Commission's programmes (e.g. the Progress programme and Lifelong learning programme) or funds which provide support for a range of actions related to anticipation of skill needs and to the transfer of results into policy and practice. For example, the Lifelong Learning Programme enables people at all stages of their lives to take part in stimulating learning experiences, as well as helping to develop the education and training sector generally across Europe. This includes networking, knowledge sharing and discussions about different anticipation methodologies and approaches in different countries and at different levels, building a more comprehensive system for anticipation by experts, using existing (European) forecasts as a starting point when performing various analyses, etc. Ideally the anticipation exercises could contribute to better design and targeting of project activities, as well as increasing the efficiency of the budget spent.

AP At the risk of asking you questions that aren't yours to answer or are unanswerable, from the perspective of forecasting, do you have an opinion on what responsive education looks like? At system level and at providers level? Do studies on the effectiveness of solutions for responsiveness of different education systems exists? Are data about IVET 'and CVET available with regard to this? How can forecasting information support responsiveness? Ideally specified for the different audiences & actors/ levels (EU, national, sectoral)

Key messages:

- *Transferring and implementing anticipation results into policy and practice remains a big challenge;*
- *The main obstacles quoted by Member States are the lack of accurate and robust data, the need for better methodologies and for a greater stakeholder involvement;*
- *But policy makers are still loath to "let go" and the tendency to try to plan from the top down remains strong.*
- *Integrating changing skill needs into LLL in the long term requires a more proactive approach, anticipating rather than just reacting to change;*
- *Work-based learning helps to bridge the gap between the worlds of education, training and work and developing competence-based qualifications;*
- *Stakeholders are a valuable source of information, especially for qualitative data;*
- *ESCO should contribute to achieving better:*
    - *synergy between employment and education and training policy; and*
    - *links between labour market forecasts and education provision.*

7. Conclusions

7.1 The Rationale for Anticipation

It is clear that it is not possible to predict the future precisely. It is equally clear that all individual actors in the labour market need to make strategic plans and choices. Such plans need to be guided by robust LMII, including a forward looking element.

The need to anticipate changing skill needs in a regular, systematic and consistent manner across the whole of Europe has now been recognised, by the New skills for New Jobs agenda and more recent initiatives associated with the 2020 Employment Strategy. Anticipation is a key element in 3 of the EU Employment Guidelines.

Analysing changing skill needs and peering into the future (both quantitatively and qualitatively) are important elements in avoiding market failures. This type of Labour market information is a public good but the use of such results at a European level is still mainly limited to Government (policy makers & expert groups). It is argued here that such information has a broader role in helping to make markets work better, by informing all labour market participants about the situations they may face.

There is much higher investment in Anticipation by other countries. North America in particular provides an example of 'best practice' in providing material to all labour market participants, leading to greater market transparency and efficiency as well as helping to improve matching processes. Such work needs to serve a range of audiences, including: stakeholders, social partners, practitioners and individuals – not just policy makers.

7.2 Alternative approaches to anticipation

Anticipation is carried out in many different ways, all of which have their strengths and weaknesses. Different methods provide different results -no one method is sufficient by itself.

There are also many problems and pitfalls. This means that such results therefore require careful interpretation. They should not be taken too literally but as indicative of general trends and tendencies. Nobody has a crystal ball, and the future is not inevitable, but many trends are likely to remain robust and can therefore help to inform individual choices.

Forecasts need to serve the large range of audiences, including: stakeholders, social partners, practitioners and individuals – not just policy makers.

There is a huge variety of different approaches - but regular, systematic, quantitative, model based forecasts, and scenario developments, are a key element.

7.3 What is available and where to find it

Most countries have some kind of system for skills anticipation, but they vary greatly in levels of sophistication and detail. Much of this is determined by their existing statistical infrastructure.

There has been a shift in the objectives of identifying future skill needs from manpower planning, to more general assessment of skills needs to inform all labour market participants.

Systems are becoming more sophisticated and complex, and there is clear trend to combine methods.

The case for a pan-European system for skill needs anticipation is generally accepted and the Cedefop work has begun to fill this gap. But much more remains to be done, although various initiatives are in place to move things forward, including the EU Skills Panorama.

7.4 Key results of the latest Cedefop Pan European projections

The impact of the crisis and subsequent recession has been severe and the future for the labour market in Europe remains quite uncertain. Despite this, many broad trends continue regardless, in particular the shift towards a more knowledge based and service economy and towards knowledge and more high level skills intensive jobs.

Sectoral and technological change will have significant implications for skills. But it is not all in favour of high skills, there will be some growth at lower skills levels in areas where it is not possible to automate or mechanise.

This is reflected in changing occupational patterns, which show growth at both high and low levels, and also in the demand for formal qualifications.

However, the supply of formal qualifications is also rising rapidly, and it is hard to separate out different influences. There are likely to be continuing problems of mismatches and, imbalances, and concerns about over- as well as under- qualification.

Demands for various generic and key /core/ basic skills is also likely to be a significant feature, although this is not covered in the main Cedefop results.

7.5   The Sectoral dimension:

The sectoral dimension is at the heart of understanding changing skill needs. Some kind of active involvement by employers in particular is essential to ensuring that all labour market participants understand the changing nature of jobs. In many countries this is reflected in the setting up of Sectoral bodies (Sector Skills Councils, Sector observatories, etc). Usually these involve both the social partners (unions as well as employers). This places a priority on focusing on sectoral developments.

