



PANORAMA

**Skills for
Europe's future:
anticipating
occupational
skill needs**



Cedefop

Skills for Europe's future: anticipating occupational skill needs

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Foreword

Information on national skill needs is no longer enough: a European labour market requires European-level information. It is in this context that Cedefop has developed the first European skills needs forecast.

Cedefop's analysis of skills needs, conducted in 2007, provides a consistent and comprehensive medium-term forecast of employment and skill needs across Europe and has made a major contribution to identifying labour-market trends. The results of these projections of employment and skill needs across the whole of Europe (EU-25 plus Norway and Switzerland) up to 2015 were presented for the first time in the Agora conference 'Skills for Europe's future'.

Over 160 participants attended the Agora in Thessaloniki, and Cedefop was delighted to host such a successful conference; we look forward to organising other follow-up conferences on this important issue central to the future development of the European economy.

The severity of the current financial crisis adds an exceptional degree of unpredictability about the future of the world's economy. Yet, to put Europe on the road to recovery, it is essential to improve human capital and employability by upgrading skills. The possible impact of the crisis is not yet reflected in the forecast. However, as soon as data are available, scenarios have to be calculated if this crisis changes the long-term trends substantially.

These proceedings comprise the presentations and discussions of this Agora conference. We hope this publication will support not only policy-makers and researchers working on skill needs, but also social partners and practitioners.

Aviana Bulgarelli
Director of Cedefop

Acknowledgements

This publication results from proceedings of the Agora conference 'Skills for Europe's future' organised by Cedefop in February 2008. It has been prepared by the team working in Cedefop on the early identification of skill needs project. Thanks go especially to Torsten Dunkel, who compiled the papers, Alena Zukersteinova, for her helpful comments, and Manfred Tessaring who supervised the publication.

Cedefop would like to acknowledge all those who actively contributed to the conference and this publication.

Preface

The future development of skills – both skill needs and supply – on European labour markets ranks high on the current policy agenda. The year 2008 was particularly marked with an increased political awareness of anticipation of skill needs by various recent policy documents calling for assessment of future skill requirements at both national and European levels. Cedefop, with support of its expert network Skillsnet, has been proactive in this respect and delivered, at the beginning of 2008, a first pan-European forecast of occupational skill needs up to 2015 for EU-25, Norway and Switzerland. The results were presented for the first time at Cedefop's Agora conference 'Skills for Europe's future' organised on 21-22 February 2008 in Thessaloniki.

Other objectives of the conference were to discuss the findings and future network plans with policy-makers, social partners, practitioners and all other relevant stakeholders. It also aimed to disseminate other information on future skill needs collected and shared among experts and researchers in Cedefop's network Skillsnet; these are summarised in the proceedings.

The lack of data about what skills will be needed in the future has been a long-standing concern in Europe. Anticipating occupational skill needs is a priority in the Maastricht and Helsinki communiqués (European Commission, 2004; 2006), in the European Council's integrated guidelines for employment for 2005-08 (European Commission, 2005, guidelines 19, 20 and 24), in the Regulation (EC) No 1083/2006 on the European Social Fund (Council of the EU, 2006), and in the social partners' framework of actions for the lifelong learning development of competences and qualifications (ETUC et al., 2002). The need to improve mobility in the European labour market, to increase the skill level of the population and to prevent skill mismatches, makes information about the future development of skills and competences even more important.

The relaunched Lisbon agenda emphasises human capital and related investments in education and training as important policy levers to foster growth, employment and competitiveness, together with innovation, research and development. The 2007 Council resolution on new skills for new jobs (Council of EU, 2007) stressed the need to anticipate skills needs – and skills gaps – emerging in European labour markets, including explicitly by strengthening Cedefop's network for the early identification and forecast of skill needs (Skillsnet). In the short term, information on emerging skills needs is crucial, especially as several sectors already face skill shortages.

After the successful Agora conference and the favourable political momentum, Cedefop has been actively involved in the new community initiative on 'new skills for new jobs'. This follows the request of the European Council (March 2008) asking the European Commission for a comprehensive assessment of Europe's future skills requirements up to 2020, taking account of technological change and an ageing population, and to propose ways to anticipate future needs. The European Commission has released the policy priorities in its communication of 16 December 2008 on new skills for new jobs: anticipating and matching labour-market and skills needs (European Commission, 2008).

The present publication contains the contributions of the Agora conference 'Skills for Europe's future', the summary of the discussions in the working groups, and the conclusions of the conference. This volume consists of six main parts: the first part deals with progress in early identification of skill needs. Rob Wilson and Alena Zukersteinova present the results of Cedefop's medium-term forecast of occupational skill needs in Europe and future priorities in this area.

The second section locates skills in a wider context. Carlo Dell'Arringa discusses the prospects and challenges of the European labour market. Ernest Berkhout shows the effects of ageing on European labour supply and provides insight into potential employment gaps and the possible role of migration. Riel Miller goes beyond skills and explains the context of banal creativity and spontaneity in a learning intensive society.

The third part covers presentations and discussions of the working group 'Forecasting skill needs at European Union (EU) level' and provides detailed information on the medium-term forecast. Rob Wilson and Ilias Livanos explain details of methods, assumptions and results of the medium-term forecast on occupational skills. Ben Kriechel analyses the significance of the replacement demand in the ageing society. Frank Cörvers sheds light on the skills supply forecast to be carried out in the next phase of Cedefop's forecasting activities. Ben Gardiner reports the results of the working group discussion.

The fourth part comprises contributions and discussions of the working group 'Skill needs in sectors'. Henriette Freikamp identifies emerging qualifications in tourism. Uwe Schumann analyses skill needs in the innovative area of nanotechnology. Martin Mulder investigates skill needs in the agri-food sector. Donald Storrie discusses retraining and other measures for workers displaced at restructuring. Thom ter Stege promotes EuroSkills 2008, an event developing new and attractive ways in promoting skilled labour and educational pathways in VET in a European context. Bernd Dworschak reports the results of the discussion of this working group.

The fifth section deals with presentations and discussions of the working group 'Skill needs in enterprises'. Olga Strietska discusses enterprise surveys as a tool for skill needs analysis. Germana Di Domenico, Ronald van Bekkum and Britta Lüdeke analyse vacancy statistics and monitoring in public employment services and Jean-Louis Zanda discusses measurements of recruitment difficulties in Europe. Frederike Behringer presents first continuing vocational training surveys 3 (CVTS3) results in relation to skill needs analysis. Mark Keese reports the results of the discussion of this working group.

Finally, the sixth part outlines key policy challenges raised by David White, Xavier Prats Monné, Matthew Highham, Jean-François Robinet, Petri Lempinen, Slava Pevec Grm, and Marie Panayotopoulos-Cassiotou. Last, but not least, the conclusions of the Agora conference are drawn, and the way forward is outlined by Torsten Dunkel, Manfred Tessaring and Alena Zukersteinova.

We hope that the conference, which resulted in the present publication, was not only a successful event but gave impetus for further activities on the path to developing a European system of early identification of skill needs.

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PART I

Early identification of skill needs: the work in progress

Alena Zukersteinova and Rob Wilson

Medium-term European occupational skill needs

1. Medium-term European occupational skill needs

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Abstract

This article provides an overview of the results of the Cedefop project on developing a medium-term forecast of occupational skill needs in Europe and summarises the key findings. The forecast covers the period up to 2015 and shows that, while many Member States face particular problems, there are also many common features. Globalisation and technological change are expected to continue to have significant impacts on sectoral employment structure and the demands for different types of skills. The continuing shift towards services and the knowledge economy, the catching-up process for many countries, implications for occupations and qualifications (including a general increase in the demand for skills, with implications for continued investments in education and training), are all highlighted. At the same time there are indications of polarisation, with significant growth in employment in some less skilled areas, plus implications for issues of exclusion and job quality.

1.1. Introduction

The future development of skill needs and skill supply in Europe ranks high on the current policy agenda. The revised Lisbon agenda emphasises human capital and related investments in education and training as important policy levers to foster growth, employment and competitiveness, (together with innovation, research and development). Consequently, the integrated guidelines for growth and jobs 2005-08 and 2008-10 (European Commission, 2005; 2007), demand better anticipation of skill needs, labour-market shortages and bottlenecks to improve the matching of labour-market needs and supply. The 2007 *Council resolution on the new skills for new jobs* (Council of the EU, 2007) also stresses the need to anticipate skills needs and skills gaps emerging in European labour markets.

Quantitative projections can help to inform active labour-market policies (ALMPs) (relating to training, migration and many other areas), as well as informing individuals about the developing situation. Of course it is not possible to predict the future precisely, and such projections should not be regarded as inevitable. Rather they map out one possible future, if past trends and patterns of behaviour and performance continue. The need to make strategic plans and choices which can influence the future path taken by the economy and labour market is widely accepted. These plans and choices need to be guided by robust labour-market information and intelligence, based on regular, systematic and quantitative approaches to forecasting and scenario development. Skills are a key part of the

infrastructure of the economy, and the choices made by both policy-makers and individuals about investment in education and skills will help to determine the path the economy takes.

Many countries are already undertaking this kind of work. However, due to the different methods, data and classifications used, they are not comparable across Europe. Until now there has been no system at European level which provides a pan-European perspective: Cedefop has responded with its own approach. Within the framework of its Skillsnet network for the early identification of skill needs, it has launched a project to develop a medium-term forecast of occupational skill needs in Europe. This offers, for the first time, a comprehensive pan-European perspective, providing estimates on a consistent basis for all Member States, using comparable data. The results represent the most comprehensive and consistent set of skill projections ever produced for Europe. Although there are some data problems and questions outstanding, many of the trends identified are quite robust and not sensitive to the detailed data problems nor to the detailed model specifications used to explain changing patterns of skill demands with industries. This suggests that such projections can provide valuable and robust information to a broad range of users, from individuals making career choices through to policy-makers operating at the highest strategic level.

1.2. Approach and methodology

This project was initiated by Cedefop with support of its Skillsnet network. The forecast has been developed as a team effort and reflects contributions from many people. The core team comprised Rob Wilson and Ilias Livanos from the Warwick Institute for Employment Research (IER), Ben Gardiner and Hector Pollitt from Cambridge Econometrics, and Frank Cörvers and Ben Kriechel from the Maastricht Research Centre for Education and the Labour Market (ROA). Many individual members of Skillsnet contributed as experts, reviewing and commenting on many detailed and emerging findings, and providing additional data.

The main objective of this project was to develop the basic database and tools required to produce, for the first time, a comprehensive and consistent skill needs projection for Europe, using comparable data from Eurostat. This has been achieved by adopting a modular approach, involving four main elements: a multisectoral macroeconomic model, occupational and qualification expansion demand modules; and a replacement demand module⁽¹⁾. In combination, these modules form a methodological framework for producing quantitative projections of changing skill needs, which can be reproduced and updated regularly, as well as modified to explore alternative scenarios. A systematic dialogue and discussion of the approach and results produced has been carried out within Skillsnet.

The results provide past and likely future trends at pan-European level by sector, occupation and qualification, including indication of replacement needs. The forecast covers EU-25 (before the accession of Bulgaria and Romania) plus Norway and Switzerland. Various alternative sets of employment projections by occupation and qualification have

(1) More details on the different modules are available in Part III of this volume.

been produced. These alternative scenarios cover a range of possible economic situations Europe may face over the next five to 10 years, focusing on their implications for employment and skill needs. It is emphasised that net employment change – or expansion demand – alone is of only limited value to assessing future job openings. Total requirements have also to consider the replacement of workers leaving the workforce for various reasons. In many occupations replacement demand will far outnumber expansion demand.

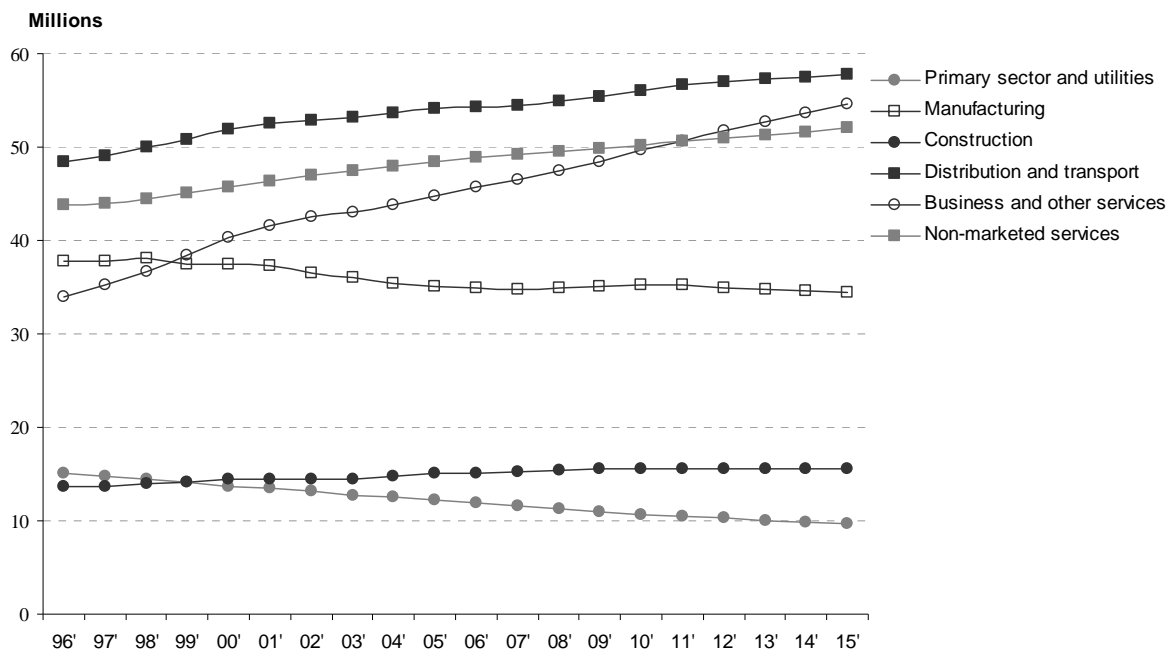
1.3. Key findings and implications

1.3.1. Sectoral change

The analysis confirms that Europe has experienced continuing shifts in employment away from the primary sector (especially agriculture) and traditional manufacturing industries. The main growth areas are projected to be in services and the knowledge intensive economy in general. These trends are likely to continue to be a key feature over the coming decade, both within individual countries and in changes between European countries. The new Member States in particular are still going through a process of development and structural change that many of the older Member States have already experienced. In some respects this transition is gradual as many of them will still continue to rely to a much greater extent on agriculture and manufacturing for employment. In part this is an internal process, particular to each country, but it also reflects shifting patterns of activity and people across borders, as capital and labour adjust to the changing political and economic situation. In some countries this is leading to atypical changes, as some activities in manufacturing have been transferred eastwards and southwards within Europe. Overall, the results of this projection suggest that these patterns of change will continue in the immediate future, and that they will be more evolutionary than revolutionary in nature.

Nevertheless, substantial change is in prospect, with over 13 million additional jobs being created between 2006 and 2015 in EU-25 plus Norway and Switzerland. This is despite the loss of well over two million jobs in the primary sector and almost half a million in manufacturing. Services are where the real growth is expected. Distribution, transport, hotels and catering together are projected to see employment grow by 3.5 million over the next decade, while non-marketed services are expected to increase by only slightly less. Business and miscellaneous services has the best prospects, with almost nine million additional jobs being created between 2006 and 2015.

Figure 1:1 **Past and likely future trends by sector, EU-25 plus Norway and Switzerland**



Source: Cedefop (2008, p. 42).

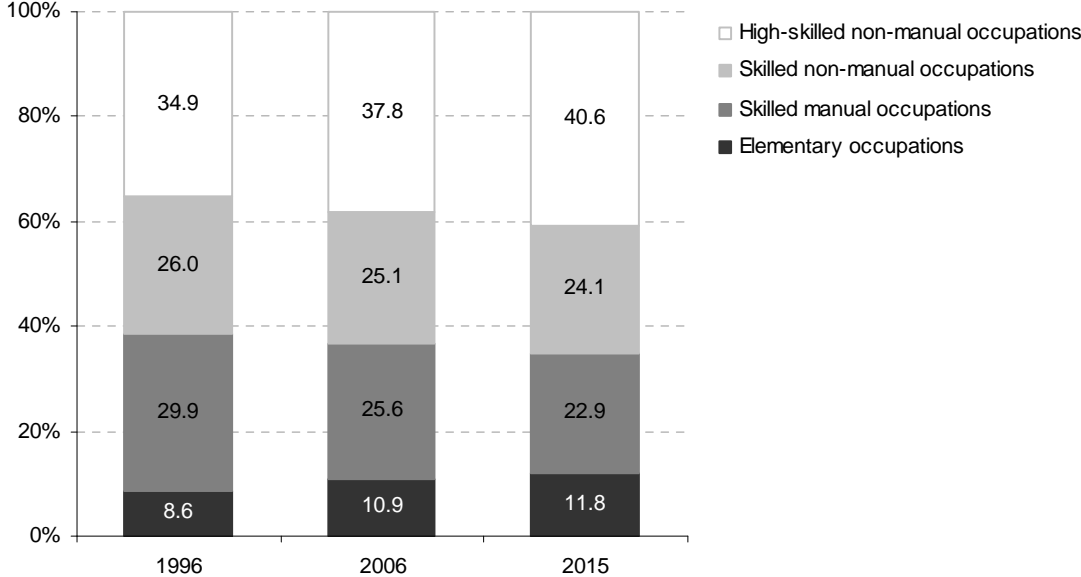
1.3.2. Prospects for occupations and qualifications

The projected sectoral changes taking place will have significant implications for occupational skills needed in the future. These will be reinforced by changes in the way work is organised and jobs are performed within sectors. The main implications are continuing growth in demand for many highly and medium skilled workers but also for some lower skilled occupations. Almost 80 out of 210 million European workers are currently employed in higher level jobs such as management, professional work of one kind or another plus technical support of those activities. These areas are all expected to experience increased demand over the next decade. In contrast, jobs requiring traditional agricultural skilled workers, several other craft and related skills, and clerical skills, will decline in number. There will, however, be significant expansion in the numbers of jobs for many service workers, especially in retail and distribution, and also for some elementary occupations requiring little or no formal skills.

This has been characterised as polarisation in the demand for skills. It raises concerns about job quality and mismatch, and related problems of social equality and exclusion for many of Europe's citizens. The structural and other changes taking place will, if these trends continue, create many jobs at higher level but also many at the lower end of the job spectrum, with low pay and poor terms and conditions. This will pose significant problems for policy-makers concerned with issues of equity and social cohesion. The study emphasises that even in those areas where employment levels are expected to fall, there will be many job openings and need for education and training. This affects both sectors and occupations.

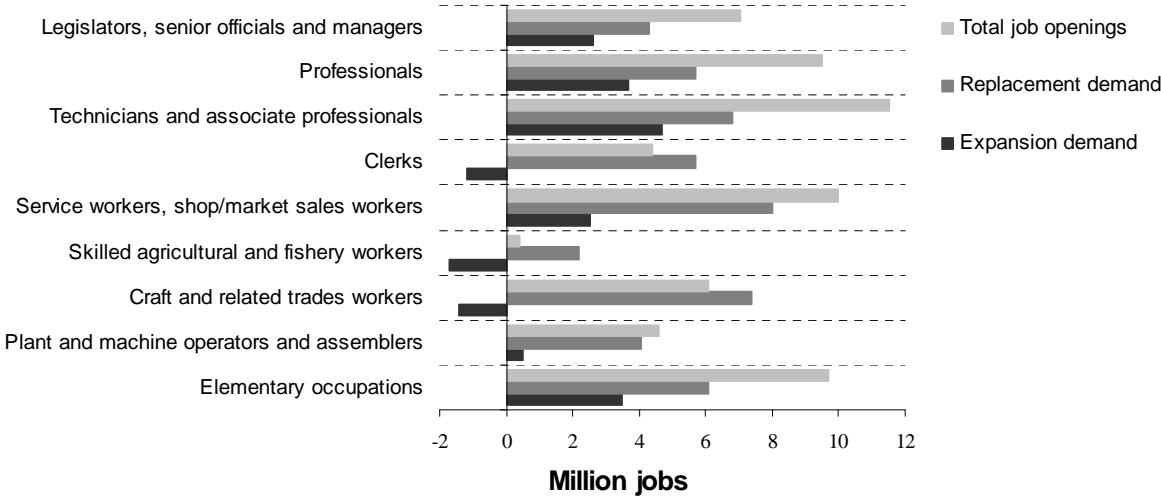
Again it is important to emphasise that the projections are not inevitable. They indicate what might happen if policies and practices remain unchanged.

Figure 1:2 Occupational structure, in %, EU-25 plus Norway and Switzerland



Source: Data from Cedefop (2008a).

Figure 1:3 Demand by occupation, 2006-15, millions, EU-25 plus Norway and Switzerland

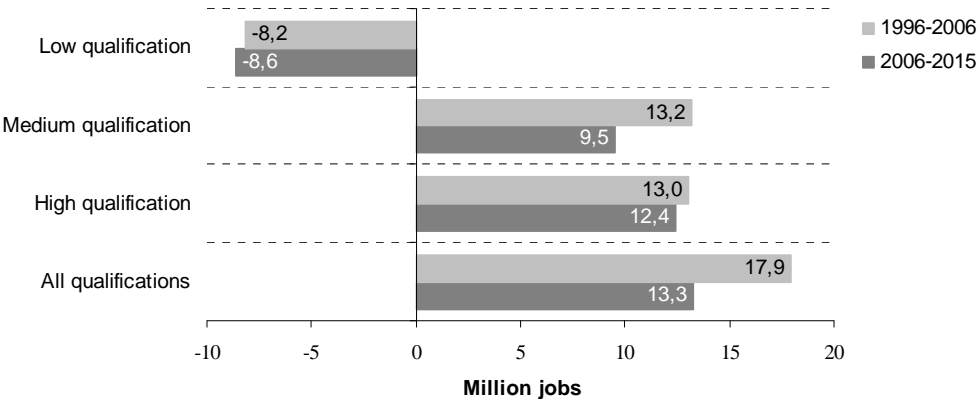


Source: Cedefop (2008b).

Despite the structural changes projected, the primary and manufacturing sectors will remain viable sources of jobs and crucial components of the economy. Similarly there are significant replacement demands by occupation (to replace those leaving for retirement or other reasons), even for those occupations where employment levels are projected to fall sharply. It is important that policy-makers, education and training providers and individual citizens are aware that many of those occupations that are likely to see job losses will remain viable sources of employment, and make important contributions to the economy for many years to come.

Of course the nature and skill requirements of these jobs will not remain unchanged, and it is important also to understand the way in which they are evolving. This includes the formal qualifications that are typically required to undertake such jobs. While there is no simple one-to-one relationship between occupation and qualification, it is possible to explore how these are changing over time. The analysis focuses on three levels (high, medium and low qualifications). The results highlight the general increase in qualification levels across most jobs.

Figure 1:4 **Qualification change, millions, EU-25 plus Norway and Switzerland**



Source: Cedefop (2008a, p. 61).

At the broadest level the projected changes are even more dramatic than for occupations. In total, the net employment increase in Europe of over 13 million jobs between 2006 and 2015 comprises increases of almost 12.5 million jobs at the highest qualification level (ISCED 5 and 6) and almost 9.5 million jobs at medium level (ISCED 3 and 4), offset by a sharp decline of 8.5 million jobs for those with no or few formal qualifications (ISCED 0 to 2). In part these changes reflect the expected continued growth in supply of people who have acquired formal qualifications. While some have argued that there is the possibility of oversupply in some areas, there is also considerable evidence of increasing needs for, and even shortages of, formal qualifications in many areas.

1.4. Conclusions and next steps

These results represent the most comprehensive and consistent set of skill projections ever produced for Europe. Although there are still many data problems and questions outstanding, many of the trends which emerge from the analysis are robust and not sensitive to detailed data problems, nor to detailed specifications for models used to explain changing patterns of skill demands within industries. This suggests that such projections can provide valuable information to a broad range of users, from individuals making career choices, enterprises that invest in education and training, through to policy-makers operating at the highest strategic level.

Such pan-European projections are not a substitute for projections at a national level. Rather they can complement these, offering for the first time a broad and consistent overview for the whole of Europe. While this might not be able to compete with what is being done for some individual countries (which is based on many years investment in data, systems and knowledge), it can provide a common framework within which these more detailed and in-depth analyses can be compared.

This project is just a starting point, as it covers only the demand side of the labour market. In 2008, Cedefop-Skillsnet, in cooperation with the research team and country experts, will continue this work by developing complementary forecasts of skill supply and analyses of possible future labour-market imbalances. Cedefop will also make regular updates of both, demand- and supply-side forecasts, and further methodological and data improvements, as well as enriching the results by additional qualitative research. In the longer-term, the intention is to initiate a dialogue with all Member States on establishing a common European approach to skills forecasting which can be used by all countries, namely a bottom-up approach to collecting data and forecasting skills at European level.

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PART II

Skill needs in a wider context

Carlo Dell'Aringa

European labour market: prospects and challenges

Ernest Berkhout

Ageing and European labour supply: potential
employment gaps and migration

Riel Miller

Beyond skills: banal creativity and spontaneity in a
learning intensive society

2. European labour market: prospects and challenges

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Abstract

Three challenges await European labour markets in the future: globalisation, population ageing and the ‘productivity gap’.

Facing these challenges requires a radical shift towards the following lines of action: improving policies to cope with structural adjustment problems; attracting and retaining more people in employment; improving adaptability of workers and firms; and strengthening active labour-market policies (ALMPs).

Europe needs to invest more in human capital. Too many people do not enter or leave the labour market because of a lack of skills, or due to skill mismatches. European countries must improve their ability to anticipate skills needs. This is essential to counter the rapid obsolescence of existing skills and to lessen the social and economic costs of restructuring their economies.

2.1. Introduction

There are three challenges that European labour markets have to face in the future: globalisation, population ageing and the ‘productivity gap’ (Denis et al., 2006).

The aim of this contribution is to show that the Member States have to increase their efforts if they want to meet these challenges. The paper shows also that the anticipation of skill needs will make these efforts more productive.

First the three challenges will be described, then solutions will be proposed for coping with them, and, finally, conclusions will be drawn.

2.2. Three challenges for European labour markets

2.2.1. Globalisation and economic integration

Globalisation and economic integration are increasingly affecting the way Europeans live and work and demanding rapid responses to, and management of, change. Further, the rapid ageing of the population is calling into question Europe’s ability to remain competitive and achieve higher employment and economic growth in the future. Finally productivity growth has slowed significantly. The need to boost productivity has been an integral part of the European economic reform process set in motion in Lisbon in 2000. Instead the EU has lagged behind the US in the productivity stakes in the last 10 years.

Globalisation, population ageing and the productivity gap are the three challenges that the European labour market has to face in the coming decades.

Globalisation is sometimes perceived as a source of job losses and growing labour-market insecurity. There is also a feeling that some groups benefit more than others from globalisation. Nevertheless, history demonstrates that globalisation holds the promise of better living standards for all. For example according to the OECD growth study (Pilat, 2002), a 10 percentage point increase in the ratio of trade to GDP is associated in the long term with a 4 % increase in per capita income. Also there is some evidence that more open economies tend to grow faster than the less open ones.

The labour market plays a crucial role in realising the potential gains of globalisation. To realise such gains, it is crucial that sectors and firms where comparative advantage lies are also able to seize new opportunities. This in turn requires a transfer of jobs from declining sectors or occupations to expanding ones. Transferring resources to more productive uses as quickly as possible is an important driver behind increased living standards and sustained growth.

A novel feature of the adjustment challenge is that it goes hand-in-hand with rapid adoption of information and communications technology. Such technology facilitates the fragmentation of the production of goods and services, and outsourcing of certain tasks to other countries. Consequently the continuing process of globalisation entails job losses and job gains within sectors, as well as between them. In short adjustment opportunities and challenges potentially concern a broader range of jobs, both skilled and unskilled, in services and goods-producing sectors. The adjustment is not painless and it may have made both employment and wages more vulnerable. This is why public support for furthering international economic integration could decrease if the perception that many workers do not benefit from it becomes diffuse.

Globalisation requires mobility to ensure that workers are not trapped in jobs which have no future. Overly-strict employment protection legislation may reduce mobility by constraining firms' ability to cope with a rapid changing environment. However, a certain degree of employment protection is needed (like advance notification of plant closing) and may reduce adjustment costs. Benefits systems play an important role in reintegrating displaced workers and reducing the social costs of adjustment. However, if unemployment benefits and other welfare benefits are badly designed, work incentives and labour supply could be negatively affected. A successful approach is use mutual obligations/activations policies which increase reemployment probability: examples are effective job-search assistance and compulsory participation in a labour-market programme after a period of unemployment. Also, policies are needed that ensure sufficient job opportunities as well as employability.

Low-skilled workers are particularly disadvantaged by globalisation. Free trade, combined with skill-biased technological progress, tends to reduce the demand for unskilled labour relative to that for skilled labour. Improving skill development opportunities for the low educated is strongly needed. Better skilled workers are more mobile across occupations, industries and regions than their unskilled counterparts. They face a lower risk of layoff and, when they lose their job, they have a relatively good chance of obtaining new employment. Improving skill development requires a set of complementary policies that include: reducing

early school failure and achieving high quality initial education; strengthening the links between initial education and the labour market; and incentives for both workers and firms to invest in human capital.

To increase globalisation benefits, both adjustment and distributional concerns must be addressed. The transfer of resources from declining sectors and occupations to expanding ones is necessary, but worker security in the form of employment-oriented protection is also needed. These activities should be train people in the skills required in the new jobs and sectors, so data on future employment developments are needed.

2.2.2. Ageing population

The second challenge that Europe must face is an ageing population, which poses a threat to macroeconomic performance and competitiveness. By 2030 the working-age population in EU-25 will total 288 million, down from 308 million in 2005, while there will be 116 million people aged over 65, compared to 77 million in 2005. The number of youths (aged 15-24) and young adults (aged 25-39) is already falling, and both will continue to decline significantly. As a result, the working-age population will include an increasingly important proportion of older people in the age range 55-64 in the next two decades, rising from 17 % in 2005 to stabilise at around 23 % from 2025 onwards. Employers will have to rely increasingly on the experience and skills of older workers. At the same time, the dependency ratio (the number of people aged 65 years and older relative to those of working age) is foreseen to rise from the current 25 % to 40 % by 2030, and reach 53 % by 2050; instead of having four people of working age for every person aged 65 and over, as at present, there will be only two people by 2050 (European Commission, 2007).

Economic growth rates tend to decline with an ageing population, mainly because of the effect on overall employment levels of the reduction in the working-age population. European Commission 2006 projections forecast that, if current trends and policies remain unaltered, annual GDP growth for EU-25 will fall systematically from 2.4 % over the period 2004-10 to only 1.2 % between 2030 and 2050. Europe will increasingly have to rely on productivity gains as a main source of economic growth. At the same time, older workers will constitute an increasingly important element of EU labour resources. Based on current policies, ageing will lead to even greater pressures on public spending. For EU-25, it is projected (European Commission, 2006) that age-related expenditure will rise by around 4 % of GDP up to 2050, representing an increase of 10 % in public spending. As a result, overall public finances risk becoming unsustainable in many countries, compromising the future equilibrium of pensions and social security systems in general.

In this context, increasing participation of older workers and delayed exit from the labour force will be essential.

Labour turnover will increase with more older people leaving their jobs in favour of new entrants to the labour market. A high proportion of these new entrants will come from countries outside Europe. Also, migration inside EU-25 will increase. It will be essential to anticipate the skills needed by the demand for labour due to replacement if we want to avoid bottlenecks in the labour markets and facilitate the process of matching jobs with new workers.

Features of systems that currently are more successful in supporting active ageing include good levels of general health for older people and reasonably high standardised retirement ages; relatively high spending on ALMP measures and participation in lifelong learning; flexibility of working hours and work organisation; and reduced financial pressures on older workers to leave the labour market, both in terms of the financial incentives for older workers to retire and the cost pressure on employers to hire younger workers rather than older ones.

2.2.3. Productivity gap

A further challenge for Europe is the productivity gap. The EU is one of the worlds most competitive and innovative economic areas and scores highly in global rankings, both in output per worker and real per capita income. It is this capacity to innovate, to create new products, and to do things better and more efficiently through process innovation that is at the heart of European prosperity. However, the EU has lagged behind the US in productivity since the mid-1990s. In addition, increasing globalisation and the rise of major new economic powers, such as China and India, are also putting pressure on Europe, particularly as it faces the additional challenge of a greying population in the coming decades.

European productivity has moved generally upward since the end of World War II. In the 1950s and 1960s, it rose rapidly, slowed in the 1970s, picked up again in the 1980s to mid-1990s, and then slowed once more. Real output growth can be analysed in terms of growth accounting, whereby real output developments are attributed to the rates of change in capital, labour and total factor productivity.

Table 2:1 **Total factor productivity growth (annual average growth in %)**

| | Euro area | | The US | |
|---|-----------|-----------|---------|-----------|
| | 1980-95 | 1996-2005 | 1980-95 | 1996-2005 |
| Market economy | 0.9 | 0.4 | 0.7 | 1.4 |
| Electrical machinery, post and communications | 2.6 | 4.8 | 3.8 | 7.1 |
| Manufacturing, excluding electrical | 1.5 | 0.9 | 0.9 | 1.5 |
| Other industrial production | 1.6 | 0.2 | 1.2 | -0.7 |
| Distribution services | 1.3 | 0.7 | 1.8 | 2.4 |
| Financial and business services | -1.0 | -1.3 | -2.3 | 0.1 |
| Personal services | -1.1 | -0.9 | 0.6 | 0.7 |

Note: Data for the Euro area exclude Ireland, Greece, Cyprus, Luxembourg, Malta, Portugal and Slovenia.

Source: ECB (2008, p. 49).

Rather than attempting a full real output growth decomposition, the ECB, in its *Monthly bulletin: January 2008* (ECB, 2008), reports annual total factor productivity growth, which appears to be the key factor behind the large difference between real output growth in the US and that in the Euro area in the period 1996-2005. The decline in Euro-area total factor productivity growth was fairly broad-based and included manufacturing and the industrial products as well as services, such as distribution and business services. The data reported in the table confirm earlier findings which attribute the slowdown in Euro-area labour

productivity growth to developments in some services activities that make use of information and communications technologies (ICT) (such as distribution services and financial services). Poor labour productivity performance in these services in Europe reflects insufficient technological and innovation overspill as well market rigidities. The bulletin conclusion is: ‘the fact that labour and product market rigidities are a drag on euro area labour productivity growth is a reminder that, despite a significant progress in some areas, the implementation of structural reforms has not yet enabled a knowledge-based economy to be launched. Further efforts are therefore required – as advocated in the renewed Lisbon strategy – in order to facilitate the allocation of resources to their most productive uses while fostering labour productivity growth and technological progress’ (ECB, 2008, p. 49).

Some analysts linked sluggish productivity growth over the past decade with the unprecedented rise in employment levels but there is no economic theory or empirical evidence that shows the existence of such a trade-off. What looks like a trade-off is only temporary: improving productivity and creating jobs can go hand-in-hand, especially if new technologies and work processes are diffused rapidly. Much of the US productivity growth in the last decade is due to growth in the ICT sector itself, which is considerably larger than in the EU. We expect that in Europe this sector will expand more and it is crucial that we know well in advance the skill content of the jobs that will be created.

2.3. Coping with challenges

What has been, so far, the responsiveness of Member States to globalisation, population ageing, and the productivity gap? The recent implementation reports of the European employment strategy indicate three areas of intervention:

- (a) attracting and retaining more people in employment;
- (b) increasing investment in human capital;
- (c) improving the adaptability of workers and firms.

These are exactly the policies to meet the challenges but, although much has been done, a better response is still to be found. Let us briefly examine why:

Efforts have been intensified to reach out to groups and individuals at the margin of the labour market. Despite this, policies for young people, women and older workers are still not sufficiently developed. Youth unemployment is a severe problem in many Member States and labour-market segmentation to the disadvantage of the young is increasing. Education, or rather the lack of good education, plays a key role in this. Also, a significant minority of young people find themselves working in jobs outside their field of education. Some of the consequences of these job-qualification mismatches are that those affected tend to have a lower occupational status and are more likely to be in temporary jobs.

Through the European pact for gender equality, Member States were asked to include a perspective of gender equality in their employment policies. Despite this, female employment and systematic gender mainstreaming are rarely emphasised. Anticipating future occupational skill needs will reduce these mismatches.

Member States continue to implement reforms to encourage older workers to stay longer in working life. However, currently over half of the 55-64 year olds in the EU are inactive, mainly for reasons of retirement but also due to poor health, personal or family responsibilities, or the belief that no work is available. Transition into inactivity for older people is nearly always a path of no return. Despite the recent improvement, efforts to promote active ageing must still be pursued vigorously. Labour-market participation of older people in Europe remains low by international standards and the employment rate for people aged 55-64 is still 6.5 percentage points from the Stockholm target of 50 % by 2010;

Many Member States are developing policies to increase investment in education and skills. Implementation is progressing but often piecemeal. Only a minority of Member States have a comprehensive strategy to invest in human capital throughout the life cycle.

In particular, prevention of early school leaving is progressing slowly: in 2005, 6 million young people left education prematurely. Many Member States need to increase their efforts if the EU is to reach its 2010 target of 85 % of 22 years olds in the EU having completed at least upper secondary education. Since 2000 the figure has moved little from around 77 %.

The situation is also worrying in terms of adult participation in lifelong learning. In 20 of the EU-25 Member States participation rates remained virtually stable or actually fell. Participation is particularly in southern Member States and most of the new ones. Empirical findings indicate that some groups of employees have a lower likelihood of participating in employer sponsored training than others in the EU. Access to training remains unequal, particularly for older workers, the less educated, those in precarious jobs and workers with the lowest income. This has a negative impact on the employability of these groups, and hence increases the risk of social exclusion and income inequality. It also undermines the sustainability of social protection systems by increasing the probability of older workers leaving the labour force early. Further, the likelihood of participation in training remains quite low in small enterprises; this has potential negative effects on the innovation activities an important business segment (European Commission, 2007).

Finally, despite the increasing need for adaptable labour markets, improving the adaptability of workers and enterprises is the area which shows the weakest implementation policy. Globalisation, population ageing and technological progress require increased flexibility. So far, governments have tended to focus on easing labour-market regulation for new entrants. Many Member States have increased external flexibility at the margin, chiefly easing employment protection legislation for temporary contracts only, keeping stringent rules for regular contracts largely intact. This has favoured the development of two-tier labour markets in which the brunt of adjustment to shocks falls on employees under atypical contractual forms. This has led to precarious employment and a lack of adequate provision of training for workers under atypical contracts, with negative impact on productivity (European Commission, 2006).

A more comprehensive approach is necessary to combine flexibility and security in a more integrated approach. Flexicurity policies should attempt at going beyond the old trade-off where more flexibility meant less security. The aim is for workers to exchange traditional security in the job for security in the market, brought about by efficient and cost-effective ALMPs, and adequate social protection in the mobility between jobs. These require knowing

well in advance the skills and the competences needed in expanding sectors. But the situation in this respect is not encouraging: the Member States have not made any significant progress on shifting resources from passive to active measures, despite the declared intentions of many governments (European Commission, 2006). The evidence suggests that job search assistance programmes in general, and activation policies in particular, rank high among the more cost-effective measures. These measures must interact positively with passive labour-market policies. The disincentive effects of relatively high and long-lasting unemployment benefits on labour supply can be, at least partially, counteracted by adopting well-designed ALMPs.

2.4. Conclusions

Efforts have to be intensified and policies put in place to improve in all three European employment strategy priorities: attracting and retaining more people in employment, increasing investment in human capital, and improving the adaptability of workers and enterprises. Additionally, forecast of occupational skill must make training activities and measures in favour of adaptability more effective instruments to deal with the challenges that European labour markets have to face. This is needed, if we want to improve the responsiveness of European labour markets to the three challenges: globalisation, population ageing and the productivity gap.

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3. Ageing and European labour supply: potential employment gaps and migration ⁽²⁾

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Abstract

Although age distributions differ between countries, the ageing challenge is apparent everywhere. In the coming decades, average age will increase across Europe. As a consequence, the ratio of the working-age population (age 15-64) to the elderly population will decline, meaning relatively less supply of labour, resulting in a potential employment gap. Though different in magnitude, the ageing effect is clearly present in all countries. If EU-25 employment remains at 63 % (as in 2007) the average employment level will have decreased by 30 million persons in 2050. This effect is relevant to the short-term perspective, as the first post-war birth cohorts are leaving the labour market already.

3.1. Introduction

The picture of age distribution of the future European workforce leads to consideration of the potential employment gap and possible solutions to close it. These include raising participation rates and real labour productivity, with a focus on the possible role of migration in labour supply. Besides being the most unpredictable, this is also the most disputed variable. As traditional migration patterns are rapidly changing at the moment it is not possible to be conclusive and absolute. However, the labour migration debate can still be elevated to a more scientific level by tackling some common misperceptions and adding new empirical facts.

3.2. Ageing in Europe

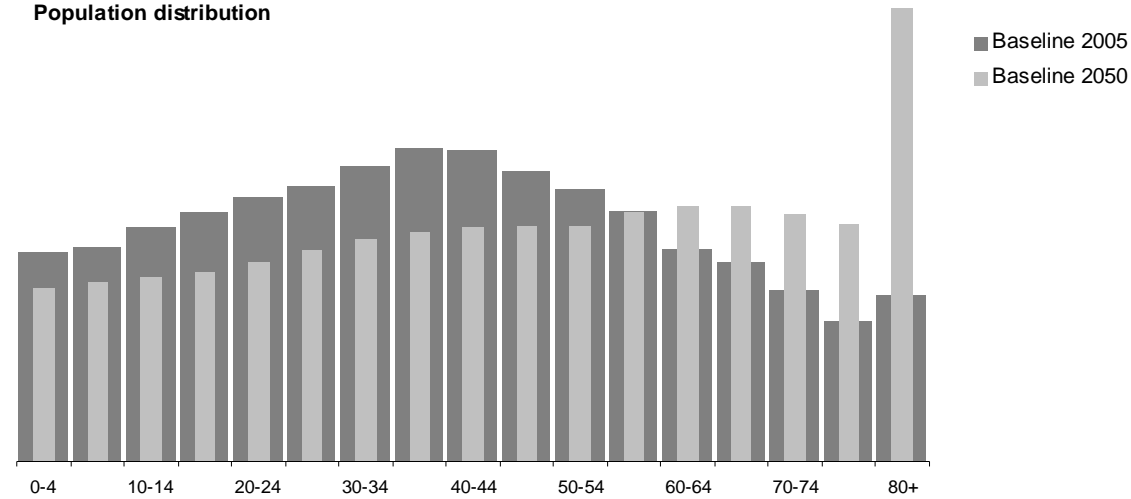
Although age distributions differ between countries, the ageing challenge is apparent everywhere. In the coming decades, average age will increase across Europe. The most recent population projection published by Eurostat ⁽³⁾ signals that the working age population in EU-25 (people aged 15-64) will drop from 305 million in 2005 to 255 million in 2050, while the population aged 65+ will rise from 77 million to 135 million. Total population will remain

⁽²⁾ This paper is extracted from Berkhout et al. (2007).

⁽³⁾ The projection database is officially called EuroPop2004: Eurostat population projections 2004-based and originally consisted of four scenarios; the three basic projections 'baseline', 'low growth' and 'high growth' plus a hypothetical no-migration variant. In this publication the baseline projection is used mainly, because this projection is built on the most realistic assumptions given current knowledge. The high growth- and low growth-variants indicate what will happen if all assumptions work together in population growth or population reduction. The no-migration variant is used to indicate the implicit effects of migration in the baseline projection.

more or less constant, but its share of working age population will fall from 67.2 % to 56.7 %. The effect of ageing on EU-25 age distribution is shown in detail in Figure 3:1.

Figure 3:1 **Age distribution of the future EU-25 labour force (baseline projection)**



Source: SEO calculations based on Eurostat (Europop2004).

The figure compares the relative age distribution of 2005 with that of 2050. The height of the bars represents the relative size of the age group in the total population, the dark grey bars represent the 2005 population and the light grey bars for the 2050 population. All the dark grey bars together represent 100 %, as do all the light grey bars together. In the next decennia the middle ‘bulk’ of 2005 will shift to the right and the share of ‘older elderly’ (aged 80+) will more than double. The consequence is a potential employment gap because a lower proportion of economically active people has to meet the same demand for goods and services.

3.2.1. The potential European employment gap

The effect of declining working age on potential labour supply is best illustrated by the hypothetical calculation of the potential employment gap in Table 3:1. The first columns show the 2005 employment situation. Out of 450 million people in the EU, 67.2 % (305 million) are between the ages of 15-64. The employment rate among this potential labour force is 63.6 %, which means that actually 194 million people are currently employed.

But in 2050 the working age rate will have dropped to 56.7 %, purely as a consequence of ageing. For illustrative purposes, we isolate the ageing effect by assuming population size to remain constant over time ⁽⁴⁾; the ageing effect translates into a potential labour force of only 257 million in 2050. If European employment rates remain at their current levels that

⁽⁴⁾ In detailed calculations it will become clear that this assumption does not matter for the relative size of the potential employment gap, if we assume that the size of demand is proportional to the size of the population.

would mean a labour supply of only 163.5 million. Because population size remained constant, demand will also remain at the same level so the potential gap ⁽⁵⁾ between labour supply and demand will be roughly 30 million. Among other solutions, this potential gap might be closed by raising the employment rate. If, on average, 75.5 % of the new labour force would participate in employment, labour supply would increase to (75.5 % x 257 million) 194 million people, thereby equalling demand.

Table 3:1 **Calculation of the potential employment gap, EU-25 (purely ageing effect)**

| | Supply | | Demand | Difference | To close the gap |
|--|--------|----------|----------|------------|------------------|
| | 2005 | 2050 | 2050 | 2050 | |
| Population (<i>in million</i>) | 453.8 | constant | constant | constant | |
| Working age rate | 67.2 % | → 56.7 % | | | |
| Potential employment 15-64 (<i>in million</i>) | 305.1 | 257.1 | | | 257.1 |
| Employment rate | 63.6 % | 63.6 % | | | 75.5 % |
| Real employment (<i>in million</i>) | 194.0 | 163.5 | 194.0 | -30.5 | 194.0 |

Source: SEO calculations based on Europop2004.

Relaxing the assumption of constant population, similar calculations can be made for the four different scenarios in the Eurostat projections (Table 3:2).

Table 3:2 **Potential employment gap: absolute and relative size in four scenarios**

| | Employment gap (x1 000 persons) | Employment rate needed to close the gap |
|-----------------------|------------------------------------|--|
| Ageing effect only | 30 485 | 75.5 % |
| Baseline scenario | 30 216 | 75.5 % |
| No migration scenario | 30 904 | 77.7 % |
| Low growth | 25 915 | 75.4 % |
| High growth | 36 972 | 76.0 % |

Source: SEO calculations based on Europop2004.

The baseline projection differs from the calculation in Table 3:1 only in a small decrease in population size. This affects the absolute, but not the relative, size of the employment gap, because demand should decrease proportionally. Also, in the baseline scenario an employment rate of 75.5 % will close the potential employment gap. Under the low growth and high growth scenarios results are quite similar (when measured in relative terms). The (hypothetical) no migration scenario, however, differs: because migrants are more often of working age, disallowing immigration leads to a smaller potential labour force. This means that a larger proportion of the potential should be activated, until an employment rate of 77.7 % is reached. Characteristics of migrants will be elaborated further in Section 3.3.

⁽⁵⁾ 'Potential gap' because in this calculation we make some strong implicit assumptions.

Implicit in the potential employment gap calculations above are the following assumptions:

- (a) constant demand (per capita);
- (b) constant inactivity rate;
- (c) constant length of average working week;
- (d) constant labour productivity;
- (e) migration along Eurostat projections 2005-50;
- (f) migrant supply fits required type of labour exactly.

To what extent these assumptions are realistic depends largely on the country and economic sector under consideration. For example, if a country's employment rate is already quite high, it will be more difficult to increase it any further. Possible other solutions and differences are briefly discussed below. Some assumptions are necessary because of lack of empirical estimates: if better data becomes available, they could be replaced. For example, following Cedefop's medium-term forecast of future skill needs (Cedefop, 2008), the assumption of constant demand could be replaced by a yearly growth of 0.6 to 0.8 %. Similarly, real labour productivity growth might also be allowed to be positive then ⁽⁶⁾. The migration projections used are the same as in the recent Cedefop forecast and stem from Eurostat sources. More recent and better national migration figures may exist, although it will probably remain the most vulnerable part in any supply side projection.

3.2.2. National differences and closing the gap

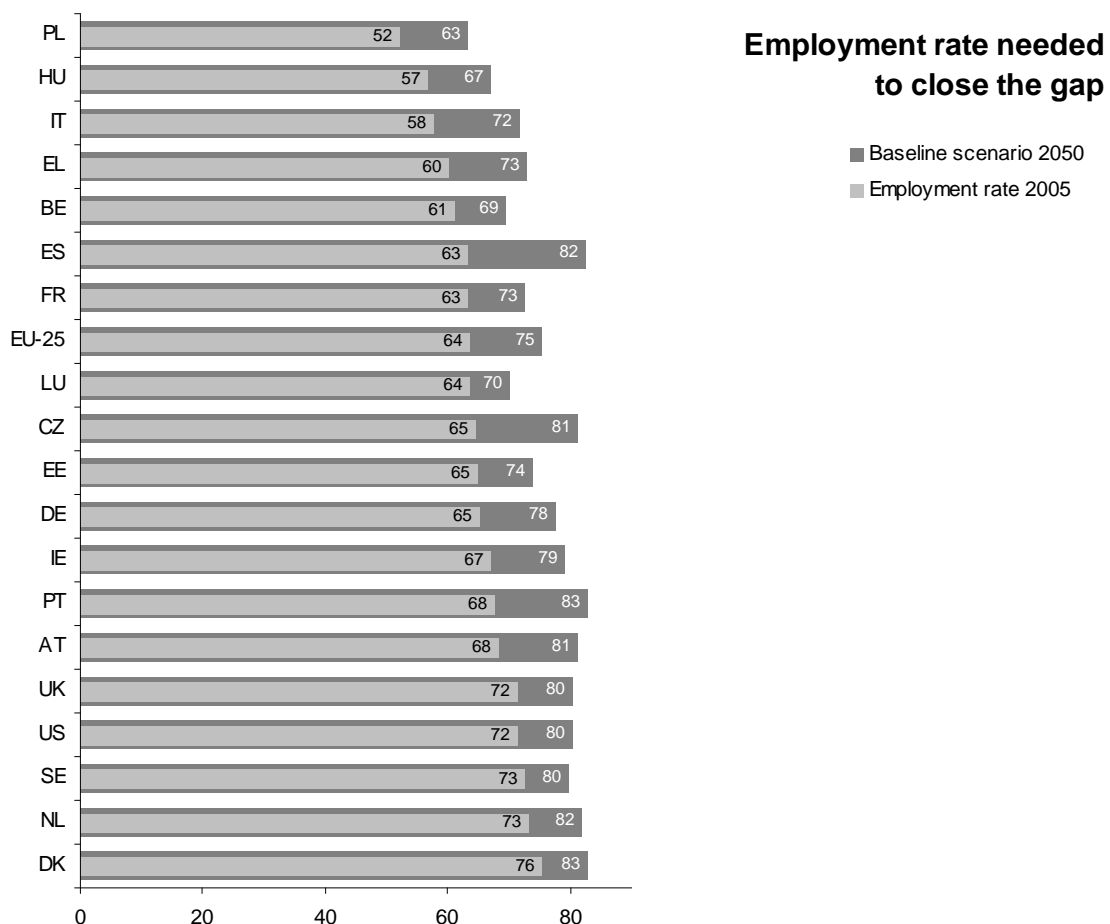
Employment gaps exist in almost all EU-25 Member States. Those with older populations or low net migration face the largest challenge (Figure 3:2). Several policy options might be considered, but usefulness, eligibility and effectiveness will differ strongly between countries and between different economic sectors. Not only because of structural economic differences: finding the optimal mix is also subject to national preferences and traditions. A 'one size fits all' policy solution is not available. The most frequent suggestions are:

- (a) increasing employment participation;
 - (i) number of persons;
 - (ii) number of hours worked per person (this seems less plausible than the former);
 - (iii) make employees take pensions at a later age;
 - (iv) stimulate part-time pensions instead of the currently dominant all-or-nothing pension schemes;

⁽⁶⁾ These figures are only illustrative; for realistic assumptions national estimates should be used and demand growth per capita calculated. Productivity growth should be analysed, preferably at sectoral level, and corrected for inflation. Sectoral labour shifts (such as from industry to services) will influence labour productivity (in this case to lower productivity).

- (b) stimulating population growth. This option is still suggested occasionally but is really not sustainable in the long term and will only make things worse. It will only be effective after 25 years, and after 65 years the problem will have returned on a much larger scale;
- (c) increasing productivity. An efficient and realistic option in the manufacturing and the agricultural sector. However, it is harder to achieve in labour-intensive service sectors, where constant (real) productivity seems a realistic assumption;
- (d) decrease output (GDP) per capita. For an economist this is the least favoured option, though the necessary outcome 'if everything else fails';
- (e) sectoral shifts of labour. As labour is scarce it might move from the lower-paying sectors to the higher-paying sectors. Normally this would also mean a shift to the more productive sectors. This will not bridge the overall employment gap but merely shift the problem from one sector to another while increasing overall productivity;
- (f) extra labour migration (in fact a regional shift of labour). If arranged so as to be beneficial to both the host country and the immigrant, it is an economically sensible option. However, it can be useful only if immigrants supply the skills the labour-markets need. Temporary migration should also be considered. Also it should be noted that in the baseline scenario 'normal' migration is already included.

Figure 3:2 **National differences in the effects of ageing**

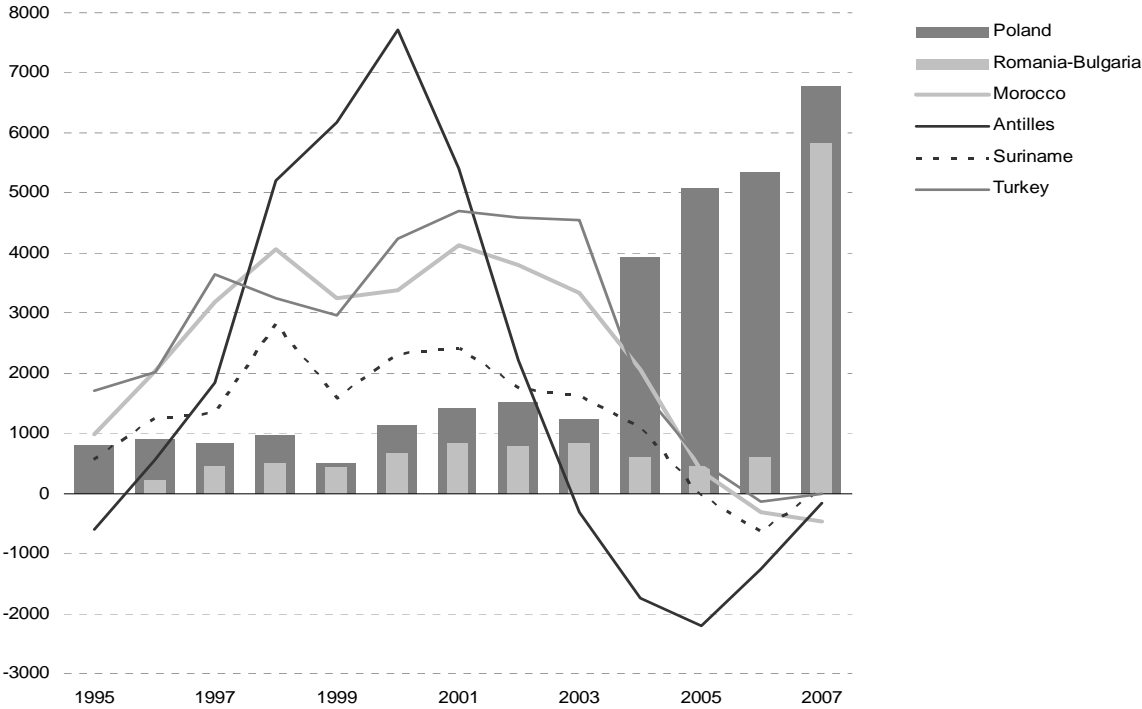


Source: SOE calculations based on Europop 2004.

3.2.3. Changing character of migration

When thinking of labour migration, many people still visualise low-skilled Turkish or African males, as was common during the last 40 years of the 20th century. But those traditional migration patterns are now rapidly changing, at least in western Europe. Tighter migration policies and EU enlargement are causing rapid changes. For example, in the Netherlands, immigration from traditional migrant countries (the Netherlands Antilles, Morocco, Suriname and Turkey) is falling and, since 2006, is even negative: emigration is higher than immigration (7). At the same time net migration from Poland is increasing sharply, as well as migration from Bulgaria and Romania since their entry into the EU.

Figure 3:3 Net migration from ‘traditional’ and ‘new’ migrant countries to the Netherlands



Source: own calculations, based on Statistics Netherlands (2008).

Most other west European countries have also experienced a shift from intercontinental migration to within-EU migration (from east to west). Recent studies show that these ‘new migrants’ are further characterised by much higher employment than the ‘old migrants’, a relatively low age (between 20-40) and a higher return migration (labour migration is partly

(7) See statline.cbs.nl: ‘external migration by country of birth, sex, age and marital status’.

used to fill seasonal gaps in the western labour markets). Another important fact is that many of the east European migrants are working in low-skilled jobs ⁽⁸⁾.

3.2.4. Skill composition of traditional immigrants

The changing character of migration, shown in the previous paragraph, shows that it might not be useful to think of immigrants as one homogenous group. Kahn (2004) clearly states that 'the distribution of immigrant skills is in most cases bimodal, while that of natives is single-peaked' in a study on Canada, New Zealand, Switzerland and the US. He suggests the presence of two distinct immigrant populations, one quite similar to natives and one with clearly lower skills. This implies that in terms of employment there would be no real difference between immigrants and natives in the top of the skill distribution, while at the bottom end immigrants would be overrepresented among the inactive. That was found to be the case, except for US male immigrants. The larger share of low-wage jobs in the US economy was found to offer more opportunities to male immigrants compared to the other countries, while low wages lead immigrant women in the US to supply less labour than immigrant women in the other countries.

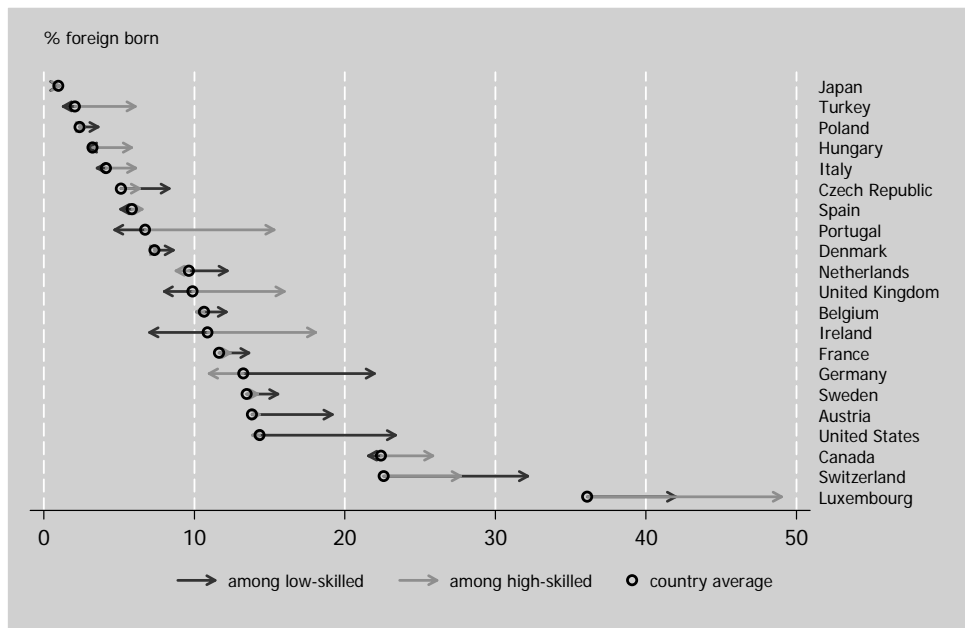
Figure 3:4 is based on the OECD database on immigrants and expatriates (2005) on these findings ⁽⁹⁾. It gives the average proportion of immigrants (defined as 'foreign-born') in a country, compared to the proportion among the high skilled population and among the low skilled population. If the black arrow points to the right, immigrants are overrepresented among the low-skilled working age population. If the black arrow points to the left immigrants are underrepresented. If the grey arrow points to the right, immigrants are overrepresented among the higher educated, and so on. In 13 of the 20 countries immigrants are overrepresented among the higher educated, in 11 countries they are overrepresented among the lower educated. In some countries the distribution of immigrants among educational level is bimodal ⁽¹⁰⁾. In the Czech Republic, France, Sweden and Switzerland, the foreign-born are overrepresented among both the low-skilled and the high-skilled. Ireland, Portugal, Switzerland, Turkey and the UK show a substantive overrepresentation of high-skilled immigrants; in Ireland, Portugal and the UK this goes together with an under-representation of lower-skilled immigrants. In the countries with relatively many immigrants, the low-skilled are overrepresented (except for Canada).

⁽⁸⁾ Drinkwater et al. (2006), Hughes (2007) and Wadensjö (2007).

⁽⁹⁾ Unfortunately these data only reflect 'old migrants' because they refer to the year 2000 for most countries.

⁽¹⁰⁾ The definition of skill level in the OECD/Eurostat data used is much less detailed than it is in Kahn's study. Only three national skill levels (low, middle and high) are used while Kahn used a continuous individual distribution. More important is that OECD and Eurostat use the 'highest completed level of education' as a proxy for skills whereas Kahn uses a complex instrument measuring applied cognitive skills (International Adult Literacy Survey).

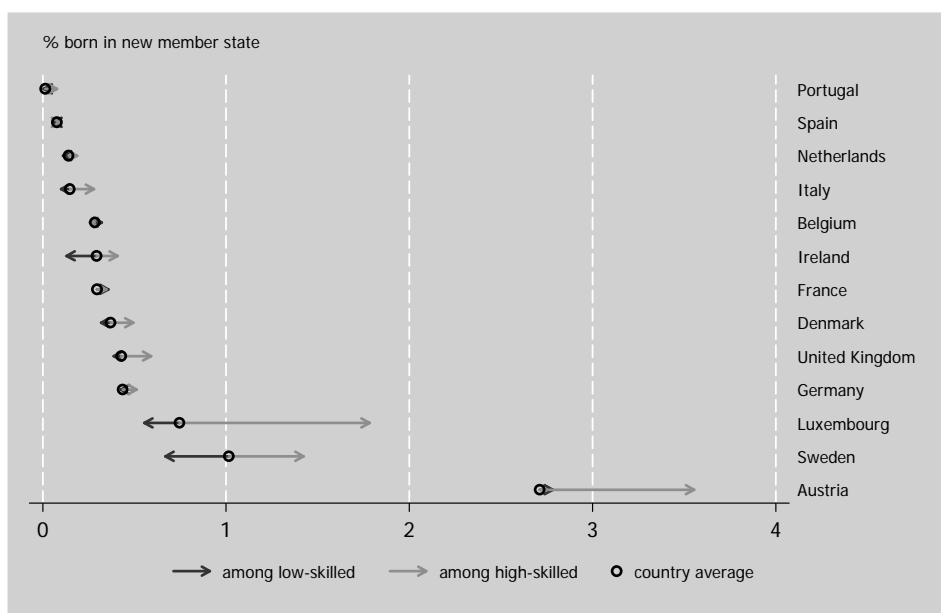
Figure 3:4 Immigrants overrepresented among both low-skilled and high-skilled



Source: OECD (database on immigrants and expatriates, 2005).

Instead of looking at foreign born immigrants we can look in a similar way at the differences between natives and migrants from the 10 new Member States. Figure 3:5 shows that differences between the local population in EU-15 and migrants from the new Member States were only relevant in Luxembourg, Sweden and Austria. Only in the last was more than 1 % of the population born in one of the new Member States, in the year 2000. In all countries, the eastern European migrant population had higher average education than the native population.

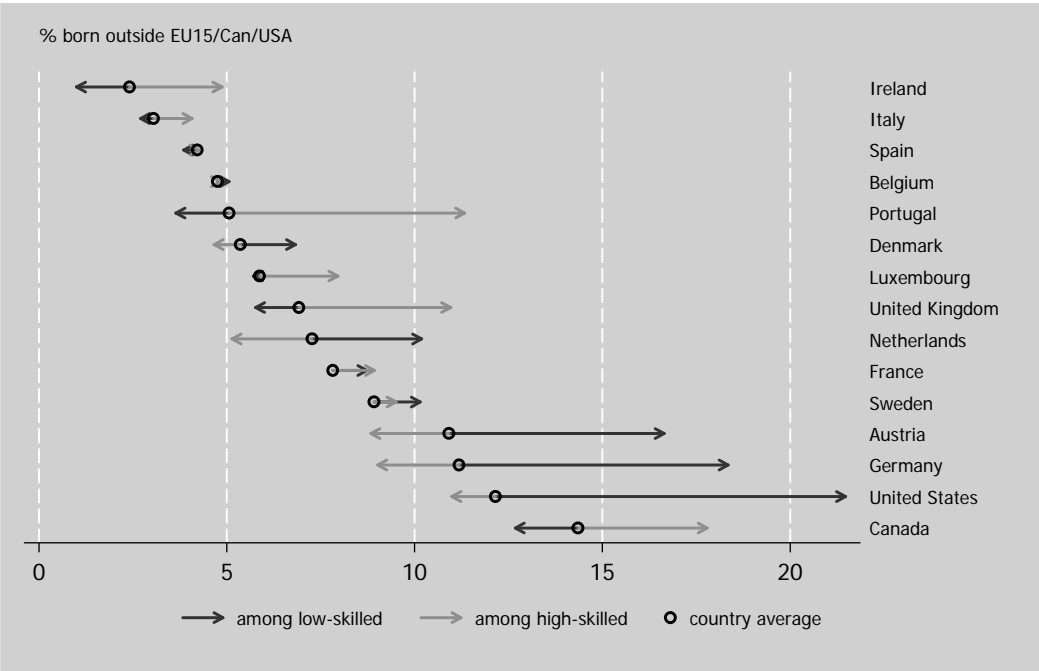
Figure 3:5 New Member States immigrants in EU-15 have nearly similar skill distribution



Source: OECD (database on immigrants and expatriates, 2005).

In Figure 3:6 the immigrant population is defined as non-western: born outside EU-15, the US or Canada. These migrants are relatively low-skilled in Denmark, Germany, the Netherlands and Austria; they are relatively high-skilled in Ireland, Italy, Luxembourg, Portugal and the UK. Immigrant educational distribution is bipolar in France and Sweden. Compared to Europe, Canada and the US have more non-western immigrants; in the US mainly low-skilled, in Canada mainly high-skilled.

Figure 3:6 Overrepresentation of non-western immigrants among skill groups



Source: OECD (database on immigrants and expatriates, 2005).

3.3. Conclusions

Migration has many different faces. It is not only low-skilled labour that immigrates and high-skilled labour that emigrates, as is sometimes suggested. In many countries at least two different migrant groups can be characterised, one relatively high-skilled and one relatively low-skilled.

The recent trend of intra-European migration means a rise in migration of high-skilled labour, although often working in low-skilled jobs. Even when focusing only on immigrants from non-western countries outside the EU, they turn out to be relatively high-skilled in the one country and relatively low-skilled in the other; much seems to depend on institutional differences like current and historical immigration policies, cultural links and (wage) structure of the economy. But the recent opportunities for (nearly) free labour migration among EU-27 citizens seem irreversible; intra-European labour migrants will probably characterise European migration for some time. This structural character implies the challenge of ensuring that immigrant labour remains beneficial to both the immigrant and the host country.

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Databases

- Eurostat, several databases, mostly collected in the labour force survey,
<http://epp.eurostat.ec.europa.eu/>
- OECD database on foreign-born and expatriates; 29 countries, most data collected from the 2000 census, stocks and flows. This is the source for the OECD trends in international migration publications.
www.oecd.org/document/51/0,2340,en_2649_37415_34063091_1_1_1_37415,00.html
- Europop2004 population projections can be found on the Eurostat website under the theme of 'Population and social conditions' in the Data section.

4. Beyond skills: banal creativity and spontaneity in a learning intensive society

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Abstract

The relationship between knowledge and wealth is often equated to the relationship between certified skills and paid employment in the form of a 'job'. This is a limited way of defining both what people know how to do and the value added by people's efforts. Considerable attention has been paid to different ways of accounting for broader conceptualisations of work and wealth but it has been difficult to get beyond the categories defined by the existing rules and norms of the industrial system.

The existing industrial system, which includes services subject to the organisational logic of hierarchical specialisation (e.g. division of conception and execution) and scale economies (e.g. mass-standardisation), is highly dynamic. Tracking these shifting forms of skill input and value-added output is a major and important task that naturally uses an ergodic model, i.e. one that assumes continuity in the underlying frameworks between the past and the future.

The following takes a non-ergodic approach by imagining 'change in the conditions of change'. The imaginary 'learning intensive society' (LIS) and the model it rests on offer one way of illustrating that there can be changes in the conditions of change in the relationship between knowledge and wealth. The outcome scenario sketched briefly imagines a future model without reference to path taken to get to this outcome, nor the probability nor desirability of such an outcome.

The point is to provide policy-makers with a way of detecting emerging systemic patterns and to explore new ways of making sense of phenomena observed in the present. The point is not to offer an alternative model that serves as planning target for policies meant to get from now to some ideal future. The aim is to assist decision-makers to understand the anticipatory assumptions that underpin their choices.

4.1. Imagining a changed context: the learning-intensive society

What is being imagined? The imaginary subject used for this exercise can be described in terms of two overarching attributes. One attribute is related to the composition of wealth-creating activity and the other to the 'intensity' of learning.

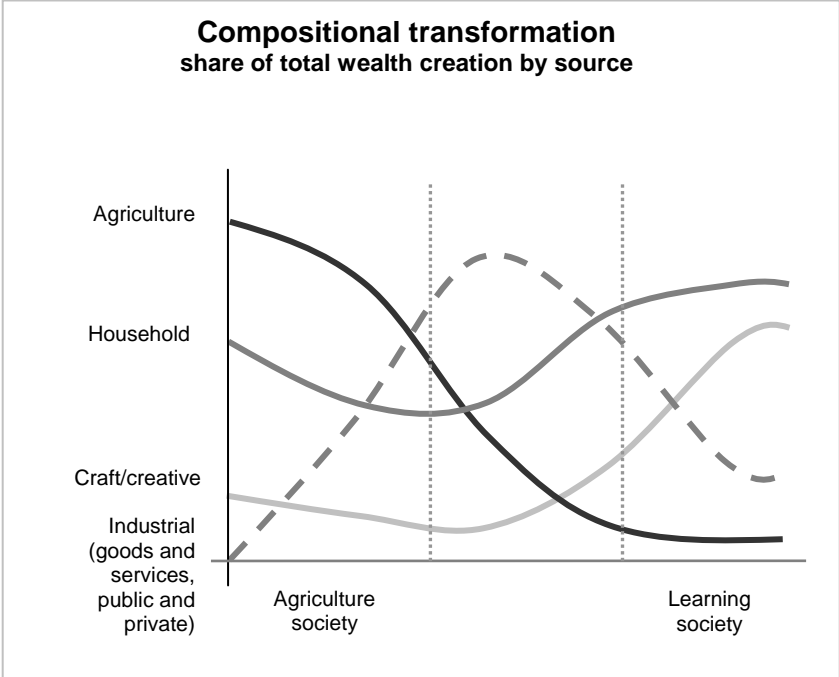
Figure 4:1 depicts an imaginary change in the composition or different proportions of different types of production activity ⁽¹¹⁾ in total wealth creation (at each point in time the proportions total 100 % of wealth created) ⁽¹²⁾. The decline in activity devoted to producing

⁽¹¹⁾ The term 'production activity' is intentionally generic and could be measured in a variety of ways, including time, inputs or outputs, using monetary or non-monetary metrics. For the purposes of this story the figure simply illustrates a change in the proportions of this type of activity.

⁽¹²⁾ Resources devoted to the production of agriculture is not the same as the total resources devoted to what we eat: this includes restaurants, home preparation of food, time spent shopping for food, learning how to cook, etc.

agricultural products is a familiar story. A similarly recognisable pattern, although now considered with much more anxiety, is the ‘hollowing out’ of industrial activity. All types of industrial activity are included, from hospitals and schools to factories and banking, since, from a workflow organisational perspective, all these activities share the same basic logic: specialisation (division of labour, in particular the distinction between conception and execution) and economies of scale (standardisation) ⁽¹³⁾. Figure 4:1 offers an illustration of an imaginary reallocation of wealth-creating activities such that industry becomes relatively marginal while ‘household’ and ‘craft’ become more important as a proportion of total production activity.

Figure 4:1 **Imagining the LIS: compositional dimension**

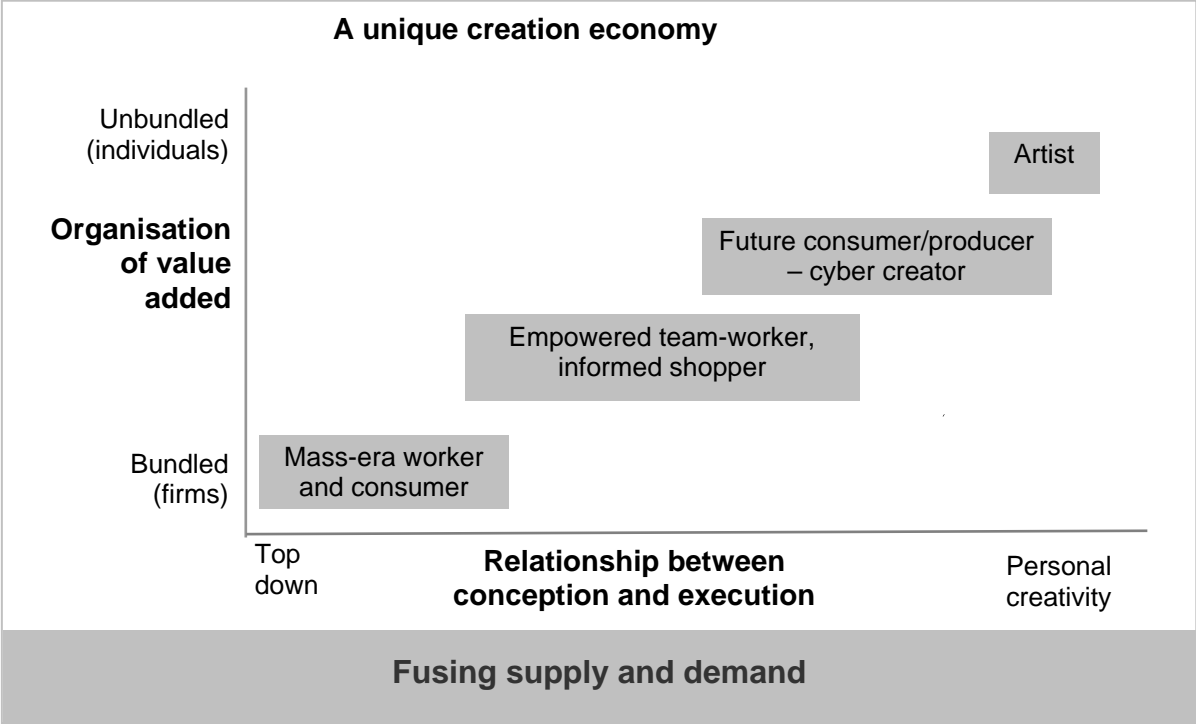


The terms used in Figure 4:1 – household and craft – are not meant to be definitive nor, reiterating for emphasis, predictive. The language of the future – the words we will use to describe the world – have yet to be invented and the forms suggested by the terms used here may never become manifest. Either way it is not possible to use what does not yet exist. The point is that in this story humans continue to find things to do – ways to add-value – and create utility, even if what is deemed useful to one person is considered a waste to another and what is ‘value’ changes over time. The category ‘household’ activity, largely unaccounted

⁽¹³⁾ This is not meant to imply that the different sectors are characterised by the same evolutionary processes: there are clearly distinctive dynamics in different activities, different ownership structures, etc. There are also parts of these sectors that resist industrial productivity and competitiveness improving changes such as the division of conception from execution, usually due to some mechanism that protects these activities from choice or profit or reallocation imperatives, such as doctors and schools. Note as well that there are sectors where industrial forms of organisation are finally penetrating, such as in agriculture and education.

for by industrial era bookkeeping, involves the many activities that are both essential for everyday life but also a fundamental component of the everyday life. What makes it more relevant and traceable is that much of this household activity is now included in the basic unit of economic activity, unique creation.

Figure 4:2 **Imagining the LIS: unique creation**



Unique creation is what the terms imply. It is creative, something dreamt up by the unique person or team that had the idea ⁽¹⁴⁾. Figure 4:2 offers a partial description of the unique creator, the artist in the upper-right of the possibility space. This figure evokes the main organisational attributes of production: how it is coordinated and where the value-added comes from. Unique creation overthrows the centrality of the two profound dualisms of industrial society, between demand and supply, conception and execution. This is not quite a change in the mode of production – markets and private property still reign – but certainly a change in the ownership of the means of production and a decisive break with the image of the pyramidal hierarchy of creativity and talent that is used to legitimate meritocracy.

There is also a craft dimension to unique creation, highly specialised skills that are networked with both household and industrial production through coproduction. This is personalisation – the self or local bespoke value-added – intangible or tangible, that entails refinement of specific skills. The artisan and expert do not disappear, but the cost of

⁽¹⁴⁾ Note, most of the discussions of the transformation of production along the lines of mass-customisation, unique creation and joint design remain within the context of the overarching organisational forms of the industrial era: the firm and the administrative system. The emergence of new systems happens from both within and outside existing ones and certainly in relation to (through opposition, support, ignorance) existing systems.

integrating their knowledge into unique creation through highly fluid, transparent and dense networks is much lower. The ‘banal creativity’ of every person as artist does not negate the role of craft but integrates and extends it in new ways.

Today there are emergent phenomena, such as the growing importance of do-it-yourself and of the social networks of Web 2.0 as platforms for collaborative unique creation. Such experiences and infrastructure are essential for building up the capacity, so at odds with the passivity of mass-consumption and mass-production, to discover and refine what matters in a unique creation economy. This investment and pursuit of meaning in unique creation, that on the surface looks like the branding and individualism of today’s hyper-active conspicuous consumption, connects to another critical attribute of the LIS: the personalisation of community.

Figure 4:3 **Imagining the LIS: identity dimension**

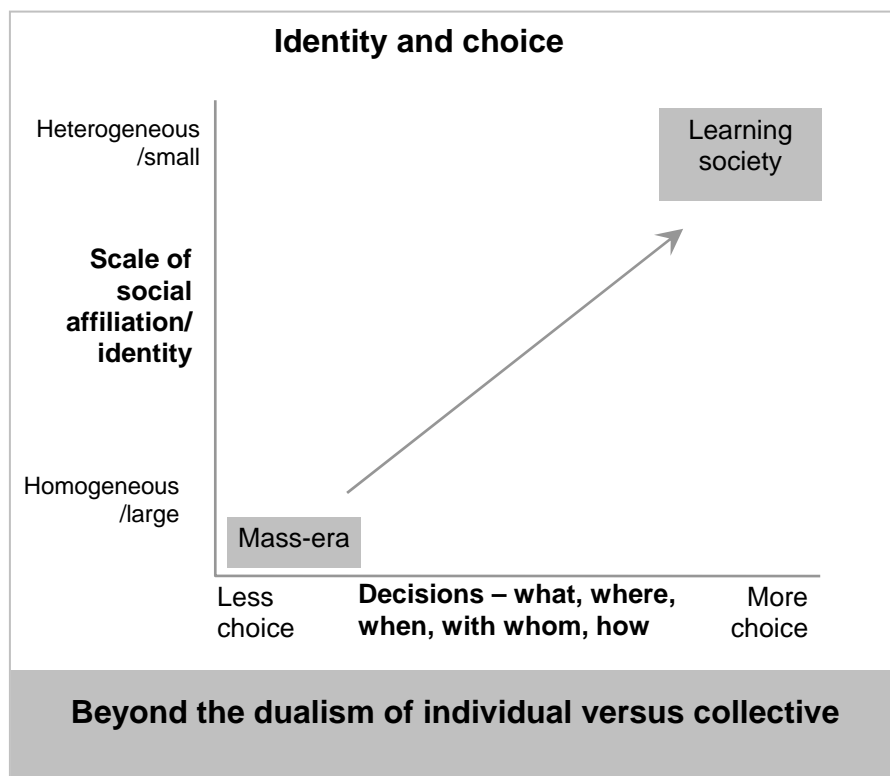


Figure 4:3 describes the personalisation of community through the creation of identity. In the LIS the frenzy of efforts to fill the vacuum left by the insufficiency of yesterday’s mass-identities, be it of nation, religion or class, has opened up, creating space for a more engaged and collective construction of personal identity. In the LIS, learning-by-doing occurs in a highly interdependent and densely networked context. People are engaged in constant and diversified experiments in their search for an answer to the question of ‘who am I?’ In the LIS there can be no mistaking that meaning is socially, inter-actively constructed. Identity is personal and collective at the same time; responsibility is internalised not socialised.

Both the economic and social dimensions of this imaginary LIS require an underlying capacity to be constantly engaged in decision-making. It is a decision intensive social order and, since all decisions are about the future, it is also a society where anticipatory systems are called into play constantly. Relative to the industrial era, people in this imaginary LIS have an enhanced capacity to make choices. This may be called ‘futures literacy’; it is similar to an important attribute of the functioning of industrial society, the capacity to read and write. In a similar fashion, future literacy plays an important role in simplifying the economic and social organisation of the LIS.

Figure 4:4 **Imagining a LIS: decision-making dimension**

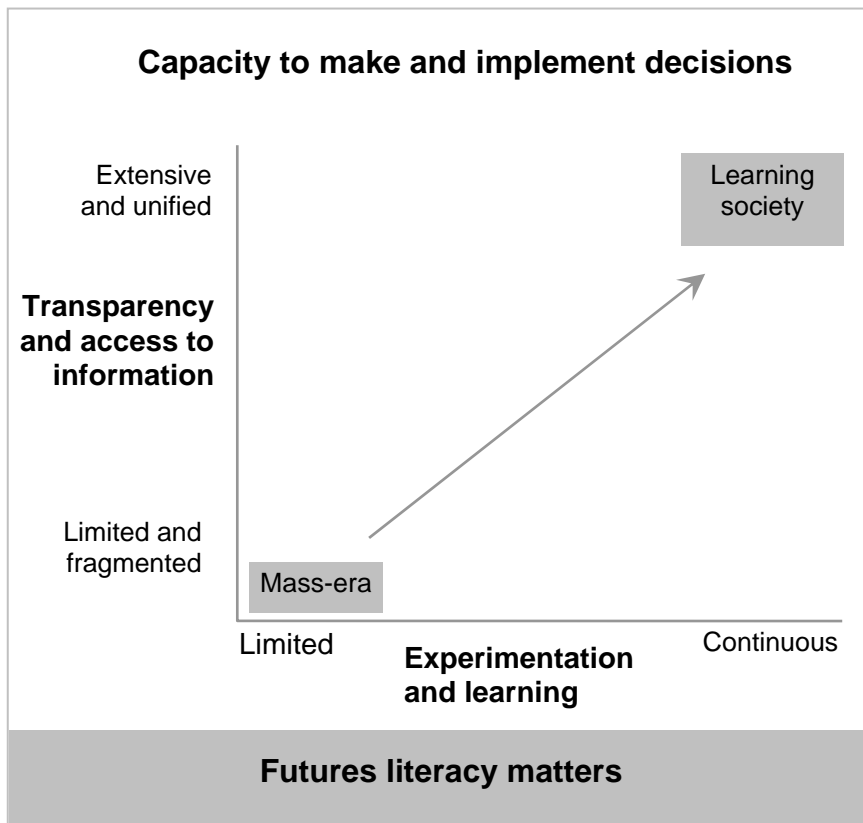


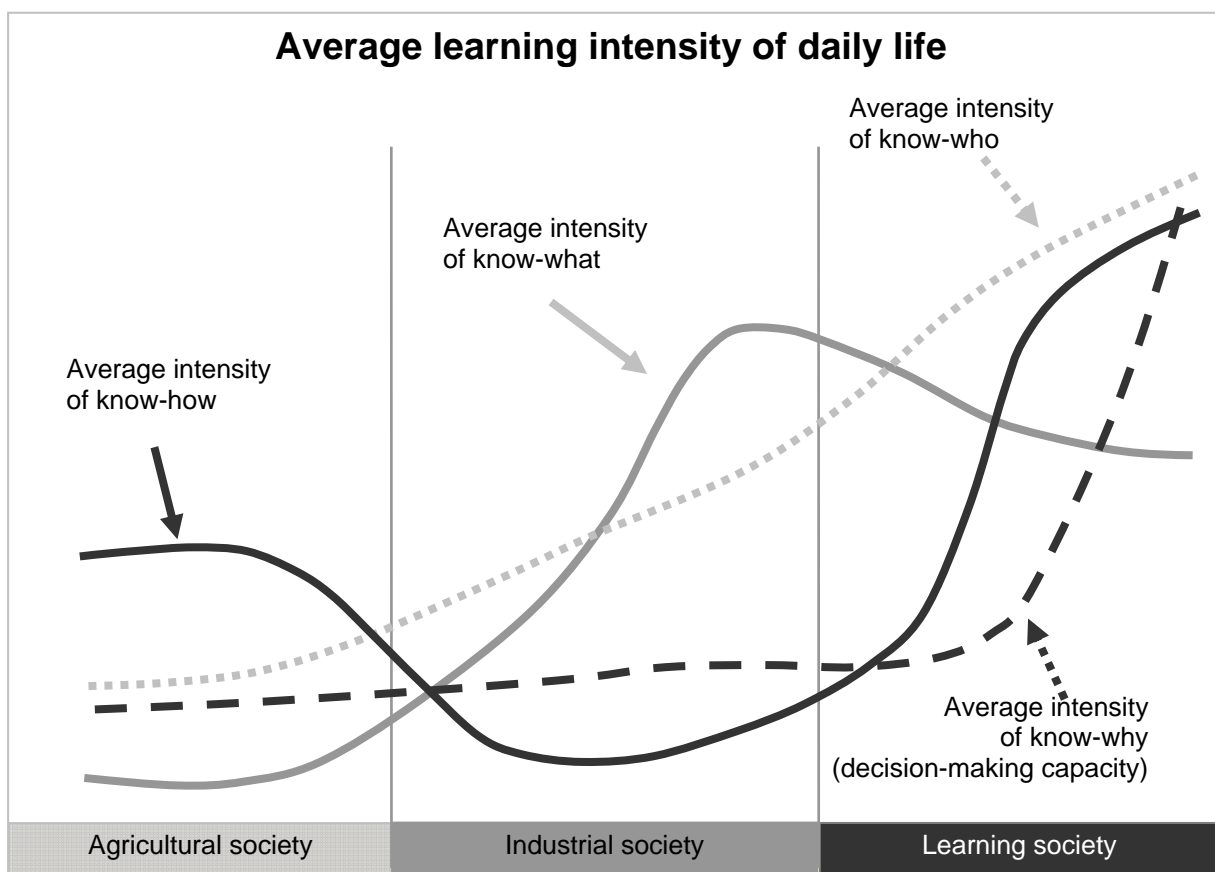
Figure 4:4 depicts this enhanced decision-making and anticipatory capacity. All other things held constant, it is reasonable to consider that if a person has more and better information, has more experience with making choices, and lives in a context where value is put on developing the capacity to discover the potential of the present, then their capacity to make decisions should be better than if they lived in a context where they faced little choice, less information, fewer opportunities to experiment and an authoritarian or fatalistic view of social wellbeing.

However, this enhanced capacity to make decisions does not at all imply – as might be thought on the basis of industrial era notions of leadership, artistic genius and entrepreneurial exceptionalism – that everyone becomes a visionary. The kind of creativity implied by the model of the LIS can be described in much more mundane terms related to the unique creations and identity development of each person, on their own terms and

relative to their own path of discovery. This is the ‘banal creativity’ that makes a learning-intensive society practical, not some illusory world of hyper-educated geniuses. Instead, it is in the conduct of everyday activity: the daily decisions about what to do, how to tell the story of one’s self, who to link up with and in what ways, what information is needed right now in order to act now, and so on.

Figure 4:5 illustrates this idea of a growing average learning intensity of everyday life, over an entire lifetime and across an entire society, using the four knowledge variables: know-what, know-how, know-who and know-why. The deskilling/reskilling of know-how reflects the rise and fall of the extreme division of conception and execution achieved by the industrial creative society – with its thin layer of cream on the top – giving way to a much broader diffusion of do-it-yourself and professional-amateurs. Know-what explodes with the diffusion of basic literacy and the mediums of mass-communication, reaching the point of information overload: not enough control to filter the raw data of information and only pay attention to relevant sources.

Figure 4:5 **Imagining the LIS: learning dimension**



Know-who increases as the permissions and means for connecting beyond the perimeter of the already familiar grows. The boundaries of the village or schoolyard or water cooler or canteen all begin to fade as the connections of daily life bring a wider range of contacts. Finally, the last and potentially most influential variable for changing the overall

average, since it starts from a relatively low base and grows quite quickly, is know-why. Again, this is not in a cosmic or 'rocket-science' sense of the term, but in a way that is meaningful for what people do in their everyday lives and how they construct the unique creations and identities that construct their world. It is this attribute, the search at a mundane and personal level for know-why, that gives the term LIS its meaning.

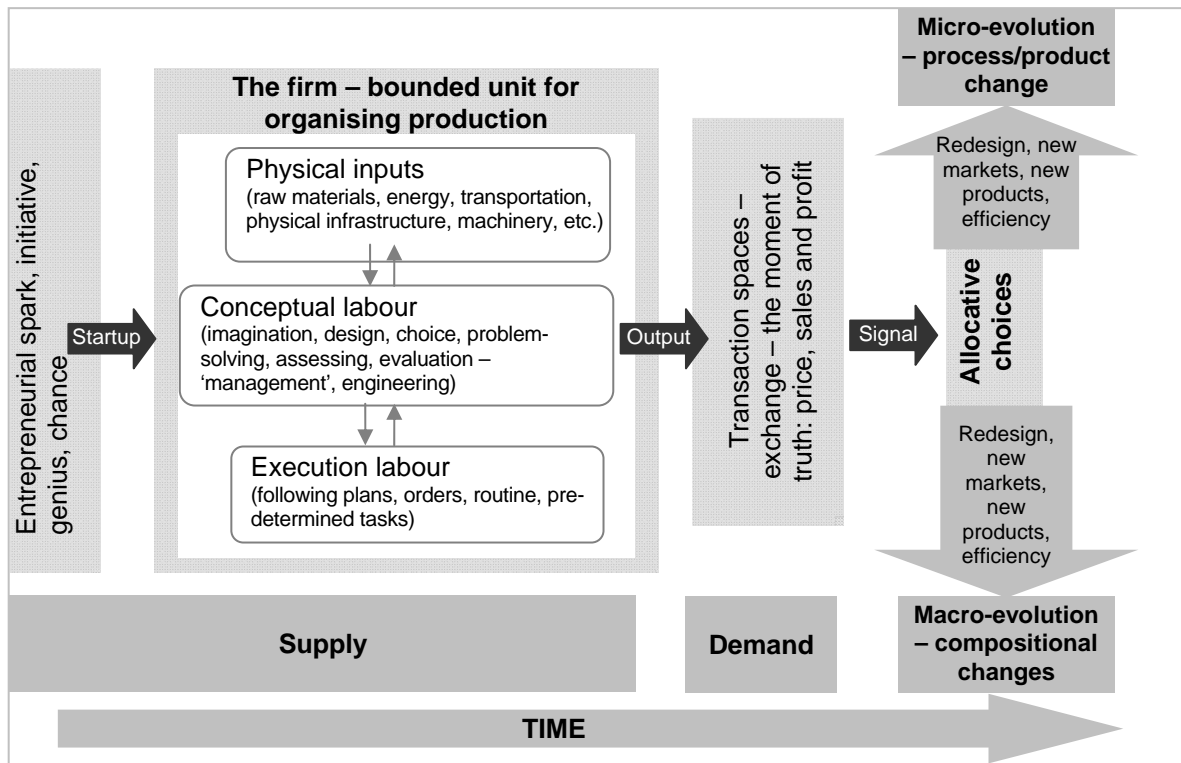
4.2. Beyond skills: spontaneity, futures literacy and ambient learning

In the LIS the industrial era mechanisms that create a link between skills and jobs is broken. Production activities with a one-way flow from conception to execution are no longer predominant. Figure 4:6 outlines the typical industrial era production process that moves from an entrepreneur who has a brilliant (innovative) idea to the design of a production process that requires specific skills to hiring people with those skills from a pool of people trained to have those skills. Afterwards the test of the market and the reallocation decisions – to abandon the production process because it is not profitable or redesign it, with implications for the skill mix, - closes the loop.

The process described in Figure 4:7 applies to even the most white collar creative work of the industrial era. The creative class, even though they invent things and are often the breakthrough innovators, like Apple's Steve Jobs or Google founders Sergey Brin and Lawrence Edward, still fit firmly within the flow of industrial production. These innovators are at the top of a pyramid and are the initiators, decision-makers who launch and control the production process and the skills that are specified and engaged in the production process. In the industrial era production is organised, for many reasons, including the way value is accounted for (meaning what is feasible from a business model point of view), in firms that, however restructured and modernised, remain administrative organisations ⁽¹⁵⁾.