The Sectoral Studies commissioned by DG Employment, and the Cedefop quantitative skills projections, represent two important elements in attempting to meet these needs, albeit aimed at slightly different audiences.

Although they have certain limitations in terms of coverage and timeliness (in particular they were undertaken before the financial crisis) the DG Empl Sectoral Studies provide many useful insights into the future nature of skills demands from employers.

Such work complements the Cedefop projections, and there is considerable scope for further harmonisation and interaction between the two methods. This includes exploiting the Sectoral Studies more and extending them to focus on likely developments in detailed occupational change within sectors. This can then be used as input into the Cedefop quantitative multi sectoral analysis (as exemplified by the approach used in the US by the BLS). The development of linked quantitative scenarios to 2020 using the Cedefop multi-sectoral approach to provide consistent assumptions to underpin any new scenario development work at sectoral level would be a significant step forward.

7.6   Implications for education and training and lifelong learning (LLL)

Transferring and implementing anticipation results into policy and practice remains a huge challenge. The main obstacles quoted by Member States are the lack of accurate and robust data, the need for developing good methodologies and for a broader and deeper stakeholder involvement.

Perhaps a bigger problem is that policy makers at national level are still loath to "let go" and allow choices and decisions to take place a more micro level. The tendency to try to plan form the top down remains strong.

Integrating changing skill needs into LLL in the long term requires a more proactive approach, anticipating rather than just reacting to change. It also needs to involve all stakeholders.

Stakeholders are also a valuable source of information, especially for more qualitative data.

Work-based learning can help to bridge the gap between the worlds of education, training and work. Developing competence-based qualifications should also help.

ESCO should contribute to achieving better greater synergy between employment and education and training policy. It should also help to make a better the link between labour market forecasts and education provision.

References

Bosworth, D. (2009) *The R&D, knowledge, innovation triangle: education and economic performance*. Beyond Current Horizons: DCSF. http://www.beyondcurrenthorizons.org.uk/evidence/work-and-employment/

Cedefop (2009) *Skill mismatch: Identifying priorities for future research*. Cedefop working paper No. 3, Cedefop research arena (Cedra): Thessaloniki.

Cedefop (2010a) *Skills supply and demand in Europe: medium-term forecast up to 2020* http://www.cedefop.europa.eu/EN/identifying-skills-needs/index.aspx).

Cedefop (2010b) *A bridge to the future. European policy for vocational education and training 2002-10* (http://www.cedefop.europa.eu/EN/Files/3058_en.pdf)

Cedefop (2008) *Systems for anticipation of skill needs in the EU Member States*. Cedefop working paper No 1 (http://www.cedefop.europa.eu/EN/Files/WorkingPaper01_Oct2008.pdf)

CIHE (2009) *The Demand for STEM Graduates and Postgraduates*. CIHE STEM Policy Group.

DG Employment (2010). *Sectoral studies* http://ec.europa.eu/social/main.jsp?catId=784&langId=en

European Commission (2010) *New Skills for New Jobs: Action Now.* A report by the Expert Group on New Skills for New Jobs, prepared for the European Commission, February.

Fryer, Bob (2010) *Open letter to Vince Cable*: http://www.campaign-for-learning.org.uk/cfl/corporatenewsletter/may/professor_bob_fryer_an_open_letter_to_vince_cable.asp

GHK (2008) Commission Staff Working Document accompanying the communication from the commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - *New Skills for New Jobs: Anticipating and matching labour market and skills needs*. {COM(2008) 868 final}

Hamilton, V. (2010). *The US response to the global skills challenge.* UKCES Annual Convention on Skills, Jobs and Growth, 8-9 February 2010, London. http://www.neilstewartassociates.com/jd225/live.php

OECD (2007) *Innovation and Growth Rationale for an Innovative Strategy*. Paris, Organisation for Economic Cooperation and Development.

OECD. (2006). *Evolution of student interest in Science and Technology studies*. Policy Report: http://www.oecd.org/16/30/36645825.pdf

Purcell, K, *et al*. (200). *FutureTrack: Emerging evidence on HE in the UK*. Institute for Employment Research, University of Warwick.

SEMTA (2009) Skills and the future of Advanced Manufacturing. A Summary Skills Assessment for the SSC Advanced Manufacturing Cluster. December 2009: http://www.semta.org.uk/pdf/ADVMFG%20Report%20Mar10.pdf

SEMTA (2010) Skills and the future of UK Science, Engineering and Manufacturing Technologies. The 2010 realities, expected developments and key priorities. The Full Sector Skills Assessment for Semta's sectors. http://www.semta.org.uk/public_bodies/research/sector_skills_assessment_2009.aspx

Wilson, R.A. (2008) *The Demand for STEM Graduates: Some benchmark projections*. CIHE/ETB/DIUS. http://www.cihe.co.uk/category/themes/policy/stem/.

Wilson, R.A. J. Barton, J. Koucký, M. Lepič and H. Pollitt, (2008) *Alternative approaches to anticipating employment and skill trends: Comparison of the DG Employment Sectoral Studies and the CEDEFOP projections.* In part delivery of Framework Agreement on Forecasting skill supply and demand in Europe (in response to open invitation to tender No AO/RPA/AZU-TODUN/European-skills-forecasts/009/08). Technical Report no: 007