⁽¹⁵⁾ It is possible to argue that the firm can evolve to the point where it no longer uses the administrative methods of command and control, hierarchical conception and execution, etc., but at some point in the evolutionary process resilience gives way to transformation and there is discontinuity of forms. The human hand has been genetically traced to its origins in the fins of the fish, there is genetic continuity, but it seems absurd to say that a human is a fish.

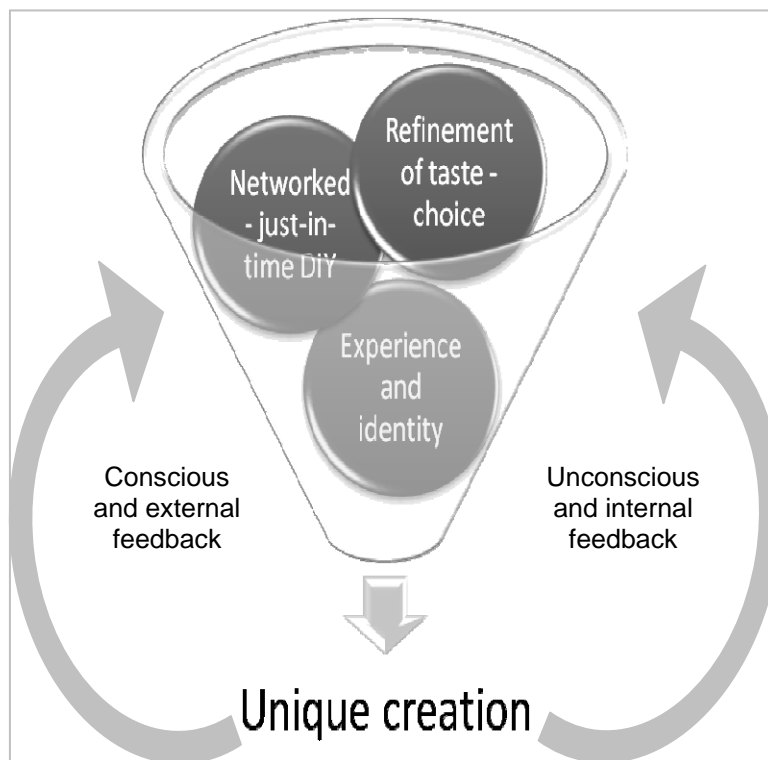
Figure 4:6 **Determining skill needs in the industrial era: a division of conception and execution**



In the LIS, both the objective of the production process and the way of organising production change profoundly ⁽¹⁶⁾. First, the relationship between conception and execution is different, since the key steps are personal and involve a fusion of what were formerly two sides of a clearly demarcated division between supply and demand. Second, given the spontaneous nature of the banal creative insights that drive personalised unique creation (material and immaterial, including identity), these innovations arise as people question, encounter, collaborate, discuss, reflect, etc. This means that the skills needed to engage in these activities are largely internal to the personalisation process, cannot be contracted out to someone with the skills, and cannot be specified in advance because what is being produced is only discovered at the moment of its production. The more that process becomes product the less amenable the production process to industrial era forms of organisation.

⁽¹⁶⁾ The question of the business models, or how people generate income and engage in market exchange is an important question and the belief (anticipatory assumption) that firms, jobs, stores and marketing are the only way to make the economy go around is deeply entrenched. This is not the place to go into these how-to questions but it is both historically true and within the range of our imaginations to think of a different way of realising the advantages of market exchange and cash income.

Figure 4:7 **Learning: the organisation of unique creation**

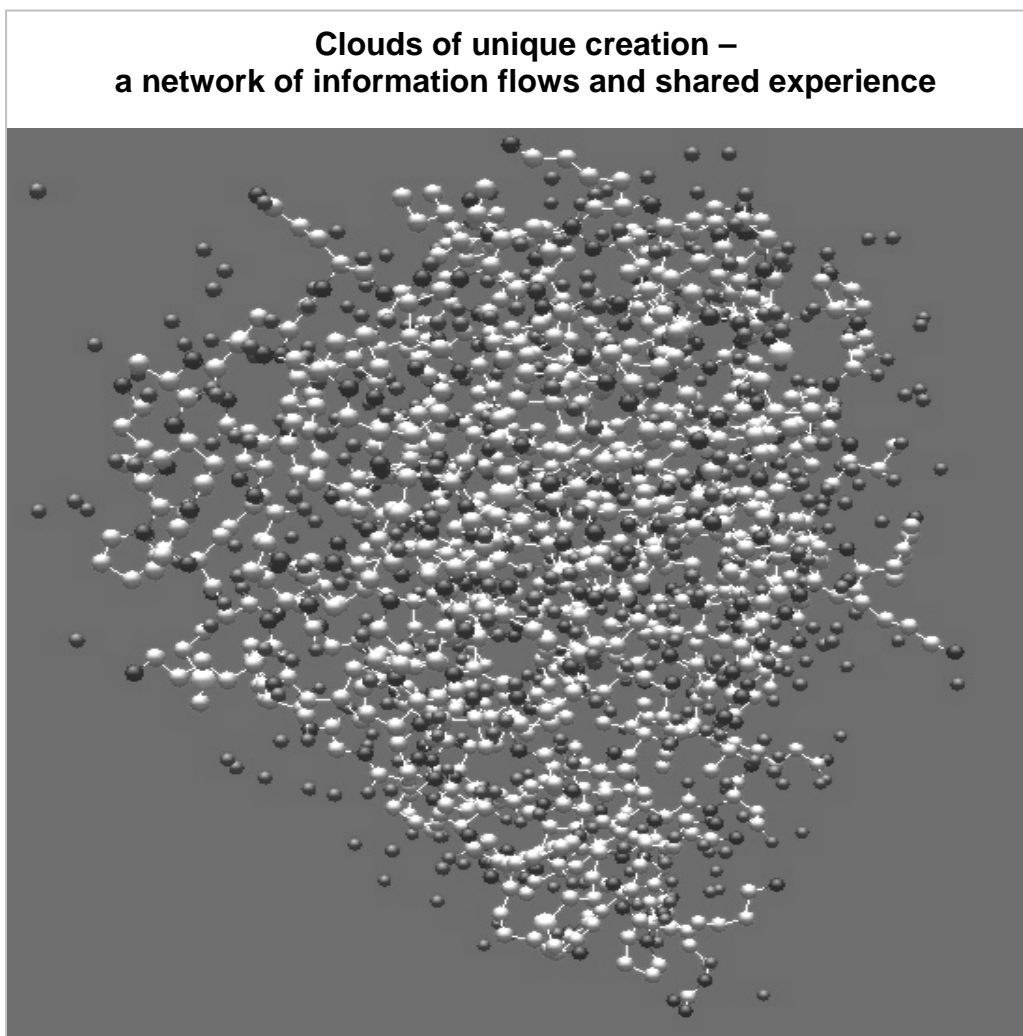


Figures 4:7 and 4:8 offer one way of illustrating and contrasting the organisation of production with the industrial era. In Figure 4:7 it is the internal process of reflection that is the fundamental moment of production (a term that undoubtedly is redolent of industrial era ways of thinking). Certainly there are feedback loops that then alter choices. There is also collaboration, in various ways, some of which are still industrial in nature such as outsourcing tasks or simply purchasing off-the-shelf inputs. From a value-added point-of-view, largely because of the immense success of the productivity-enhancing evolution of industrial production, these outsourced activities are not the predominant source of society-wide value creation. As seen in Figure 4:1 the structure of value creation has been restructured. The efforts to become more competitive industrially have been successful and, just like productivity enhancements in agriculture, allowed resources to be devoted elsewhere.

Figure 4:7 shows how the organisation of the use of resources in the LIS is primarily devoted/created in learning, i.e. learning-intensive society. The preponderant share of value – both used and created (input and output, stock and flow) in unique creation and the personalisation of identity - is not embodied in an artefact or even an experience; it arises from the learning that occurs by doing and experimenting. The radically different nature of the relationship between the socioeconomic system and skill is defined at its root by the specific nature of learning as simultaneous and inextricable consumption (time, mental and physical energy, pleasure) and production (output of new insights, pleasure of realisation, problem solved).

This does not at all imply that there is no in-depth knowledge. All those who learn deepen their knowledge of themselves, in their lives and in their communities. They become wiser, relative to their own aspirations and life (to be judged on heterarchical not hierarchical grounds). There is still access to, and use of, the old industrial forms of expertise but, fortunately, this is an inexpensive input. The sharing that is critical for learning is, however, central. Perhaps the easiest way to describe the way value creation is organised in the LIS is with the image of a cloud. Figure 4:8 is unfortunately static in print but it should be swirling and reconnecting, with a continuous process of new hubs, new networks, new loners. It is a cloud of communities within which communities are born, die, and change membership on a permanent basis and in ways consistent with the unpredictability and spontaneity of complex evolutionary processes.

Figure 4:8 **Learning: clouds of unique creation**

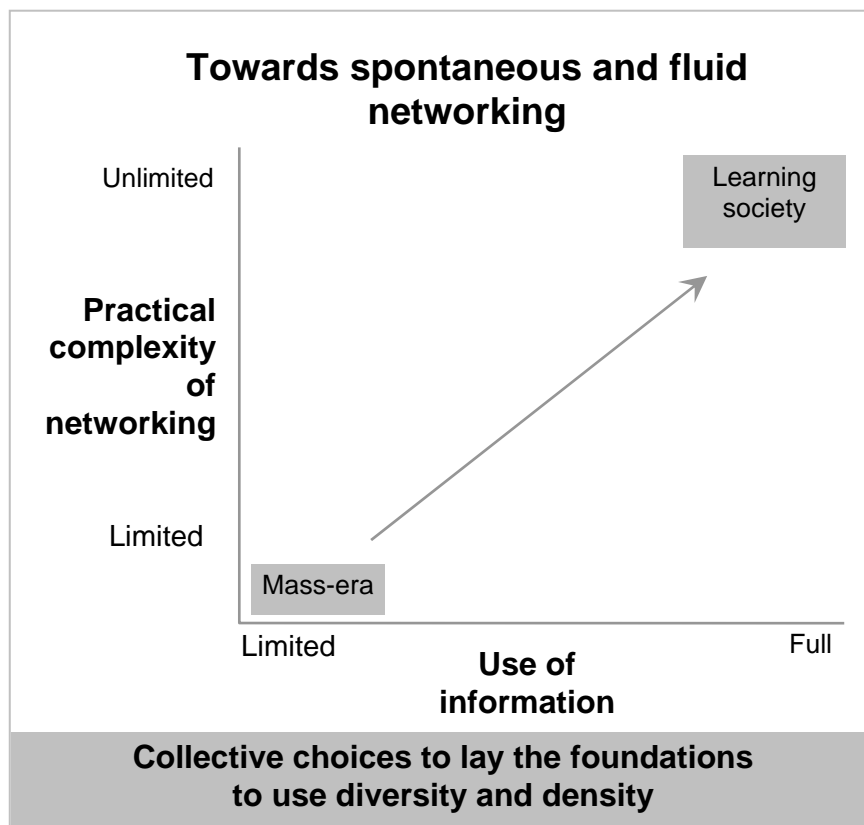


Imagining the LIS in this way – and it is only one way as there are an infinite variety of other ways of describing this kind of society – makes high demands on achieving transparency, access and trust.

4.3. Conclusions

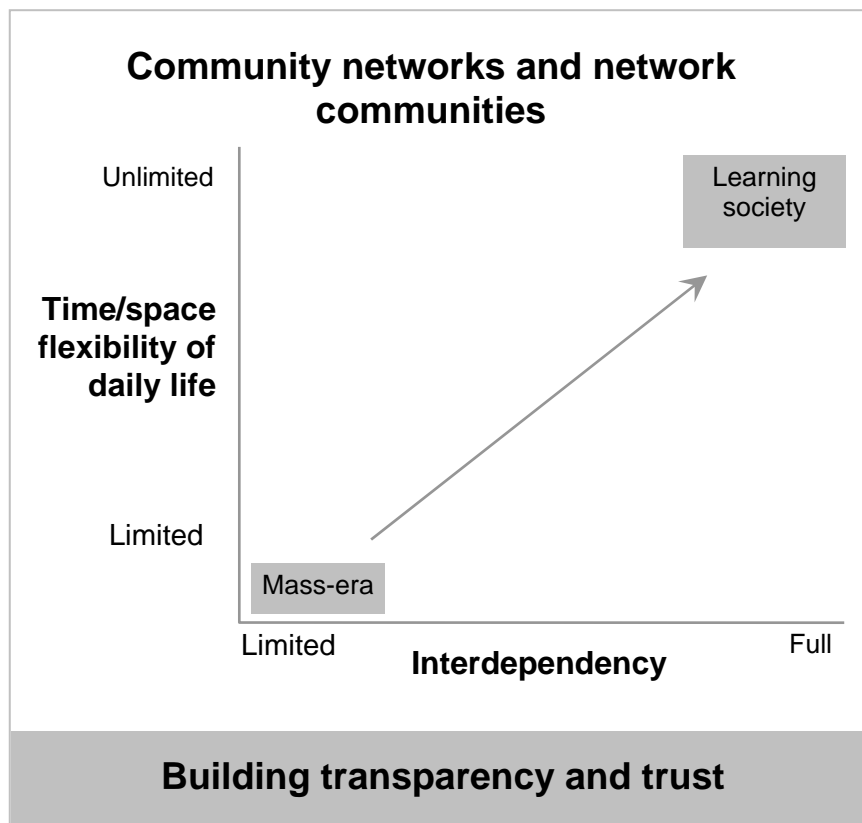
For the LIS to be as fluid and spontaneous as the patterns within a cloud it needs an operational infrastructure that corresponds. Figures 4:9 and 4:10 sketch different aspects of these requirements. Figure 4:9 highlights the importance of collective resources (technologies, norms, institutions) like the semantic web and ambient computing. These are the underlying conditions for this descriptive specification of the LIS; the environment, like the Earth’s atmosphere and water that make cloud formation possible.

Figure 4:9 **Attributes of the cloud: collective condition, connectivity inside-out**



Similarly, the requirements for community fluidity are highlighted in Figure 4:10 where the LIS in the upper-right quadrant depends on the ease of asynchronous and synchronous connections with differing degrees of bandwidth (from text messages to face-to-face) combined with a high degree of inter-dependency. In this way life adapts to the needs of learning as it happens, when it happens, with whom it happens, and where it happens. This is not the industrial era’s organisation of life to suit the needs of the place where they are willing to hire your skill. The person is not a tool or input into a production process where the specification of the role of the tool is what defines the skill and ties the person to the job.

Figure 4:10 **Attributes of the cloud: collective condition, connectivity outside-in**



The LIS is 'beyond skills' because it is a way of imagining a community where people are not instrumentalised.

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PART III

Forecasting European skill needs

The workshop discussed the following questions:

- (a) what are the main changes in the demand for skills in Europe? What are the implications for policy;
- (b) how should further work on forecasting skill needs in Europe develop;
- (c) how could data deficiencies be solved? How could labour-market information and intelligence be improved? Which policy measures, at which level, can help to tackle the issue?

Rob Wilson and Ilias Livanos

Medium-term forecast of occupational skill needs in Europe

Ben Kriechel

Replacement demand in an ageing society

Frank Cörvers

Skills supply forecast

Ben Gardiner

Forecasting European skill needs: summary and conclusions

5. Medium-term forecast of occupational skill needs in Europe

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Abstract

The following discusses issues of data, methods, results and implications arising from the Cedefop project 'medium-term forecast of occupational skills needs in Europe'. For the first time a comprehensive and consistent set of employment projections have been produced for the whole of Europe. Here is a summary of results and the way in which they have been produced. They are based on data from Eurostat, both from national accounts and the European labour force survey. The focus here is on likely changes in the structure of employment by occupation and qualifications. The most robust results are obtained from the simplest models, involving some form of trend extrapolation rather than more sophisticated models with behavioural content.

Highly-skilled occupations are projected to experience strong increases in employment, across all countries up to 2015. The increase is projected to be weaker for medium skilled occupations, with the exception of service workers who are expected to experience a strong increase. The numbers of those in elementary occupations is also projected to show a significant increase. High and medium qualification employment is projected to increase for all countries while the numbers in employment with low or no qualifications will decline.

5.1. Introduction

The following discusses data, methods, results and implications of the Cedefop project 'Medium-term forecast of occupational skills needs in Europe'. This project was undertaken by a team led by the Warwick Institute for Employment Research (IER), and involving Cambridge Econometrics and the Research Centre for Education and the Labour Market, Maastricht (ROA). Each group was responsible for particular aspects of the project, with the main elements distinguished as separate modules. A discussion of the modular approach can be found in Wilson (2007).

5.2. General approach

Previous reviews (such as Wilson et al.; 2004) suggest that, when carrying out quantitative skill projections, best practice worldwide involves the use of large scale, multi-sectoral models. These provide essential understanding of how structural economic and technological changes are affecting the demand for skills. The typical quantitative modelling approach involves three main elements.

The first key component is a multisectoral macroeconomic model of some kind, usually built around a Leontief input-output table, which takes into account the links between sectors. Such models are usually estimated using quite complex and sophisticated econometric methods. The key outputs from these models, for the present project, are consistent

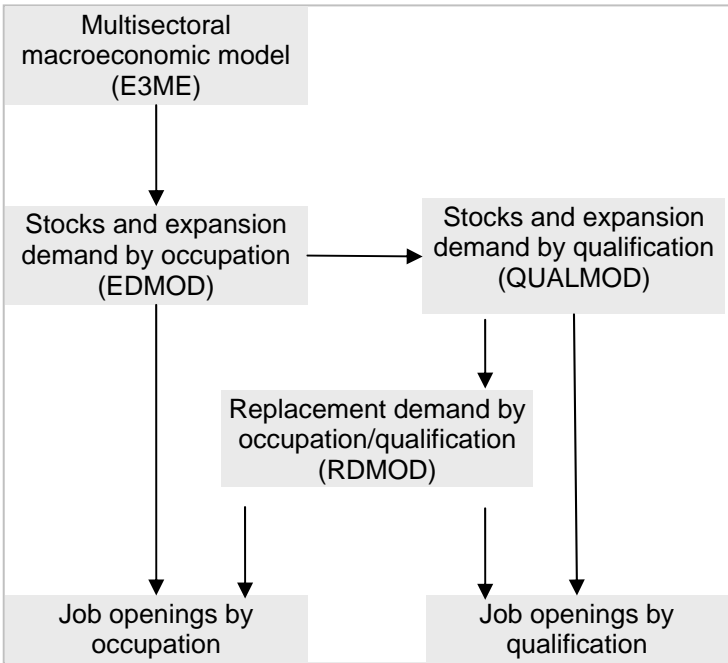
projections of employment levels by sector. In addition to providing projections of sectoral employment, such models can be used for various other purposes, including more general macroeconomic policy analysis. This may be significant for future use of the new framework which this project has developed.

The second key component is a module, or set of modules, which translate the employment projections from the multi-sectoral model into implications for skills demand. These elements vary considerably across countries. This aspect is much less sophisticated, mainly due to the more limited nature of data available on skills. In most cases, the focus of attention is limited to occupational employment structures within sectors. The trends in such structures are often analysed simply rather than with more sophisticated econometric methods. Forecasts of so-called expansion demand (net changes in occupational employment which can be negative) are based on analysis of changing occupational patterns of employment within sectors.

The third key component relates to what is usually referred to as replacement demands. On the demand side of the labour market it is important to distinguish between future changes in employment level expansion (or contraction) and demand arising when workers leave the workforce for whatever reason (due to retirement and various types of mobility).

The framework developed in this project adopts a modular approach to exploring skill needs, focusing on these key components, set out in Figure 5:1.

Figure 5:1 **Modular approach**



Four separate modules can be distinguished:

- (a) Module 1: a set of multisectoral macroeconomic forecasts, based on the preferred macroeconomic model (E3ME);
- (b) Module 2: an occupational expansion demand module (EDMOD), based on labour force survey (LFS) data;

- (c) Module 3: a qualifications expansion demand module (QUALMOD), based on similar data sources;
- (d) Module 4: a replacement demand module (RDMOD).

Module 1 (E3ME) is based around the existing and well established pan-European multisectoral macroeconomic model developed by Cambridge Econometrics in collaboration with others. This is described in greater detail in Gardiner et al. (2007), along with the underlying assumptions made about the main external influences on the economy and the labour market.

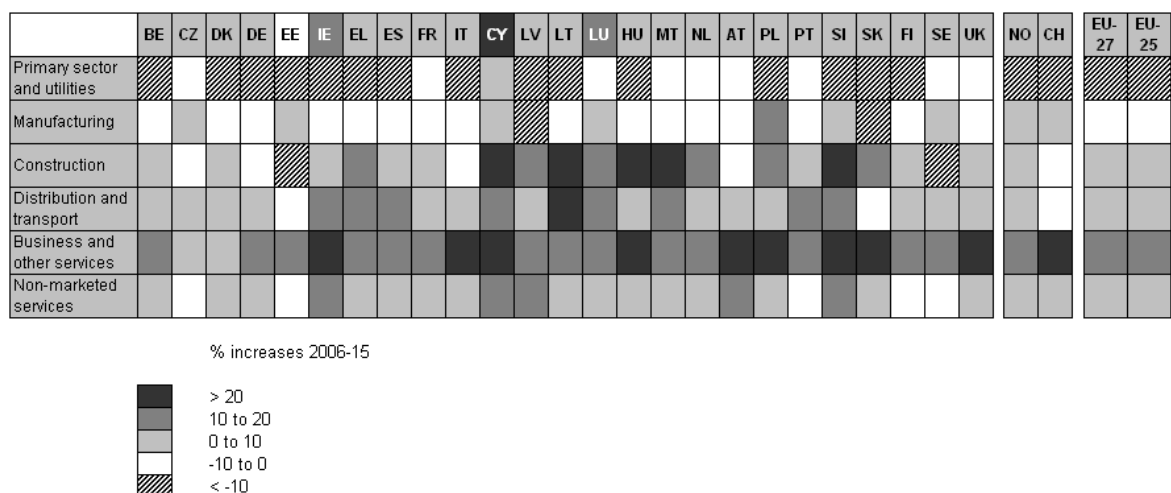
Module 2 (EDMOD) builds upon previous work in individual countries. It focuses on the factors influencing occupational structure within sectors. It delivers a comprehensive and consistent set of expansion demand estimates, based on LFS data from Eurostat.

Module 3 (QUALMOD) focuses on the implications for formal qualifications, adopting similar procedures and data to EDMOD. The data available on qualifications are even weaker than for occupations, with many problems of consistency across countries and over time as well as many gaps. Problems of consistency in classification across countries are more severe here than in any other area. Modules 2 and 3 are described in detail in Livanos and Wilson (2007c).

Module 4 (RDMOD) again builds on previous research efforts. It delivers a set of replacement demand estimates, without which projections of expansion demands are of little value. However, data on some aspects of replacement demands are weaker than those on occupational employment structure. Nevertheless, the analysis conducted by Kriechel and Cörvers (2007) suggests that sufficient information exists to provide at least a broad indication of the likely scale of replacement demands.

In combination, the four modules deliver a comprehensive and consistent detailed picture of job openings across Europe. Job openings are defined as the sum of expansion and replacement demands.

Figure 5:2 **Change in sectoral employment by country, 2006-15**



The main focus here is Modules 2 and 3. Before discussing these it is helpful to set the context by considering the sectoral and industrial results on which they depend. The E3ME model delivers a set of consistent sectoral employment projections. A summary of E3ME sectoral projections for all Member States can be seen in Figure 5:2. Generally, it is industries in the service sector that are projected to be the main 'winners' in employment terms, whereas employment for most industries in the primary and secondary sectors, including agriculture and much of manufacturing, is projected to decline.

5.3. Occupation and qualifications

5.3.1. Expansion demand by occupation and qualifications

A review of the data available suggests that it is possible to create employment matrices by occupation cross-classified by qualification from the LFS. However, it is also clear that there are problems in comparability across countries in how occupations and qualifications are coded within the LFS.

Despite the weak data, especially for qualifications, it is possible to begin to explore implications for changing demand for skills. Ideally, this approach can be extended to include a much more comprehensive and explicit analysis of the supply side. However, there are some significant data limitations in many countries. The supply side will be scrutinised in a subsequent Cedefop project undertaken by the same research consortium.

Another key issue is separating out supply from demand issues. The present exercise focuses on changing patterns of those in employment without any reference to supply side developments.

5.3.2. Modelling employment by occupation and qualification

Previous research on expansion demands and occupational structure is quite limited, especially at a detailed level. There is even less work on modelling qualifications from a demand perspective. There is quite a large gap between the ideal theoretical model and the typical specifications used in most national level skills projections.

One of the main reasons for this is data limitations. Where detailed data have been available, researchers have exploited them. The ideal approach, based on economic theories of what determines demand for skill, would relate occupational and qualification structure to a range of economic and other determinants, including:

- (a) technology;
- (b) cyclical indicators;
- (c) price (wage) indicators;
- (d) other economic factors such as trade performance.

In practice, many such models revert to simple extrapolative procedures (using linear or non-linear methods). Time is the only independent variable, acting as a proxy for technological change and other factors.

More often than not, therefore, the paucity of information available has resulted in simple approaches based on time series methods with a single variable (the occupational share), rather than multivariate, behavioural approaches. In many cases judgement rather than any formal model is a key element (see for example the approach adopted by the Bureau of Labor Statistics in the US).

These issues are discussed in more detail in Livanos and Wilson (2007c) where a range of explanatory models have been explored covering both occupation and qualification. The focus is on employment patterns (shares) within sectors. Livanos and Wilson (2007b and c) describe both the data issues with which the project has had to grapple, as well as the further refinement of the models used to explain changing employment structure by occupation and qualification.

The most robust results for changing occupational and qualification employment shares are obtained from some of the simplest models, involving some form of simple trend rather than more sophisticated models with behavioural content. Given the problems with the current data this is probably not too surprising. As the data are extended and improved it may be possible to add in more economic content to this part of the modelling.

Figure 5:3 presents a summary of the results at broad occupational level for all Member States. Highly-skilled occupations are generally projected to experience strong increases in employment, across all countries. The increase is projected to be weaker for medium-skilled occupations, with the exception of service workers who are expected to experience a strong increase. Employment in elementary occupations is also projected to show a significant increase.

Figure 5:3 Change in occupational employment by country, 2006-15

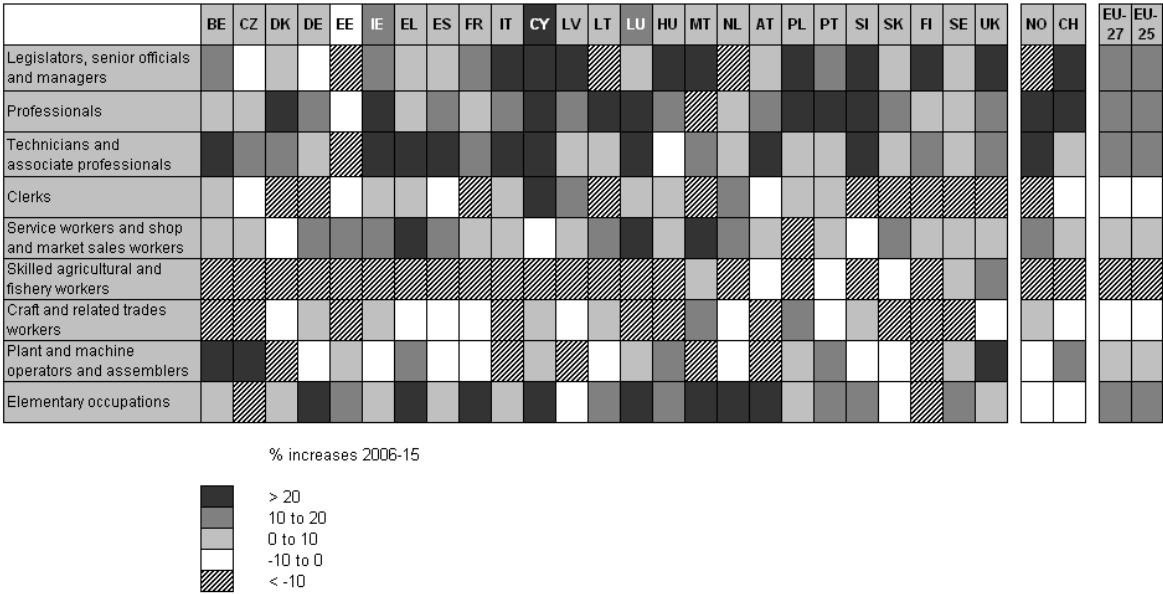
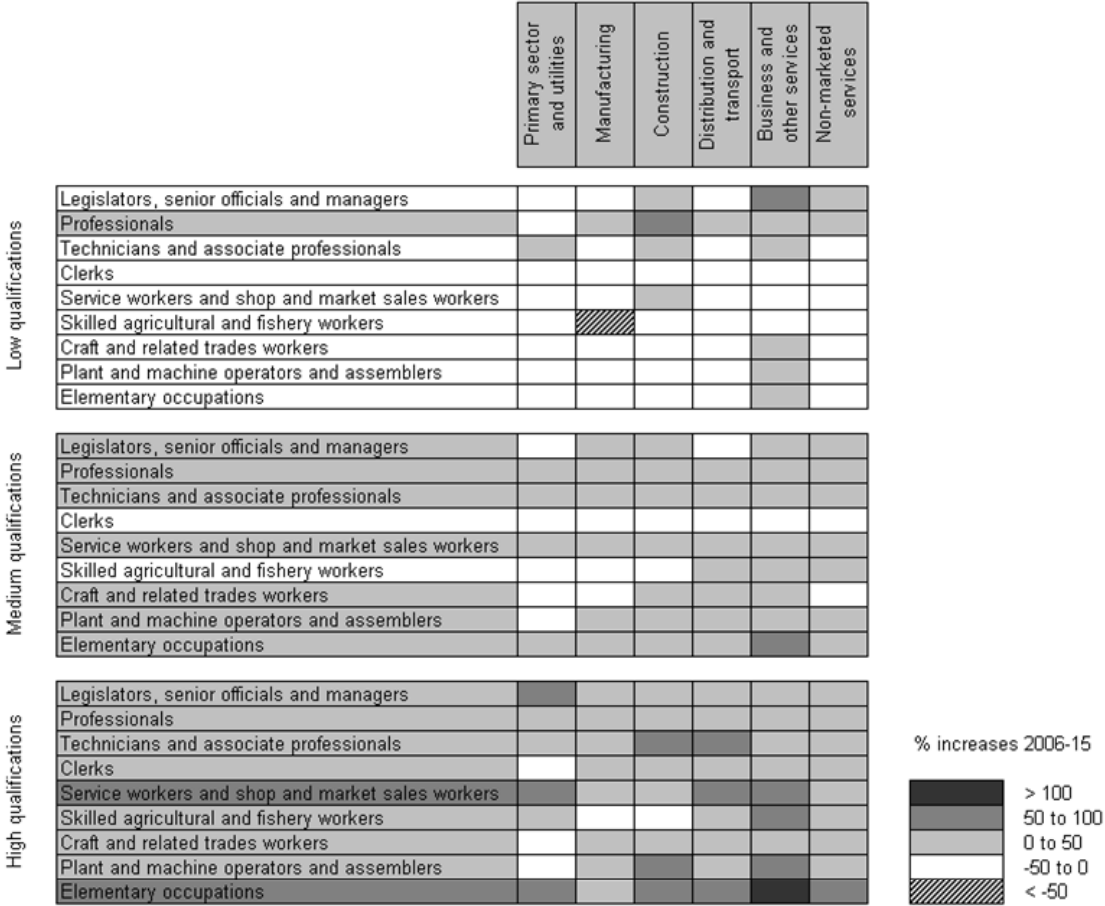


Figure 5:4 presents a summary of the qualifications of those in employment by broad occupational group and sector of economic activity. The numbers in employment with high and medium qualifications is mostly projected to increase for all countries. However, the

numbers in employment with low or no qualifications will fall. This is probably a reflection of supply side factors as increasing numbers of young people enter the workforce, since they tend to be much better qualified than the older workers they are replacing.

Figure 5:4 Change in qualifications employment by country, 2006-15



The project has also involved development of three alternative macro scenarios which present a range of possible economic situations Europe may face over the next five to 10 years. All this has been brought together in a series of country workbooks, as along with more conventional reports. The detailed results in the workbooks have been made available in a manner to assist continuing dialogue with country experts to try to improve the quality and robustness of the basic data and results, by taking note of local knowledge.

Various alternative sets of employment projections by occupation and qualification have been produced. These include different macro and sectoral scenarios as well as alternatives based on LFS rather than national accounts estimates of sectoral employment structures. Although there are many differences, the broad patterns discussed above remain consistent across these alternatives.

The results also include implications for replacement demands which, in many cases, are of much greater significance in terms of job openings and education and training requirements than expansion demand estimates.

5.4. Conclusions

The employment projections presented are based on the use of E3ME as a starting point for assessing sectoral prospects at pan-European level. This information has been used in combination with data from the European LFS to generate implications for occupations and qualifications.

Overall, the results suggest strong increases in demand for highly-skilled occupations and service workers as well as for elementary occupations. Also, the numbers of those with medium and high qualifications in employment is projected to increase steadily. In contrast, the numbers with low or no formal qualifications in employment will decline (although this is as much due to supply as to demand forces). These broad results are obtained irrespective of the precise method or data used, and the alternative scenarios considered.

This project has been concerned with the development of a sound historical and projections database, including developing the basic data and related software needed to produce projections of the demand for skill in a replicable fashion. A key objective has been development of a framework within which alternative possibilities can be considered. While there may still be some concerns about the quality of some of the data for individual countries or for particular sectors or occupations, this framework enables other, better data to be easily incorporated to improve the quality of analysis and projections.

The project involved producing a set of benchmark projections that can be the foundation for continuing dialogue about such issues across Europe. These consider different possible macroeconomic scenarios as well as the impact of using LFS, as opposed to national accounts based, employment estimates.

The project has focused on refining data and models used for expansion and replacement demands, although this has proved a difficult task. The analysis has been based on both the LFS microdata (individual level) and the published data from Eurostat.

The project has initiated dialogue with both individual country experts and the relevant statistical authorities. As this continues it is hoped that the quality and reliability of the relevant data and estimates will gradually be improved. While these results have their limitations, they provide a useful starting point for thinking about likely future developments in employment structure across the continent. The present set of projections has been put together with the voluntary involvement of many individual country experts. It is clear from the issues raised by these preliminary results that such involvement is crucial to ensuring credibility of the results for individual countries and for improving both estimates and methods.

The project has revealed several outstanding problems and issues, especially data quality. There is also scope to improve the basic methods, but the potential for further refinement and improvement offered by the framework is clear. The modular structures adopted and the presentation of the material in the form of separate country workbooks enables such developments to take place at individual country and pan European levels.

As with all quantitative projections, a considerable amount of judgement is needed to develop robust and credible results. This must involve individuals from individual countries who can bring to bear their unique data and trends knowledge and expertise in their own countries. The feedback obtained so far suggests that with such input it will be possible to

develop a much more robust database. It is recommended that further resources be sought to support such activity.

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6. Replacement demand in an ageing society

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Abstract

Occupational skill forecasting should not only be concerned with growing and declining occupations within an industry or the economy. An important element of occupational demand is that of replacement, which consist of the open positions that need to be filled by school-leavers or other entrants to the labour market. Replacement demand is driven by the age composition of occupations. Within an ageing society, replacement demand tends to become more important, as more occupations are ageing rapidly, generating the need to fill the vacant positions of employees that have left the occupation. Net replacement demand is estimated for the European skill forecasting project. Summary results for the EU and some countries are discussed as along with important drivers generating the underlying occupational replacement demand.

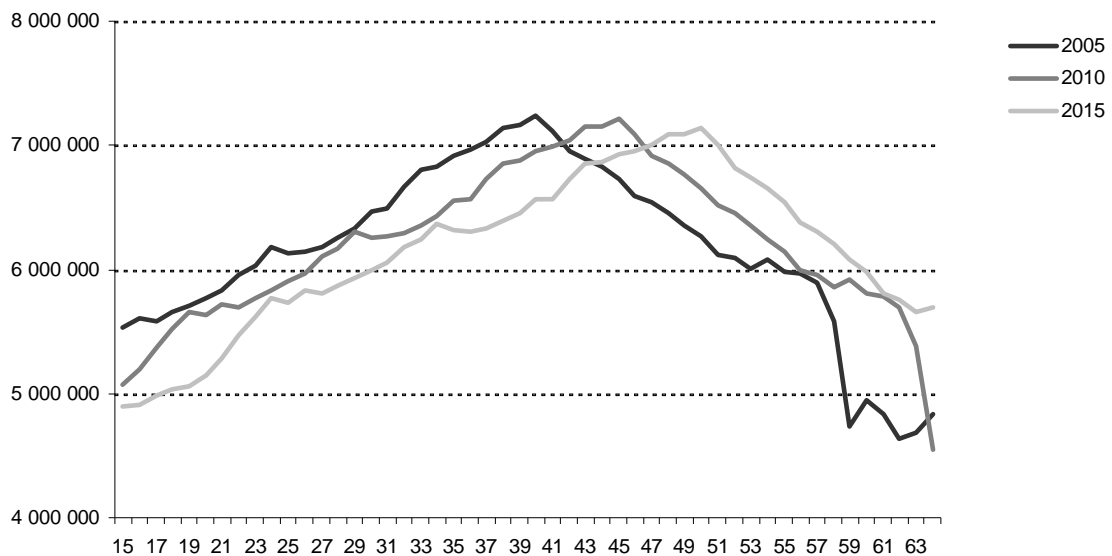
6.1. Introduction

In the coming decades the population of the European Union (EU) will inevitably grow older. Predictions from Eurostat, show the population in prime working age (15-64) will shift significantly to the older age cohorts. While the dimension differs by country, the overall trend is the same for all EU countries (Figure 6:1). We will have to face a society which is increasingly older, which has to make use of older workers, and at the same time mobilise and adjust its existing, potential labour force to fill the gaps, or replace, those workers that eventually leave the labour force.

The Lisbon agenda addressed this issue. In the context of the increasing greying of the labour market, measures have to been taken to mobilise the 'reserves' of the labour force. This means measures to stimulate participation by women and lower educated workers that have withdrawn from the labour market. Further, the working age should be extended, both to reflect the increase in life-expectancy and also to fill the gaps, or rather avoid gaps arising too quickly.

The extension of working age includes two important measures: one, and probably the better known, is the extension of required working age to the point where it is considered (legally) normal to work. However, while in most countries there is a significant volume of workers who work until they reach the official pension age, pre-pension plans, sickness-benefits, or the extended use of unemployment insurance mean that many older workers effectively leave the labour market much earlier. Extension of the retirement age will also have an effect on these issues, though many national governments enact policies to overcome the prevalence of early retirement and stimulate participation until legal retirement age.

Figure 6:1 **Development of EU-25 working population**



Source: Data from Eurostat, baseline case (2004).

The economy needs a skilled workforce. Demand for specific types of workers should be solved as quickly as possible to overcome skill shortages translating into production inhibitions. Many companies constantly evaluate changes in production, and how those translate into current capacity of their machinery and workforce. In growing companies, skilled personnel will be added on a regular basis. However, even companies that are not expanding, or those that might even be declining over time, need to replace personnel on a regular basis.

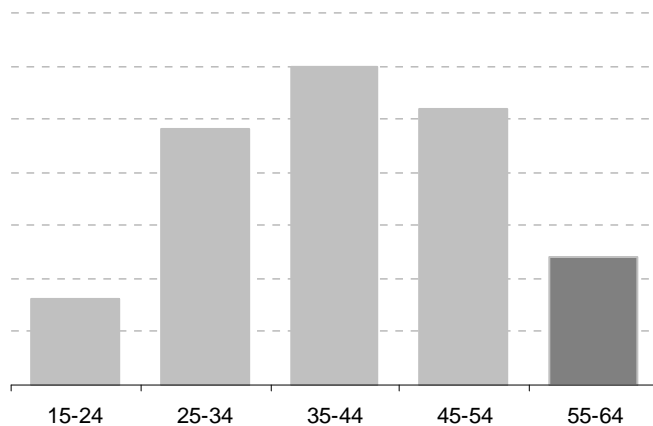
6.2. Replacement demand

Workers leave companies for various reasons: to take up the same job at a similar company, to take up a different occupation altogether, to leave the labour market, perhaps temporarily, and due to retirement. While skill needs discussions often focus on growing firms, industries, or sectors, many vacancies in companies occur due to the need to replace a worker who has left the company. Replacement demand addresses this latter case.

The simplest replacement demand is for those that retire at the end of their working life. This can be explained in the context of a single firm producing goods, ignoring at first different occupations or skill levels to focus on basic concepts. The translation to occupation or skill specific replacement demand follows.

In Figure 6:2 the right-hand bar reflects workers who are 55 years or older. In the next 10 years, these workers will all reach the age of retirement – which we assume to be 65 years for this exercise – and thus leave the company for retirement. Given that the firm wants to continue producing in the same way and the same amounts it will have to replace those workers that retire.

Figure 6:2 **Age composition**

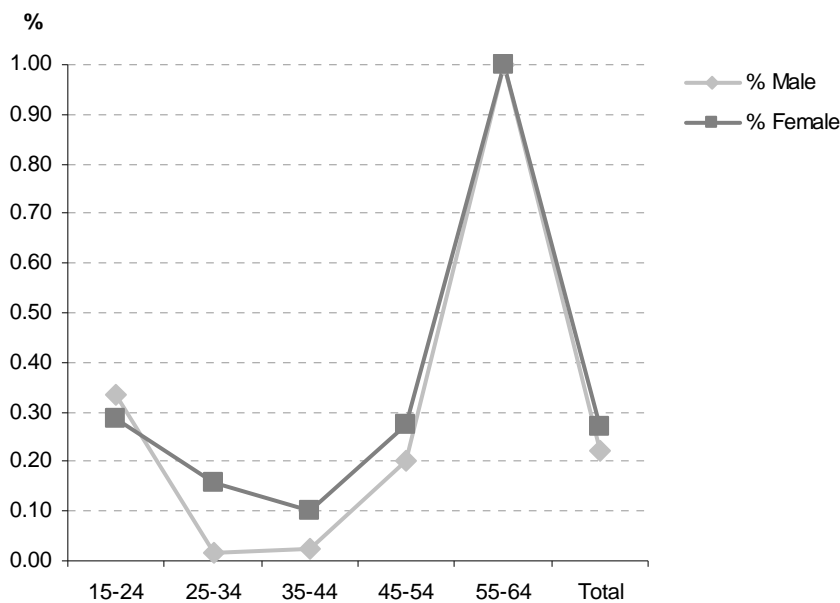


However, these workers are only a portion of those actually leaving the company; there are workers leaving in all age groups. The age of a worker has some influence on these movements, as has the gender. Figure 6:3 splits the workers into male and female and includes, workers leaving the company at different times. There are higher outflows among female workers aged 25-34 and 45+. These outflows have different causes: for example, among younger workers adjustment into careers after finishing school or their labour-market training causes them to 'shop' around to find a suitable job. The female work population between 25 and 40 years old often has considerable outflow rates for family and household reasons: some female workers of this age group leave entirely, others work part time. From the age of 45 workers leave the labour force through sickness, early retirement, or unemployment. The chance of leaving a company increases with age – even before the legal retirement age – and is quite often also affected by special, legal or institutional arrangements that encourage actions at a certain age ⁽¹⁷⁾. There are several occasions and reasons to leave an employer, leaving a vacancy to be filled; retirement is simply the most predictable and covers the largest numbers.

As well as outflows, the firm will have new recruits to fill vacancies, movements within the firm in which a worker replaces another who left but leaves a vacancy in his own position, and so on. Inflows are usually concentrated around the younger age cohorts: new workers having left school or finished their apprenticeship entering the labour market, or those that have been working for some time at other companies. There is also the return of women between the ages of 30 and 45 after having families. The net picture after adding fictional in and outflows shows a net outflow among the older cohorts, while in the younger cohorts there is generally a net inflow of workers.

⁽¹⁷⁾ See Dohmen and Pfann (2004), the separation rates at a Dutch company, in which the probability of separation before eligibility for early retirement drops tremendously, while it increases during the eligibility period. Workers that want to quit are waiting for the financially more attractive moment.

Figure 6:3 **Outflow coefficients**

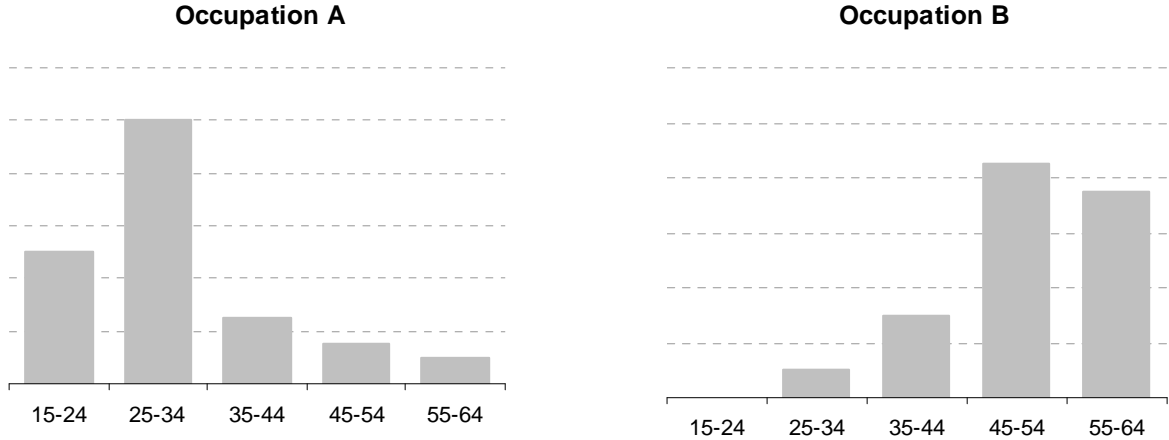


6.2.1. Replacement demand by occupations

Firms do not have interchangeable, homogenous workers, but rather functions that necessitate certain skills and are attached to certain occupations. If we translate this analysis to occupations, we have a basic understanding of the replacement demand by occupations: within occupations across the entire economy we can also give the distribution of workers in age cohorts. The (aggregate) behaviour of in- and outflows of one occupation is similar to that in the firm example. Occupations can differ in replacement demand simply because of differences in the demographics within the occupation. Figure 6:4 depicts two distributions of workers within two occupations. While occupation A has more younger workers, occupation B is heavily skewed towards older workers. One can expect that the replacement demand for occupation B is significantly higher than occupation A for this reason alone.

There are occupation specific differences, mainly through two reasons that are not yet reflected in the example. Some occupations are stepping stones in typical careers, so the outflow will be significantly higher at a younger age than retirement as a significant proportion makes a career move towards the higher level occupation. These higher level occupations also reflect this stepping stone position in a career through the fact that they often do not have any younger holders, as inflow is at an intermediate age. Examples for this are the senior public administration workers that rise from lower level occupations.

Figure 6:4 Demographic composition within occupations



The other reason is that any occupation might have its own institutional settings. For example, military personnel are quite often able to retire earlier than the usual retirement age, especially in functions that are deemed especially taxing on the worker’s health, or in which prime health is a prerequisite. Fighter-jet pilots are usually a good example for this. However, there are occupations that are physically challenging and, even though there is no institutional early leave arrangement, a significant proportion of the workers do so. This might be health-related or by passing into other less physically challenging occupations. Certain occupations in building are good examples.

6.2.2. Replacement demand in Europe

Net replacement demand is defined as demand that remains after some expected adjustments in participation have been incorporated.

The estimation of the net outflows by occupation, gender and age group was done by an adapted cohort-component method ⁽¹⁸⁾, which uses historic outflows to predict future outflow coefficients. These coefficients are adjusted for expected changes in participation rates based on country experts and the E3ME predictions ⁽¹⁹⁾. The demographic development is included and reflects the country specific trends of the Eurostat forecast as depicted in Figure 6:1.

Replacement demand relies on three main sources for its estimation: the labour force survey to construct the outflow coefficients based on the occupation specific demographics and to estimate the size of an occupation; participation rates from the E3ME model; and the Eurostat population forecast.

⁽¹⁸⁾ More details can be found in Kriechel and Cörvers (2007).
⁽¹⁹⁾ The E3ME predictions are described in Pollitt (2007)

Figure 6:5 Replacement demand 2005-15



Source: Cedefop (forthcoming), based on calculation by ROA/IER/CE.

Figure 6:5 summarises the results of the replacement demand estimation for the period 2005-15; it shows the aggregate replacement demand percentage. These results depend on the historical trends in the LFS data, and could change significantly if institutional or policy changes occur that affect the flow patterns across and out of occupations.

6.3. Conclusions

An ageing society, such as we are facing in Europe at the moment, implies that more workers will be employed within older age cohorts. This will lead to increased replacement demand in those occupations that have a large share of older workers. If replacement needs remain unaddressed, it will lead to shortages on the labour market alongside those arising from general changes in the occupational structure.

Policy that changes the institutional setting or the legal basis of retirement or early retirement is likely to affect replacement demand figures. While policy changes, already introduced or expected shortly, are incorporated in the model, new initiatives might be used to address and postpone some of the skill demand predicted by the Cedefop forecast to 2015. Measures that address replacement demand with specific respect to retirement are, however, only temporary fixes.

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7. Skills supply forecast

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Abstract

The case for forecasting the demand for, and supply of, skills in Europe in a regular, consistent and systematic way is now well established. The project described aims to extend the work done previously on the demand side to cover the supply of skills and will develop a medium-term forecast of skill supply in Europe. It has the objective to develop a robust, consistent, quantitative approach to modelling skill supply across Europe.

7.1. Introduction

To develop a robust, consistent, quantitative approach to modelling skill supply across Europe three main tasks have to be completed. First, consistent demographic and labour supply data by age and gender must be developed and analysed to produce models and projections as part of a multisectoral macroeconomic model (E3ME). Second, a multilogit analysis should be carried out using Eurostat and LFS microdata to establish the probabilities of individuals in each country attaining different levels of qualification. Third is collation and analysis of aggregate data on educational participation and graduation, flows through the educational system, and transitions from education to the labour market.

This will be done in a medium-term perspective (10-15 years), breaking skills levels down by ISCED to as detailed a level as the data will sustain. This may include a breakdown by field of education (discipline) if the data are sufficiently robust. The analysis will be conducted for each of the EU-27 Member States, plus Norway and Switzerland. Where possible, different variants will be explored based on different assumptions. These results will be presented and disseminated in such a way as to facilitate a process of systematic dialogue with other individual country experts in the course of the project.

These three tasks are discussed below.

7.2. Modelling labour supply by age and gender

The links between overall labour supply and activity in the wider economy will be provided by the E3ME model. E3ME is a well-established macro-econometric model used for forecasting and policy analysis across Europe. It includes a relatively detailed treatment of the labour market, including econometric equations for employment demand, hours worked and wages (all by 42 economic sectors) and labour-market participation rates. The specification of these equations means that the model is well-suited to short and medium-term forecasting. Model

⁽²⁰⁾ This article and the whole project have been carried out in collaboration with IER and CE.

parameters for each of these equations are estimated empirically using data sets covering the period 1970-2006 for the Member States plus Norway and Switzerland (1993-2006 for the new members).

This project focuses on the supply of labour, which E3ME addresses through its labour-market participation rate equations. This models labour supply as a function of economic activity, real wage rates, unemployment and benefit rates. At present, model parameters are estimated for labour-market participation in each country by gender. It is proposed that this treatment be expanded in this project so that participation rates are modelled separately for different age groups. This is of key importance for modelling educational participation and attainment since these are known to be age specific.

As with any model development exercise, it is important to consider the various factors and technicalities involved from both the practical and theoretical point of views. The first task, data collection, will mainly draw on the data sets provided by Eurostat (population data) and the European LFS. This will provide the data required to complete a set of labour-market participation rates. Ideally the other variables in the equation (wage rates, benefit rates and unemployment rates) could also be disaggregated by age group and gender; this possibility will largely be determined by the availability and quality of time series data, and will be assessed in the scoping phase of the study, early in the project.

The next task is to determine whether any additional variables should be added to the existing model equations. For example, the factors that determine labour-market participation will be different for workers approaching retirement age from those that determine labour-market participation rates among graduates. Again, this will largely be determined by the availability of suitable data and will be addressed in the scoping phase of the study.

This expanded model framework will then be used to create a detailed set of baseline projections for labour supply, disaggregated by country, age group and gender and covering a 10-15 year period. This will form a key input to analysis of qualifications and skills supply and provide the link between economic activity and labour-market supply.

Finally, these links will be used to provide a range of projections of available skills through scenario-based analysis. In this way a range of projections can be formed around the baseline forecast, indicating areas that are most sensitive to the economic climate.

7.3. Use of multilogit methods to predict supply by qualification

The multilogit qualifications model operates by modelling the propensity of a representative individual in each country to obtain a given level of highest qualification, based on analysis of a combination of a time series and a cross-section of individual data from the LFS micro dataset. The modelling of qualifications structure and trend is done using a multinomial logistic regression model. The model incorporates age group and gender differences in educational attainment, differentiating trends by age group and gender. In principle the model also incorporates region/country specific effects on underlying structure and trend, based on differences between countries.

This method of analysing changes in employment structure uses a probability model, estimated on both individual and pseudo-individual data. The propensity to be employed in a

particular occupation is modelled using a multinomial logistic regression framework, based on pooled cross sectional data from the LFS, by incorporating appropriate explanatory variables in the model. As well as using the results of the multinomial logistic regressions to generate a consistent set of projections across all countries, this method also aims to generate insights into the factors influencing historical changes.

A multinomial logistic regression model is used to estimate the probability of an individual attaining qualification level j at time t . The probability of the representative individual attaining level j at time t can be expressed as a function of vector of explanatory variables, normalised by the sum of probabilities for all qualification categories. There are j levels of qualifications (as measured using ISCED). The sum of probabilities is constrained to add up to one. The vector of regressors, included in the model as explanatory variables, can include the range of personal and other indicators available in the LFS micro dataset.

The regression coefficients are estimated so that the predicted model achieves 'best fit' to the observed data. This is done using the maximum likelihood method. The matrix of regression coefficients is then used to predict the distribution of people by qualification at each point in time, t . Note that categorical variables (country, age, gender, etc.) can be included in the model as an exhaustive set of dummy variables. The model can be applied separately to the total population, the economically active population and the employed workforce.

This approach has been used by the Warwick Institute for Employment Research in developing qualification supply projections for the UK as a whole and for Scotland (Jones and Wilson, 2006; Wilson and Bosworth, 2006).

7.4. Participation ratio method and predictions of labour supply

The participation ratio method can be used to complement the results of the multilogit method; the results can serve as a robustness check on the multilogit based results. In contrast to the multilogit method, the participation ratio method uses aggregate data from Unesco-OECD-Eurostat (UOE) on educational attainment by age groups and on graduates by level and field of education. The data come from the joint UIS (Unesco Institute of Statistics)/OECD/Eurostat questionnaires on education statistics, which constitute the core of the database on education. Each of the 27 countries (EU-25 plus Norway and Switzerland) considered provided data from administrative records to commonly agreed definitions. ISCED 0-6 is the basis for international education statistics. This part of the project will use two variables: the number of students by ISCED level, age category (15-19 and 20-24) and gender for the period 1998-2005 and the number of graduates by ISCED level, age category and gender for the period 1998-2005. Unfortunately, while specific information for education level 3C is available for the number of graduates in some countries, no distinction from aggregate level 3 is possible for the number of students by education level.

In the participation ratio method, graduation rates in population categories are assumed. The population categories can be defined by a certain combination of age groups and other characteristics like gender. For the purpose of projection, graduation rates can be assumed

to remain stable, to follow the observed trend or to change in some other way. The analysis tries to identify robust trends in graduation rates. However, the data for a significant number of countries are either limited in scale (short time span) or in scope (not differentiated by age categories or ISCED levels) or both. This will limit considerably the range of possibility in terms of dynamic component in the model. An attempt will be made to develop meaningful scenarios for the evolution of graduation rates for all countries, based on observed trends in those countries for which enough scale or scope is available.

The participation ratio method has recently been applied in a report by Ekamper (2007) for Cedefop to examine the demographic implications for the number of students and graduates and teachers by level and field of education. Ekamper has published the projections for the five year periods from 2005 up to 2050, differentiated by two broad age groups (15-19 and 20-24), four ISCED levels (2-5) and 10 fields of education. According to Ekamper, the participation ratio method for the projection of graduates has several attractive characteristic features: it is a relatively simple and practical method, the necessary data are usually available and projections can be updated easily (Ekamper, 2007).

7.5. Conclusions

To make the projections by Ekamper suitable for meeting the objectives of this particular project, the method will need to be modified and extended, to encompass additional assumptions and flows through the education system and transitions from education to the labour market. Nevertheless, for the ISCED 2-5 it is possible to apply the flow and transition ratios on the numbers of graduates published by Ekamper. For the ISCED 6 it will be necessary to develop new forecasts of the number of graduates by field of education, and calculate the inflow of graduates to the labour market by making similar assumptions.

ROA has considerable experience with labour supply projections in its regular forecasting projects in the Netherlands. Further, ROA is involved in consulting the Ministry of Education in its projections of the number of students and graduates to control the budget of education expenses (MINOCW, 2007).

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8. Forecasting European skill needs: summary and conclusions

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8.1. Introduction

This working group contained three presentations ⁽²¹⁾, two of which referred to the skills needs study, while the other focussed on the forthcoming work modelling the supply of skills. The aims of these studies are twofold: first, to develop prototype tools for forecasting skills across Europe and to identify the main issues involved in doing this; and second, to complement, not substitute, the existing Member State systems for analysing and forecasting skills needs.

The aim of this working group was to address four policy-related questions. What are the main changes in the demand for skills in Europe and what are the implications for policy? How should further work on forecasting skill needs in Europe develop? How could data deficiencies be solved and how could labour-market information and intelligence be improved? Which policy measures at which level can help to tackle these issues?

8.2. Main changes in the demand for skills in Europe and implications for policy

The main changes in skills demand in Europe were identified as follows:

- (a) sectoral employment trends are clear, i.e. shift from agriculture and manufacturing to services. The exact movement varies by Member State but is fairly robust across different scenarios of economic development;
- (b) the sector employment trends have occupational characteristics/implications:
 - (i) an increase for high-skill occupations (e.g. professionals);
 - (ii) a decline for some low-skill occupations (e.g. clerks);
 - (iii) a decline for traditional skilled trades (e.g. craft jobs);
 - (iv) an increase for elementary occupations (e.g. cleaning, call centres).
- (c) population trends, especially ageing patterns and migration, have important implications for employment demand (by sector) that cannot be ignored, expansion versus replacement demand;
- (d) replacement demand is more important than expansion/contraction demand, implying positive net changes in all categories overall.

⁽²¹⁾ See Chapters 5, 6 and 7.

The resulting policy implications are:

- (a) to accommodate/help manage sectoral change rather than stop it and to understand the implications with respect to skills, training and qualifications;
- (b) to understand the implications of a changing population structure for replacement demand, for example policies on retirement, flexible working, and migration;
- (c) to establish links to other (related) policy goals such as Lisbon.

8.3. Further work on forecasting skill needs in Europe

Table 8:1 outlines some ideas on how work could develop on skills forecasting in the short, medium and longer term.

Table 8:1 **Skills forecasting in the short, medium and longer term**

| Short term (the coming year) | Medium term (the next few years) | Long term (5-10 years) |
|--|--|---|
| <ul style="list-style-type: none"> • further dissemination of, and feedback on, the demand-side results; • supply-side project: improve treatment labour supply (age and gender) and model distribution of qualifications by different population cohorts; • confront demand and supply to identify the expected gaps; • engage more with national experts/ existing systems to contrast and compare findings. | <ul style="list-style-type: none"> • improve the modelling to allow for more interaction between demand and supply of skills (rather than modelling as two separate entities) and dealing with migration patterns; • investigate alternative methods/tools to look at over-skilling and mismatch in general; • link to other work going on with other Directorates-General, for example quality of jobs through the European Foundation for the Improvement of Living and Working Conditions; • improve the quality of data at European level. | <ul style="list-style-type: none"> • more detailed employer surveys as in the US; • develop a joint European approach to oversee development; • reviewing results/projections to see how accurate they were, and what can be learned from any discrepancies. |

8.4. Data deficiencies and labour-market information and intelligence

The key data issues were identified as follows:

- (a) broad sector/occupational trends are clear, but the detailed information is often sparse or missing completely;
- (b) the link from detailed employment by industry by occupation by qualification is of key importance;
- (c) lack of consistency of qualification levels across Member States prevents proper comparison;
- (d) there is a long-standing issue about comparability of national accounts versus LFS statistics;
- (e) there is concern over whether we measure what is really going on and the ability of the statistics to get closer to on-the-ground training procedures.

Investment in statistics is, therefore, required to:

- (a) fill gaps in industrial/occupational data series;
- (b) challenge and reduce discontinuities, consistency and volatility across Member States;
- (c) get closer to local-level initiatives;
- (d) investigate the possibility of regionalisation of the statistics.

8.5. Policy measures which can help

Table 8:2 summarises the various policy measures that could be undertaken at various levels of decision-making, local, national and supranational.

Table 8:2 **Policy measures at various levels of decision-making**

| Policy measures | Policy application level | | |
|-------------------|--|--|---|
| | Local | Member State | European |
| Changes in demand | Better engagement with local experts to learn about shifts in patterns of employment, occupations and skills. | Coherence between Member State policies and overall European goals. | Consistency across different policies, for example Lisbon 70 % employment rate target. |
| Forecasting | Investigate regional patterns and hotspots of skills demand (e.g. city-regions). | Improve forecasting capability for skills demand and supply. Compare and learn from different approaches. | Coordinate developments so that the whole is greater than the sum. |
| Data | Better sampling at local area/sector level. More appreciation/measurement of local/firm-level training and skill changes. | Better tracking of sector occupations and qualifications through national statistical agencies. Increased emphasis on harmonisation. | Drive from above through Eurostat to improve quality. More effort to improve consistency and reduce volatility. |

PART IV

Skill needs in the sectors

The workshop looked at sectoral case studies and addressed the following questions:

- (a) what are the main drivers of change in the sectors;
- (b) what are the main restructuring and adjustments trends and mechanisms in the sectors;
- (c) which skills are needed in highly knowledge-intensive and innovation sectors;
- (d) which skills needs are new and emerging;
- (e) what are the implications for policy?

At the end of the workshop a forthcoming competition EuroSkills 2008 was briefly presented as a way of promoting skills to a wider public.

Henriette Freikamp

Identifying emerging qualifications in tourism

Uwe Schumann

Skill needs in an innovative sector: nanotechnology

Martin Mulder

From tradition to innovation: skill needs in the agri-food sector

Thom ter Stege

EuroSkills 2008

Bernd Dworschak

Skill needs in the sectors: summary and conclusions

9. Identifying emerging qualifications in tourism

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Abstract

Developments in qualifications tend to constitute a response to changing professional requirements in business operation and are, therefore, dependent on numerous, continually changing and interrelated factors and trends; these include technological and organisational developments, changes in underlying political and economic conditions (increased globalisation) and the emergence of new individual and societal demand structures. Such triggers can revolutionise whole sectors in just a few years, thus creating a demand for new qualifications.

The project 'Emerging qualifications as a basis for the early recognition of developments in qualifications' draws its conclusions from studies of 'trendsetter companies' from selected sectors. One of the sectors studied was tourism ⁽²²⁾. Below are the results of studies carried out on selected emerging qualifications in tourism. Changes in employee activities and qualifications are described against a background of underlying societal conditions and their influence on the sector. The emerging qualifications identified concern travel design and business travel ⁽²³⁾.

9.1. Defining emerging qualifications

Qualitative studies carried out on the early recognition of qualification developments are based on the assumption that new qualifications – referred to as 'emerging qualifications' (Abicht et al., 1999, p. 11 et seq.) – can in principle be established and described as soon as they begin to develop. Emerging qualifications include qualification requirements that can often only be seen in the initial stages, but may be the start of a demand trend that will expand significantly in the future. It was the object and the purpose of the research project to identify these emerging qualifications within tourism.

New or emerging qualifications develop during specific work processes, but especially in the context of innovative technological, organisational and consumer-oriented changes: at microlevel in operational terms. Against this background, the studies of the tourism sector are aimed at:

- (a) innovative companies, such as travel agencies;
- (b) key suppliers, such as those offering booking and reservation software;

⁽²²⁾ The isw has so far established qualification developments and emerging qualifications in a total of 14 research fields: information and communication technology/multimedia, retail trade, financial services, health, wellbeing, tourism, security services, mobility/public transport, construction, renewable energy, life sciences, biologisation, farming and, in a separate project, nanotechnology. Research results, sector reports and qualification descriptions are available from Internet: <http://www.frequenz.net> [cited 5.1.2009].

⁽²³⁾ A full description of the trend qualifications in the various areas of activity is given in Abicht et al. (2002, p. 32 et seq.).

- (c) sector insiders and experts, such as sector associations and sector-related research establishments.

The emergence of new qualifications occurs 'naturally', as it were, in trendsetter companies; tourism's fields of activity and areas of operation constantly change, requiring their employees to provide new or different qualifications. As companies are more likely to articulate the lack of appropriately qualified employees rather than the development of new requirements, an open dialogue between researchers and companies is essential if emerging qualifications are to be identified.

Emerging qualifications are identified less through traditional methods of research than through the description and analysis of the operational process.

9.2. Research method

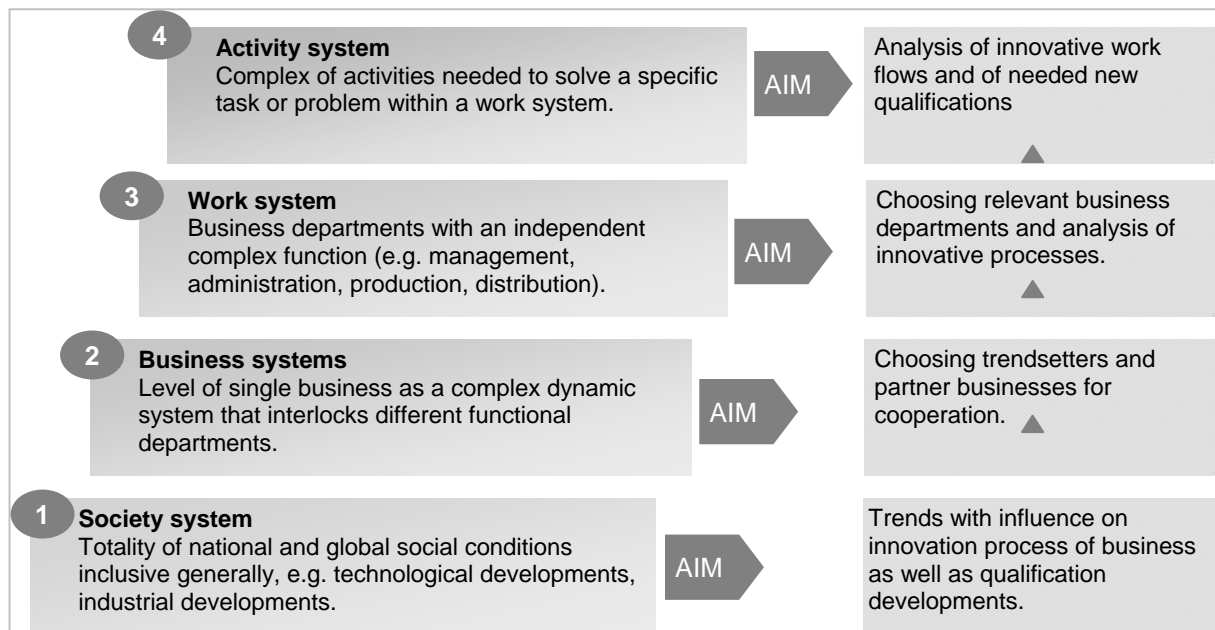
Qualifications and qualification requirements develop in connection with real changes in company processes. These take place under unstable and complex conditions and cannot be either controlled or predicted. An appropriate theoretical framework for these conditions, and also a theoretical basis for the method of establishing emerging qualifications, is offered by the system- and self-organisation theories, of which two relevant ones are mentioned here as examples: self-organised systems (von Foerster, 2003) and synergetics (Haken, 1988). Reflecting change is largely dependent on the models of perception and activity of those involved and affected; therefore, the research takes particular account of constructivism, relating explicitly to the perception and the process of individual understanding and learning (Heeg, 2005, p. 476).

The underlying approach to the study⁽²⁴⁾ combines elements of rigorous logic and experience-based intuition. A strict methodical process, addressing various levels of research simultaneously, enables identification of a specific emerging qualification. Using this theoretical basis, the individual stages of the process model are understood as complex dynamic systems that are also interlinked through varied interactions. Specifically, these are:

- (a) societal systems (such as the Federal Republic of Germany) as the highest research level; emerging developments, which accompany the development of the societal system and affect the business systems, are studied by analysis of expert knowledge and literature, in particular regarding results of emerging and future research;
- (b) business systems (individual business in the tourism industry in Germany) as part of the societal system;
- (c) work system (company divisions such as sale of tourism products and services, marketing of tourism products and services);
- (d) activity systems, which include the professional actions of people within a work system and the qualifications, knowledge and skills needed for these. Fields of activity in the tourism sector include advice on and sale of tourism products or chaperoning.

⁽²⁴⁾ Abicht and Freikamp (2007, p. 19 et seq.); Abicht and Bärwald (2000); Abicht et al. (1999, p. 36 et seq.).

Figure 9:1 Procedure for establishing emerging qualifications

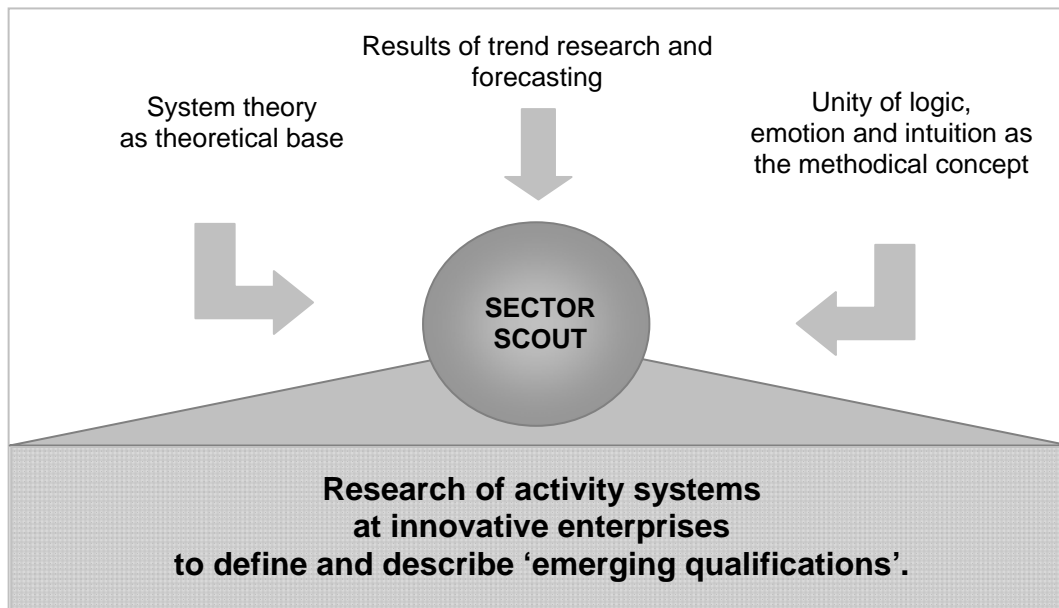


Qualitative and multiperspective research tools were chosen to establish emerging qualifications. Instruments like sector scanning (analysis of specialist magazines, Internet searches, secondary analysis of official statistics, meta-analysis of studies), sector scouting, interviewing of experts based around a central theme (Bogner et al., 2005; Bortz and Döring, 1995), assessment of available data sources from companies and expert workshops supplement one another.

In empirical studies in companies, the main method used is sector scouting (Abicht and Freikamp, 2007, p. 19 et seq.; Bärwald and Freikamp, 2003; Abicht and Bärwald, 2000). The research instruments resulting from market research and used by the authors in training research for the first time incorporate the basic principle that employees are taken on who have distinct insider knowledge and varied contacts within the sector under study; they are also able to carry out and document independently the empirical investigations within the companies according to the planned procedure. The sector scouts thereby employed are able, in direct conversations with business partners, to ascertain important details and nuances or facts that are not immediately clear, to understand the thought processes of these partners, and ultimately to put themselves in their position in the business 'scene' to identify emerging qualifications.

The further processing of the empirical data collected – in other words the concrete description of emerging qualifications found and their justification and classification into larger societal and sector-specific contexts – is carried out in collaboration with sector scouts and scientists with years of experience in researching training needs.

Figure 9:2 **Sector scouting**



9.3. Procedure

Studies at societal system level permit working hypotheses on possible qualification-related trends. Using the working hypotheses, the further procedure is derived from empirical studies carried out in the companies (business systems).

Trendsetter companies, key suppliers and experts are specifically identified and signed up for active participation in the project. A total of 75 companies and experts were contacted, including travel agencies, tour operators, hotels, travel companies, further education establishments, and associations. After identifying the most important supplier groups and emerging developments, it was necessary to limit the tourism research to individual areas ⁽²⁵⁾.

Basis on the limited research area, empirical work was organised in a more targeted manner. More than 30 trendsetter companies and experts agreed to participate; most attended a series of interviews with experts based around a central theme associated with the assessment of written supply plans and, in some cases, possible observation of specific work processes. In addition, Internet searches were continually carried out, the daily and special trade press was analysed and conferences and trade fairs were attended. The provisional findings were discussed and verified in a workshop comprising business partners and experts.

⁽²⁵⁾ Research was carried out in travel agency and travel design, chaperoning, handling of business travel processes and care of travel agencies. Hotels, the catering trade and transport (bus, railway, airlines) were not initially covered in the research because the development of emerging qualifications here requires a separate study.

9.4. Tourism trends for Europe

Tourism in Europe is increasingly influenced by major global trends, referred to as 'megatrends'. These include demographic changes, climate change, macroeconomic trends such as changes in income or the effects of globalisation, political factors, cultural factors and the issue of security. Alongside these external trends, changes in consumption are having an increasing impact: the key terms travel experience and lifestyle should be mentioned here. These include marketing trends, the influence of information and communication technology and developments in transport (ETC, 2006; Abicht and Freikamp, 2005).

These underlying conditions intensify competition in the sector and, at the same time, provide an impetus for innovation because increasingly polished strategies are needed to sell tourism products and services. Companies competing in the market react to the trends with corresponding offers (FUR, 2007; ETC, 2006):

- (a) demographic changes lead to the development of new target groups: products and services are offered to those with limited mobility, the elderly and those travelling alone;
- (b) macroeconomic trends (globalisation, changes in income, etc.) lead, among other things, to an increase in business travel: hence, more offers in the business travel sector;
- (c) changes in consumption patterns, such as individualisation and differentiation of lifestyles lead to an increase in products and services in the individual tourism sector with, for example, short breaks, city breaks, cultural visits and language holidays;
- (d) increasing awareness of health issues leads to health tourism products and services such as health and wellbeing tourism;
- (e) greater emphasis on experience leads to a supply of activity, adventure holidays and event tourism;
- (f) the blurring of work and leisure time leads to a supply of products and services combining relaxation with learning or the acquiring of skills and abilities, such as language and seminar holidays, creative holidays.

Studies into establishing emerging qualifications in the tourism sector show that development is primarily determined by societal trends.

9.5. Changed areas of work and activity

The trends described and their impact on tourism are reflected in changing tourism products and services, and also in changed areas of work and activity among those working in tourism. Travel design and dealing with business travel are the two areas selected below.

9.5.1. Travel design

The pluralisation of lifestyles and individualisation mean that customers are demanding more individual or tailored tourism products and services. These changed and increased customer expectations and requirements lead to corresponding employee activities.

Travel design refers to designing individualised tourism products and services on based on specific customer wishes. Carried out in travel agencies or tour operators, travel design is now established alongside advice on, and sale of, what used to be largely standardised products (package holidays). Travel agency activities used to be limited largely to providing advice on and selling tourism products and services that were subject to a prescribed plan (travel brochures). Activities mainly included searching for information and passing it on to customers. Travel design activity now involves customers setting out specific criteria for their desired holiday (destination, time period, budget) and an individual or tailored holiday being designed on the basis of these requirements, not found in that form in any brochure.

Planning, designing, arranging and organising individual tourism products and services for individuals or groups includes the following activities. An initial customer analysis is carried out either in person or over the telephone. The travel design sector either has the initial customer contact it, or customer requests and desires are forwarded to it from the front office. Then, in accordance with the respective requirements and preferences of the customer, an individually structured product is developed. This includes organising travel to and from the destination and a schedule and action plan at the destination, as well as researching the infrastructure, possible activities and cultural attractions at the destination. The main activities here are checking the availability of flights or cheap rail allocations, coordinating connections, contacting hotels – for example regarding the possibility of late check-in – and negotiating with car rental companies at the destination. After discussing them with the customer, all of the agreed components of the holiday are combined to produce a practicable, attractive product.

9.5.2. Business travel

Organising and handling activities involved in business travel is usually either done by travel agencies or internally by companies whose employees travel frequently on business. The new development is using a structure based on the division of labour: either a business travel management department is established within the company itself (usually part of the personnel or purchasing department) or responsibility for business travel affairs is handed over to a travel agency.

If the person works in an internal business travel department, organising, handling and settling payments for business travel includes, in addition to settling fees and the company's own fleet, negotiations with hotels, car hire companies, airlines, railways, taxis and other suppliers. The aim is to reduce costs while increasing quality. Strategies aimed at optimising purchasing negotiations are developed, travel guidelines are drawn up and compliance is monitored. Activities involve considerable internal communication.

This new trend in business travel is reflected in the formation of structure based on division of labour, which leads to the creation of a hierarchy. Management coordinates the team beneath it, develops and monitors travel guidelines and controls communication within the company. Activities at the middle qualification level include researching connections and routes, booking appropriate flights, train journeys, hire cars and hotels, settling fees and assisting in the establishment of travel guidelines within the company and ensuring compliance.

In this division of responsibilities, handling business travel is increasingly being subcontracted to travel agencies. This development can be seen both in small and medium-sized companies and in individual customers spending large amounts on business travel. The travel agency sees to the planning, organisation and settlement of business travel activities for individual customers and companies. Also, by arrangement with or according to the instructions of the customer or the company department responsible for future business trips, corresponding tourism services are combined, organised and provided. The travel agency increasingly plays the role of full service provider, particularly in business travel management. This category also covers innovative business areas such as relocation services, for companies wishing to move, because of their high potential. These services include providing assistance in looking for property or accommodation, dealing with the authorities in the new area, full organisation and handling of the move and assistance in looking for suitable schools and nurseries.

9.6. Emerging qualifications

The contents of new activities and the associated qualifications required are defined according to the subdivision of individual areas of activity of travel design and dealing with business travel processes. Each of these areas of activity requires its own personal characteristics or soft skills and technical qualifications. These are described in detail below.

9.6.1. Travel design

Employees in the travel design sector, when giving their advice and carrying out their design work, need to be able to empathise, communicate, be creative and have organisational ability. They have to establish the wishes of customers, advise them in accordance with their wishes and turn these wishes into corresponding tourism plans and products.

Employees are aware of the tourism products and services available at the desired destination; they are able to provide a realistic picture and offer insider tips. To do this properly, they need knowledge and ability in advising customers, and sales strategies. Also essential are a basic understanding of travel law and general familiarity with the main destinations and tourism products and services. The planning, design and presentation of comprehensive tourism products also require computer skills (including knowledge of various booking and reservation systems), familiarity with the Internet and the ability to carry out research.

Through their knowledge of business management (cost and payment accounting, controlling, marketing) and environmental protection, employees can develop an eye for what is feasible and, therefore, offer customers the best possible product. Languages and negotiation skills in dealing with external suppliers complete the requirement profile.

9.6.2. Business travel

To reduce the costs of planning, organising, dealing with and settling payments for business trips, the personal characteristics and soft skills required of employees in the business travel

sector include organisational ability, problem-solving skills, independence, negotiation skills and reliability.

They also need knowledge and skills in analysing needs and advising customers, in contracts and negotiation strategies for dealing with external service providers (hotels, airlines, car hire companies, etc.), as well as knowledge and skill in designing and planning trips and travel packages, travel law, contract law and tax law. In companies above a certain size, the development and control of internal travel guidelines are relevant factors. It is also essential that employees have good computer skills (including knowledge of various booking and reservation systems), familiarity with the Internet and the ability to carry out their own research. They also need knowledge of cost calculation, cost and payment accounting, remuneration systems, settlement and control of business trips and legal knowledge regarding relevant visa, passport and health requirements. Languages and good office, project and time management skills complete the profile.

9.7. Summary and conclusions

Following the studies carried out to establish emerging qualifications in the tourism sector, a sector report has been drawn up, containing the findings described here and also brief descriptions of sets of qualifications. These sets of qualifications have been compiled, discussed and verified with the relevant partners. The descriptions only include activities and qualifications that are already recognisable in trendsetter companies or that partners and experts have referred to: it is not claimed that the descriptions are either complete or that they can be generalised.

It should be pointed out that emerging qualifications are not new jobs, but rather additional stimuli or impulses for discussing the existing initial and further training system in the sector. These research results are intended to help those responsible for tourism initial and further training, in particular the social partners, to improve the current qualification system and to update various job descriptions.

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10. Skill needs in an innovative sector: nanotechnology

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Abstract

As well as giving an international overview of nanotechnology, this contribution presents the findings of isw in training research, including those on innovative staff activity and skill needs, and recommendations for initial and continuing vocational training.

10.1. Introduction

In a narrow sense, nanotechnology covers all methods and techniques carried out within the dimensions of one to a hundred nanometres (nm), 1 nm being a thousand millionth of a metre.

Many experts expect nanotechnology to grow in economic importance as the influence of these technologies increases in almost all industrial sectors. According to Lux Research (2006), nanotechnology sales in the global market were estimated at USD 32 billion in 2005 and are expected to rise to USD 2.6 trillion by 2014, accounting for 15 % of total world sales of consumer goods.

Europe holds a significant share of this growth potential, which is expected to create new jobs at various skill levels. However, because nanotechnology is still mainly found in research and development, it tends to focus on scientists and engineers. Some 119 university courses are already on offer in 20 countries, most of them European, while in six countries 25 crash courses or summer schools are on offer on nanotechnology subjects (Nanoforum.org, 2005).

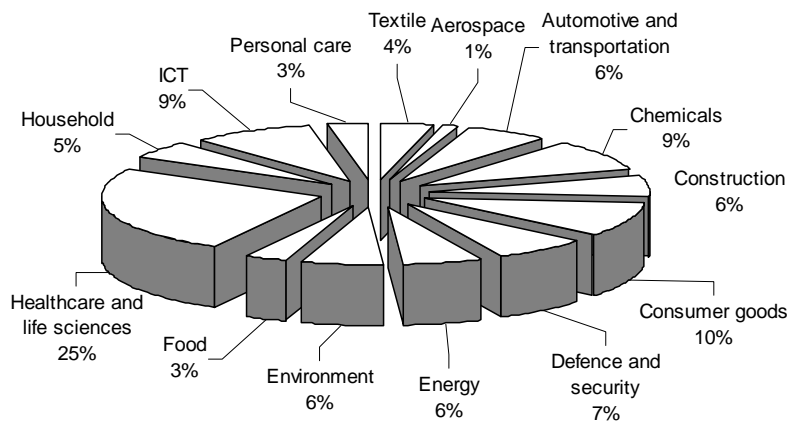
At the medium skills level, such as skilled workers, engineers and laboratory technicians, requirements are also rising, driven by increasing focus on the production of nanoproducts and associated work processes based on the division of labour. So far there is little demand in the sector for low-skilled workers.

In an action plan, the European Commission calls on Member States 'to foster interdisciplinary training and education for R&D in N&N, focusing on physics, chemistry, biology, toxicology and ecotoxicology and engineering [...]' (European Commission, 2005). In the seventh EU research framework programme, approximately EUR 3.5 trillion is earmarked for nanosciences, nanotechnologies, materials and new production technologies.

The interdisciplinary nature of nanotechnology makes it difficult to propose quantitative estimates. According to forecasts by Roco (2001), the nanotechnology sector is expected to need some two million workers worldwide by 2010-15, approximately 0.8-0.9 million in the US, 0.5-0.6 million in Japan, 0.3-0.4 million in Europe and 0.2-0.3 million in other regions.

The extensive international online database compiled by nanoforum.org ⁽²⁶⁾ provides details on 2 353 organisations in the nanotechnology sector in 34, mainly European, countries, including companies, research institutes, networks and associations. According to studies carried out by the Technology Transfer Centre (cited in Institute of Nanotechnology, 2007), there are more than 300 nanotech companies in Europe. The figure below shows the relative distribution of the target markets of European nanotech companies.

Figure 10:1 Target markets of nanotech companies in Europe in 2007



Source: Technology Transfer Centre, cited in Institute of Nanotechnology (2007).

Nanotechnology is particularly well-researched in Germany. In the German online database of the VDI Technologiezentrum, some 560 small and medium-sized enterprises and 130 large-scale enterprises are listed in the nanotechnology sector ⁽²⁷⁾. These are estimated to provide some 50 000 direct and 114 000 indirect jobs in Germany (Luther et al., 2004).

According to an online survey by Malsch and Oud (2004), more than 70 % of over 700 experts surveyed expected a rising demand for labour in nanotechnology. Some 44 % predicted demand within five years, 24 % between 5-10 years and 3 % in more than 10 years; a further 8 % expected no demand and 21 % did not know. When asked for the most important skills, the most common answer was interdisciplinary skills, followed by knowledge of societal aspects, communication and presentation techniques and entrepreneurial thinking (Malsch and Oud, 2004).

Nanotech companies use various organisational development strategies. According to one international study (Singh, 2007), nanotechnology companies prefer, when recruiting

⁽²⁶⁾ <http://www.nanoforum.org> [cited 7.1.2009].

⁽²⁷⁾ <http://www.techportal.de> [cited 7.1.2009].

new staff, those with general skills (24 %) over specialists (12 %), but those who combine both are the most sought-after (58 %). Some 53 % of respondents offered new recruits no training, while 32 % used this option. Of the training methods used, on-the-job training was preferred (26 %), followed by ongoing vocational training programmes (22 %) and one-week crash courses (15 %). These were followed by online courses (11 %), qualifications through part-time work (10 %) and evening classes (9 %).

The results of training research projects carried out by the isw in Germany are presented below by way of example.

10.2. isw project: trend skills in the nanotechnology sector

In a project funded by the Federal Ministry of Education and Research and the project manager Jülich, 151 employees from 132 establishments throughout Germany involved in nanotechnology were selected and surveyed in several stages (Abicht et al., 2005).

The aim of the project was to identify at an early stage the needs for innovative activity that were expected to develop into broad skill needs. It gave priority to companies that were leaders and trendsetters in their sector. Overall, five different research clusters were identified: nanochemistry/materials, nanobiotechnology, nanooptics, nanoelectronics and nanoanalysis. Table 10:1 shows several trend developments in this field.

Table 10:1 **Cluster-specific trends**

| Cluster | Scientific-technical trend developments |
|-----------------------------|--|
| Nanoanalysis | <ul style="list-style-type: none"> • surface analysis and high-resolution structural analysis up to and including nanoanalysis (nanoscopes, atomic force microscope, scanning tunnelling microscope, saxitoxin, etc.); • combination of qualitative and quantitative analysis techniques; • high throughput screening, parallel measurements. |
| Nanochemistry/ materials | <ul style="list-style-type: none"> • production of nanoparticles in solution and on coatings; • chemical nanocoatings, scratch-resistant varnishes; • production of functional molecules, fullerenes and carbon nanotubes; • nano-compounds and functional polymers; • chemical nanoanalysis. |
| Nanobiotechnology | <ul style="list-style-type: none"> • more effective methods of diagnosis, tests, for example biochips; • biosensors, for example in the security sector or environmental engineering; • materials research, drug delivery, drug targeting, gene therapy; • individual medicine permitting custom-made therapies. |
| Nanooptics | <ul style="list-style-type: none"> • ultra-precision optics for the production of optical components of high quality; • versatile uses of laser technology; • new efficient light sources such as light- and organic light-emitting diode. |
| Nanoelectronics | <ul style="list-style-type: none"> • increasing miniaturisation of complementary metal-oxide semiconductor technology; • polymer electronics; • RFID technology; • increasingly effective digital memories, GMR effect. |

Note: RFID – radio frequency identification.
GMR – giant magnetoresistance.

In addition to the various trend developments, individual employee requirements at establishments in various employment sectors were also investigated. Following analysis of activities carried out, the various trend skills identified were consolidated and summarised in relation to each cluster in the form of 18 skills profiles outlined in Table 10:2.

Table 10:2 **Skills profiles in nanotechnology**

| | Cluster-specific qualification profiles | Cross-cluster qualification profiles |
|--|---|--|
| Nanochemistry/ materials/ nanoanalysis | (1) nanochemistry laboratory assistant (2) nanoassistant (3) materials science technical assistant | (15) nanoanalyst |
| Nanobiotechnology/ nanoanalysis | (4) specialist in nanobiotechnological research (5) specialist in biohybrid technologies (6) specialist in quality assurance (7) nanobiotechnology documentation specialist (8) product adviser for nanobiotechnological applications | (16) specialist in nanosurface treatment (17) nanotechnology documentation specialist |
| Nanooptics/ nanoanalysis | (9) specialist in ultra-precision optics (10) specialist in photonics/laser technology (11) product adviser for nanooptical applications | (18) product adviser for nanotechnological applications |
| Nanoelectronics/ nanoanalysis | (12) specialist in nanoelectronics (13) specialist in mask manufacture (14) optoelectronics engineer | |

Source: Cedefop, Abicht et al. (2006).

The skill profiles are not new occupations; they are activity-related descriptions of innovative technical, practical and social skills. They are intended to draw attention to new skill requirements in the sector and serve as proposals to the social partners and the authorities responsible for classification work and vocational training authorities of how to check, modify and, where necessary, reorganise existing forms of initial and further training and how to develop further training modules.

Skill profile 3 from the cluster nanochemistry/materials is shown in Table 10:3 by way of example (Abicht et al., 2005).

The following cross-cluster references and recommendations can be given for initial and further training at intermediate skill level:

- (a) in the various industrial sectors or clusters influenced by nanotechnology, the activities required of skilled workers are of varying degrees of distinctiveness;
- (b) more areas of skilled worker activity are being affected, for example documentation, preparation of samples, analysis and quality assurance;
- (c) a single occupation for all nanotechnological fields of employment, such as a nanotechnician, is not recommended because the skill requirements vary considerably;
- (d) existing job groups closely related to nanotechnology include laboratory assistants (in physics, chemistry and biology), technical assistants, electronics engineers, microtechnologists, mechatronic engineers, and so on;
- (e) further training can cover many of the new nanotechnology requirements. The problem is a lack of clarity and limited transferability of much training. Flexible, transparent and transferable forms are recommended here, for example through modules and further training databases.

Table 10:3 Skill profile 3: materials science technical assistant

| | |
|--|---|
| (a) field of activity and employment | <ul style="list-style-type: none"> • materials science technical assistants work closely with materials scientists and other natural scientists and engineers and are involved in developing, producing and processing new materials; • their field of employment is research and development departments at universities, in industry or in testing institutions and materials testing offices; • they carry out analyses and tests, beginning with the selection of starting materials, then the intermediate products (solutions), the auxiliary and working materials (e.g. solvents), and the characterisation of end products; |
| (b) similar existing skills | <ul style="list-style-type: none"> • chemistry technical assistant, physics technical assistant, physics laboratory assistant, materials tester; |
| (c) knowledge and expertise – technical know-how | <ul style="list-style-type: none"> • principles of physics, chemistry and biology, as well as mathematics, focusing on nanotechnology, for example understanding of dimensions; • good knowledge of physics in relation to solid bodies, tribology, rheology and surface, coating and materials technology, and good knowledge of chemistry (inorganic, organic and physical chemistry), particularly principles of chemical synthesis and analytical chemistry, as well as principles of biochemistry; • good knowledge of materials in relation to polymers, ceramics, glass, metal and, in particular, possible combinations of material classes, particularly in the form of nanocomposites; • good database skills (laboratory information management systems), spreadsheets, statistics, presentation programmes and equipment software and control; • basic knowledge of quality standards, for example according to GLP, GMP and DIN-ISO standards and working instructions (standard operation procedures) • knowledge of hazardous materials regulations, including potential hazards; • good knowledge of the use of suitable means of personal protection and measures for protection in the workplace, particularly when working with unbound nanoparticles; • basic knowledge of project management; • good knowledge of English, technical English; |
| (d) competences and abilities – practical skills | <ul style="list-style-type: none"> • work in clean rooms of different classes; • expertise in dealing with different computer-based methods of analysis such as microscopy (e.g. scanning probe, scanning force and scanning tunnelling microscope), spectroscopy, chromatography (e.g. high and fast performance liquid chromatography), photometry or volumetry; • expertise in dealing with procedures for the production and processing of nanoparticles, nanopowders and nanostructured surfaces (e.g. CVD, CVS, PVD, coating methods, applying by doctor, etching and mechanical methods); • expertise in the use of characterisation methods, for disruption-free material analysis (e.g. X-ray spectrometry, X-ray fluorescence), in procedures for testing ceramics (thermoshock equipment), when measuring wear characteristics and wear-resistance (tribometer, Taber Abraser); |
| (e) interpersonal skills | <ul style="list-style-type: none"> • excellent teamwork, but also the ability to work alone; conscientiousness and sense of responsibility; • accuracy and precision very important in the analytical sector; |
| (f) other | <ul style="list-style-type: none"> • high degree of flexibility and ability to deal with problems. |

Note: GLP good laboratory practice
GMP good manufacturing practice
DIN-ISO German edition of International organisation for standardisation
CVD chemical vapour deposition
CVS concurrent versioning software
PVD physical vapour deposition

Source: Abicht et al. (2005).

The skills sought by nanotech companies often vary according to current job requirements, which are created by specific customer demands and are associated with new production and services components. The specialist knowledge required for high technologies within companies is often extended through cooperation with research institutes. New forms of cooperation and organisation between academic and business sectors may increase the transfer of science and technology, as is the intention of the isw project Nano to business.

10.3. isw model project: Nano to business

In the entrepreneurial development and use of nanotechnology there is often the need for highly specialised knowledge that is particularly difficult for small and medium-sized enterprises to implement. Also, the possibilities that nanotechnology can offer many companies in different sectors are often unknown.

The aim of the model project Nano to business in companies in the State of Brandenburg is to tap into nanotechnological potential and to identify and initiate company-specific innovation. This can be done by transferring know-how from experts and scientists to individual users in the company. Innovation management should be improved and an effort should be made to develop employees' individual skills. Special programmes should be put into effect to ensure sustained implementation of innovation plans already initiated.

The development of individual employee skills in accordance with requirements in the workplace is a key factor for the success of nanotech companies. Further information is available on the project website at <http://isw-institut.de/nano-brandenburg>. This project is funded by the European Social Fund and the Ministry of Employment, Social Affairs, Health and Family in the State of Brandenburg.

10.4. Conclusions

Nanotechnology is a key 21st century technology driven rapidly forward by international competition in research and development and by the emergence of innovative nanoproducts. This technology spans numerous disciplines and almost all industrial sectors. It also increasingly requires new skills and new fields of activity. Crucial to the success of nanotechnology is the involvement of outstanding scientists and researchers and highly qualified experts.

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11. From tradition to innovation: skill needs in the agri-food sector

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Abstract

This contribution deals with the impact of developments in the agri-food sector on future skills needs. It is argued that agriculture and food manufacturing are very diverse, not only in terms of size of organisations, but also regarding the sectors within agriculture and food manufacturing, the sectors outside primary production and food manufacturing, and the categories, content, and level of the jobs involved. Major developments in the sectors are described, and a wide variety of generic skills needs are reviewed.

11.1. Introduction

What are the consequences of the developments in the agri-food sectors on future skills needs? For long the agriculture and food production sectors were out-of-fashion, having a negative image, and sometimes hostile reaction from the public. However, tighter regulations on environment and animal welfare, the notion that outsourcing of primary production and manufacturing of food products to low wage countries may not be sustainable, and the latest *World development report* (World Bank, 2007) which stressed the importance of agriculture for poverty reduction, mean the sector is on the rise again. The many, sometimes astonishing, innovations in the sector generate curiosity, and education programs in life sciences and natural resource management have attractive titles and content. European policy-making also made a shift from the purely industry-driven primary production to an integrated vision of agriculture and rural development (Hortet Tarroja, 2006).

This contribution first provides more details about the context of the study carried out within Skillsnet, the design of this project, and the way the information was collected. Next, we argue that the sectors about which we report are very diverse, not only in terms of size of organisations, but also regarding the sectors within agriculture and food manufacturing, the sectors outside primary production and food manufacturing, and the categories, content, and level of the jobs involved. Then, we examine major developments in the sectors and review the generic consequences for skills needs.

11.2. Skillsnet work on agri-food

In 2006, Cedefop commissioned a study on future skill needs in agri-food and forestry-wood. Literature in these fields was selected and studied. A paper was prepared to describe the field and the need to identify future skills needs in these sectors. Experts were selected by contacting key stakeholders in the sectors mentioned, including EU employer and employee organisations, the Directorate of Agriculture and Rural Development of the European

Commission, industry, and experts from agricultural, food and forestry education. The experts were asked to prepare a paper on the developments in their respective fields: European agriculture, rural development, food manufacturing, fisheries (Raben Olrik, 2006), organic production (Timmers, 2006), consumer risk perception (Brennan, 2006), and education provision. They were also asked to conclude with an outlook on future skill needs in these fields. The experts were selected on the basis of their European or global view and their broad information basis regarding the fields mentioned. They presented their papers in an interactive workshop, first in plenary presentations and discussions on all sectors involved, and then in two parallel sessions, one for the agri-food and the other on the forestry-wood sector. In total about 40 experts were involved in this exercise. This paper is a synthesis of the results presented for the agri-food sector (for more details see Cedefop, 2006).

Several skills observatories within the EU were consulted for collection of information: these are listed in the annex.

11.3. Diversity in the agri-food sector

Reflections on transition in the agri-food sector have to accept that the socioeconomic structure and employment outlook are very diverse. There is the individual small-holder, who uses traditional production methods, and there are the multinational food companies who employ tens of thousands of employees around the globe. The diversity in terms of the structure of the agriculture, forestry and fishing sectors and the manufacturing sectors is visible in the NACE classification (Eurostat, 2008).

Further, the agri-sector is also referred to as the agri-food complex, indicating that it goes beyond primary production (farming), and includes trade, industry (such as food and feed manufacturers), private services (such as banks, insurance companies, sectoral organisations and associations) and public services (legislation and regulation on product quality and public health) for agriculture and food production.

The workers in this complex have diverse occupations at different levels, from the low educated subsistence farmer to the PhD in bionanotechnology or geoinformation systems. The multitude of occupations existing within these sectors is visible in the international standard classification of occupations (ISCO-88), which lists over 100 occupations in the agri-food sector. These categories comprise:

- (a) elementary occupations, such as farm-hands and labourers;
- (b) service workers and shop and market sales workers, such as shop, stall and market salespersons and demonstrators (in the food retail sector);
- (c) skilled agricultural and fishery workers, such as gardeners, horticultural and nursery growers, and dairy and livestock producers;
- (d) craft and related trades workers, such as agricultural or industrial machinery mechanics and fitters, and bakers, pastry-cooks and confectionery makers;
- (e) plant and machine operators and assemblers, such as wood-processing-plant operators, and dairy-products machine operators;

- (f) technicians and associate professionals, such as safety, health and quality inspectors, life science technicians, agronomy and forestry technicians and farming and forestry advisers, buyers, and appraisers, valuers and auctioneers;
- (g) professionals, such as biologists, botanists, zoologists, and agronomists;
- (h) legislators, senior officials and managers, such as production and operations managers in agriculture, hunting, forestry and fishing, production and operations managers in manufacturing, supply and distribution managers, research and development managers, managers of small enterprises in agriculture, hunting, forestry and fishing, and managers of small enterprises in manufacturing.

The international standard classification of occupations 2008 (ISCO-08) of the International Labour Organisation, agreed in December 2007 (ILO, 2007) shows comparable variety.

In speaking of future skills needs in the agri-food sector, it is important to be aware of the diversity within this sector regarding the stratification of the sector of agriculture and food production, of the fact that other sectors that go beyond the primary and industry sector are part of the agri-food complex, and that there is a wide variety of jobs and education levels in the related fields. It has also to be considered that there is wide variation between agricultural and food production practices across the EU, ranging from subsistence farming to large-scale industrial production.

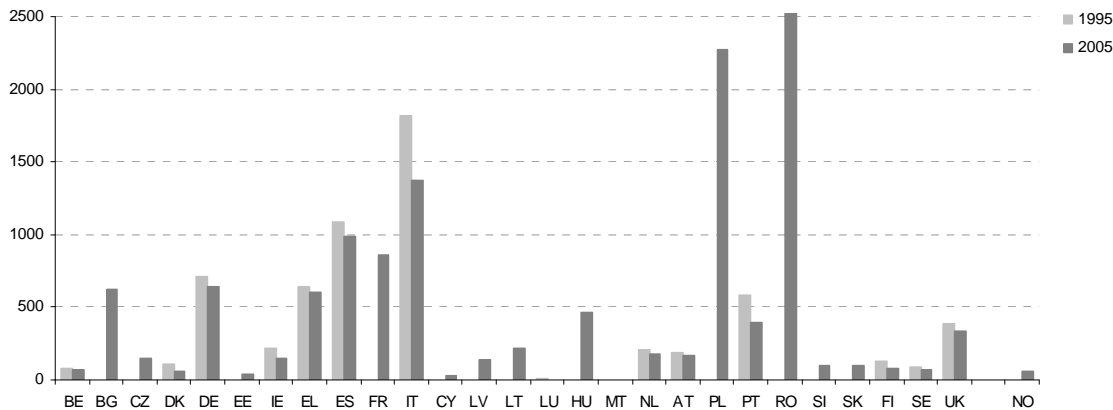
Since it is impossible to give an overview of future skill needs in all individual categories of the agri-food sector, the following presents the major developments and generic consequences for skill needs.

11.4. Employment trends and prospects in the sectors

Total employment in agriculture was 7.3 million in EU-15 (1995) and 9.5 million in EU-27 (2005). This can largely be attributed to the fact that in Romania and Poland total farm labour force is much higher than in EU-15 Member States (Figure 11:1). In general, employment in agriculture is decreasing. For EU-15, the decrease in employment in agriculture between 1995 and 2003 was 13 %. The decrease in EU-25 between 2003 and 2005 was 4 %.

It is expected that because of restructuring, much of the subsistence farming in Romania and Poland will also decrease, and that many current job holders in agriculture will leave the sector to start a new livelihood.

Figure 11:1 Total farm labour force in EU-15 (1995), EU-27 (2005) and Norway



Note DE including ex GDR from 1991.
 For 1995, data for BG, CZ, EE, FR, CY, LV, LT, HU, MT, PL, RO, SI, SK and NO are not available;
 Luxembourg: data for 1995: 5.33; Malta: data for 2005: 4.06
 Source: Eurostat labour force data.

Figures show that in 2004 in EU-27 4.7 million persons were working in the food industry. For EU-25 this figure was 4.4 million persons. In 1999 this figure for EU-25 was 4.6 million persons. Thus, there is a slight decrease in employment in the food sector in EU-25.

Figure 11:2 shows that the highest employment in the food sector is in Germany, France, and the UK. Poland, Italy and Spain also have relatively large numbers employed in the industry.

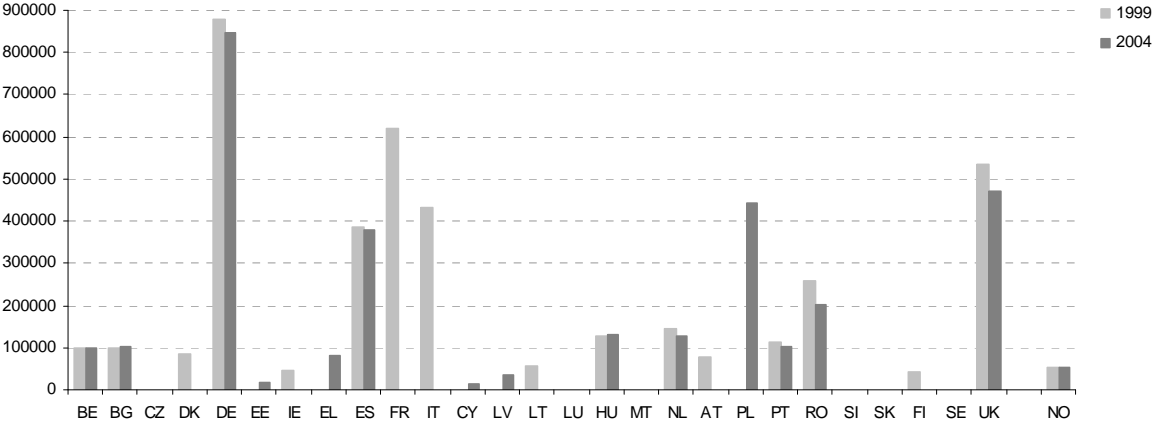
From further analyses (based on the 2004 data) it is clear that there is also a wide variation in employment across sectors in different Member States. Spain, Italy (both >350 000) and Portugal (>250 000) are the Member States with relatively the largest proportions of employment in crop production. France (>200 000), Romania (>150 000) and also Spain (about 130 000) have the largest proportions of employment in animal farming. Poland and Romania (both > 150 000) are the two leaders in employment in mixed farming. Germany is the Member State with the highest proportion of employment in agricultural services (>180 000), and Greece for hunting, trapping and game propagation, including related service activities (>50 000).

Employment trends and prospects in the sectors are such that further decline is expected. In the primary sector, the need for quality improvement, cost reduction and food security result in scale enlargements. Whereas the number of farms is reducing (in the Netherlands the annual decrease of the number of farms in the primary sector is on average 1.9 % for 1990-95, 2.8 % for 1995-2000, and 3.2 % for 2000-05⁽²⁸⁾), the farms themselves

⁽²⁸⁾ Berkhout and van Bruchem (2006). More specifically: 'over the last five years, the number of specialised intensive livestock productions in particular has diminished sharply (by over 5 % per year), principally due to buying-up schemes to reduce the manure surplus. The numbers of greenhouse horticultural holdings and dairy farms have also fallen sharply, by almost 5 % and more than 4 % per year respectively. The reduction of the number of specialised arable farms remained limited to 2 % per year.' (p. 11).

grow bigger, leading to skills needs that are comparable with growing small and medium-sized companies. In the food production industry expensive labour costs are being cut by automated production processes. Developments in the primary sector and in manufacturing are similar: process innovation leads to decreasing employment, and many of the remaining jobs become more knowledge-intensive. In the high-tech precision horticulture sector this is sometimes referred to as knowledge farming (Hulsink, 2005).

Figure 11:2 Employment in the food industry in EU-27 and Norway (1999 and 2004)



Note
 CZ: 1999, 2004: confidential.
 DK: 2004: confidential; 2002: 85 133.
 DE including ex GDR from 1991.
 EE: 1999: not available; 2000: 20 307.
 IE: 2004: confidential; 2003: 49 438.
 EL: 1999, 2004: not available.
 CY: 1999: not available; 1998: 9 884.
 LV: 1999: confidential.
 LT: 2004: confidential; no data for previous years either.
 LU: 1999, 2004: confidential.
 MT: 1999: confidential; 2004: not available.
 AT: 2004: confidential; 2001: 77 965.
 PL: 1999: confidential; 1998: 46 7255.
 SI: 1999: not available; 2004: confidential.
 SK: 1999: not available; 2004: confidential; 2002: 46 936.
 SE: 1999, 2004: confidential.

Source: Eurostat, NACE Division 15: manufacture of food products and beverages - input indicators.

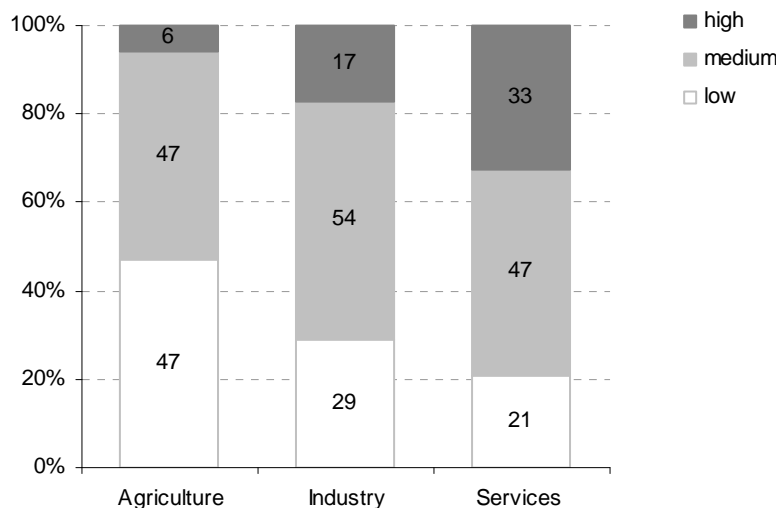
11.5. Qualification levels in agriculture, food and wood

The qualification levels of workers in agriculture can be compared with those in industry and services (Figure 11:3). The percentage of low qualified workers is the highest in agriculture (47 %); it is less than half of this in the services sector (21 %), and in between (29 %) in the industry sector. The percentage of highly qualified workers in the agriculture sector is 6 %, whereas it is 33 % in the services sector and 17 % in industry.

The percentages of medium-skilled employees in the three sectors do not differ a lot: they vary from 47 % in the agriculture and services sectors, to 54 % in the industry sector.

This picture confirms the double qualification strategy in the European labour market, indicating that there is parallel growth of, and need for, higher (ISCED 5-6) and lower (ISCED 0-2) level educated workers, and not just up-skilling. However, Figure 11:3 indicates a slightly modified meaning of this double qualification strategy, which is that, higher versus intermediate (ISCED 3-4) qualification strategy is taking place, and needed.

Figure 11:3 Qualification level of workers in agriculture, industry and service sectors



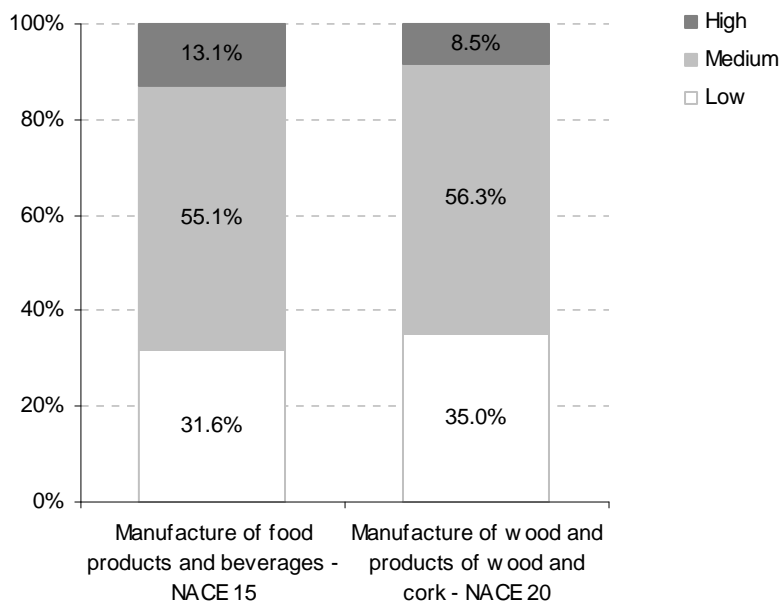
Source: Eurostat (LFS data) employed persons aged 25-64 years; without 'no answer'.

Figure 11:4 shows the breakdown of the qualification structure in manufacture of food products and beverages (NACE 15), and in manufacture of wood and products of wood and cork (NACE 20). In both cases the levels of educational attainment are higher than in agriculture, but overall lower than the average attainment in manufacturing.

Lifelong learning in terms of participation in continuing education (also based on Eurostat data for 2002) in the agriculture sector is relatively low if compared with participation in industry and services. It is highest in Finland, the UK and Denmark and lowest in Poland, Spain and Italy.

As a general conclusion, it can be stated that the general skills level of workers in the agriculture and food sector is a concern, and that the future economy requires workers with higher initial vocational education levels, who are also active in lifelong learning.

Figure 11:4 **Qualification level of workers in manufacture of food products and beverages NACE 15 and 20, EU-27, 2005**



Source: Eurostat (LFS data).

11.6. Major developments

The agri-food sector faces dramatic changes (Gravemaker, 2006). New regulations are introduced to primary production, there is multifunctional use of the land by different stakeholders such as farmers, tourism and leisure organisations, service organisations and private individuals for domestic purposes. More licensing is needed for production, which is increasingly taking place in supply chains and networks owned by leading retail companies. Chain certification, legislation about chain liability, backward and upstream chain integration are relevant developments in this respect (Meerman, 2006). Innovation in products and processes continue, for example in nutrigenomics and bionanotechnology. ICT is becoming more advanced in logistics and transportation, for instance tracking and tracing of food products in the production chain. There is also growing public concern about food safety and animal welfare. At international level there is the big issue of competing claims on crops to fulfil different needs: energy production for the large energy consuming countries in the west, and also in China and India as emerging global economies, and rural development and poverty reduction in third world countries. Maize, soya, sugar cane from palm fields are being used to produce lubricants instead of feeding local communities. Further, economic and labour-market restructuring is taking place, meaning that subsistence farming will be increasingly taken over by commercial or industrial farming, with consequences for managing natural resources involved and the carbon footprint as an effect of that. International sourcing

with huge environmental effects, scale enlargement, and the pressure on employee cost reduction all make the food sector extremely complex.

Several major developments can be discerned.

First is stronger regulation. Various food crises have arisen in recent times: foot-and-mouth, bovine spongiform encephalopathy, pig pest, and the avian flue, to name a few. But also food manufacturers have had problems with some of their products, demanding recall from supermarkets. Prevention, food crisis management, and risk communication are essential and organisations that are better in doing this have a competitive advantage. To underscore the importance of food for public health, the EU has established the European food safety authority (in Parma, Italy). Systems of hazard analysis and critical control points offer further control.

There is a growing consciousness that current production and consumption levels are not sustainable, that the carbon-footprint needs to be reduced, that energy-use based on non-renewable resources needs to be cut back, that food miles need to be diminished, and that waste has to be processed in sustainable ways, for instance by upflow anaerobic sludge (Lettinga, 1996). At company level this is referred to as corporate social responsibility. Concern for sustainability also leads to new reporting practices in farms and companies, which is an additional burden for them.

Globalisation has an impact. fresh food is purchased from all over the world, which results in tighter logistics, the improvement of cold chains, e-access to auctions, and competitive targets. In the flower industry, auction-bought goods try to reach supermarkets the same day;

Competition is very much about price and quality. Winners will be those who can produce at the lowest cost and the highest quality. Cost reduction and quality improvement both demand higher skill levels. It is not possible anymore to enter the high-end agri-food or forestry-wood sectors as a businessman without a thorough knowledge of the field (the products), management, marketing, and corporate strategy in the enterprise.

Climate change has many dimensions. There are various skill needs emerging along with different educational responses (Mulder, 2007). Climate change not only relates to environmental policy and technology, and creates a new sector and labour market, it can also lead to the introduction of various new (plant and animal) diseases in the EU. Producers need to be alert and, where needed, take appropriate action. But if water levels change, farming will be affected either by droughts or excessive precipitation. Water management systems have to be designed, improved or renewed to cope with these changes. Also other protective measures need to be taken against extreme weather conditions, such as heavy snowfall or lower temperatures and frost.

The public has diverse expectations of the agriculture and food sectors (Mulder and Ernstman, 2006): room for recreation in the countryside; an attractive landscape; animal welfare; diminishing use of chemicals for agriculture; a healthy environment; nature conservation; rural development; living in rural areas; and food safety and diversity. This means that primary producers and manufacturers, have to deal with a multitude of new actors. This consumes a considerable amount of time and energy, especially when there are conflicts between the actors.

Chains and networks leave hardly any room for individual and small entrepreneurs who would like to go commercial. For these small-holders, cooperation at cluster, chain or network level is necessary (Bijman et al., 2006). A cluster is a conglomerate of private and public organisations around a certain product. Small-holders can work together in cooperatives, linked to auctions by large manufacturers and wholesale to retail organisations.

There is a continuing technological innovation in the food sectors. In crop production, robots are being developed for automatic harvesting (which is labour intensive), in food production bionanotechnology is being used for health and lifestyle purposes, and in the fisheries new technologies are being introduced on vessels. However, the amount of technological innovation varies across different sectors and subsectors.

In various subsectors the workforce is ageing. For jobs which become obsolete this is less of a problem, but many jobs need new young workers. An example is in fisheries, in which there is a need for new skilled workers.

11.7. Skills needs

These developments lead to various new skill needs; some are already articulated, others are more relevant for the coming years. Where and when they will be applicable depends on the specific context:

- (a) tighter regulations imply that owners, managers and workers in the sectors need higher skill levels;
- (b) sustainability requires problem solving, conflict, innovation, out-of-the-box thinking, and creativity;
- (c) global sourcing and trading leads to increased skill needs in fields like international market knowledge, national and international trading systems, logistics, and intercultural communication;
- (d) climate change leads to new jobs and skills regarding environmental policy and technology, recognising, curing and preventing new animal and plant diseases, and water management and other extreme meteorological conditions which need to be reflected;
- (e) dealing with the public, or rather, publics, implies new communication skills. A new role is emerging, which is aimed at facilitating multiple-stakeholder problem analysis and decision-making processes;
- (f) working in chains, networks and clusters creates new skill needs in cooperation on the basis of contracts and common trust. Skills regarding handling relative autonomy are important here as well;
- (g) innovation obviously creates new skill needs, for instance in food microbiology, biotechnology, bionanotechnology, remote sensing, geoinformation science, aquatic ecology, entomology, nematology, and quantitative veterinary epidemiology. Innovation needs innovation competence and learning skills;
- (h) the ageing workforce implies increased attention to lifelong learning of workers, both in information currency and also in learning new ways of thinking and action. Radical

innovation may be required as markets may disappear, production methods may not be sustainable, and economic conditions may deteriorate and regulations may increase, leading to a point where business owners need to take another course;

- (i) complexity and knowledge intensity, and scale enlargement, demanding higher education levels for the owners and workers, as well as more task differentiation in middle management;

The skills needs described here vary significantly by business model (Martin, 2006), and the development scenario that will unfold (Andersen, 2006). There will most likely be farming for fun, food production for regional specialities, large scale dairy production, upscaling organic farming, farming for ecotourism, farming for care, and farming for environmental education.

Summing up, the following generic and transversal skills can be discerned. Implementing new business models; entrepreneurship; trustful cooperation in competitive areas; administration resulting from new regulations; implementing sustainable forms of energy use; realising provisions for rural leisure facilities; preserving the cultural countryside heritage and (eco-) tourism; countryside living; creating and maintaining healthcare services in refurbished farms; producing regional food specialties; realising nature conservation; using persuasive communication; creating rural hospitality services; realising product innovation; creating service businesses in rural areas; dealing with internal organisation and human resources management; dealing with international marketing; getting to know new and current ways of financing the enterprise; working with advanced systems of logistics; implementing strategic systems of finance and control; getting to know and handle asset management, including skills with dealing with the construction and property consultancy sector; acquiring knowledge about international law and regulations, such as trade tariffs and barriers, trade regulations regarding quantities and quality control; dealing with importing and exporting organisations; creating foreign establishments; communicating with foreign authorities and market organisations, such as export associations; intercultural communication with local managers and employees; effectively working on national, regional and local labour relations; dealing with the issues regarding backward supply-chain integration; creating and implementing process innovation; in-cluster cooperation and knowledge sharing; interdisciplinary understanding; searching for collective cost reduction and quality improvement in alliances and innovation projects, political sensitivity; corporate social responsibility and integrity; hazard analysis and critical control points; implementation, operating and maintenance of new production and harvesting devices; knowledge-sharing and together with that, knowledge-protection against hostile competition; and ensuring intellectual property. These are all fields demanding new skills in various subsectors in the agri-food domain.

11.8. Conclusions

The agri-food sector faces job losses, qualitative changes in work content, restructuring of the labour market, higher skills levels needed, and the need for lifelong learning because of the ageing working population and continuously accelerating rate of change.

Various studies itemise these needs, especially in entrepreneurship (Lans et al., 2007; Mulder et al., 2007), agricultural consultancy (Shim, 2006), professionals in open innovation teams (Du Chatenier et al., 2007) and professionals in the agri-food sectors having to deal with various expectations of the public (Mulder and Ernstman, 2006).

Further empirical research is needed, using primary data collection on skill needs from a stratified sampling technique. This will yield more specific information from specified sectors in certain local, regional, national or supra-national circumstances, for more specific job categories and educational fields and education levels. Such research requires a long-term perspective to be able to assess gradual and revolutionary changes in skill needs.

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Annex

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- the Irish expert group on future skills needs (<http://www.skillsireland.ie/>);
- the sectoral knowledge centres Aequor (food and environment sector) (http://www.aequor.nl/aequor/pages/v_english/frmset.asp), SVO (meat sector) (<http://www.svo.nl/english/home.asp>), and CBL (food trade, including retail) (<http://www.cbl.nl/english/>);
- the UK sector skills councils 'Improve' (food and drink manufacturing and processing sector) (<http://www.improveltd.co.uk/>), and 'Lantra' (environmental and land-based industries) (<http://www.lantra.co.uk/>);
- the National Observatory of Employment and Training in the Czech Republic (<http://www.nvf.cz/observatory/enindex.htm>);
- FreQueNz, the research network for early identification of qualification needs in Germany (<http://www.frequenz.net>);
- the *Observatoires prospectifs des métiers et des qualifications* in France (<http://www.interef.com/ateliers/observatoires/presentation.htm>);
- the Fafo in Norway (<http://www.fafo.no/indexenglish.htm>), and its project 'Qualification (http://www.fafo.no/english/avf/avfkomp.htm), competence, and continuing- and vocational education', which conducts studies among others on learning and conditions of learning in working life, the competence market – supply and demand, impact of education and training on wages, career development and employability, social partner cooperation on the competence reform, and lifelong learning.

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12. Reskilling and other measures for workers displaced by restructuring

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Abstract

This paper examines what to do when a company is forced to restructure its work force and lay off workers. It first highlights the methodological weaknesses of most evaluations of reskilling and other policies for workers displaced by restructuring. Given the scarcity of reliable evaluations it draws on the firmer based active labour-market policy evaluation literature (targeted at the unemployed) to examine the lessons that may be applied to displaced workers. It argues that there are various reasons why job matching and counselling services may be particularly efficient. It is exceedingly difficult to generalise on the type of skills that should be provided as this depends on the state of the particular labour market. However, the few proper evaluations of labour-market policies addressed to displaced workers suggest that the policy efforts must be extensive and include a significant amount of general schooling. It is emphasised that 'crowding-out effects' i.e. when policy serves only to secure a job for the programme participant, which would otherwise have gone to someone else, is particularly problematic when conducting policy for displaced workers.

12.1. Introduction

The fundamental concept of economic efficiency is allocative efficiency, i.e. that resources (labour and capital) are allocated to the activities in which they yield the greatest economic welfare. Similarly GDP growth hinges crucially on the resources being reallocated in response to shifts in supply and demand. This reallocation can occur internally, within the firm, or externally between firms and sectors. Ideally, the required adjustment of labour resources would occur within the firm (and by aggregation within the sector) by the reskilling of the existing workforce to provide the firm quickly with new skills and avoid the unemployment that often accompanies external reallocation.

The identification of current and future sector skill needs in the European Union (EU) is the subject of a major study covering 16 sectors initiated by Directorate-General for Employment. Existing EU level studies of skills needs by sector include various Cedefop publications (e.g. Cedefop, Zukersteinova and Strietska-Ilina, 2007) and those from the European Monitoring Centre for Change. However, one can assume that even with the best possible foresight on the part of the firm or policy-makers, structural change will continue to lead to jobs being lost and workers becoming unemployed. The purpose of this paper is to examine what type of policy should be applied when this occurs: there is no attempt to predict the future but to outline preparation for when the need to restructure occurs.

First is explanation of why most evaluations of training and other measures in restructuring lack a foundation on which evidence based policy conclusions can be made. Then, drawing on ALMP literature, is demonstration of how such evaluations can and should

be conducted. The approach in this paper is then to examine what conclusions from the evaluations of ALMP in general may be applicable to the particular circumstances of displaced workers.

The main conclusions are that there should be an important role for job matching services such as intensified job search and career counselling. It is exceedingly difficult to generalise on the type of skills that should be provided as this depends on the state of the particular labour market in which the restructuring occurs. However, the few proper evaluations of labour-market policies addressed to displaced workers suggest that the policy efforts must be extensive and include a significant amount of general schooling. When positive effects are found for participants in such programmes they are not immediate and thus suggest a longer follow-up period than typically has been the case.

12.2. Restructuring policy evaluation: lessons from ALMP

A full and proper evaluation of the impact of policy requires three levels of analysis: first, to measure the value added of policy interventions for the participants (a micro evaluation); then the impact of the measures on others (a macro evaluation); and, finally, a judgement of whether the cost of the measures was worth the money (a cost-benefit analysis).

Micro evaluations require that one first identifies the labour-market outcome for the policy participants (workers displaced at restructuring) and then compares this with the (hypothetical) scenario of the labour-market outcome for these people had policy not have been implemented. Obtaining a control group to represent the alternative scenario is the key issue in programme evaluation. Once the two samples are identified, multivariate analysis is used to control for differences in factors that influence the labour-market outcome for the two groups. Ideally, this should ensure that the difference in labour-market outcomes between the two groups is solely attributable to the policy measures and thus the impact of policy on outcomes is identified. The main methodological problem is that the selection process into a programme, either on the initiative of the participant or a policy administrator, may be due to factors that are difficult to measure, such as motivation, health or capability, and thus difficult to control for.

There are, of course, innumerable follow-up studies of workers displaced at restructuring where active policy measures have been applied. However, there are exceptionally few such studies that have any possibility of determining the added value of policy on labour-market outcomes, due to the lack of an appropriate control group. While there are registers or other sampling frames of unemployed people from which to extract a control group of non-participants to evaluate ALMP, there is no obvious and easily accessible such sampling frame for displaced workers. The selection problem is also typically more problematic. In addition, measures at restructuring are applied differently, by different actors and with widely varying degrees of support, thus making generalisations difficult.

However, even properly conducted micro evaluations are limited as they do not take account of how policy measures may affect other members of the local labour force. For example, if training measures led to a worker displaced at restructuring getting a job that otherwise would have gone to someone else, this negative 'crowding-out effect' should be

subtracted from the overall measure of policy outcome. In the case of ALMP addressed to specific disadvantaged groups (handicapped, long-term unemployed, etc.), a rational policy-maker might be able to accept such crowding out on the basis of equity. However, it is difficult to see how equity considerations can motivate priority given to workers displaced at restructuring over other jobseekers, particularly if these others are unemployed.

It is important to stress the policy implications of 'crowding out'. The most common measure of policy success after restructuring is the reemployment rate of the displaced workers⁽²⁹⁾. Expressed somewhat provocatively, one could state that the rate is simply a measure of the success that the displaced workers had in winning the competition with other members of the local force for the available vacancies. The extent to which policy gave them such an advantage is obviously of concern as, compared to the targeting of disadvantaged groups, there is no social motivation for this priority. This argument assumes that ALMP does not create new job vacancies and implies that successful policy at restructuring requires regional and industrial policy initiatives. It also suggests that only examining the reemployment rate of the displaced workers, and comparing this to that of a control group, is not a sufficient measure of overall policy success. This requires analysis of macro indicators such as the local employment and unemployment rates.

12.3. What ALMP works for the unemployed?

This section summarises the evaluation results of ALMP policy in general, i.e. mainly to the unemployed. The following sections examine how these general results could be applied to policies for workers displaced at restructuring.

Most ALMP evaluations of training programmes find modest positive effects, particularly for those with better labour-market prospects and adult women, though by no means all do⁽³⁰⁾. A particular weakness of the evaluations is the relatively short follow-up period. This may be expected to be particularly serious for training measures as it can take considerable time to reap the returns on initial human capital investment.

Probably the most positive and robust impacts are found for intensified matching or job search services (sometimes in combination with unemployment benefit sanctions). There is some indication that these measures work best for the higher-skilled. Also, as these are quite cheap measures, the cost-benefit results are also more likely to be positive. One disappointing result of ALMP generally, including search measures, is the poor results found for youths.

The implementation of a temporary wage subsidy leads by definition to a job. However, it is in many respects a problematic policy measure. For it to be a successful it requires that

⁽²⁹⁾ The reemployment rate of displaced workers is recommended for measuring the impact of ALMP by the European Commission (European Commission, 2002).

⁽³⁰⁾ Note that some studies find negative impacts. This occurs due to the so called 'locking-in' effects which imply that participants could have used the time they participated in the programme better by looking for a job instead.

the worker still holds the job when the subsidy expires. Much research shows that, to the extent that the person secures the job, either they would have secured the job anyway without the subsidy (dead-weight loss) or that had the employer not employed the displaced worker they would have employed someone else (crowding-out).

Macro studies which examine the impact of measures on other members of the labour force are rarer ⁽³¹⁾. However, there is little doubt that crowding-out effects are empirically significant. Econometric studies indicate high crowding-out effects, sometimes up to 100 %. While research acknowledges concerns about the reliability of precise degree of crowding-out, it is reasonably confident in ranking the extent of crowding-out among different types of programmes. The conclusion is that the effects are appreciably larger the more ALMP measures 'liken a job'. Thus, various types of temporary wage subsidies have the highest crowding-out effects. It would appear likely that 'pure matching measures' such as intensified job search measures and training have much lower crowding-out effects, as job search services and labour-market training do address what is really feasible with ALMP, namely, increasing employment by reducing the mismatches on the labour market.

12.4. Addressing job displacement human capital loss

Before drawing conclusions on the lessons to be learnt from ALMP for the unemployed, that then could be applied to displaced workers, it is first necessary to examine evidence on the nature of the loss incurred by displaced workers, as it differs somewhat from the situation of the unemployed.

Research in the US and Europe finds convincing evidence of significant economic losses due to job displacement ⁽³²⁾. This is hardly surprising as, at least in the short term, a period of adjustment is required. However, more significant, there is also quite firm evidence of long-term losses for displaced workers in earnings and unemployment. Eliason and Storrie (2006) and others argue that this is largely due to displaced workers experiencing repeated job loss. The vulnerability of the recently displaced to subsequent displacement is due to their relatively low level of firm-specific capital on the new job. When the new employer is to lay off workers, this low level of firm-specific capital means that they are of relatively less value to the firm and so more prone to being selected for displacement. Indeed, the economics literature attributes the destruction of firm-specific human capital at displacement as the main factor explaining the extent and distribution of the costs of displacement in the short term; it would appear that this is also behind the longer term effects.

The key difference between the situation of displaced workers and the unemployed is the loss of firm-specific capital by the former. The four points below identify the nature of the

⁽³¹⁾ Cost-benefit studies which examine the microeconomic impact in relation to the costs of the measures are even rarer.

⁽³²⁾ Note, of course, that these are average effects. Some workers move on to better jobs immediately. Those with short tenure at the firm (often younger workers) experience fewer problems.

loss incurred by the displaced worker; the first three can be viewed in terms of firm-specific capital:

- (a) a job may be the outcome of a long process of searching for and trying out various jobs, before finding one that matches the workers competences and personal preferences. When this job is lost it may require another lengthy matching process;
- (b) the competences of the displaced workers may be linked to the lost job and be specific to that place of work and not marketable on the external labour market. This firm-specific capital may be acquired by on-the-job training or experience at the workplace and so is likely to be strongly correlated with the length of service at the firm;
- (c) employees with long service may have accrued seniority rights that will be lost on losing the job. These include job security rights and seniority wages;
- (d) the loss of a job can be a stressful event both in financial and social terms ⁽³³⁾. This is a problem itself and may impact negatively on the chances of getting a new job. This may also be particularly serious for older workers with long seniority.

12.5. Appropriate types of reskilling and other policy

What implications does the above discussion have for measures to be implemented at restructuring?

The brief overview of the ALMP research, based on the target group of all unemployed persons, mentioned that results were poor for young persons but better than average for women, higher-skilled and others with relatively good labour-market prospects. Displaced workers obviously have some labour-market experience. It is more difficult to generalise on their skills and labour-market prospects, compared to the unemployed in general, but the fact that many do get a job immediately after displacement indicates that they probably do make a more promising target group in this respect

12.5.1. Job search and counselling measures

As job search, matching and counselling measures are probably the most effective of all ALMP measures, they should be provided as part of any policy package to address job loss at restructuring. Job search during the period of notice combines the positive features of on-the-job search and unemployed job search. While still employed they can utilise on-the-job contacts and do not suffer the discouragement of long unemployed job search nor the stigma of unemployment. The knowledge of impending job loss may provide the same incentive to search as intensively as the unemployed.

⁽³³⁾ There is a great volume of research literature on the impact of job loss and unemployment on physical and mental health in many academic disciplines. The key problematic issue in this literature is distinguishing whether job loss causes bad health or whether those with bad health are more likely to lose their job. Eliason and Storrie (2004) provide strong evidence that there is a significant causality running from job loss to higher mortality.

While looking for a new job may be particularly efficient during notice it may not be obvious to the employee that this is the case and there is a potential high return in encouraging and assisting job searches at this early stage of the restructuring process. There are good reasons to allow a long period of notice, with the opportunity to obtain time off the job to search, and also to provide intensified job search services, including occupational guidance, during this period.

The discussion on the nature of loss incurred from job displacement reinforces the relevance of matching and counselling activities for displaced workers. Restructuring is stressful for workers and may diminish their ability to act in accordance with their long-term interests. The need for a coherent and transparent restructuring process is helpful in this respect but even a well administered process may still lead to problems for individual workers which should be addressed with dedicated counselling services. As there is some evidence from research, in both the US and Europe, that recurrent job separations explain much of the long-term negative effects of the initial displacement, it is important to make concerted efforts to obtain a high quality match of the worker to a new job as opposed to just a 'quick-fix' match. This may entail something different from the services typically offered by public employment services to the unemployed, such as aptitude tests and career guidance, and may imply that the provision of such services could be obtained from other, possibly private sector, providers.

12.5.2. The role of social partners

The involvement of the social partners in active measures during restructuring may improve efficiency. They are well placed to start this work early in the process. Also, as efficient matching requires good knowledge of the capabilities of the job-seeker, the social partners are able to conduct such activities. All those involved (the appropriate public administrations, the social partners and the workers themselves) should grasp the window of opportunity that the notice period offers. For this to function properly it is vital to have clear and early information on impending job loss.

Given the efficiency that the social partners can bring to this process, it is logical that they take a lead in matching activities as early as possible, either with own funding or possibly with contributions from public bodies. To some extent this approach is currently being applied in some countries. Ohlsson and Storrie (2006) show that in Sweden the State engages later on in the process, after the firm and the bipartite job security organisations have carried out a first round of intensified job search and other matching activities⁽³⁴⁾. This is partly intended to avoid dead-weight losses. One could also argue for a division of responsibilities between the social partners and public bodies where the latter guarantees a certain level of funding for all displaced to attain a certain level of employability. The social partners could then devote further resources to those with firm-specific capital. Presumably it

⁽³⁴⁾ In many cases, these services are financed by bipartite job security funds as established by collective agreements. They are increasingly implemented by private sector outplacement agencies.

is just this category of worker, i.e. those with long tenure, that the social partners would be most inclined to adopt social responsibility for.

12.5.3. Recuperating the loss of firm-specific capital

It is difficult to envisage how policy, at least in the short term, can help to recuperate losses such as seniority rights and benefits (including wages), obtained only by long tenure. The most obvious way to promote recapture of firm specific capital may be to apply measures that directly and quickly get the displaced worker a job, using temporary wage subsidies. The argument against this is the severity of dead-weight loss and crowding-out effects. If, despite these arguments, subsidies are to be used, they should only be one element in a broader strategy to place individuals with particularly low employability; they should also include some commitment in return from the employer to provide training and thus to help guard against subsequent displacement. Arguably, the only real motivation for subsidies is when they are addressed to particularly disadvantaged groups of displaced workers and so make the crowding-out effects acceptable for equity reasons. In general, the package of measures implemented should be designed to minimise these effects and temporary wage subsidies should be avoided, with priority given to more traditional ALMP matching measures such as search and counselling, mobility grants and training.

The basic policy approach is self-evident, namely to provide the platform for the displaced worker to accumulate human capital that will be useful for jobs in other firms. Career guidance is, in many cases, only a first step and training and education are the key policy tools. It is difficult to generalise about the orientation of this training as much depends on the state of the local labour market. If there are skill mismatches then customised training courses for such jobs should be provided. More generally, however, concerted efforts should be made to adapt the firm-specific skills of the displaced worker to suit the needs of the external labour market. This may include validation of skills learned on the job but not documented.

What must be avoided is job specific training for jobs that do not exist. The activating role of ALMP in general, and training in particular, may be useful in mitigating the permanent scars on individuals and society that may result from long-term unemployment. These active individuals may then be able to return to work when times improve. However, with no jobs in sight, participants may experience training as meaningless or even punitive and endless rounds of training for a job that will never appear can be just as demoralising as long-term unemployment. As it may often be the case that restructuring occurs in depressed local labour markets, this scenario may be quite common. Again, some Swedish experiences may be instructive. In the mid-1990s, Sweden experienced mass unemployment for the first time since the 1930s, and it became obvious that training the unemployed to fill non-existent jobs did not make sense. The biggest single individually-oriented policy response was the adult education initiative (*kunskapslyftet*) which at one point had as many participants as there were school children in upper secondary school. This provided formal school education for poorly educated adults and there was not even an implicit promise of subsequent job. It was presumably interesting and meaningful for participants, or at least more so than training that

obviously would not lead to a job. Evaluations of this massive programme have shown, on balance, positive results ⁽³⁵⁾.

12.6. Evidence of impact ⁽³⁶⁾

An extensive recent review of the recent ALMP literature (Kluve et al., 2007) ⁽³⁷⁾ cites only one study which examines the impact of ALMP on displaced workers (Winter-Ebmer (2006)). This study finds relatively large positive effects of a special ALMP programme for displaced steel workers in Austria. The policy intervention was intensive and expensive and included a contribution from the participants themselves. Retraining programmes focused on requalification and occupational reorientation (included personality and orientation training). It also included a significant amount of formal education and long training periods, rather than marginal skill upgrades. Evaluations showed that five years after the programme, employment was significantly higher for participants compared to non-participants.

Ohlsson and Storrie (2007) compare the labour-market outcome of workers displaced from the LKAB iron ore mines and the closure of the Uddevalla Shipyard, both of which were the object of extraordinary ALMP measures, with all other workers displaced due to a plant closure but who did not receive extraordinary measures. The follow-up period is 15 years. There was no evidence of the extraordinary measures having any significant effect until after five to seven years. However, there was a large increase in the number of workers who had upper secondary school education among those receiving extraordinary measures compared to the comparison group. Indeed, a distinguishing feature of these measures was a much broader orientation of the types of educational programmes compared to more traditional narrow labour-market training. The results were interpreted as showing that it was the opportunity to avail of more general education that yielded the positive long-term results.

These are two of the few studies that evaluate intensified ALMP measures in Europe addressed at displaced workers and using an appropriate control group. Both show positive results and both included significant elements of intensified job search activities and general education measures. They were also expensive. Ohlsson and Storrie (2007) argue that the lack of short-term effects indicate that the quick fix of a limited set of new job skills is not sufficient to compensate for the loss of firm-specific human capital that may have been built up over many years. This is particularly the case in depressed labour markets with few available vacancies. General, non-specific human capital takes time to yield benefits both due to the duration of the education programme itself and to the time required to find an

⁽³⁵⁾ The most recent high quality research on this programme finds substantial increases in post programme annual earnings. According to their estimates, the social benefits of offering these individuals comprehensive education surpass the costs within five to seven years (Stenberg and Westerlund, 2008).

⁽³⁶⁾ Following the logic of the first section of this paper, only research that addresses the issue of establishing the counterfactual case, a control group, that is necessary for all impact evaluation, is covered.

⁽³⁷⁾ Kluve's selection of only one such case is also motivated by the lack of a control group in the vast majority of all other studies on policy for displaced workers.

appropriate match for skills that are not so obviously related to a particular occupation or match with a particular employer.

Given the argument that the loss of the job is attributable to the loss of firm-specific capital, it may appear paradoxical that two studies suggest positive effects for more general human capital creation. One possible explanation is that public policy is seldom the appropriate means to address the creation of firm-specific capital. Public policy is more suited to the provision of general capital which in turn may provide a solid platform for the individual in regaining a secure position on the labour market.

12.7. Conclusions

There is still not enough European research for policy-makers to make an evidence-based decision to adopt the general education approach to improve the employability of displaced workers. Also, the positive results from the three cases cited resulted from extensive policy interventions in combination with other measures, and were expensive. However, regardless of whether it has a significant impact on future earnings or not, the provision of, for example, upper secondary school education for those who lack it, provides something of value to the individual in terms of self-esteem, maintaining activity, etc.; this may be a preferable option when there are no jobs in prospect in the local labour market. If this approach were to be adopted more generally for displaced workers, it probably should entail some reorganisation of the institutional framework for the implementation of ALMP for displaced workers. For example, responsibility for the adult vocational education and training system in Denmark, addressed primarily to employed workers, was recently transferred from the Ministry of Employment to the Ministry of Education. This was to allow better coordination with other educational programmes including the provision of upper secondary schooling.

There are strong arguments for intensified job search measures including career orientation and counselling for displaced workers. There are few reliable studies of the effects of training for displaced workers and, as the type of training that should be implemented is so dependent on the state of the local labour market, it is difficult to arrive at firm general conclusions. Some of the few existing European evaluations suggest that positive effects may be obtained from more general schooling measures. Only under exceptional circumstances should temporary wage subsidies be used. Apart from the well established dead-weight loss effects, the equally well documented crowding-out effects are unacceptable from an equity perspective.

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13. EuroSkills 2008

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Abstract

The EuroSkills 2008 event was a showcase for today's craftsmanship and vocational education and training (VET) in Europe. Hundreds of young professionals, VET students and graduates, competed and demonstrated their skills in almost 50 typically European trades. EuroSkills 2008 provided unique opportunities for developing new and attractive ways in promoting skilled labour and educational pathways in VET in a European context.

13.1. Introduction

EuroSkills 2008 was held from 18 to 20 September 2008 in Ahoy Rotterdam (the Netherlands). Hundreds of young professionals, VET students and graduates competed and demonstrated their skills in around 50 typically European trades for the first time. They convened from across Europe to showcase the skills necessary for their profession and to face the challenge of performing at their best in competitive conditions. The EuroSkills event is organised by Skills Netherlands under the supervision of the European Skills Promotion Organisation (ESPO) in conjunction with WorldSkills.

Political support for EuroSkills is given by European Commissioner Jàn Figel' (Directorate-General for Education and Culture) and the national governments. At the Helsinki meeting in 2006 it was decided that priority should be given to the image, status and attractiveness of the VET system in all EU Member States. In the reviewed priorities of the Helsinki communiqué skills competitions, such as EuroSkills, are identified as a promising method for developing and highlighting excellence in skills.

In Rotterdam young European professionals met with European colleagues and together presented their talents and skills to a broad public. Due to the competitive element, they needed to produce the finest possible can to become the best in Europe within their trade. Their performance promoted the excellent talents of these skilled youngsters, inspiring others and giving them and their skills a sense of recognition. For the individuals involved it is a 'once in a lifetime' experience which could have a positive impact on their careers. The selection of the competitions and trades is through the cooperation of several international stakeholders from industry, education and government. All these parties all play an important role in promoting skilled trades, of importance for the economy. The final goal for each competitor is to become the EuroSkills champion in their trade. An even greater accomplishment is to win the team challenge together with the team members. For the parties involved, EuroSkills 2008 provided unique opportunities to develop new and attractive ways to promote skilled labour and educational pathways in VET in a European context. The EuroSkills event is organised under the supervision of ESPO, in conjunction with WorldSkills. The event catalogue gives an overview of the competitions and enables potential participants to decide the areas in which they wish to compete.

13.2. Europe's competitive edge

The EuroSkills event has a thematic and open approach to various skills' competitions and trade demonstrations. The competition shows the different skills in action, permits involvement in hands-on activities and provides additional information about the trades presented (vacancies, earnings, training opportunities, etc.). EuroSkills focuses on the vocations and skills necessary to maintain Europe's competitive edge in the world. The skills' competitions accurately reflect the vocational standards required by Member States and the EU as a whole. The competitions lie at the heart of the EuroSkills event as they have the greatest value in terms of promotion and publicity. EuroSkills 2008 was supported by the European Commission, the Dutch Ministries of Education and Culture, Economic Affairs and Agriculture and the City of Rotterdam.

13.3. Skills excellence and ESPO

In 2007 ESPO was founded as a member association for authorised national skills organisations in all EU Member States, EFTA and candidate countries. ESPO's main objective is to promote skills excellence, VET and craftsmanship, with a focus on European youngsters. ESPO supports the European lifelong learning policy and aims to raise the appeal and importance of high quality VET throughout Europe. EuroSkills 2008 was developed in cooperation with the members of ESPO. All European countries can join ESPO and this membership is necessary to be able to take part in the competition. At present, 29 countries have joined ESPO.

13.4. Boost for personal development

The EuroSkills competitions offer significant benefits to those who enter and to those who support them. First, the competitors are encouraged to get the most out of themselves in the competitions. It gives a boost to their personal development and raises sense of pride and self-esteem. Second, the national and European collaboration between schools and the business sector allows the parties involved to discuss developments in trades and skills and stimulate innovations. This helps organisations to develop and to establish partnerships between stakeholders from government, education and the world of business. Finally, the event provides a great opportunity to promote craftsmanship and VET in Europe.

EuroSkills 2008 was open to young people who have gained, or are gaining, vocational skills in a wide range of industries and businesses, at many different levels. Many skills cover several competitions, each of which has specific entry requirements with regard to age, extent of work experience and/or level. In keeping with the main routes into employment, most competitors are apprentices, college students, trainees and/or employees.

For 2008 candidates were required to be between 18 and 25 years of age, and have been born on or after 1 January 1983. Each competition has a restricted number of participants. For team competitions a maximum of 10 to 12 competitors can be accommodated per

competition. Special hospitality packages were created to accommodate competitors, staff and their friends and relatives.

13.5. Competitors' village

EuroSkills 2008 featured a competitors' village to house all competitors, with bus transfers between here and relevant competition locations. The village offers a great opportunity for competitors to spend more time together and exchange experiences. It accommodates up to 580 competitors and team coaches. Facilities include fully equipped, high standard holiday villas, hotel accommodation, apartment-like accommodation, an on-site medical service, security, high-speed Internet and recreational facilities. Throughout the competition, the competitors' village is a true European village in a peaceful and relaxing area. At the hotel reception, counsellors can assist guests in many languages.

13.6. Facts and figures EuroSkills 2008

The Euroskills event featured:

- (a) exhibition floor covering 35 000 m², expandable to 50 000 m²;
- (b) promotion of craftsmanship and vocational education by means of competitions, demonstrations and interactive events for the audience;
- (c) EuroSkills village: conference programme on vocational education, skills development and partnership between education and industry;
- (d) participants and competitors from all European countries;
- (e) political and financial support from the European Commission (Directorate-General for Education and Culture), Dutch Ministries of Education, Economic Affairs and Agriculture and the City of Rotterdam;
- (f) advertising and public relations campaign for media coverage in Europe.

More information available from Internet: <http://www.euroskills.info> [cited 12.1.2009].

14. Skill needs in the sectors: summary and discussion

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14.1. Introduction

In some sectors globalisation, current demographic trends and increasing labour mobility in Europe have contributed to the emergence of a truly European labour market. Other sectors have undergone significant restructuring, adjustment to the knowledge-based economy and a greater interplay of production, distribution and supply chains, as well as interpenetration of primary, secondary and tertiary sectors. These trends have an immense impact on skill needs, the occupational patterns of skills, the emergence of new skill requirements and hybrid occupations. As a result, sectors are experiencing skill gaps and shortages which affect company and sector performances. Providing the appropriate skills is essential for European competitiveness, especially in new technology and innovation. The working group examined different sectoral case studies addressing the questions below.

14.2. Drivers of change, restructuring trends and adjustment mechanisms

Tourism is one of the most important growth sectors in the European economy. Providing 24 million jobs, tourism and the related sectors account for more than 12 % of employment in Europe. In the past 10 years, growth in the number of jobs in tourism was higher than the average for the European economy as a whole. Europe remains a primary tourist destination. At the same time, tourism is a sector with one of the highest mobility rates across Europe, and so has a European nature at least as far as its dynamics is concerned. The sector is challenged by trends such as demographic change, environmental issues, growing demand for customer orientation and increasing international competition. Specific trends include new structures generated by competition and cooperation among service providers, high labour mobility, volatile markets in an insecure environment, changing customer demands towards individualisation and significant potential in various market segments. The sector addresses the demand for more individualism by offering short visits, city tourism or language trips. New target groups are found, for example, in those with restricted mobility. Increasing desire for adventure orientation is met with event tourism. The mix of work life and leisure time has led to language and training trips while increasing business travel demands specific business travel management.

Nanotechnology is a key technology of the 21st century, a cross sectoral area and important technological multidisciplinary field. World market sales of nanotechnology are predicted to reach USD 1 trillion by 2015. Europe holds a significant share in the growth potential, which could create new jobs at different occupational levels: for researchers and

scientists and also for a range of technicians and specialists. The industrial use of the nanometre dimension has just started. Similar to information technology, the study of basic physics goes hand-in-hand with the development and the introduction of first products on the market. Trends include nanoanalytics, nanochemistry/material, nanobiotechnology, nanooptics and nanoelectronics.

In the agri-food sector the socioeconomic structure and employment outlook is very diverse. On the one hand there is the individual small-holder who uses traditional production methods, and on the other hand there are multinational food companies with thousands of employees around the globe. Further, the agri-sector is also referred to as the agri-food complex, indicating that it embraces primary production, trade, industry (such as food and feed manufacturers), private services (such as banks, insurance companies, sectoral organisations and associations) and public services (legislation and regulation regarding product quality and public health). Major trends and challenges include, for example, stronger regulation, environmental care and public concern about food safety and animal welfare, multifunctional land use, chains and networks, technological innovation and ageing workforces.

14.3. Skill needs in knowledge-intensive and innovation sectors

Multiskilling, newly emerging occupations and hybrid occupations reflect the trends of new types of services and growing demand for flexibility in tourism. Three sets of skills in new tourism working fields were presented in the working group: travel designer, travel guide for individuals with restricted mobility and business travel manager. The travel designer plans individual tourist products and services based on the specific customer needs. The travel guide for persons with restricted mobility guides and cares for older as well as disabled tourists and is responsible for information and organisation during the journey. The business travel manager is responsible for organising and controlling business travel for single customers and for whole businesses.

Skill needs in highly knowledge-intensive and innovation sectors such as nanotechnology arise under conditions of economic development and scientific technological progress. These skill needs have to be transferred to further education (training courses, modular qualification systems) or/and initial education and training (modification or reorganisation of professions, vocational training, study courses). In the case of nanotechnology, 18 qualification profiles have been developed and recommended: nanochemical laboratory assistant, nanoassistant, materials scientific-laboratory assistant, nanoanalyst, specialist in nanobiotech, specialist in biohybrid technologies, specialist in quality assurance, specialist in documentation on nanobiotechnology, product adviser for nanobiotech, specialist in nanosurface treatment, specialist in documentation on nanotechnology, specialist in ultra-fine optics, specialist in photonics/laser technology, product adviser for nanooptical application, product adviser for nanotechnological applications, specialist in nanoelectronics, specialist in mask manufacture and optoelectronics engineer. In general, the whole area of new technologies demands a set of basic skills which can be specific or general at different occupational levels and which can promote innovation, research and development.

The trends and challenges in the agri-food sector create many skill needs which are not absolutely new but include many generic and transversal skills. Employment in the agri-food sector is decreasing but skill needs and qualification levels are increasing. Examples of skills found are entrepreneurship, the ability to learn from conflict, to realise innovation in networks, to think out-of-the-box, to find and use opportunities creatively, having international market knowledge, the ability to deal with national and international trading systems, logistics, and intercultural communication. Also, the skills needs described vary significantly by business model applied: eco tourism, regional products, healthcare or industrial farms.

14.4. Conclusions and policy implications

Identifying future skill needs in new or innovative sectors is not simply a matter of quantity (how many employees are needed?). Future skill needs, or even skill shortages in new and emerging fields, cannot be extracted or derived from official statistics since they are not captured in the occupational nomenclature. According to the maturity of a technology, this identification to an even greater extent has to include qualitative issues of skills needed for the application of the new technology: what do these employees have to know/have to be able to do? If a technology is not mature, profound information and knowledge on how the jobs and tasks of employees in this sector change is needed before a solid quantitative assessment of the employment potential is possible and feasible. In sectors such as tourism, to forecast or to identify which skills will be needed in future has to be achieved under conditions of sector volatility and vulnerability.

Tackling the qualitative side of the problem of identifying new skill needs, the appropriate and suitable level of research has to be discussed. It might be most valuable to have a look at real on-the-job developments in (key) companies, workplaces and work processes. Another discussion of the appropriate level of research should focus on generic versus specific skills: is it more useful to have a look at generic and transversal skills or at specific skill needs of a certain sector?

Further empirical research is needed, collecting primary qualitative data to complement existing quantitative surveys. This would yield more specific information from certain sectors in particular local, regional, national or supra-national circumstances, for more specific job categories, educational fields and education levels. However, such research requires a long-term perspective to be able to assess gradual and revolutionary changes in skill needs.

Stakeholders, in anticipating skill needs, have to discuss and provide ways of transferring research results into practice. This includes the participation of industry at an early stage of research to ease the transfer of results after completion. European competence centres for certain technologies or sectors might also be helpful for synergies instead of widespread investment in many countries.

However, even with the best possible anticipation, structural change will continue to lead to jobs being lost and workers becoming unemployed. While there are strong arguments for intensified job search measures, including career orientation and counselling for displaced workers, there are very few reliable studies of the effects of training for displaced workers. Some of them suggest that positive effects may be obtained from more general schooling measures.

PART V

Skill needs in enterprises

The workshop addressed the following questions:

- (a) are enterprise surveys and analyses a relevant source of information and measure of skill needs;
- (b) which option is best for the Skillsnet project: to introduce changes into an existing European survey, such as CVTS; adjust existing national surveys; or organise a special survey on skill needs in the workplace in Europe;
- (c) what system do employment services in the EU currently use to monitor vacancies? Which systems and methods are used to measure recruitment difficulties in Member States and initiatives at European level;
- (d) what are the main findings in CVTS3 on skill and training needs? Is it possible to introduce additional questions or change the questionnaire to tackle skill needs? Would it be possible to construct a sample of those enterprises that evaluate skill needs systematically for the follow-up survey?

Olga Strietska-Illina

Enterprise surveys as a tool for skill needs analysis

Germana Di Domenico, Ronald van Bekkum,

Britta Lüdeke

Vacancy statistics and monitoring: European sources and public employment services

Jean-Louis Zanda

Measuring recruitment difficulties in Europe

Friederike Behringer

Skill needs in enterprises: CVTS results

Mark Keese

Skill needs in enterprises: summary and conclusions

15. Enterprise surveys as a tool for skill needs analysis

Olga Strietska-Ilina
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Abstract

The pace of technological change and innovation, globalisation, demographic and other developments introduce important changes in the workplace which cause new skill and competence requirements. These cannot be identified by purely quantitative approaches, so Cedefop's network Skillsnet started to explore the possibilities of company surveys as an analytical tool. The comparison of approaches to enterprise surveys in 16 Member States revealed that all Member States conduct enterprise surveys relevant for identification of skill and training needs. Although methods and tools used for enterprise surveys differ across countries, several methodological similarities were identified. These, under certain conditions, provide good grounds for potential comparability. Skillsnet examines different options on how to complement national surveys with comparable data at cross-country level. At the same time, an extension of one of the existing European surveys with questions on skill needs and/or organisation of a specific European survey are other options to be discussed. The Cedefop-Skillsnet coordination team will continue the discussion with Member States to agree on a common approach and will look at possible ways to proceed further.

15.1. Introduction

Today's world is changing rapidly. Technological development and innovation, growing competition on global markets, increasing labour force mobility and Europeanisation/internationalisation of certain jobs and sectors, environmental change, aging workforce: these are few but important factors that affect daily existence in enterprises. The way companies organise and manage their work, production and services is greatly influenced by these developments. Work becomes technologically and intellectually more demanding. Management structures become flatter. An older workforce needs to be retained to compensate for the lack of younger recruits. Presence of foreign workers becomes indispensable and demands special attention for intercultural communication. Corporate social and environmental responsibility and sustainable development are widely discussed on the business agenda.

The pace of workplace change causes emergence of new skill requirements, obsolescence of qualifications, alteration of skill and competence composition of occupations, multitasking and emergence of new and hybrid occupations, incidence of skill shortages and gaps. These changes cannot be identified by purely quantitative approaches, such as forecasting. For this reason, and in parallel to the forecasting activity, Cedefop's network Skillsnet started to examine enterprise surveys as a potential tool to identify skill needs in Europe.

The need to identify how skill needs develop and to produce timely and reliable information is essential for education programme design, for the provision of counselling and

guidance services, and for efficient human resource development and labour-market policy-making at all levels: enterprise, local, regional, national and European.

15.2. Strengths and weaknesses of enterprise surveys as a method

Enterprise surveys provide first-hand information on skill needs directly from employers. They offer an invaluable insight into the demand side of the labour market, giving access to qualitative information on skill and competence requirements, their changes, and skill gaps among specific categories (e.g. occupations, graduates with specific qualifications). Enterprise surveys not only allow information collection but also verify already available data and help to understand better labour market processes and phenomena.

At the same time, enterprise surveys have several limitations. Companies are already overwhelmed by numerous surveys and any additional one becomes an extra burden and may result in a lower response rate. Employers cannot always assess their current human resource situation and their future needs objectively; the data they provide are often inflated or deflated.

Most survey results show that planning of training and recruitment goes hand in hand with broader strategic planning by companies to expand, reduce, outsource or dislocate their production and/or services. Yet, strategic thinking and the ability of the enterprise management to look beyond presence is another drawback of the enterprise surveys methodology. Indeed, companies often become hostages of a broader economic strategy of the country, sector or region, and sometimes have to adjust to changing global markets on an ad hoc basis. A broader awareness of economic trends and their driving forces is not always present inside companies and this hampers strategic thinking.

These limitations can be overcome by various means. First, questionnaires need to be limited to a minimum number of questions essential for identifying skill needs for a particular purpose (e.g. policy-making, financing of training, design of qualification profiles or training programmes, provision of information for the guidance system).

Second, not only the length of the questionnaire is important for the quality of answers and for the rate of response but also questions themselves. Careful selection and formulation of questions may help to increase the response rate and the reliability of answers. For instance, the question 'which skills do you need?' would puzzle a respondent. It might be more useful to ask which tasks are performed in this or that job, which composition of skills and competences are necessary to perform a specific job/task, which skills are core skills for a job, and, finally, what reasons prompt in-company training ⁽³⁸⁾.

⁽³⁸⁾ The incidence of training provided by enterprises may not be necessarily influenced by enterprise conditions. It can be a result of presence of public-sponsored training courses and be influenced by the supply of courses rather than the demand for training. In such cases training provision may not be always linked to skills demand.

Similarly, questions about future recruitment plans may not bring fruitful results but it is possible to learn about the future by carefully analysing past and present. Regular surveys based on the same methodology and longitudinal surveys allow comparison over time and creation of time series. Analysis of trends and their simple extrapolation may help to shed light on the future in a more objective way than employers' answers based on their subjective judgement.

Third, survey results need to be verified and enriched by additional focus groups and expert panels. Cautious treatment of results, along with the usage of holistic methods, diminishes the negative effects of any methodological limitation. At the end of the day, there is no ideal method but there certainly is an ideal approach: that is to combine different methods and to analyse results in combination with those from other statistical sources, surveys and studies. Company surveys should not be seen as panacea but just one of tools, yet very useful. In the context of Cedefop-Skillsnet activities, a survey of skill needs among enterprises appears an especially useful tool which can provide key qualitative answers to add to and to verify the quantitative mid-term European occupational skills forecast.

15.3. The Cedefop-Skillsnet initiative

Cedefop's network Skillsnet launched an initiative which:

- (a) explores the possibilities of enterprise surveys as an analytical tool which may help to reveal qualitative changes in the demand for skills, competences and qualifications;
- (b) identifies existing enterprise surveys in the Member States and at EU level;
- (c) joins efforts of country experts to achieve comparability of information;
- (d) looks for feasible ways to achieve a comprehensive, comparable and longitudinal analysis of skill requirements at company level in Europe.

In the framework of the new initiative, an expert workshop was organised in Bucharest in June 2007. The workshop:

- (a) mapped existing surveys at European level for their potential use for skill needs analysis,
- (b) compared approaches to enterprise surveys among 16 Member States for their potential comparability and compatibility;
- (c) discussed future steps towards feasibility of a common approach to enterprise surveys to analyse skill needs at European cross-country level.

15.3.1. Relevant European and cross-country surveys

Several European/cross-country surveys were identified as having the potential for adjustment to comply with the objectives of identifying skill needs. First, the continuing vocational training survey (CVTS), an EU-wide survey conducted by Eurostat and national statistical agencies every five to six years, was identified as the most suitable for skill needs analysis given its coverage, sampling and relevance of the subject for correlation of questions. However, any extension of the survey involves time-consuming procedures and

may turn out not to be feasible. Other potentially useful surveys include Eurostat's vacancy survey, community innovation survey, European public employment services' vacancy monitor, establishment survey (Eurofound, Dublin), a planned survey by European Agency for Safety and Health at Work (Bilbao), job requirement approach module of the programme for international assessment of adult competences (OECD), and a questionnaire of the once planned harmonised skill monitoring survey in Ireland and the UK. The list is not exhaustive but it provides good basis for future discussions about how existing surveys (if at all) could be used for skill needs analysis. Although in their current layout direct use is problematic, their methodological and operational experience is invaluable.

15.3.2. Relevant enterprise surveys in Member States

To verify current approaches to enterprise surveys on skill and training needs and other related subjects in individual Member States, experts were invited to submit short information based on a template prepared by Cedefop's Skillsnet team. Skillsnet's coordination team received answers from 16 Member States⁽³⁹⁾: Belgium, Bulgaria, the Czech Republic, Germany, Estonia, Ireland, Greece, France, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovakia, Finland and, the only part of the UK covered, England.

The comparison revealed that all 16 Member States conduct some kind of enterprise survey relevant to a broader subject of identification of skill and training needs. The surveys, however, differ greatly in their objectives, regularity, sample sizes and in a range of questions covered in questionnaires.

The objectives of enterprise surveys can be divided into five broad categories:

- (a) design of policies in initial and continuing education and training;
- (b) design of training programmes, vocational training standards;
- (c) identification of skill deficiencies according to level and type of education/training;
- (d) work organisation, operating environment, business and technological changes and their impact on company skill and training needs;
- (e) human resources management/development and recruitment practices and problems, skill gaps and labour shortages.

In practice, surveys pursue more than one objective and in many cases it is a combination of several of above.

Out of 16 countries, 11 conduct surveys in specific sectors, industries, occupations or territories. Some surveys are particularly targeted at small and medium-sized enterprises. The Czech Republic, Germany, Estonia, Ireland, Greece, France, Portugal, Romania, Slovakia, Finland and the UK (England only) have conducted, or now conduct, some sort of a nationwide survey.

⁽³⁹⁾ Filling in the template was a voluntary exercise. Although only 16 experts responded to the template in the initial phase, Cedefop's Skillsnet team continues to receive indications of interest to participate in the initiative from other countries. The comparison, therefore, will be updated to include the newcomers' responses in due course.

Nine countries have regular enterprise surveys of varying periodicity (monthly, annual, biennial) and five more countries plan to repeat existing surveys in future, subject to support, interest and funding. Altogether 13 countries envisage continuing enterprise surveys.

Although methods and tools used for enterprise surveys differ across countries, several similarities were identified. All countries use structured questionnaires. Six conduct face-to-face interviews, some with help of computer-assisted personal interviewing (CAPI); others use a combination of online, postal, e-mail and telephone interview techniques.

Response rate depends on the survey method. Those using face-to-face interviews enjoy around 80 % response rate; postal, telephone and online interviewing brings between 20-50 % of responses with the exception of France where telephone interviewing succeeds at 80 % response rate.

The unit of analysis is an establishment (nine surveys) or an entire enterprise/organisation (eight surveys), though in Greece and Romania different surveys apply both approaches. Respondents are mostly human resources managers/officers or, in smaller companies, owners, directors or top managers. Some Member States complement surveys with focus groups or additional surveys among social partners and other stakeholders (e.g. regional/local representatives). Only six Member States cover in the same survey or run a complementary survey among respondents-employees, of which four have results matched with responses by employers to make identification of skill gaps and training needs more robust.

The sample size largely depends on objectives pursued and level of detail needed but surveys generally seek to provide a good coverage of the segment under scrutiny (sector, profession, region, etc.). Many Member States survey many enterprises (e.g. 27 000 in England, 16 000 in Germany, 15 000 in France) aiming at covering a large proportion of the labour force. Most Member States use targeted or non-targeted sampling stratified/weighted by type and size of enterprise/organisation/establishment (in terms of number of employees), sector and region.

In their analyses, Member States widely use international classifications, such as NACE, ISCO-88 and ISCED. Only three Member States, however, use national classification systems either linked or not to the international ones. This, under certain conditions, provides good grounds for potential comparability.

Responsibility for surveys is mostly in hands of ministries and their research bodies but also it often lies with private or public research institutions, consulting companies or universities. Funding mostly combines various resources: 12 countries enjoy funding from ministries and public employment services, four (Luxembourg, Poland, Romania and Finland) report (co)funding from EU sources (European Social Fund, Leonardo da Vinci, EURES, PHARE, European Training Foundation), two (the Netherlands and Finland) have support from social partner organisations and/or their training funds, and in Germany there is also some *Länder* support.

No matter how different the methods and objectives of enterprise surveys in individual Member States, it is positive that all countries expressed their willingness and preparedness to discuss and to look for possibilities to make their results comparable to other similar surveys in other countries. It is particularly important that, even in countries with a long-

established tradition of enterprise surveys, there is readiness to make some sacrifices of comparability over time in order to achieve European comparability. It is, therefore, possible to conclude that the new initiative of Skillsnet aimed at finding a common European approach to enterprise surveys as a tool for identification of skill needs is timely and necessary.

15.4. Conclusions and further steps

Further steps remain subject to discussion and collaboration with Member States experts, EU institutions and other organisations. The following options might be pursued:

- (a) modifying/enriching questionnaires and surveys already existing or planned at European level;
- (b) choosing core questions and adjusting national surveys in selected/volunteering countries to achieve comparability of results;
- (c) launching a new Europe-wide enterprise survey specifically targeted at identifying skill needs.

Cedefop's Skillsnet coordination team prepares a conceptual framework⁽⁴⁰⁾ which is to provide clear identification of the objectives, value added and relevance of the initiative for the EU and individual Member States, including the target group and final beneficiaries. Further, Cedefop-Skillsnet plans to launch a detailed feasibility study which should verify all options and suggest design of the methodology and the specific survey layout⁽⁴¹⁾.

The coordination team also looks into different options of how to complement national surveys with comparable data at cross-country level. The team follows up the interest and willingness of Member States to have a common approach and will look at possible ways to proceed further towards a comparable and harmonised European enterprise survey to contribute to a larger database on identifying skill needs.

The emerging European labour market requires European level monitoring. The Council of the EU in its resolution of 15 November 2007 on the new skills for new jobs (Council of EU, 2007) stresses the need to anticipate the skills needs – and also the skills gaps – which are emerging in the European labour market. There is, therefore, the momentum to combine the efforts of the network, national and EU authorities, and research and data collection institutions to improve the transparency of skill needs in Europe and to add qualitative information on skills demand coming from employers to the quantitative forecast results.

⁽⁴⁰⁾ Cedefop. *Skillsnet discussion paper: employers' surveys as a tool for identification of skill needs: draft conceptual outline*. Cedefop: Thessaloniki, 2008.

⁽⁴¹⁾ NB: the call for tender for the feasibility study was launched by Cedefop in summer 2008.

16. Vacancy statistics and monitoring: European sources and public employment services

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Abstract

In a globalised labour market a clear trend of jobs moving towards countries with lower labour costs can be observed. This increased competition highlights the importance of labour upskilling and of meeting, and possibly forecasting, employer needs.

A significant effort is made by the European Commission to monitor and measure bottlenecks and recruitment difficulties to address labour-market mismatches. The value that data on job vacancies would have for economic research is relevant; they can contribute to business cycle analysis and support decision-making by pinpointing emerging deficits.

This is the background to the following analysis of the main sources of information on currently available European vacancies, with a specific focus on the role that PES may play in processing and using administrative data to provide better tailored services both to job-seekers and employers and to anticipate recruitment difficulties.

16.1. Introduction

Statistics on job vacancies are important when talking about recruitment difficulties. As statistics on vacancies as part of the demand side of the labour market were not available on an international basis, a working group of experts from public employment service (PES) was established. This group built up the European PES vacancy monitor (EPVM) which provides a comparative picture of how the PES business with recruiting employers (vacancy intake) develops over time. It shows the picture for both PES vacancy intake and vacancy stocks. The EPVM provides breakdowns to occupations and, to a lesser extent, breakdowns to sectors.

This is useful for European PES in several ways. They obtain an impression of recent increases/decreases in counterpart organisations elsewhere in the European labour market. The available breakdowns also give an idea of the composition of vacancy intake across market segments.

It would be useful to be able to place the development at the PES side within the context of total market developments in vacancy offers and show the total increases/decreases. That

⁽⁴²⁾ The views expressed in the articles are those of the author and do not involve the responsibility of the European Commission, the Centrum voor Werk en Inkomme and the Bundesagentur für Arbeit.

may now gradually become more possible with some other comparative observation instruments coming available for a growing number of European countries and with steadily increasing robustness of observations. Eurostat provides a vacancy survey and Monsterboard publishes an index of vacancies available on the Internet. Also, the observation capabilities of the PES itself are improving and give more confidence that via the PES vacancy information a fairly reliable picture of the market at large is given. One step forward has already been made by adding a new tool to PES vacancy intake: the introduction of a self-service system on the Internet to which employers can report their vacancies. These additional systems have expanded the numbers of vacancies collected by the PES and have also increased the relative share of vacancies in higher-educated occupational fields. A particularly interesting step forward made by Germany was the introduction of the so-called BA-X indicator.

This document has three parts. In the first, a short description is given of each of the now available observation instruments. Their strengths (utilities) and weaknesses are pointed out. In the second part, key information is presented on the development of the PES vacancy intake in 2007 up to the end of the third quarter, and subsequently, comparisons are made with information derived from other observation instruments. The main question is to what extent we can derive a picture of the market at large by way of the EPVM itself and in combination with these other observation instruments.

The third part examines to what extent the vacancy information on the EURES job mobility portal could replace the EPVM as a monitoring tool and produce similar or even richer information more rapidly and at reduced cost.

16.2. Available sources for information about vacancies

Vacancy statistics should be available rapidly and give a realistic picture of the labour market: complete vacancy data and necessary breakdowns. To create statistics rapidly and of good quality including useful breakdowns requires effort in opposing needs. To satisfy all needs demands a composite of different observation instruments.

16.2.1. The European PES vacancy monitor (EPVM)

The EPVM collects stocks and flows of PES vacancies on a quarterly basis, broken down to ISCO 3-digit level. Complete time series starting in 2003 are available for 17 countries and 19 PES. Data are collected quarterly. PES are responsible for collecting and recoding their vacancy data in the agreed format. Further information (fiches) exists about the contents and particularities of each country.

The strengths of the EPVM: PES vacancies include administrative data, i.e. they usually should be available regularly and almost immediately. Once the necessary adjustments are made – like coding the national system to ISCO – it should be easy to have the data ready shortly after the relevant observation date. Administrative data have one further advantage: once the items to be observed are fixed, the costs are minor compared to a regular survey if the same level of detail is to be reached. The EPVM includes both stock

and inflow of vacancies. For countries joining the EPVM it is possible to calculate time series backwards to start from the beginning as long as the PES data are there; this would not be possible for surveys. Breakdowns to ISCO 3-digit level make calculations on occupations possible that are based on a harmonised classification system. In the EPVM today more countries are covered than in the Eurostat vacancy survey.

The main weakness of the EPVM is that the PES vacancies that are its basis are only part of the market. Depending on national practices, the market share of the PES may be high or low, both in general and also for specific occupations/qualifications. For this reason, the contents of the EPVM may not show real developments in the participating countries. Further, the market share of one PES may vary not only across sectors or occupations, but also over time. Data on sectors (NACE) are not part of the EPVM yet, but this information should be possible to integrate for most national PES. Double counting may be a problem in some PES, to varying degrees.

For example, PES 'A' has a high market share in low and medium qualified vacancies, but only a small market share in the higher qualifications. If vacancies in the country rise for the higher qualifications will this be visible in the EPVM? It can be assumed that by occupation there will be an increase of the higher qualified vacancies, but in the total perhaps important developments remain insufficiently visible.

For information on recruitment difficulties it is important to have knowledge about the occupations and not only the market at large, as it can be assumed that recruitment difficulties are more a problem when it comes to highly specialised jobs.

Due to different administrative practices applied by different national PES, the vacancy stocks have different volumes compared to vacancy inflows. The ratio of both (and developments therein over time) can not easily be compared between PES.

16.2.2. The Eurostat vacancy survey

The Eurostat vacancy survey is done quarterly and creates statistics on vacancy stocks with a breakdown on sectors (NACE) except for activities of households and extra-territorial organisations and bodies. Once a year, a breakdown by occupation is provided following the international standard classification of occupations, 1988 version (ISCO-88) at one-digit level. A breakdown by region is also provided for some countries in the annual data collection.

A job vacancy is defined as a post (newly created, unoccupied or about to become vacant) for which the employer is taking active steps to find a suitable candidate from outside the enterprise concerned and is prepared to take more steps and which the employer intends to fill, either immediately or in the near future (See Eurostat reference metadata, summary methodology, job vacancy statistics).

16.2.2.1. Strengths of the Eurostat vacancy survey

The Eurostat vacancy survey has a methodology that is agreed upon. Though there are several exceptions in what to include in the survey in the different countries, these are well known and can be identified in the metadata. A regulation is planned that will make the

survey and the methodology obligatory, which will improve the quality of the data. The vacancy survey data is available on the Internet and calculations can be made online.

16.2.2.2. Weaknesses of the Eurostat vacancy survey

At present the Eurostat vacancy surveys mainly serve the purpose of adding one further business cycle indicator to an array of indicators already available. This clearly sets limits to more detailed kinds of information that should be derived from these surveys for the distinct purpose of understanding trends and conditions in the labour market that PES labour-market policy seeks to influence.

Information on occupation is provided only on an annual basis and even then only at one-digit level, i.e. details on occupations are missing. The first digit of the ISCO is more a source of information about the level of qualification needed and sectors. Currently the ISCO classification is only available for the minority of participating countries.

For calculations/estimations of vacancy turnover (and vacancy duration) both stock and flow data would be needed but only stock data is provided.

It takes some time to carry out a survey; data are usually not as rapidly available as administrative data. At 9 November 2007 data up to quarter 2/2007 were available. At this time the EPVM already had the third quarter of most countries available.

Another weakness is that some exceptions to the methodology exist, that make it difficult to compare the results between the participating countries. Therefore, the results of the vacancy survey have to be used carefully. In France the Eurostat figures are lower than the PES figures of notified vacancies. If these figures were used for a calculation of a PES market share, this would lead to a share of more than 100 %, which does not make sense.

Time series have been available since 2001 when the Eurostat survey programme started. However, up to now, the vacancy survey does not cover all Member States and for countries that participate, some gaps exist in the time series. These cannot be repaired. Time series can only be started from the point the survey begins. This is weak compared to administrative data: a PES can join later but, as long as the notified vacancies are stored, the necessary calculations can be retrospective.

16.2.3. The Monster employment index

The Monsterboard Internet-based job search portal publishes a monthly online labour demand indicator derived from a composite of the major job search portals in a country. In several countries the PES vacancy portal is included in those. For Germany, France, the Netherlands and the UK the time series started in December 2004. Value 100 represents the mean value of jobs in the base period (December 2004-November 2005). Since July 2007, an effort has been made to publish a monthly indicator for 25 European countries (all Member States minus Bulgaria, Romania and Malta, but plus Norway) but this was suspended again in September.

For the five initial countries, breakdowns are available for 24 industrial sectors (with some relation to the NACE classification) and 10 occupational categories (ISCO-88). Regional indices follow a classification system close to NUTS.

16.2.3.1. Strengths of the Monster employment index

The most obvious advantage of the Monster employment index is the timely publication every month, even including different breakdowns. Today, it provides the most up to date international indicator. Though it only represents developments in online demand for labour, it might be possible to use it as an indicator for the national vacancy market as well. A relatively good correlation with two months lag of unemployment can be demonstrated. For the Netherlands, strong correlation can be demonstrated between the development of the vacancy survey based indicator for the total vacancy market and the Monsterboard indicator; though further research on this should be done, it gives the impression of a useable indicator. The index is available on the Internet, but only as a PDF file, which is not user friendly if it is to be used for further calculations.

16.2.3.2. Weaknesses of the Monster employment index

Vacancies may be published in different sources; they may also be available several times on the Internet, notably also more than once in the sites that are included in the Monsterboard indicator. The duplication varies between countries and this can be assumed also between different kinds of jobs; higher qualifications are more often on the Internet and it can be assumed that also more duplication exists. The degree of duplication may also vary over time, notably increasing in times of labour supply scarcity. This would lead to an overestimation of increases in the vacancy market in times of economic boom. There is no information about the market share of Monster and other Internet sources, which leads to the same problem on this point as already noted as regards the PES administrative data on vacancies. With respect to the Monsterboard indicator, there is a current problem that market penetration of Internet vacancy portals is still rising. This makes it difficult to distinguish between an increase in the market as such and increase in the market share of the portals. Overestimation of the first may result.

A particularly large part of the vacancies on Internet portals are from temporary work agencies. The composition and volume development of their vacancies is not necessarily representative of all vacancies.

The Monsterboard classifications of business sectors do not corresponding exactly to NACE and – even more of a problem – since the sector classification has to be partly constructed from occupational data, the volume measurement of its composing categories may not be very exact. No significant differences exist between the NUTS classifications and the Monsterboard ones. The procedure for attributing vacancies to ISCO-classes is not transparent.

For these reasons it is not possible to compare country to country. Similarly, the construction of an overall European indicator for the total vacancy market, as Monsterboard does, raises many serious questions.

16.2.4. A combination of sources: the German BA-X

The German PES (BA) developed the BA job index (BA-X). It is a seasonally adjusted index for the vacancies known to the BA. The reference value of 100 was set at the year 2004 which was relatively neutral for economic cycles.

The index combines two different kinds of sources: administrative data from the PES register (notified vacancies) and Internet-based data. As only the first labour market is of interest for the index, the vacancies notified to the BA are reduced by subsidised jobs and jobs not due social insurance. The Internet-based vacancies are composed of those from the BA Internet site that are not already included in the notified vacancies and those found by the job-robot. The job-robot is a web-crawler with a well developed process to reduce double counting; only job offers that are not already available among the notified vacancies and among those on the PES Internet site are added.

16.2.4.1. Strengths of the German BA-X

The BA-X is published at the end of each (reference) month, regular and timely publication a major advantage of this source. The combination of the PES notified vacancies with the Internet sources of the BA-Internet and the job-robot in the BA-X gives a more representative picture of the market. As notified and Internet vacancies usually have a different structure when it comes to qualifications and occupations, the development of the market for these may also be different.

All vacancies included in the BA-X are known to the BA, so the index is a very good basis for the work of the PES.

16.2.4.2. Weaknesses of the German BA-X

The BA-X presents the development of the total job vacancies, but it is – at least so far – not possible to create index figures for breakdowns of occupations/qualifications. The reason is that only for part of the BA-X vacancies are all details known. Only the notified vacancies provide breakdowns of occupations/qualifications. The same applies for stocks and flows and other items relevant for calculations, for example duration and kind of vacancies. Additional calculations can only be done when the PES notified vacancies are taken into account.

16.2.5. Some conclusions

When assessing the observation instruments that are presently available, there is a progressively rich and varied spectrum. Each instrument has its own strengths and weaknesses, with many limitations to their use. When attempting to analyse current developments in the vacancy market, the best strategy seems to combine observations from each of the available instruments.

Even in that manner, however, it remains a quite hazardous task to construct a truthful, up to date and detailed picture for one single national labour market. It clearly will be even more difficult to endeavour the same for more countries in comparison. Too much should not be expected but it should be possible to take some steps forward with the progressive

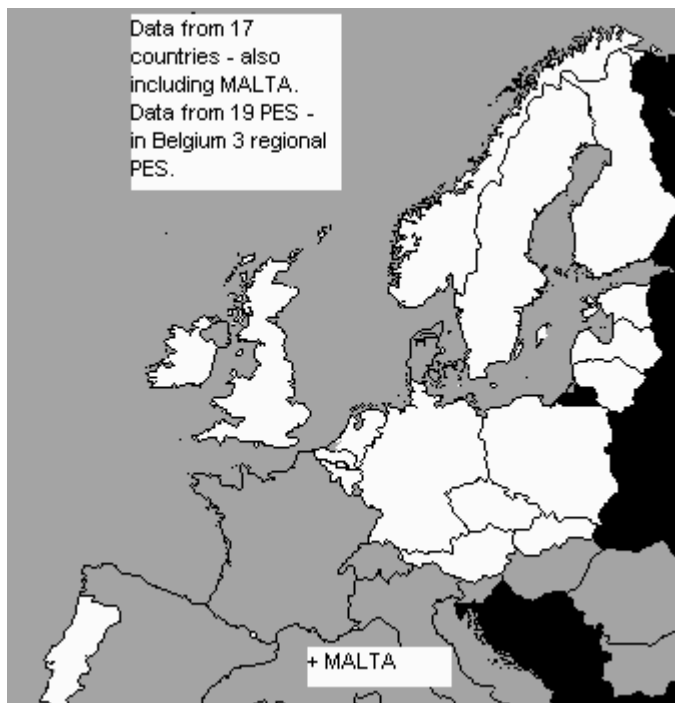
availability of observation instruments. Exploring that new territory is one of the ambitions of the EPVM.

16.3. Actual results of EPVM vacancies and other sources

16.3.1. EPVM coverage

At present 17 countries with 19 PES provide data to the EPVM; a majority of EU-EEA countries are covered, comprising around 60 % of all salaried employment. Figure 16:1 shows the participating countries.

Figure 16:1 **EPVM coverage**



16.3.2. Overall increases in PES vacancy intake

In the 12 months to the end of September 2007, the total vacancy intake increased in most PES compared to volumes over the previous 12 months (ending September 2006). Therefore, the number of open choices for a mostly decreasing number of registered unemployed jobseekers continues to increase and competition for jobs relaxes. Also, other jobseekers who consult PES vacancies without registering find more job opportunities. The total vacancy intake and the percentage changes are shown in Table 16:1.

The total increase in PES vacancy intake amounted to 13 %, nearly 1.25 million additional vacancies.

Only Estonia experienced a substantial decrease in vacancy intake, thus far for unknown reasons. In Germany the vacancy intake decreased slightly. This relates to notified vacancies for regular jobs only, as the EPVM excludes subsidised jobs and mini-jobs for which no social contributions have to be paid. In the Netherlands, the EPVM refers to job vacancy intake for active services, which also decreased slightly. Similarly, Slovakia experienced a small decrease of vacancy intake.

Table 16:1 **Total PES vacancy intake in 12 months up to Q3-2007**

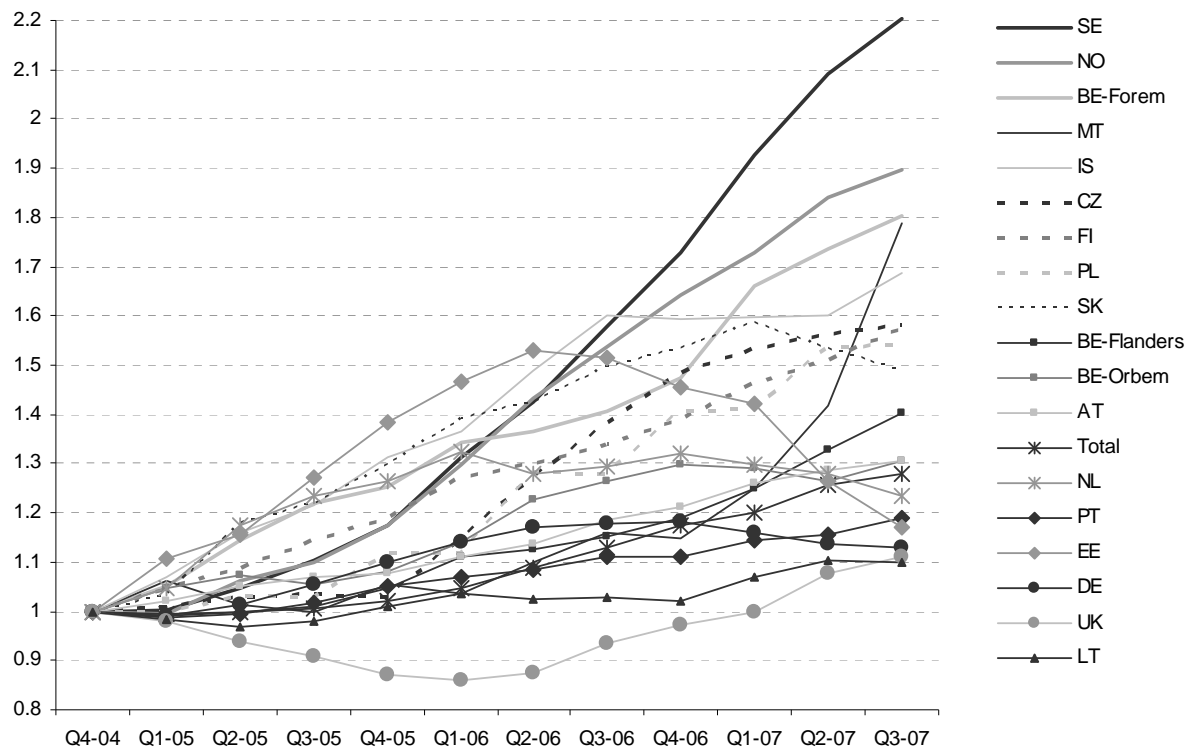
| | Absolute | Compared to previous 12 months |
|-------------------|-----------------|---------------------------------------|
| Austria | 361 000 | 10 % |
| Belgium, Flanders | 149 000 | 22 % |
| Belgium, Orbem | 17 000 | 4 % |
| Belgium, Le Forem | 123 000 | 28 % |
| Czech Republic | 189 000 | 14 % |
| Estonia | 24 000 | -23 % |
| Finland | 503 000 | 18 % |
| Germany | 2 157 000 | -4 % |
| UK | 4 008 000 | 19 % |
| Ireland | 157 000 | 5 % |
| Latvia | 39 000 | N.A. |
| Lithuania | 136 000 | 7 % |
| Malta | 13 000 | 54 % |
| Netherlands | 285 000 | -5 % |
| Norway | 384 000 | 23 % |
| Poland | 1 206 000 | 20 % |
| Portugal | 108 000 | 7 % |
| Slovakia | 98 000 | -1 % |
| Sweden | 792 000 | 40 % |
| Total 19 PES | 10 749 000 | 13 % |

Note: Figures for Poland refer to the 12 months ending end of June 2007. Figures for Latvia relate to three quarters ending June 2007.

Source: EPVM.

For the vast majority of PES, increased vacancy intake is the key characteristic since early 2004. Figure 16:2 ranks countries from highest increase since 2004 to lowest increase. Few countries deviate from the overall pattern: Estonia with a steady decrease starting again mid-2006; the UK that is only recently reaching above the level of 2004; Slovakia, Germany and the Netherlands starting to decrease slightly again in 2007.

Figure 16:2 12-month moving totals of PES vacancy intake



Source: EPVM.

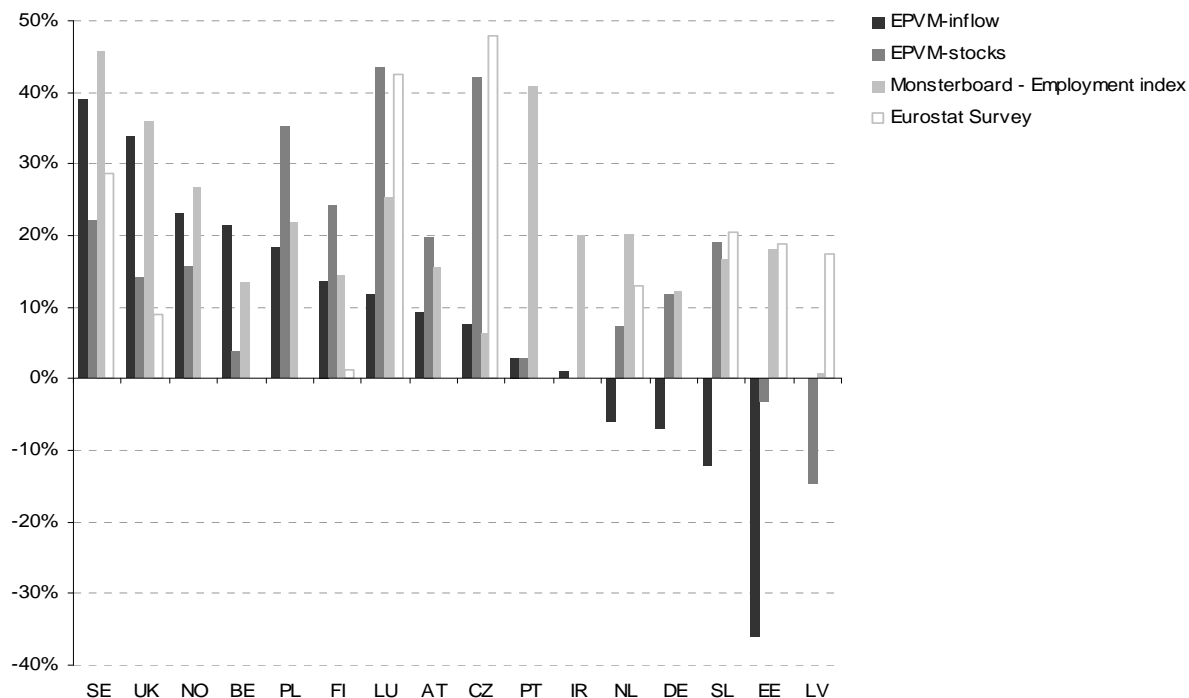
16.3.3. EPVM as a total vacancy indicator

Vacancies notified to PES are not automatically a representative picture of the market at large. Depending on the national regulations and practices, correlation may vary and make cross-country comparison difficult.

Different sources of information are becoming available, each having its own strengths and weaknesses. These sources can be used to construct a bridge between knowledge of PES business with vacancies and the objective of also obtaining a better idea of the larger vacancy market.

Figure 16:3 pictures changes in vacancy volumes as observed by EPVM, Monster employment index and Eurostat vacancy surveys. For EPVM both a flow indicator and a stock indicator are presented. The figure portrays the first quarter for which a comparison has actually become possible for a reasonable number of countries (eight): the second quarter of 2007. It ranks the change in PES vacancy intake from the highest (the UK) to the lowest country (Estonia).

Figure 16:3 Increase in vacancy volume by three measuring instruments



Source: EPVM, Eurostat vacancy survey, Monster employment index.

The newly emerging measuring instruments can only be presented in comparison for one quarter. The picture might change when later more information is available, allowing a longer-term view.

Eurostat surveys show some level of increase for all countries. The Monster employment index, limited to vacancies published on vacancy Internet sites, shows developments in the same positive direction but the level of increase is often different from that indicated by the surveys. Sometimes the observed increase is higher (as in the UK); sometimes considerably lower (as in the Czech Republic). The PES vacancy intake follows a sometimes different pattern, even showing a reduction where other measuring instruments indicate an increase, as can be seen at the right side of the figure.

PES vacancy stocks relate more closely to the concepts measured by the Eurostat vacancy surveys and by the Monster employment index but its performance compared to the PES vacancy intake indicator is not unequivocally better.

16.3.4. Comparison for nine major occupational groups (ISCO 1-digit)

In collecting information on a disaggregated level, notably on occupational classes, one observation instrument falls out: the Eurostat surveys.

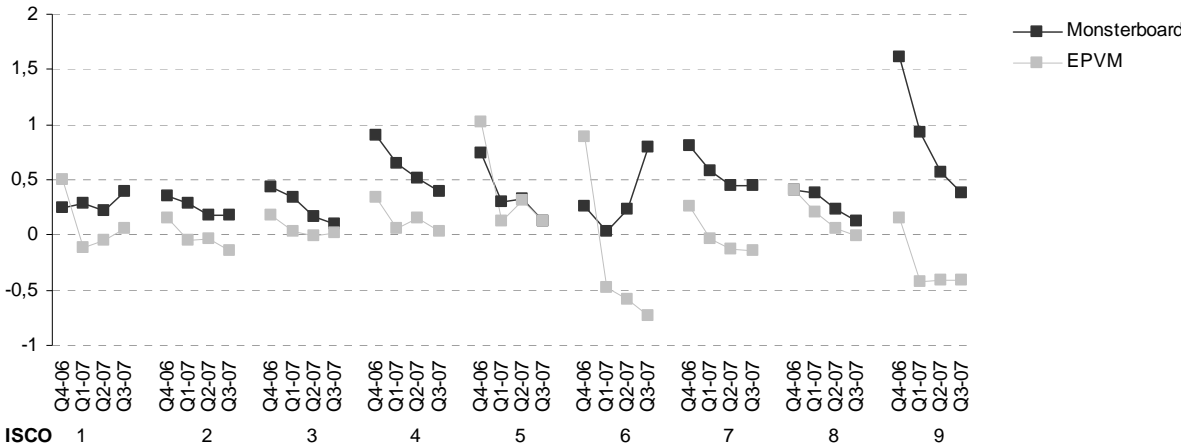
Between PES EPVM data and the Monster employment index, a comparison can, at this point in time, be made over four consecutive quarters for nine distinct major occupational classes (ISCO 1-digit). This is at present only possible for four countries: Germany, the Netherlands, Sweden and the UK.

Neither of these measuring instruments necessarily gives a representative picture of the total vacancy market. The Monster employment index is limited to vacancies published; vacancy intake via these sites may, over time, reflect variable rates in major national Internet sites specifically vacancies dealt with by temporary work agencies (this is confirmed by Monsterboard spokesmen). Further, a possible overlap is not considered. In boom times, vacancy duplication may increase.

Nevertheless, both measuring instruments together give more certainty about the direction and size of vacancy market change, in particular when their results move in the same direction.

In the following figures, each quarter shows the change compared to the same quarter one year before.

Figure 16:4 **Year-to-year increase per quarter for ISCO major occupational groups as observed by EPVM and Monsterboard, the Netherlands**



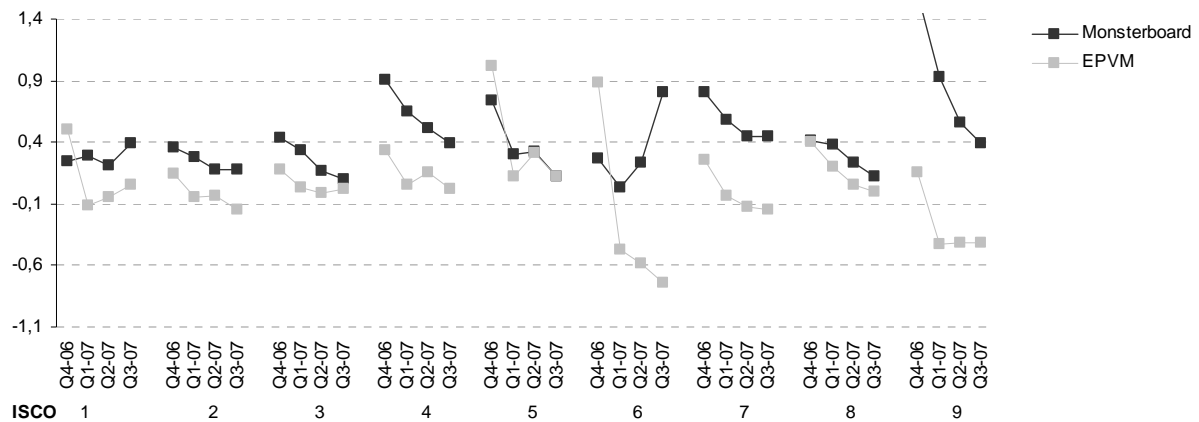
Source: EPVM, Eurostat vacancy survey, Monster employment index.

In the Netherlands both measuring instruments have limited overlap as regards the vacancy samples on which they are constructed, because the EPVM data for that country do not yet include vacancies directly notified by employers on the PES vacancy portal site (<http://www.werk.nl>).

In the majority of occupational segments, the Dutch example shows higher increases for Monsterboard than for EPVM data in most quarters. Also, where EPVM shows a reduction, Monsterboard may still reflect an increase (see for instance the last three quarters for category 7, crafts and related trades workers).

From one quarter to the next, developments often more or less follow the same pattern; see for instance the same category 7.

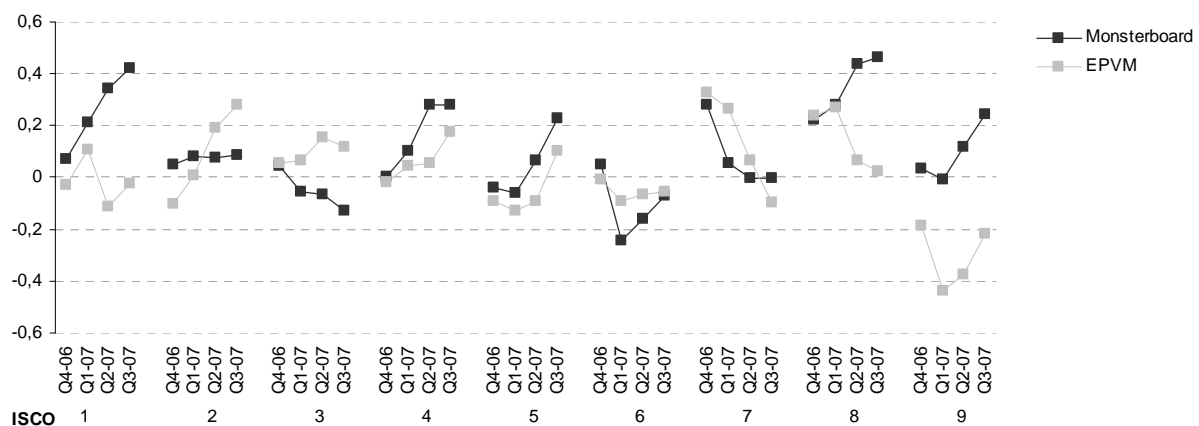
Figure 16:5 Year-to-year increase per quarter for ISCO major occupational groups as observed by EPVM and Monsterboard, Sweden



Source: EPVM, Eurostat vacancy survey, Monster employment index.

Sweden shows a year-to-year increase per quarter for ISCO major occupational groups for both sources, the only exception being two quarters in category 6. For 'skilled agricultural and fishery workers' the EPVM shows a reduction, while Monsterboard still shows a small increase. However, this is a rather small category, with few vacancies.

Figure 16:6 Year-to-year increase per quarter for ISCO major occupational groups as observed by EPVM and Monsterboard, Germany

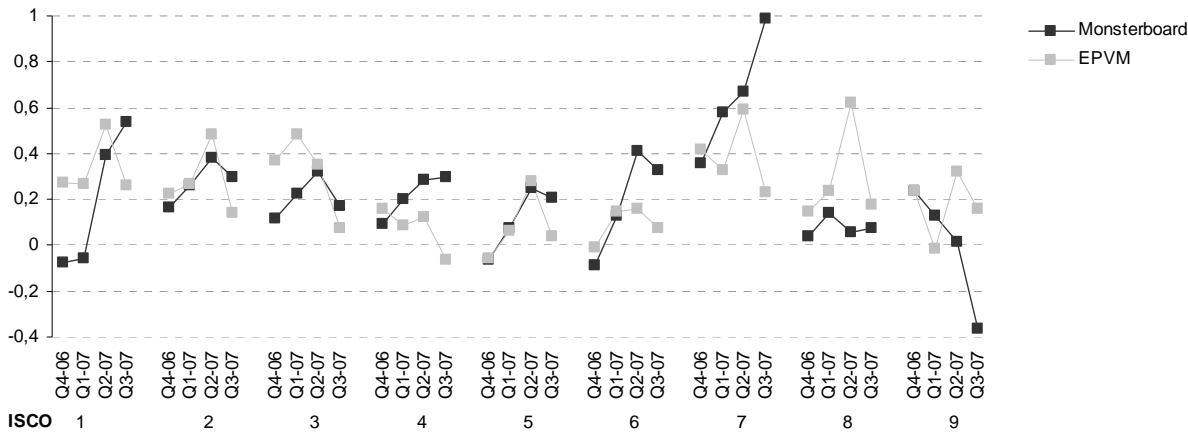


Source: EPVM, Eurostat vacancy survey, Monster employment index.

In Germany, categories 4 to 7 develop quite close in both EPVM and Monsterboard. The differences in categories 1 and 2 may be the result of differences in the coding system. The German PES classification system focuses on occupations, while the ISCO category 1 refers to the job status. For this reason, not all PES vacancies can clearly be recoded to ISCO. For

example, an engineer is by occupation in category 2 while an electrical engineering technician is category 3; both may have a job as a production and operations manager, which is in category 1. The increase in total job vacancies was greater in Monsterboard than in the EPVM, possibly because the Internet is increasingly also a platform for lower qualified job vacancies. If this is the case, the increase in categories 8 and 9 of the Monsterboard vacancies would be an increase of market share in this segment of the labour market.

Figure 16:7 Year-to-year increase per quarter for ISCO major occupational groups as observed by EPVM and Monsterboard, the UK

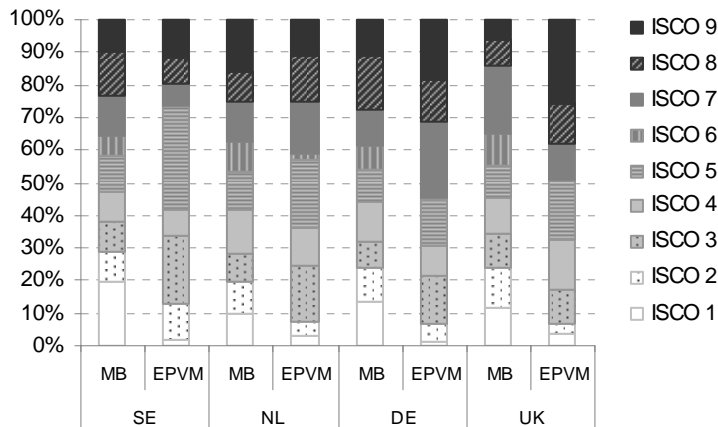


Source: EPVM, Eurostat vacancy survey, Monster employment index.

In the UK, most categories (2, 3, 5, 6) shows the same development but three categories (7, 8 and 9) have one observation point each where the development in both sources is rather different. In category 1 there was a reduction in two quarters for Monsterboard, though an increase in EPVM (in all quarters). This category plays a bigger role in Monsterboard than in the EPVM; there are perhaps certain vacancies, such as jobs for managers, that are more likely to be found on the Internet than in the PES. Also the Internet might have gained market share here.

The vacancies in these two sources are generally not the same. Monsterboard receives its vacancies from the Internet, while the PES in the different countries work with vacancies notified to their organisation. The occupational composition of the sources is quite different, and also between the countries, as displayed in Figure 16:8.

Figure 16:8 The relative importance of ISCO categories 1-9 in Monsterboard and EPVM



MB = Monsterboard.

Sources: EPVM and Monster employment index.

16.3.4.1. Differences between PES and Monsterboard

The Internet usually has a higher proportion of job vacancies with higher qualifications than in the PES. Figure 16:8 confirms this, Monsterboard having a higher share of vacancies in category 1 and, except Sweden, also in category 2 compared to EPVM. Categories 4-8, referring to ISCED 2 (comprising first and second stages of secondary education) play a bigger role in the EPVM, with some exceptions for single categories. It is interesting to see that vacancies for skilled agricultural and fishery workers (category 6) are more apparent in Monsterboard. In the UK, elementary occupations (category 9) have a 26 % share in the EPVM, but only 6 % in Monsterboard. This difference is smaller for Germany and Sweden, and in the Netherlands the share of category 9 vacancies is bigger in Monsterboard than in EPVM.

16.4. PES vacancies and EURES

The purpose of EURES is to provide information, advice and recruitment/placement (job-matching) services for workers and employers. Set up in 1993, EURES is a cooperation network between the European Commission and the public employment services of the EEA Member States (the EU Member States plus Norway, Iceland and Liechtenstein) and other partner organisations.

One important part of EURES is the job mobility portal, currently holding about a million vacancies daily and more than 100 000 CVs. Most of the vacancies are made available by the national PES providing (the majority of) their notified vacancies and sometimes also the vacancies collected via the PES vacancy portals. The Internet site registers about one million visitors a month.

The question is whether EURES is a usable source for European vacancy statistics and a possible alternative to the EPVM.

Looking at the structure of the EURES Internet portal this seems feasible: EU Member States are supposed to make all their PES vacancies available in EURES. It has the same structure for all countries, so that statistics would have the same base, and it has a breakdown of ISCO and often also of NACE. They can also be broken down to NUTS regions. There are several items saved with additional information for each vacancy, for example creation and closing date should make it possible to calculate inflow and duration. EURES provides a rich source of information and could be a good basis for cross-country comparisons.

However, there is still a considerable gap between theory and practice:

- (a) the statistics that can presently be derived from the EURES Internet portal only carry some basic information, such as total daily stocks and a breakdown by country and region. These data are available only for the actual day, not yet for the previous day let alone as time series. Information has to be stored over time;
- (b) the quality of vacancies in the EURES Internet portal varies from country to country, especially concerning the classification of vacancies to the harmonised ISCO system. Statistics using these figures would not be comparable on a country to country basis;
- (c) a lack of comparability also applies to quantity: not all EU Member States provide all their notified vacancies, and the exceptions are not the same for each country.

What has to be done to make EURES a good source for harmonised vacancy statistics? Most important would be to solve the coding problems that exist in some countries. One should also make sure that conventions, such as what kind of vacancies have to be made available in EURES, are followed by all. At least information on exceptions should be clear. Duplication of vacancies also seems to be a problem in some countries and must be avoided where possible.

These problems have to be solved and technical amendments have to be made to enable the extraction of statistics directly from the EURES system. These issues could possibly be dealt with within the framework of the web services quality project that was recently launched.

16.5. Conclusions

Since the BA-X spreads observations over a wider number of recruitment channels and methods, it will likely have a better performance over time in close-to-reality picturing trends in the total vacancy market. And it will do that rather rapidly and at low costs. But it still has to

be applied with prudence, as is shown in the above comparative analysis. Other observation instruments (Survey, Monster employment index, PES notified vacancies, etc.) should be of help in that respect.

Other PES could attempt to develop similar devices. The combination of the expanding PES vacancy-Internet sites and the traditional data of the EPVM can be a start. The Monster employment index will be of help in interpreting the changes as measured by the PES vacancy Internet site. If a robot (a web crawler) is not yet available, additional indicators could be derived from using information out of newspapers and other media (as Ireland, Malta and Norway already do).

The big challenge remains to create an observation instrument that is also capable of tracing changes in smaller segments of the labour market. This is not yet done by the BA-X, which is limited to an overall market observation. But perhaps this will be solved in the future.

The Eurostat vacancy surveys provide some limited breakdown to business sectors (11 NACE classes). This can be compared quarterly with sectoral breakdowns of PES vacancies that most PES can make. Also the Monster employment index carries information on NACE classes. In addition, it provides a breakdown to nine major occupational groups that can be combined with the PES vacancy information leading to two complementary observations, which tell more than a single one does.

However, it is and remains only the PES itself that can make further breakdowns to more detailed occupational classes and business sectors. This, therefore, is the unique value of the EPVM at European level. Supported by the more aggregated information from other observation instruments, these more detailed EPVM data can be read with greater confidence.

The key message is clearly the need to support analyses by the most aggregated information possible and to benefit from different kinds of observation methods to be complemented by qualitative tools. This is especially needed when facing challenges like labour-market bottlenecks and skill deficits in a globalised context.

Reference

Council of the EU. Council resolution of 15 November 2007 on the new skills for new jobs (2007/C 290/01). *Official Journal of the European Union*, 4 December 2007, C 290, p. 1-3.

17. Measuring recruitment difficulties in Europe

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Abstract

In a project for the European Commission aiming at improving the use of public employment services (PES) data to monitor bottlenecks on the European labour market, an inventory of statistical sources available in 15 countries to measure recruitment difficulties was set up in the last quarter of 2005. This inventory shows that recruitment difficulties are considered an important topic in most of these countries.

PES data, which are very detailed, are in most cases used to give indications about these difficulties. However, they provide indirect information, and have to be linked – whenever possible – with survey results, which make it possible to observe recruitment difficulties as they are experienced by employers. This link between PES data and survey results may prove quite useful, given that skills shortages or gaps are only a specific part of recruitment difficulties.

17.1. Introduction

Since 2001, public employment services (PES) vacancies have been used by an expert group set up by the European Commission to examine recruitment difficulties on the European labour market. However, the European PES vacancy monitor (EPVM), which was designed for this purpose, raised methodological problems.

During 2005-07, the Commission funded a project to improve this situation, and to give perspectives about the monitoring of European recruitment difficulties. This project was headed by the ANPE (France), and was carried out with the cooperation of the Norwegian Labour and Welfare Organisation, the National Research Institute for Mathematics and Computer Science (the Netherlands) and the National and Training Employment Authority of Ireland.

Part of what follows is derived from the results of this project. In particular, members of the expert group were asked to document every source they knew in their country that provided quantitative information on recruitment difficulties. An inventory (Zanda, 2006) of these sources was derived from their answers.

After examining the contribution of PES and surveys to measuring and understanding recruitment problems, the purpose of this paper is to show the importance of linking the two types of information source, and to consider the varied nature of recruitment difficulties when using these data.

17.2. PES data

PES data on recruitment difficulties are not only used at European level. In contributing countries, they are used to monitor national recruitment difficulties.

There are two main ways to analyse PES data:

- (a) the duration of vacancies: the idea is that the more time a vacancy takes to be filled, the more difficult the recruitment is supposed to be. Duration by occupations is compared to a central value (average or median). This may lead to self-evident results, especially if the same central value is used for comparing all occupations: it takes more time to recruit a financial director than a barman, for example. But it may provide useful information when using time series: if the delay required for filling a vacancy is lengthening, it may indicate that recruitment difficulties are developing;
- (b) the relationship between registered vacancies (job offers) and registered jobseekers is based on the idea is that if there are more vacancies than jobseekers, there may be a problem filling these vacancies. A high ratio (tension indicator) does not automatically imply that employers have recruitment difficulties: it can be that specific positions are not matched because jobseekers rarely state that they are looking for a particular kind of occupation, yet there is no problem finding people to do the work.

For this reason, among others, the tension indicator is not used alone. The analysis takes into account other indicators, such as the exit rate of jobseekers, the development of labour demand and supply, the fact that the contracts in an occupation are long- or short-term and so on.

On the whole, PES data only give indications that there may be recruitment difficulties in a labour-market segment; to be more reliable, the analysis requires other information.

Several PES (in Belgium, Finland, Sweden) use a Delphi method to analyse the results given by these quantitative methods. They ask PES counsellors and/or experts to validate or invalidate the occupations as being subject to recruitment problems.

This type of observation device will always imply certain recruitment difficulties because there are always occupations above the central value. These methods mostly offer indirect information.

17.3. Surveys

In fact, it is not possible to confirm that employers have recruitment difficulties if the employers do not say so. A 'difficulty' can be stated when an appreciation – which is partly subjective – is given about a situation. Surveys are the best way to collect this information on a large scale.

Table 17:1, derived from the inventory mentioned above, shows that there are different kinds of surveys that provide information about recruitment problems. Leaving out PES data in the first column and other indirect data in column 7, it is possible to distinguish several configurations:

- (a) ad hoc recurrent surveys (column 2) are specifically designed to measure recruitment difficulties and are carried out on a regular (mostly yearly) basis; as they imply high

collection costs, they serve strong interest in this matter; use is rare, but not exceptional ⁽⁴³⁾;

- (b) surveys of the labour market (column 3) deal with more general topics: for example employment and its development, hiring during the reference period, that anticipated in the near future, the recruitment channels, and sometimes economic characteristics likely to have an impact on the management of employment (activity, investments, etc.); here, few questions are asked about recruitment difficulties;
- (c) the job vacancy surveys (column 4) also deal with the situation of the labour market and could, therefore, be included in that which precedes; nevertheless, the vacancies sit within a multiplicity of topics treated in general labour market surveys; the aim is to measure and characterise precisely labour demand at a given moment;
- (d) the economic situation surveys (column 5) are numerous and are carried out in all countries by public (often institutes of statistics) or private bodies, to observe the development of the business cycle as it is perceived by firms; these surveys frequently comprise questions relating to the labour market and, within this framework, the subject of recruitment difficulties may be approached; when it is, it is generally only in a peripheral manner, and the brevity of the question(s) does not allow detailed analysis of the phenomenon;
- (e) the occasional surveys (column 6) have been implemented only once (or twice), whereas all those that were examined so far are carried out regularly, even if their periodicity can be variable. Nevertheless, they are numerous; their purpose is often to provide more structural or more 'qualitative' information on recruitment difficulties. Contrary to the recurrent surveys, which result largely in standardising the collected data to permit comparability over time, it is possible to adopt a more exploratory perspective to identify the various facets of the problem, the various types of difficulties encountered when recruiting, and even the definition of the phenomena studied; also, some of these surveys cover specific segments of the labour market.

⁽⁴³⁾ In Belgium, the same source was mentioned by three PES and is, therefore, indicated between parentheses, but is counted only once. Due to institutional changes, the situation in Denmark could not be described when data was collected.

Table 17:1 **Statistical sources allowing measurement of recruitment difficulties**

| PES | PES Data (1) | Ad hoc recurrent survey (2) | Labour market survey (3) | Job vacancy survey (4) | Economic survey (5) | Occasional survey (6) | Diverse data (7) |
|---------------|-----------------|--------------------------------------|-----------------------------------|---------------------------------|---------------------------|-----------------------------|------------------------|
| Austria | | | | | | 2 | |
| Belgium,Forem | 1 | (1) | (1) | | | | |
| Belgium,Orbem | 1 | 1 | 1 | | | 1 | |
| Belgium,VDAB | 1 | (1) | (1) | | | | |
| Denmark | | | | | | | |
| Finland | 1 | 1 | 1 | 1 | 1 | 2 | |
| France | 1 | | 2 | | 1 | 3 | |
| Germany | | | 2 | 1 | 3 | 3 | |
| Ireland | 1 | | | 1 | | | 2 |
| Italy | | | 3 | | 1 | 1 | 1 |
| Lithuania | 1 | | 1 | 1 | | | |
| Netherlands | | | 1 | 1 | | | 4 |
| Norway | 1 | 1 | | | 1 | | |
| Slovenia | 1 | | 1 | | | | 1 |
| Spain | 1 | | | | | | 2 |
| Sweden | | 1 | 2 | 1 | 1 | | |
| UK | 1 | 1 | | | 2 | | |
| Total | 11 | 5 | 14 | 6 | 10 | 12 | 10 |

Information derived from survey results varies strongly according to the nature of the survey:

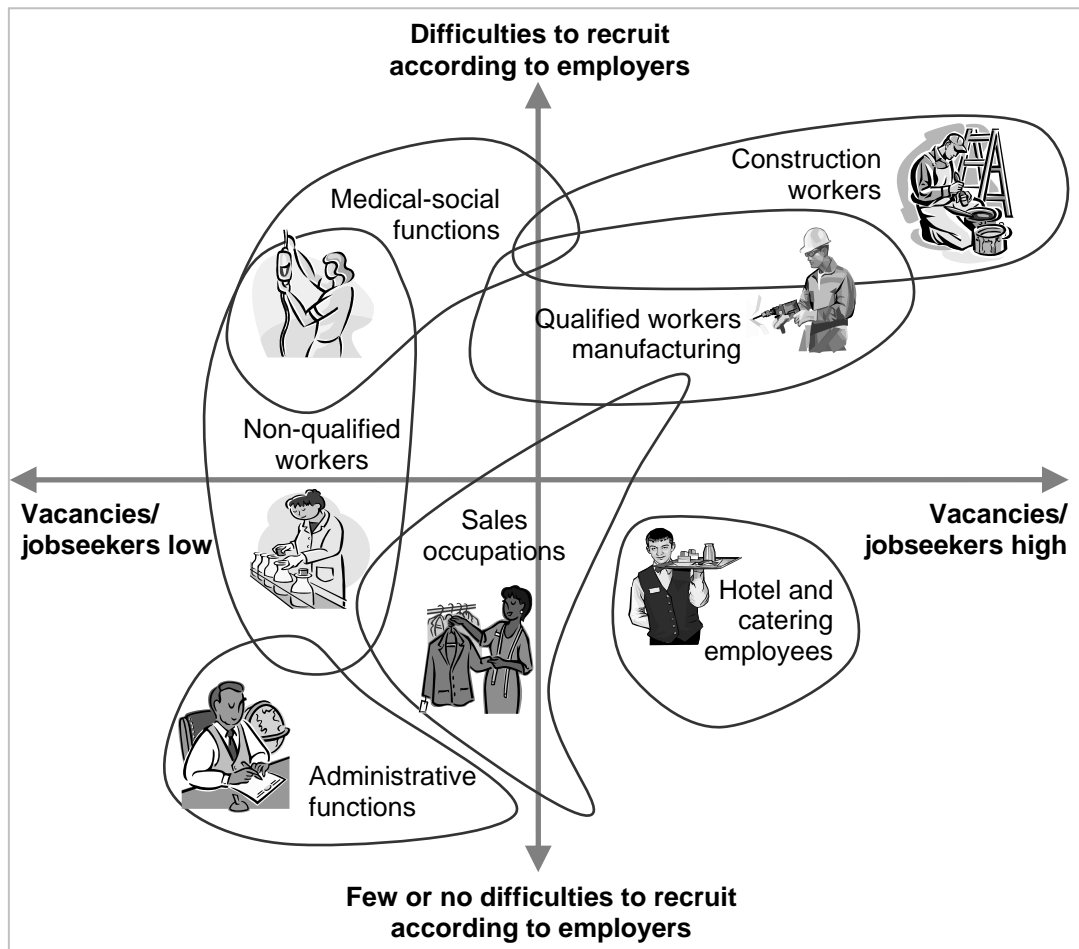
- there may be a single question asked about the problem of recruitment difficulties or a thorough examination of the situation;
- surveys may be conducted regularly, which may provide time series, or be realised only once;
- the mode of interrogation also has an impact on the type of results obtained: precise and complete data about occupations is not easy to obtain through telephone questionnaires, whereas these are the best way to collect the attitudes and judgements of employers.

17.4. Linking PES data and survey results

In most cases, both direct and indirect information (PES data) are available. The question is whether, if they are compared, both sets of results match?

Pouquet (Coffy and Pouquet, 2008) made the comparison in France between the level of the 'tension indicator' and the results of the *besoins de main-d'œuvre* (need for workforce) survey, which is a postal survey where employers are asked to indicate in a template how many people they intend to recruit by occupation (in a list of 101 occupations) and, for each of the occupations they choose, if they anticipate recruitment difficulties.

Figure 17:1 **The tension indicator and recruitment difficulties stated by employers**



Sources: ANPE-DARES; Crédoc-Unédic, enquête BMO-2006.

The match between the two sets of information is generally good but Figure 17:1 shows that it is not perfect: some occupations are not on the diagonal, either because employers frequently declare recruitment difficulties whereas the tension indicator is not very high (medical-social functions) or the opposite (hotel and catering employees).

If this is so, why use PES data and not only survey results? These results have at least two main advantages. First, they are in some cases more explicit about the nature and the causes of recruitment difficulties, and give a more direct measure of these, even if this measure must be considered with caution (especially regarding their level, which depends strongly on the wording of the questions). Second, survey results give a picture of the whole labour market, as the establishments that are interrogated are not only those which notify vacancies to the PES.

PES data give indirect indications and represent only part of the labour market, which varies according to occupations or activity sectors. However, they are available quite quickly, for any time period and at no extra cost. They are also numerous and detailed, and for that reason allow in-depth analysis: many segmentations are possible, and results remain reliable for some precise categories

For instance, the Eurostat vacancy survey gives a yearly breakdown by occupations only at the one-digit level of the ISCO-88 classification. PES data provides information at the most detailed level available in the PES classification (466 occupations in France), throughout the year.

It also provides – for every single vacancy – information about wages, about the nature of the contract (short term/long term), about working time (full time or part time), etc. This is the case for flows, not only for vacancies observed at a given moment in time (stocks). Finally, PES data allow a direct link between labour demand and supply by occupations, which should not be possible with any other source. Therefore, even if it is only on a share of the market, and even if it is indirect, PES data give much more detailed information for formal characteristics.

As both PES data and survey results have their own advantages, the best way to make reliable and in-depth analysis about recruitment difficulties is to combine these two kinds of information, which means building a link between them. This task is not easy and raises methodological problems but this is also the case if results of different surveys have to be compared. If these links are built, a thorough view of recruitment difficulties may be obtained.

One useful way to proceed is to try and understand discrepancies between results. For instance, in the case of hotel and catering occupations, many short-term contracts are registered – which is a characteristic of the business sector – and this causes the ‘tension indicator’ to stay rather high; for medical functions, the market share of the PES seems rather low, which contains the value of the indicator. These examples indicate that the reasoning cannot be the same for the entire labour market, and that it is useful to focus on specific segments when linking different sets of data.

17.5. Occupations and skills

Survey data as described in the inventory rarely give information about occupations. When they do, the occupations described are often only those subject to recruitment difficulties.

Information about skills is even rarer. In the inventory, only the British surveys seem to treat this subject; these were presented and discussed in Cedefop’s working group in Bucharest.

The national employer skills survey (England), asks: have you found the following skills difficult to obtain from applicants? (information technology, communications, customer handling, team working, foreign language, problem solving, management, numeracy, literacy, administrative skills). The fact that the survey is commissioned by the Department for Education and Skills in partnership with learning and skills councils explains the interest in this kind of information.

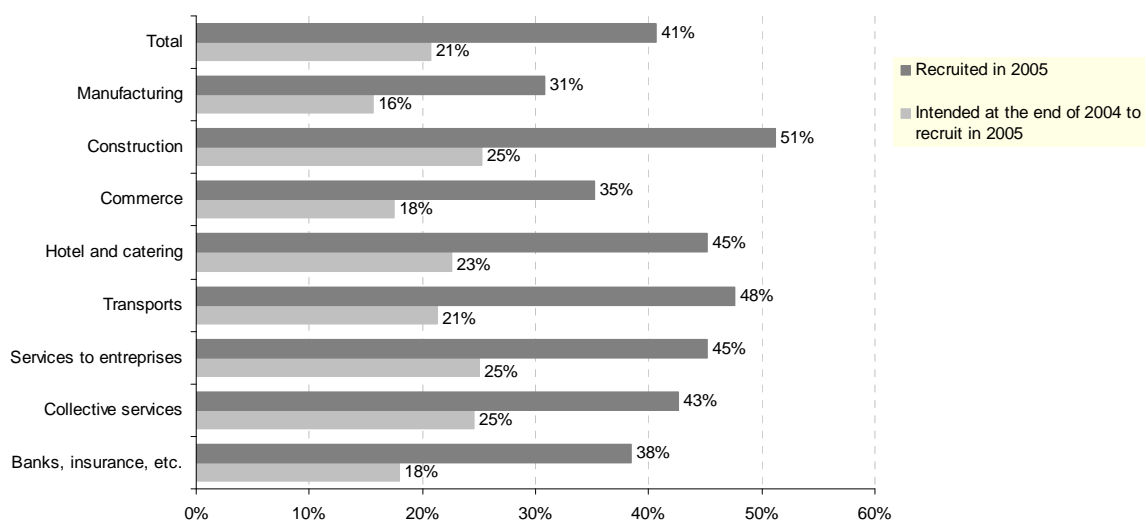
As the inventory was devoted to recruitment difficulties, the documents supplied did not have to describe surveys that focus specifically on skills. Surveys generally do not treat this topic, although there should be, in principle, no obstacle to doing so.

There are limitations to such an exercise, as there are to collecting information about occupations. One of the limitations is the doubt that enterprise surveys are a good way of

getting direct information about future skill needs, as employers are not in a good position to anticipate these needs.

Even regarding their labour demand for the coming year, employers are cautious. Figure 17:2 shows that, in the *anticipations des entreprises* survey of ANPE, those who had recruited (at least once) during 2005 were nearly the double of those who had said they would at the end of 2004. This type of situation repeats every year, and may also be observed through the *besoins de main-d'oeuvre* (need for workforce) survey.

Figure 17:2 **Establishments intending at the end of 2004 to recruit in 2005 and those having recruited in 2005, by industry**



Source: ANPE – anticipations des entreprises survey.

But this limitation should not hinder asking employers about the skills they need at present: there is no reason why surveys should not be a good tool to observe immediate skill needs. It would be useful to explore this possibility and a first step could be to include a few questions on this topic in some existing surveys. Regarding the future, time series derived from survey results could provide a good means to analyse what may happen beyond an immediate horizon.

17.6. Conclusions

Recruitment difficulties and skill needs are two different subjects, but they are frequently associated in the sense that recruitment problems are often spontaneously related to skills shortages (or gaps). This relationship is often made by employers themselves, when they are asked how they explain these problems. However, employers who experience difficulties when recruiting are not in the best position to analyse the causes of these difficulties. For instance, in the ANPE survey of 2000, 57 % of those who had had such problems said that it

was necessary to have a car to go to the workplace, but they did not establish a relationship between this and the lack of suitable candidates.

The causes of recruitment difficulties are diverse, and correspond to different types of situation. The most frequent of these situations recruiting is, in itself, a difficult process for many employers, and especially for those not used to it (generally the case in small establishments). For instance, Table 17:2 shows that employers in larger establishments know well if the proposed salary is competitive in the market, but that in establishments of less than 10 employees, nearly one in five employers experiencing recruitment difficulties does not know what the market salary is.

Table 17:2 Rating of proposed salary by employers experiencing recruitment difficulties

| Number of employees | Compared with that of the market this salary is: | | | | | | |
|---------------------|--|-------------|-----------------|----------------|------------|----------|---------------|
| | % | much higher | slightly higher | slightly lower | much lower | the same | does not know |
| Total | 100 | 9.1 | 22.0 | 4.7 | 0.8 | 46.7 | 16.7 |
| < 10 | 100 | 9.9 | 22.3 | 3.8 | 0.8 | 45.2 | 18.1 |
| 10-19. | 100 | 6.6 | 23.2 | 5.0 | 1.0 | 50.1 | 14.1 |
| 20-49. | 100 | 3.1 | 17.6 | 11.6 | 0.0 | 55.2 | 12.5 |
| 50 and + | 100 | 10.3 | 21.4 | 10.2 | 0.8 | 53.7 | 3.6 |

Source: ANPE – Enquête difficultés de recrutement (2000).

There are other illustrations of recruitment difficulties that may be regarded as ‘normal’ (which does not mean there is nothing to do about these situations), and that represent the bulk of recruitment difficulties in many Member States. This type may also be considered as ‘cyclical’, varying with the business cycle.

Other types of recruitment difficulties can be suggested: ‘endemic’ situations characterise segments like the construction sector, where problems were encountered attracting and retaining a labour force over a long period; ‘circumstantial’ difficulties were met in the ICT sector at the end of the 1990s (and decreased afterwards), because of the 2000 bug, the conversion to euro, and the development of the Internet, all factors with no direct link with the business cycle; ‘labour shortages’ should be invoked only when there is evidence that this specific cause has an impact, which may be the case in some local areas, or on the opposite in countries like Ireland, where the strong and durable economic growth resulted in an insufficient labour force and very low unemployment.

Even if they are briefly mentioned here, these various types of recruitment difficulty should make clear that many factors causing these problems have little to do with skill shortages and that many other factors have an important impact. Therefore, more training is not necessarily the remedy for recruitment difficulties; it may even be counter-productive. To be more efficient, research and public policies should distinguish situations where skill shortages are invoked simply as a general assumption, and where they are a real problem.

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18. Skill needs in enterprises: CVTS results

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Abstract

The European Survey of Continuing Vocational Training in enterprises (CVTS) is the only data source that provides detailed internationally comparable data on enterprise provided continuing training. CVTS3 took place in 2006 in the 27 Member States and Norway, relating to training activities and training policies of enterprises in 2005. CVTS2 covered 25 European countries, the reference period was 1999.

Below are findings, based on CVTS2 and CVTS3, on skill needs in enterprises. According to CVTS, enterprises' awareness of skill needs is rather low. Further, many enterprises have no procedures to assess future skill needs. The final section suggests some conclusions on the possible role of enterprise surveys like CVTS in the context of Skillsnet.

18.1. Introduction

Cedefop's medium-term forecast of occupational skill needs in Europe provides, for the first time, results for Europe as a whole. However, this purely quantitative forecasting alone cannot provide timely and reliable information on development of skill needs. Enterprise surveys might help to complement the forecast, adding their perspective on skill needs, i.e. the perspective of those deciding on forms of work organisation, defining tasks and offering jobs.

This paper contributes to the discussion on enterprise surveys as a possible tool for analysis of skill needs. The European continuing vocational training survey (CVTS) is taken as an example. It starts with a brief description of the survey. The main part of the paper presents results of CVTS2 and CVTS3 on skill needs and training needs in enterprises. The last section suggests some conclusions.

18.2. Data sources: continuing vocational training surveys

CVTS is a European enterprise survey focused on continuing vocational training (CVT) in enterprises. It has been conducted for the reference years 1993 (CVTS1), 1999 (CVTS2) and 2005 (CVTS3). As of CVTS3 it is based on a regulation (European Commission, 2006) and will be conducted every five years. CVTS is now obligatory for Member States, but only in some countries are enterprises obliged to take part in the survey. CVTS3 covers 27 Member States and Norway. CVTS2, too, covered most of these countries, with the exception of Cyprus, Malta and Slovakia.

CVTS reports on enterprises with 10 or more employees ⁽⁴⁴⁾. It covers most sectors, but does not include the public sector (education, health) and some others ⁽⁴⁵⁾.

CVTS results are published on Eurostat's homepage ⁽⁴⁶⁾. All tables and figures in this paper are based on Eurostat's tables.

The focus of CVTS remained unchanged since its beginnings; parts of the questionnaire, however, were subject to modifications. In addition, there are country-specific variations hampering comparability over time and across countries. The Federal Institute for VET (BIBB) with its partners, CÉREQ and ISFOL, is currently working on a research project commissioned by Cedefop to look into questions of quality and comparability, and to analyse CVTS3 results ⁽⁴⁷⁾. Results will be presented in due course.

18.3. Skill needs in enterprises

The questions on skill needs in enterprises were subject to pronounced changes in CVTS, making comparisons over time difficult. Both CVTS2 and CVTS3 have enterprises' views on the emergence of skill needs in the past. In addition, there is information on procedures in enterprise to assess future skill and training needs.

18.3.1. Past skill needs awareness

18.3.1.1. Results of CVTS2

CVTS2 asked enterprises about their skill needs in the past ⁽⁴⁸⁾. According to CVTS2, about half of the enterprises were aware that they had to obtain or develop new skills in the three years prior to the survey. There are strong variations between countries. In Denmark and in the UK almost all enterprises included in the survey identified skill needs (Figure 18:1); for Spain, the figure was one out of five. The share of enterprises that did not need any new skills during a period of three years amounted to 47 % on average. This is a rather disturbing result, contrasting with the diagnosis of changing and increasing skill needs reiterated in research and policy papers.

⁽⁴⁴⁾ Some countries extended coverage to include smaller enterprises. Results presented in this paper refer to enterprises with 10 or more employees only.

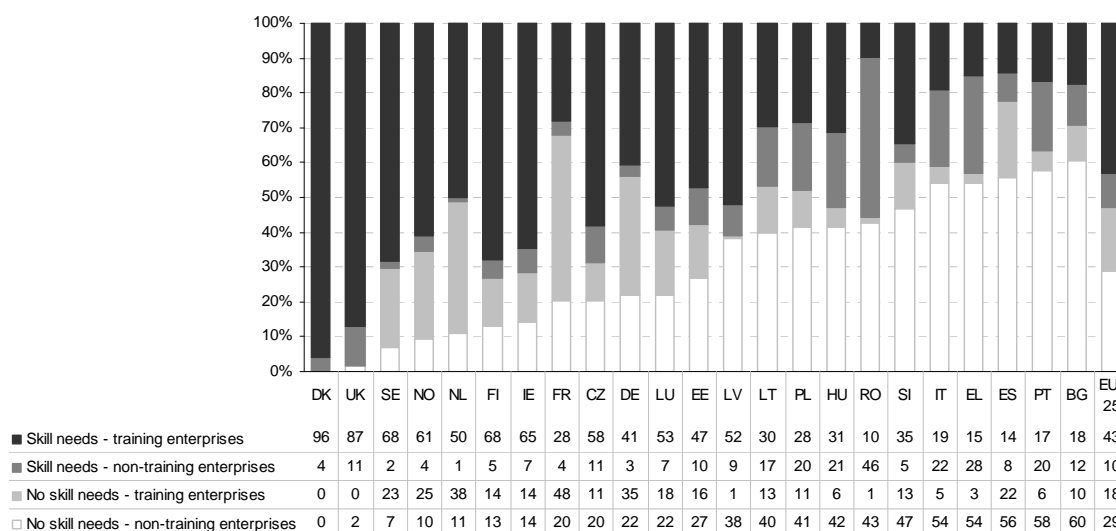
⁽⁴⁵⁾ CVTS covers the following sectors: manufacturing (NACE D); wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods (NACE G); financial intermediation (NACE J); real estate, renting and business activities (NACE K); other community, social and personal service activities (NACE O); other: mining and quarrying; electricity, gas, water; construction; hotels and restaurants; transport, communication (NACE C, E, F, H, I).

⁽⁴⁶⁾ At present (4.3.2008), data are flagged as provisional. Tables include 24 of 28 countries (Ireland, Italy, Slovenia and Finland missing) and only present selected survey results.

⁽⁴⁷⁾ Evaluation and interpretation of the third European continuing vocational training survey (CVTS3 Eva).

⁽⁴⁸⁾ The European manual for CVTS2 contains the outline questionnaire in English (Eurostat, 2000): question B3: over the last three years (1997-99) did you need to obtain or develop new skills for the enterprise? (Yes/No). The question was separated from those on training activities of the enterprises.

Figure 18:1 Skill needs in training/non-training enterprises, 1999



Note: Belgium and Austria not included due to unreliable or uncertain data.

Source: Eurostat New Cronos, CVTS2, retrieved 4 March 2008; own calculations.

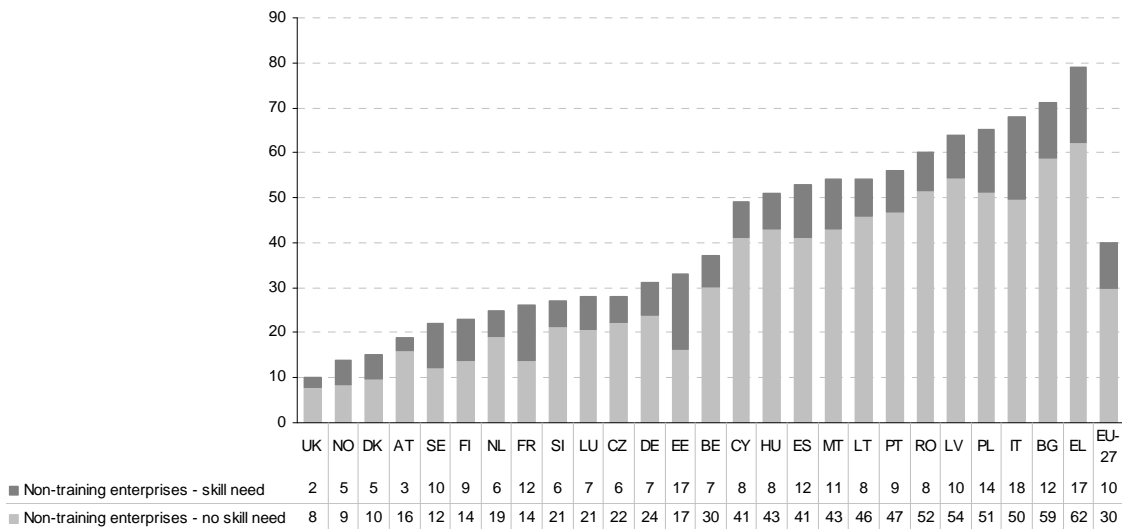
18.3.1.2. Results of CVTS3

In CVTS3, information on enterprise skill needs in the past is only available for non-training enterprises, and was not surveyed in a comparable way⁽⁴⁹⁾: what were the three most important reasons why the enterprise did not provide CVT courses nor other forms of CVT? In most countries, the majority of non-training enterprises did not perceive a skill need. In all but three countries 60 % or more of the non-training enterprises tick 'the existing skills and competences of the persons employed corresponded to the current needs of the enterprise' (exceptions are Estonia, France and Sweden). By combining with the share of non-training enterprises an estimate of perceived skill needs in a country is calculated and shown in Figure 18:2.

This is a rough estimate, not taking into account that there might be training enterprises also assessing that existing staff skills and competences were adequate (hence underestimation of the share of enterprises not perceiving a skill need). However, non-training enterprises may have ticked this item because it is an 'easy answer' and that perhaps matches social desirability. The estimated value of enterprises not being aware of skill needs is between around 10 % enterprises in Denmark, Norway and the UK and more than 50 % in Bulgaria, Greece, Italy, Latvia, Poland and Romania. For EU-27, Eurostat provides a mean of 30 %. A comparison with CVTS2 results is difficult and not possible in the context of this paper.

⁽⁴⁹⁾ See Eurostat (2006) for the outline questionnaire.

Figure 18:2 **Non-training enterprises and skill needs, in % of all enterprises, 2005**



Sources: Eurostat New Cronos, CVTS3 (provisional data), retrieved 9 September 2008; own calculations.

It is surprising that such a high proportion of enterprises, according to their answers in the questionnaire, did not perceive any need to enhance or widen the skills and competences of their staff. This raises questions of information about skill needs in enterprises.

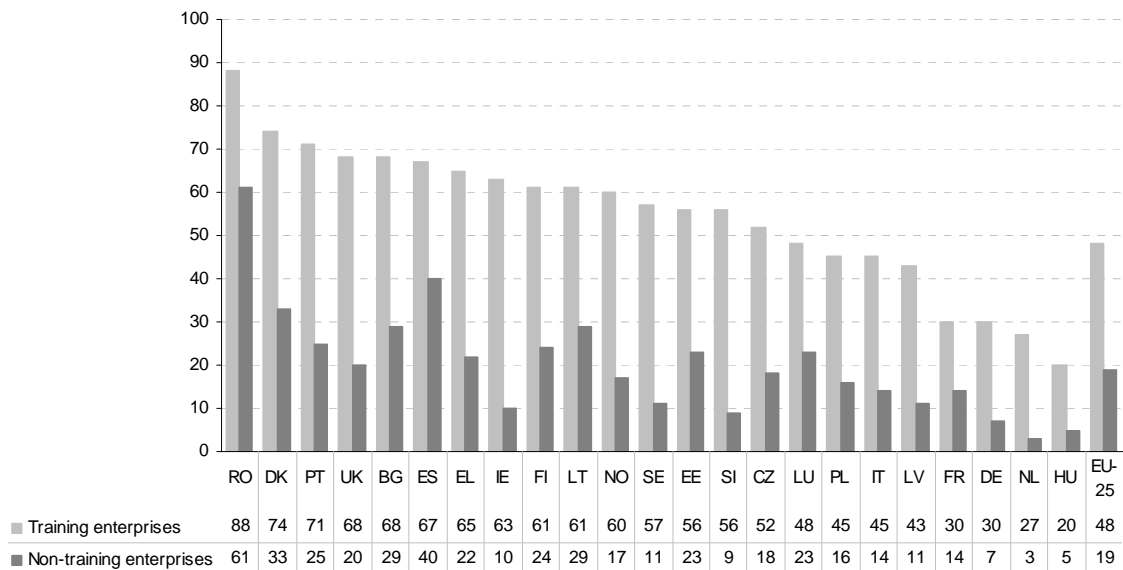
18.3.2. Assessment of future skill needs training needs

18.3.2.1. Results of CVTS2

What are enterprises doing to inform themselves about future skill needs? In CVTS2, there were two questions: one on assessment of future manpower and/or skill needs of the enterprise; the other on assessment of skills and training needs of individual employees.

Both training and non-training enterprises answered these questions. Almost half of the training enterprises (48 %) assessed their manpower and/or skill needs, compared to only 19 % of the non-trainers (all enterprises: 37 %). There are pronounced differences between countries: Denmark, Romania and the UK with high proportions of enterprises assessing skill needs, and Germany, Hungary and the Netherlands being bottom of the league. In all countries a higher proportion of training enterprises, compared to non-training enterprises, did assess future manpower and/or skill needs. The extent of differences between training and non-training enterprises, however, varied between countries (Figure 18:3).

Figure 18:3 **Enterprises assessing their future manpower and/or skill needs, in % of training/non-training enterprises, 1999**



Note: Belgium and Austria not included due to unreliable or uncertain data.

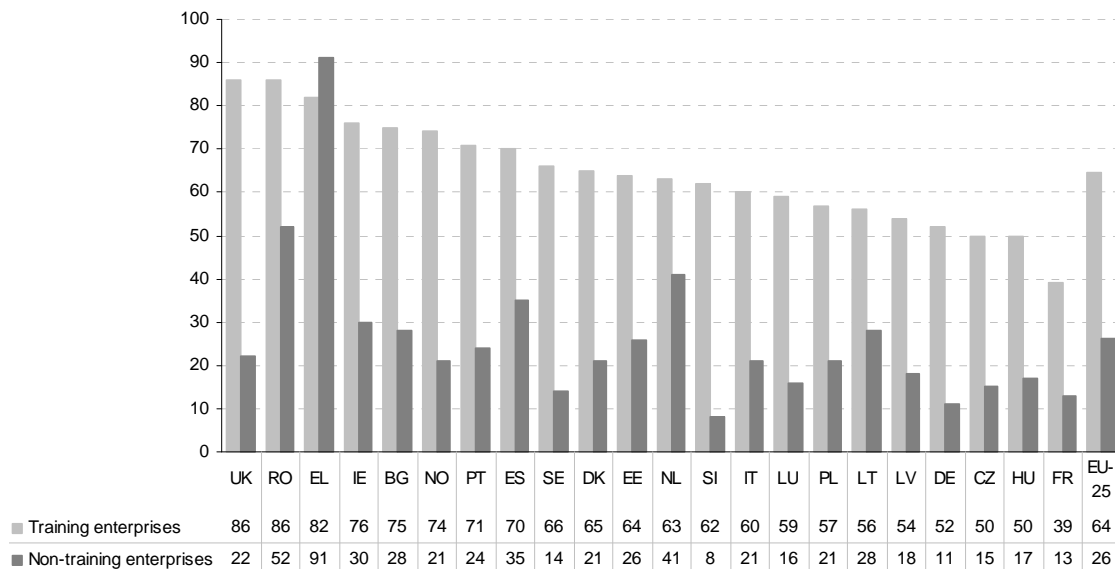
Sources: Eurostat New Cronos, CVTS2, retrieved 4 March 2008; own calculations.

Assessment of skill needs is more frequently done in big enterprises, with differences according to size varying between countries. Assessment of skill needs in small enterprises in Denmark is remarkably high; this might be related to the active role of social partners in CVT there.

In addition, in CVTS2 enterprises were asked: ‘in 1999 did the enterprise assess the skills and training needs of individual employees, for example by a review with each employee of the skills and qualifications they have or will need for the job they are doing or for their future career/job development?’ This requires both, an analysis of skills needed for the different jobs in the enterprise at present and in the future, and an analysis of the competences of individual employees. Figure 18:4 shows the proportion of enterprises that conducted this analysis at least for some part of their employees.

In 1999, half of the enterprises assessed employee training needs. Again, the proportion is much higher in training enterprises (64 %) than in non-training enterprises (26 %). In all countries except Greece training enterprises more frequently assess training needs than do non-training enterprises. Again, size matters: big enterprises assess training needs more often than small enterprises, with the exception of Greece.

Figure 18:4 **Enterprises assessing training needs of employees, in % of training/non-training enterprises, 1999**



Note: Belgium, Austria and Finland not included due to unreliable or uncertain data.

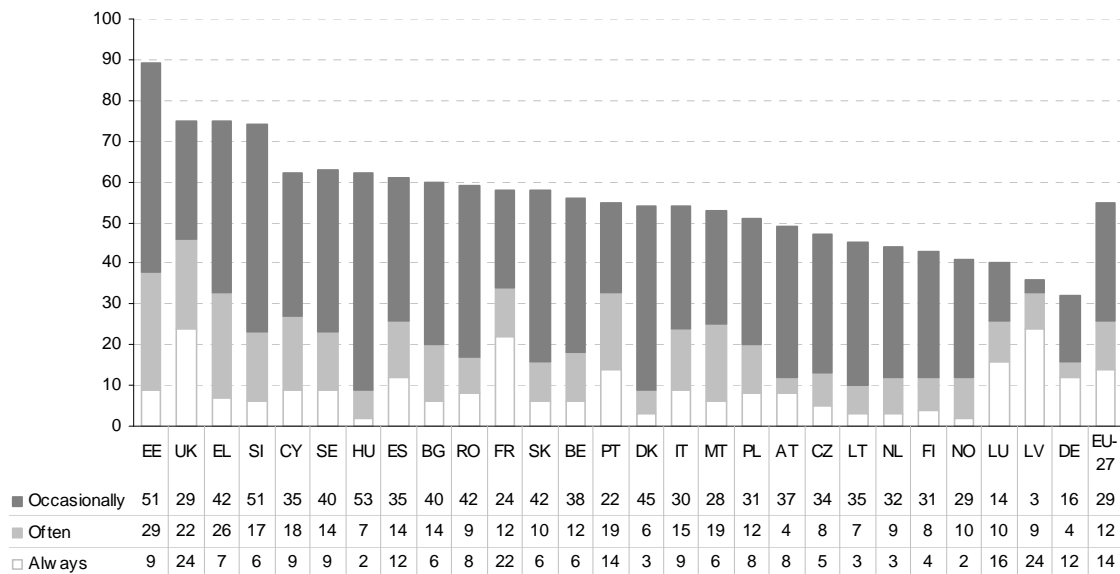
Sources: Eurostat New Cronos, CVTS2, retrieved 4 March 2008; own calculations.

18.3.2.2. Results of CVTS3

In CVTS3, questions on future skill needs were only addressed to training enterprises in most countries. The question was changed in CVTS3, hence results differing in CVTS3 from CVTS2 reflect the change of methodology intermingled with possible changes in the human resources development of enterprises.

Training enterprises were asked how frequently they implemented formal procedures for evaluating future skill needs. On average, 14 % of the training enterprises assess future skill needs 'always', 12 % do it often. Together with enterprises assessing skill needs occasionally (29 %), 55 % of all training enterprises do at least some assessment, while 45 % never apply formal procedures for assessing future skill needs. Figure 18:5 depicts diverging results in cross-country comparison. In Estonia, Greece and the UK, more than 70 % of the training enterprises always, often or at least occasionally evaluate future skill needs, while in Germany and Latvia less than 40 % of the training enterprises do this. The question is focused on formal procedures but an assessment of future skill needs may take place without any formal procedure, in particular in small enterprises.

Figure 18:5 **Enterprises assessing future skill needs by formal procedures, in % of training enterprises, 2005**



Note: Belgium, Austria and Finland not included due to unreliable or uncertain data.

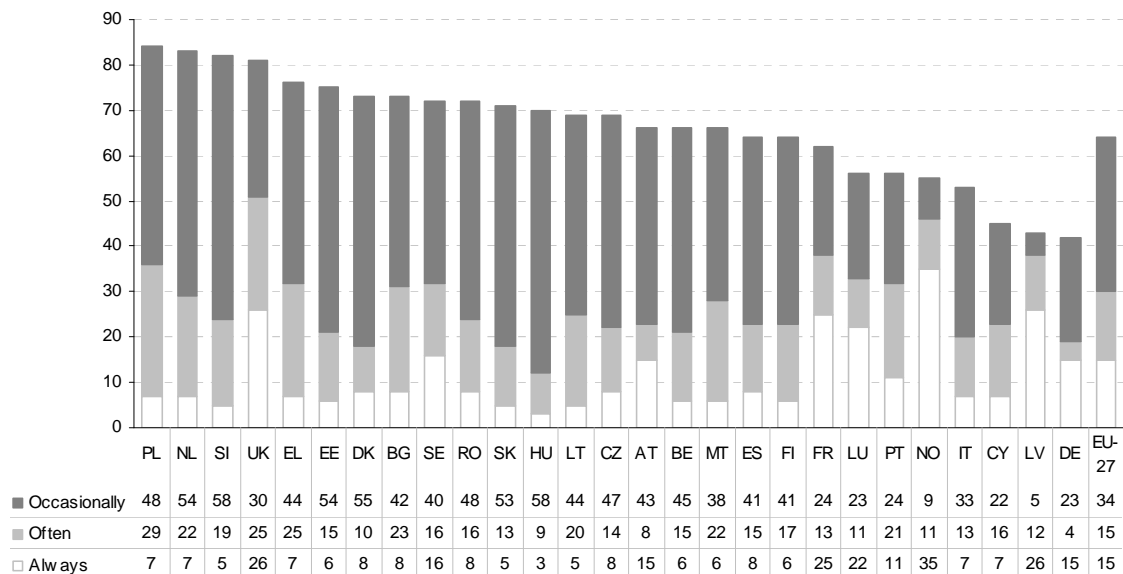
Sources: Eurostat New Cronos, CVTS2, retrieved 4 March 2008; own calculations.

Results broken down by size of the enterprise clearly show that these formal, written procedures are less frequent in small enterprises. The differences according to size of the enterprise are rather small in Estonia, Norway and the UK (around 10 percentage points) and very pronounced in Lithuania, Luxembourg and the Netherlands (more than 40 percentage points difference between small and big enterprises). However, a major measurement problem arises. A higher degree of division of labour in big enterprises may require more formalised procedures and written documents. Hence, it is unclear what these differences really indicate: higher incidence of assessment of future skill needs in big enterprises, or different procedures in assessing future skill needs (bigger enterprises more frequently using formal procedures, smaller enterprises organising and managing more informally).

The question on training needs was changed in CVTS3 to 'how frequently did the enterprise conduct structured interviews with its persons employed with the objective of establishing the specific training needs of its persons employed?' In most countries, this question was addressed to training enterprises only.

Two thirds of the training enterprises (64 %) assess the training needs of their employees at least occasionally (15 % of enterprises claim to do this 'always', another 15 % 'often'). Countries differ a lot in this respect (Figure 18:6). More than 80 % of all training enterprises in the Netherlands, Poland, Slovenia and the UK conduct structured interviews with their employees to assess training needs, while Cyprus, Latvia and Germany rank lower with less than 50 % of training enterprises doing so.

Figure 18:6 **Enterprises assessing training needs of employees by structured interviews, in % of training enterprises, 2005**



Sources: Eurostat New Cronos, CVTS3 (provisional data), retrieved 9 September 2008; own calculations.

18.4. Conclusions

CVTS provides information on enterprises' perceptions of skill needs and on the ways they inform themselves about future enterprise skill needs and employee training needs. Due to the scope of statistics defined in the regulation, information is lacking for small enterprises with less than 10 employees, and not available for all sectors.

The focus of CVTS is on CVT, not on skill needs. The questions on enterprises' skill needs form only a small part of the questionnaire. They refer to skills and competences, not to formal qualification requirements of jobs and vacancies. CVTS does not inform on the kind of skills needed, though there is information on training provided by the enterprise. This will make it difficult to relate the findings to quantitative measurement of future demand by qualification or occupation.

According to the results of CVTS, a disturbingly high share of enterprises is not aware of any skill needs emerging over a period of three years. This is not related to the possibly limited ability of enterprises to make predictions: the question covered the need to obtain or develop new skills in the past. The finding generates more questions needing thorough considerations:

- (a) are enterprises adequately perceiving the emergence of skill needs? If yes, how can the high proportion of enterprises not aware of skill needs be reconciled with research findings on changing and upgrading of skill needs?
- (b) are enterprises not aware of existing skill needs? If so, enterprise surveys of the kind of CVTS would only have limited value for the skill needs analysis of Skillsnet, as they

would not provide reliable information on the development of skill needs in the work place;

- (c) are the questions implemented in CVTS adequate? If CVTS is not asking the right questions, the awareness of enterprises regarding their skill needs will not be adequately reported;
- (d) what are enterprises doing to inform themselves about skill needs? Almost half of the training enterprises do not assess future skill needs by formal procedures; one third do not assess training needs in a formalised way. It is puzzling that in most countries training enterprises assess training needs more often than skill needs; skill need analysis might be expected as a prerequisite for proper assessment of training needs.

This paper is far from being able to answer these questions; more research is definitely needed. This does not always necessitate new surveys. Researcher access to microdata of existing European surveys like CVTS would allow in-depth analysis and contribute to the monitoring of changes in the work place.

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19. Skill needs in enterprises: summary and conclusions

Mark Keese
OECD

19.1. Introduction

The main objective of this working group was to identify the role of enterprise surveys in providing relevant information on skill needs. Two key questions were posed. First, are enterprise surveys a potentially useful tool for providing information on skill needs? Second, what is the best way to obtain comparable data across European countries on skill needs in enterprises?

19.2. Enterprise surveys as a tool for skill needs analysis

Olga Strietska-Ilina began the workshop with a useful overview of the key issues based on previous work by Skillsnet. It was pointed out that in today's rapidly changing world new occupations are emerging and existing occupations or job titles are changing in terms of the types of job tasks being performed and the skills required. These changes cannot be easily captured in forecasts of skill needs based on simple projections of employment growth by occupation and qualification. Also, information collected in enterprise surveys can potentially throw light on the broader context that is driving changes in skill needs such as technological change, globalisation, changes in work organisation and changes in consumer demand. Thus, enterprise surveys can provide information on qualitative aspects of skill needs which can usefully complement the results of more quantitative assessments.

A second important advantage of enterprise surveys is that employers can provide first-hand information on skill needs. However, there are also several limitations:

- (a) enterprises are already extensively surveyed and any new survey may produce low response rates;
- (b) employers may only reply cursorily and subjectively;
- (c) they may be quite short-sighted, responding to immediate economic conditions.

However, these drawbacks can be overcome by:

- (a) carefully selecting companies and asking relatively few questions;
- (b) treating the results cautiously and in combination with information collected elsewhere, such as through focus group discussions with selected employers or employer associations.

In the discussion it was stressed that employers often look at the tasks that need to be performed in a job rather than focusing on skills or qualifications as such. Therefore, it was important to obtain further information on how job tasks within occupations were changing.

19.3. Measuring recruitment difficulties

Germana Di Domenico and Jean-Louis Zanda discussed the uses of administrative data on vacancies and registered jobseekers as tools for measuring recruitment difficulties. They pointed out that these data can provide useful information but long time series are required to interpret differences across occupations, such as difference in coverage of vacancies, and to separate cyclical from structural trends. It is also important to distinguish the reason for recruitment difficulty since this may not reflect a skill shortage but may instead arise, for instance, because an employer is unwilling to pay, or is unaware of the market-rate for a worker in a specific occupation. It is also important to complement these administrative data with information on recruitment difficulties from enterprise surveys; many such surveys with this type of information already exist, both nationally and at the European level, but with different purposes, methodologies and frequency of collection.

In the general discussion, it was emphasised that administrative data on vacancies and registered jobseekers have the advantage of being timely, relatively inexpensive and available in most European countries. However, further effort is required to make these data more comparable at European level, especially with respect to the provision of greater occupational detail.

19.4. Skill needs in enterprises: CVTS results

Friederike Behringer provided an overview of the type of information on skill needs, and some summary results, that can be obtained from the CVTS. She focused on the results of CVTS2 for 1999 and CVTS3 for 2005. Only a few questions relating to skill and training needs are contained in CVTS but these have changed from one round of the survey to the next, hampering any analysis of changes in skill needs over time. For instance, the question of where there was any formal assessment of skill needs was not asked of all enterprises in CVTS3, in contrast with CVTS2, but only those that undertook any training of their workforces.

The results of these questions on skill and training needs raised more questions in the ensuing discussion than answers. For example, a high proportion of enterprises report that they have no formal assessment of skill needs and many enterprises report that they are not carrying out training because they have no unmet skill needs. Are these results because enterprises do not adequately assess or anticipate changes in skill needs or are the questions asked in CVTS not the right questions? What is the situation in very small enterprises, given that the CVTS only covers enterprises with 10 or more employees (although some countries do survey smaller enterprises)? There are also large differences across countries, sectors and by size of enterprise that need to be accounted for. Further research is required to answer these questions, which would be facilitated by giving outside researchers easier access to the microdata.

It was concluded that CVTS can provide some interesting insights into skill needs but it requires further development and greater standardisation and quality control which may not be easy to achieve.

19.5. Conclusions

Several general conclusions emerged from the presentations and discussions in this session. First, enterprise surveys can provide a useful tool for identifying skill needs but we need to identify more clearly what we want to collect, for whom and why. In particular, more information needs to be collected on soft skills and actual job tasks, not just on formal job titles or qualifications. The OECD's new survey on adult skills, PIAAC ⁽⁵⁰⁾, which is planned for 2011, may provide some guidance on what types of soft skills are becoming increasingly important in the labour market.

Second, in terms of options for using enterprise surveys to collect comparable information on skill needs, it may be difficult to adapt existing mandatory European surveys such as CVTS. It may also be difficult and expensive to establish an entirely new European survey devoted solely to skill needs. One possibility instead might be to establish a Eurobarometer-type survey but of enterprises rather than individuals. This could be used to survey enterprises on a regular basis but with different and rotating modules for each round, including one on skill needs.

Third, progress in this area should also be sought through further harmonisation of existing national enterprise surveys and surveys of recruitment difficulties. Finally, it was agreed that Skillsnet has a vital role to play in carrying this agenda forward.

⁽⁵⁰⁾ Programme for the international assessment of adult competences.

PART VI

Skills for the future: key policy challenges

Stakeholder views: panel discussion summary

*Torsten Dunkel, Manfred Tessaring,
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Conclusions: the way forward

20. Stakeholder views: panel discussion summary

This final section addresses key policy challenges related to future skill needs and the views of the stakeholders on them. The panel comprised European key policy-makers and stakeholders who discussed the following issues:

- (a) what do the predicted changes in employment patterns imply for policy? Which measures should be taken in education and training, in the labour market, in guidance and counselling, for workforce mobility? What can the social partners do;
- (b) how can we turn research findings into practice in these fields? How can the social partners contribute;
- (c) what could be done to improve the labour-market information and intelligence system? How could we improve current statistics collection and data coverage? What could be done at EU level? How can individual Member States help?

The views are presented by panellist.

David White from Directorate-General for Education and Culture, European Commission, pointed out that marginal adjustments make long-term trends. Although marginal adjustments may not bother policy-makers, they do bother those at the margin. He also stated that forecasting works in a way that the closer you get, the harder to know where to go. We still do not know, for example, how many teachers will be needed in 15 years but any decision is based on an implicit forecast. Now the discussion is about how to take decisions based on an explicit forecast, so it is bound to be reliable. In his contribution, he touched on the issue of migration which is necessary to compensate for demographic decline but which is not controllable. Education is a crucial issue for migrant communities for whom competences and soft skills are fundamental. Cultural diversity is one of the great drivers of creativity and innovation, so it should not be seen as hostility. Cultural diversity should be incorporated into initial education.

David White: 'education is not to prepare people for work but for life (of which work is a part). Life skills are important, and so are soft skills'.

Xavier Prats Monné⁽⁵¹⁾ from Directorate-General for Employment, European Commission, argued that European societies are influenced by many inter-related changes: demographic; technological; societal; and of course globalisation. Thus, the enlarged EU will need to focus increasingly on three broad policy areas: education, skills and the modernisation of labour markets, while strengthening cohesion and solidarity.

The education levels of the workforce will increasingly determine the competitiveness of European economies. Hence the importance of investment in skills, though not in any skills: vocational training and lifelong learning have to be driven by demand rather than by offer, and must respond both to the productivity interests of enterprises and to the employability

⁽⁵¹⁾ Disclaimer: the opinions expressed in this contribution do not represent the official views of the European Commission.

interests of workers. The modernisation of labour markets requires improvement in the adaptability both of enterprises and workers, and a stronger emphasis on the protection of employment and employability than on the protection of specific jobs. He concluded that the key to adaptability and employability is the identification and adaptation of skills needs.

Matthew Higham from BusinessEurope (Confederation of European Business, formerly UNICE) pointed out that 'to reinforce and leverage competitive advantages, we need to increase productivity in technology-intensive production and sectors – notably the jobs and occupations in which the increasing demand for higher skills is pertinent (Europe can no longer compete on a low-wage basis)'.

Referring to the conclusions in the Helsinki communiqué he acknowledged the drive towards evidence-based policy-making in VET: hence the current political momentum for intensifying work on anticipation and forecasting skills needs towards quantitative results.

Political priorities for the work on anticipation and forecasting of skills needs call for better anticipation of skills needs, even if the emphasis is more on the need to develop and reinforce partnerships at different levels – company, local, sectoral, regional, or national – to ensure that education and training systems, companies, and individuals are better able to respond to labour-market needs. He emphasised the importance of adaptability to change for companies, education and training systems as well as for individuals.

As one of the issues raised during the conference has been the difficulties encountered when trying to engage employers, he recommended that quantitative forecasting should be complemented with an approach that focuses on qualitative anticipation over the short-term. This would be closer to actual practices, rather than theory, and can more effectively engage the employers, looking specifically at sectors and local level.

Pointing out that real policy implementation was at and within Member-State level, he considered the European level as complementing the work done and, via the OMC, looking at and disseminating best practices on existing examples where labour markets at different levels have mechanisms that enable them to react and adapt rapidly to desired or forced changes.

He emphasised 'whatever the approach taken to take this work forward, the employers must be involved in any exercise that seeks to improve matching on the labour market'. However, 'this highlights a methodological issue: namely that approaching employers on a study with a quantitative approach about skills forecasting over 5-10 years will not be perceived as relevant for most, given that companies themselves often do not know what their skills needs will be within 2-3 years'.

Marie Panayotopoulos-Cassiotou, Member of the European Parliament, emphasised globalisation as a challenge, for which 'the European workforce must adapt to a constantly-changing environment in which new skills are always desirable'. Therefore, coherent lifelong education and training strategies have to be implemented, as they not only form the basis of economic competitiveness and individual employability but also ensure social cohesion, sustainable development, personal growth and more active citizen participation in society.

She acknowledged Cedefop's work, supported by the international Skillsnet network, as of considerable importance: forecasting labour-market needs and new production methods

would help Member States' education and training systems – and by extension the workforce – adjust to the new reality, ensuring better economic and social integration for all.

Equal access to lifelong education and training for all and to new technologies should be a priority in national and Community measures. In addition to issues of access, she raised the question of how to recognise qualifications: the agreement concluded between the Parliament and the Council on the European qualifications framework for lifelong learning was a decisive step towards improving the transparency and comparability of qualifications obtained in the different education and training systems of the EU.

Marie Panayotopoulos-Cassiotou stressed 'we should also pay attention to measures allowing an easier transition between school and the labour market. This can be achieved by offering a broader range of courses and by establishing flexible learning arrangements (e.g. partnerships with companies). The European Youth Pact, adopted by the Council in March 2005, is particularly insistent on this point'.

She stated that adapting to globalisation is not possible without the cooperation of employees and employers. Social dialogue and the promotion of corporate social responsibility are of vital importance: only by creating a flexible work environment that promotes lifelong learning will employees be encouraged to perfect their skills. This requires adaptation of working hours, a better balance between professional and family life, and cost-sharing.

Finally, she put forward the need to exchange information on best practices, and set up networks in forums and joint projects, to provide a better idea of current and future labour-market needs.

Slava Pevec Grm, Slovenian Presidency representative, National Institute for Vocational Education and Training, Slovenia, emphasised that the Slovenian Presidency set up an ambitious programme of education and training. Special focus was on the following priorities: strengthening the visibility of the role of education and training in the revised Lisbon strategy; promoting creativity and innovation in connection with the modernisation of schools; and promoting intercultural dialogue and multilingualism.

She stressed that future skills anticipation and forecasting would inevitably be one of the core activities of the Commission and the Member States in the post-2010 period. Expressing the need for a coordinated approach and respect of the responsibilities of Member States in education and training, and warning not to introduce new bureaucratic obligations in terms of reporting or filling in extensive surveys, she considered the question of what data, why and for whom it is gathered to be of crucial importance.

Concluding that the full value of the EU's role in skills development had to be recognised and exploited, and comparisons with other global players had to be examined, she recommended better synergies between different education and training policies, active and passive labour-market policies, migration, social policies and R&D be considered.

Jean-François Robinet, French Presidency representative, *Ministère de l'économie, des finances et de l'emploi*, France, stressed the importance of thinking in a medium-term perspective and not restricting oneself to day-to-day business. He thanked Cedefop and all who worked on the study. The study confirmed work already done in the past and also at national level. Its findings provide evidence to justify policy choices.

He suggested the work by Cedefop should be expanded to Member States. The reduction in employment in the traditional sector should be linked to the impact in regions and all those concerned should be brought together.

He pointed out that governments, in particular, face two challenges: first, they need to make every effort to put in place policies to accompany economic changes in sectors particularly hard hit by globalisation; and second, they need to make public opinion aware that some changes – for instance, more service jobs and fewer jobs in industry – are structural.

The more the social partners are involved in making the analysis, and are able to make those they represent aware of it, the easier it will be for public opinion to understand this change. The Cedefop study – like that conducted in France two years ago – clearly shows a trend towards a growing number of job vacancies, which the natural demographic trend, due partly to the overall ageing of Europe's population, will find it difficult to fill without radical changes in initial and continuing training.

Petri Lempinen, senior advisor in the Finnish Confederation of Salaried Employees, vice chair of the Cedefop Governing Board, advisor in the European Trade Union Confederation, acknowledged that forecasting of skills needs presented possible pictures of future labour market landscapes. These pictures were multidimensional and they would have to be studied from both a quantitative and a qualitative perspective at the same time.

He pointed out that European trade unions fully agreed with that conclusion, as there were still 80 million low- or non-qualified workers in Europe. He expressed the need to develop ways of recognising and validating skills and competences. Validation of existing skills to make a qualification that could be recognised outside the workplace was a practical way of raising skills levels, if it was complemented with training. As job profiles changed it was not sufficient to validate existing skills but to learn more or new things. He expressed the need to organise learning and training, to define the qualifications required, as it was important to know where the labour market was going.

He acknowledged the role of forecasting exercises in this context. Forecasting of skills needs is a tool of change and a tool for change. He strongly agreed with conclusions of the Agora Conference that Europe needs strong cooperation. Every Member State should develop quantitative and qualitative methods of forecasting skills needs.

Petri Lempinen highlighted that the main challenge in Europe was nowadays the mismatch of future needs of labour market and performance of education and training systems: 'forecasting exercises give us information on a possible future, and then it is up to policy-makers to make sure that education and training meet the needs of society'.

21. Conclusions: the way forward

Torsten Dunkel, Manfred Tessaring, Alena Zukersteinova
Cedefop

The Agora conference on Skills for Europe's future, 21 and 22 February 2008, was organised as a platform to present the results of the first consistent and comprehensive medium-term forecast of occupational skill needs across Europe carried out by Cedefop. This forecast, conducted in 2007, has, for the first time, provided projections of employment and skill needs up to 2015 across the whole of Europe (EU-25 plus Norway and Switzerland).

Summarising we can conclude from this inspiring and encouraging – thanks to all speakers and participants – Agora conference:

- (a) approval and overwhelmingly positive feedback by the participants (European Commission representatives, social partners, ministerial delegates, researchers and practitioners, etc.) on the medium-term forecast performed, which also was confirmed by their evaluation of the conference.
 - (i) Juan Menendez-Valdes, the chairman of Cedefop Governing Board recalled that 'there was a lot of scepticism among the Governing Board members raised about the mid-term skills forecasting project. However, lack of knowledge is even worse than no exact knowledge. It is deemed necessary to put together forecasting efforts, sector studies and enterprise surveys, to look for synergy of results and to produce comparable information'.
 - (ii) Cedefop, in cooperation with experts of its Skillsnet network, should use the political momentum for support to carry on with its forecasting and other activities in early identification of skill needs ⁽⁵²⁾;
- (b) although further analysis is needed to clarify the implications for policy and research, we can already argue from the present findings that the projected sectoral change will have significant implications for occupational skills needed in the future. Even though employment is expected to fall in the primary and manufacturing sectors, they will remain crucial to the economy and a major source of jobs that will demand new skills to cope with technological change. Labour-market trends are being reinforced by changes in how jobs are performed and work is organised. The main implications are continuing growth in demand for many highly and medium-skilled workers but also for some lower-skilled occupations. Almost 80 out of 210 million European workers are currently employed in higher level jobs such as management, professional work of one kind or another or technical support of those activities. These areas are all expected to experience increased demand over the next decade. In contrast, jobs requiring traditional agricultural skilled workers, several other craft and related skills and clerical

⁽⁵²⁾ Additional financial support from Directorate-General for Employment for a regular update of the forecasting will be granted as Progress – the Community programme for employment and social solidarity – was adopted by the European Parliament in March 2008.

skills will decline in number. There will, however, be significant expansion in the numbers of jobs for many service workers, especially in retail and distribution, and also for some elementary occupations requiring little or no formal skills.

- (i) Technological and other changes tend to polarise job requirements, creating many jobs at the higher and lower ends of the job spectrum, the latter with low pay and poor conditions. Potential shortages of high-skilled jobs and overqualification in elementary jobs also require a suitable policy response.
 - (ii) The structural and other changes taking place will, if these trends continue, create many jobs at higher level but also considerable numbers at the lower end of the job spectrum. This will pose significant challenges for policy-makers concerned with equity and social cohesion and calls for measures such as retraining and upskilling as well as enhanced guidance to avoid the danger of polarisation and to prevent skill mismatches.
 - (iii) The nature and skill requirements of these jobs will not remain unchanged and it is important also to understand the way in which they are evolving. This includes the formal qualifications typically required to undertake such jobs. While there is no simple one-to-one relationship between occupation and qualification it is possible to explore how these are changing over time. The results of the medium-term forecast emphasised the general increase in qualification levels across most jobs, essential at a time when the financial crisis adds an exceptional degree of unpredictability about the future of the world economy;
- (c) methods refinement and research on the improvement of data, with the help by country experts, is needed. Although advanced methods have been used for the forecast, there are still some limitations mainly caused by the quality of data. Detailed examination of results for individual countries reveals several outstanding problems and questions. These are especially severe for some of the smaller countries where the sample sizes in the European labour force survey (the basis for occupational and skills-related information) are inadequate to provide robust estimates. Even for many of the larger countries there are problems with the data which can probably only be addressed by further detailed dialogue between individual country experts and the relevant statistical authorities.
- (i) However, the framework developed allows for alternative data and assumptions to be incorporated with relative ease. Therefore, given cooperation with the countries concerned, such issues can, in principle, be resolved.
 - (ii) It is also important to emphasise that there is considerable scope for improvement in the methods used to forecast occupational and qualification structures, as well as to estimate replacement demands. The modular approach enables further refinement and improvement at individual country and pan-European levels. The detailed data (country workbook) are available for Skillsnet members upon request from: skillsnet-team@cedefop.europa.eu.
- (d) continuing dialogue towards a European skills forecasting system is needed as this is not the end, but the beginning, of the work. Cedefop will continue and strengthen its

efforts to establish a European skills forecasting system by continuing dialogue, improvement and update, and by complementary activities.

- (i) As with all quantitative projections, a judgement is needed to develop robust and credible results. This must involve country experts who can bring to bear their unique knowledge and expertise in data, trends and political strategies regarding employment and socioeconomic development for their own countries. The present set of projections has been put together with the voluntary involvement of many individual country experts. The feedback obtained so far suggests that, with such input, it will be possible to develop a much more robust database.
 - (ii) Cedefop is carrying out complementary forecasts of the future supply of skills, as well as detailed analyses of possible mismatches between supply and demand, such as skill shortages and gaps, oversupply and overqualification.
 - (iii) Further, Cedefop, with support of the Directorate-General for Employment, intends to make the forecasts of skill supply and demand a regular exercise (every two years), including updating and improving data and methods regularly, in cooperation with country experts. The forecasts will be examined against actual developments on the labour market. This validation work will also be produced every second year. The results of this work will be used for further refinement of successive forecasts. Cedefop will organise regular expert meetings for validation of interim results, workshops and dissemination conferences.
 - (iv) In the longer-term, the intention is to initiate a dialogue with all Member States on the establishment of a common European approach to skills forecasting which would be used by all countries, as a bottom-up approach to collect data and forecast skills at European level;
- (e) in parallel to quantitative measurement at macro level, Cedefop is also exploring the feasibility of identifying skill and competence needs at the workplace using employer surveys. Cedefop has already initiated the discussion and feasibility work on the possible development and implementation of a specific regular enterprise survey in the EU-27. The work and discussion is organised around a series of workshops, and should eventually achieve agreement of all concerned on the organisation, content, concepts and the methodology of the survey (including framework questionnaire, data collection modes, sampling, survey frequency, etc.). From 2010, pilot testing in the Member States should verify the methodology and, in direct discussion with enterprises and social partners, the relevance of the questions and availability of data. As a result of the pilot testing, detailed, robust and validated methodology should be made available for future regular use at EU-27 level.
- (i) Cedefop, in cooperation with its Skillsnet members, will also continue to identify and anticipate new and emerging skill needs in specific sectors (such as healthcare and environment);
- (f) Cedefop is involved in other related projects and activities such as the comprehensive sectoral analysis of emerging competences and economic activities in the EU (carried out by Directorate-General for Employment) and the programme for international assessment of adult competences, PIAAC (carried out by the OECD); a joint seminar

with the OECD on the job requirements approach – a part of PIAAC – was organised in early 2009. Topics of the further research agenda include validation of non-formal and informal learning (e.g. migrants), adult learning, and training for older workers.

In conclusion, complex identification and analysis of future skill trends and its implications will provide sound evidence for policy-making to prevent or alleviate possible future distortions on labour markets: skills shortages or gaps, or other forms of skills mismatch such as oversupply or overqualification of the workforce.

Publications

Cedefop. *Future skill needs in Europe: medium-term forecast: synthesis report*. Luxembourg: Publications Office, 2008 (Cedefop Information series).

Cedefop. *Future skill needs in Europe: medium-term forecast: key findings* Luxembourg: Publications Office, 2008.

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Cedefop. *Sector flash: healthcare*. Luxembourg: Publications Office, 2009.

Further Skillsnet activities in 2008

Future skill needs in healthcare, sectoral workshop in cooperation with the European Social Dialogue Committee in the Hospital Sector in the EU (the European Federation of Public Service Unions [EPSU] and the European Hospital and Healthcare Employers' Association [Hospeem]), in Thessaloniki, 22-23 May 2008

[http://www.trainingvillage.gr/etv/Projects_Networks/Skillsnet/events.asp?idnews=3502]

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Ben Gardiner obtained an upper second BSc (hons) in economics with econometrics in 1991 from the University of Bath having spent the previous year at Cambridge Econometrics

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David White has been director of lifelong learning, education and training policy at the Education and Culture Directorate General since January 2007. One of his responsibilities is to achieve the adoption of the proposal for a European Institute of Technology. He studied economics and politics at the Universities of Belfast, Manchester and London, before joining the British Government Economic Service. After moving to the European Commission in 1974, he worked in the Directorate-General for Employment and Social Affairs and the Secretariat General, before joining the Cabinet of President Jacques Delors. As head of the public procurement policy unit from 1987-93, he was responsible for opening up public procurement in the EU and the EEA. In the Uruguay Round, he led the negotiations that led to adoption of the government procurement agreement. As director for enterprise policy from 2000-04, his main concern was to support the competitiveness of business through industry, innovation, external relations and competition policies. This led into the creation of an Innovation Policy Directorate, of which he was director 2005-06, improving the conditions for dynamic and innovative business. In this period, he participated in the preparation of the proposal for a European Institute of Technology.

Rob Wilson is a professorial fellow and deputy director of the Warwick Institute for Employment Research at the University of Warwick in the UK. He leads the institute's labour assessment and market forecasting work, although he has researched and published on many other aspects of labour-market behaviour, including the changing patterns of demand for and the supply of skills at national and international levels. He has played a leading role in producing *Skills in England* for the Learning and Skills Council since 2002. He is editor and contributor to various other publications in this area including *Working futures* for the Sector Skills Development Agency and *Projections of occupations and qualifications* for the Department for Children, Schools and Families. Most recently he has led the Cedefop Skillsnet project on producing *Medium-term forecasts of occupational skill needs in Europe*, which for the first time has produced a consistent and comprehensive assessment of employment prospects for the whole of Europe. Among his professional responsibilities, he has been a member of the Medical Workforce Standing Advisory Committee and the Skills Task Force Research Group. He is currently a member of the Migration Advisory Committee set up to advise the UK government on where there are likely to be skill shortages that can be sensibly filled by migrants.

Jean-Louis Zanda has been a research manager and senior researcher in the National Agency for Employment (ANPE) since 1992. He works mainly on labour demand, and especially on recruitment. Among other things, he has carried out several quantitative and qualitative surveys with employers, and in particular built ANPE's annual cycle survey. For about 10 years, he has also focused on recruitment difficulties. On this subject, he has recently (2005-07) headed a project for the European Commission, which aimed to improve the comparability of data available in different countries, including both survey results and data produced by public employment services. With a doctorate in sociology, he has formerly worked as a researcher and training manager in social welfare. He also worked as a teacher for several years at the university.

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List of abbreviations

| | |
|------------|--|
| ANPE | <i>Agence National pour l'Emploi</i> [National Agency for Employment], France |
| isw | Institute for Structural Policy and Economic Development, Germany |
| OECD | Organisation for Economic Cooperation and Development |
| ROA | Research Centre for Education and the Labour Market, University of Maastricht |
| SEO | <i>Economisch Onderzoek</i> [economic research] connected with University of Amsterdam |
| Skillsnet | Cedefop network on early identification of skill needs |
| BA-X | Job vacancy index of the Federal Employment Office, Germany |
| ALMP | Active labour-market policy |
| CVTS (1-3) | Continuing vocational training in enterprises (1-3) |
| E3ME | Energy-environment-economy (E3) model of Europe |
| EDMOD | Expansion demand module |
| EEA | European economic area |
| EFTA | European Free Trade Association |
| EPVM | European public employment service vacancy monitor |
| ESPO | European Skills Promotion Organisation |
| EU | European Union |
| EU-25 | European Union 25 Member States as of December 2006 |
| EURES | European Employment Services |
| Europop | Eurostat population projections |
| Eurostat | Statistical Office of the European Communities |
| GDP | Gross domestic product |
| ISCED | International standard classification of education |
| ISCO | International standard classification of occupations |
| ISCO-88 | International standard classification of occupations version 1988 |
| ISCO-08 | International standard classification of occupations version 2008 |
| ICT | Information and communications technology |
| LFS | Labour force survey |
| LIS | Learning intensive society |
| NACE | Statistical classification of economic activities (in the European Community) |
| NUTS | Nomenclature of territorial units for statistics |
| PES | Public employment service |
| R&D | Research and development |
| VET | Vocational education and training |

Country codes

EU-27

| | | | | | |
|----|----------------|----|-------------|---------------|--------------------------|
| BE | Belgium | LV | Latvia | FI | Finland |
| BG | Bulgaria | LT | Lithuania | SE | Sweden |
| CZ | Czech Republic | LU | Luxembourg | UK | United Kingdom |
| DK | Denmark | HU | Hungary | | |
| DE | Germany | MT | Malta | Others | |
| EE | Estonia | NL | Netherlands | IS | Iceland |
| IE | Ireland | AT | Austria | NO | Norway |
| EL | Greece | PL | Poland | | |
| ES | Spain | PT | Portugal | AU | Australia |
| FR | France | RO | Romania | CA | Canada |
| IT | Italy | SI | Slovenia | CH | Switzerland |
| CY | Cyprus | SK | Slovakia | US | United States of America |



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