Investing in the Future of Jobs and Skills

Scenarios, implications and options in anticipation of future skills and knowledge needs

Sector Report
Health and Social Services

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Preface

This report presents the final results of the study *Comprehensive analysis of emerging competences and economic activities in the European Union in the health and social services sector*. The report is part of a series of sixteen future-oriented sector studies on innovation, skills and jobs under the same heading, commissioned by the European Commission (DG Employment, Social Affairs and Equal Opportunities). Eleven of these studies were executed by a core consortium led by TNO (Netherlands Organization for Applied Scientific Research) and consisting of TNO Innovation Policy group (Leiden, the Netherlands), TNO Labour (Hoofddorp, the Netherlands), TNO Innovation and Environment (Delft, the Netherlands, SEOR Erasmus University (Rotterdam, the Netherlands) and ZSI (Centre for Social Innovation, Vienna, Austria). The core consortium was in charge of the overall management of the study, the further elaboration and application of the overall approach and methodology, as well as data collection and analysis.

The study was carried out during the period January 2008-March 2009. Stakeholders in the sector, including the European sectoral partners and representatives of various other organisations, have been involved in various ways and forms throughout the study. This included a sectoral kick-off meeting at the start of the study and three multisectoral stakeholder meetings in Brussels during which intermediate results of the studies were presented and discussed. Valuable workshop discussions in the frame of the project were held and inputs received from a number of experts. Apart from multiple inspiring consortium ('internal') workshops, one 'external' workshop was held. A draft final version of this report was validated and complemented during this final workshop in Brussels on 5 and 6 March 2009. The final workshop brought together an apt mixture of different European and national sector experts representing the industry, European social partners, other various representative organizations, academia as well as the European Commission (see Annex 2 for a full list of participants). The workshop, which formed an explicit and integral part of the methodological approach, yielded a number of helpful comments and insights which have been used in further finalising the study. We express our sincere gratitude to all workshop participants and to all those that contributed to this study.

A special word of thanks holds for the European Commission, notably Jean-François Lebrun and Manuel Hubert, and Klara Foti of the European Foundation for the Improvement of Living and Working Conditions who proved to be excellent guides during the project.

Delft, 10 March 2009

Dr Frans A. van der Zee (overall project leader)

1 General introduction

This report presents the final results of the study Comprehensive analysis of emerging competences and economic activities in the European Union in the health and social services sector. The report is part of a series of sixteen future-oriented sector studies on innovation, skills and jobs under the same heading, commissioned by the European Commission (DG Employment, Social Affairs and Equal Opportunities). The study was executed by a consortium led by TNO (Netherlands Organization for Applied Scientific Research) and consisting of TNO, SEOR – a consultancy of Erasmus University (Rotterdam, the Netherlands) and ZSI (Centre for Social Innovation, Vienna, Austria). The study was carried out during the period January 2008-April 2009.
While the main focus of the study is on the future of skills and jobs by 2020, the study is both backward- and forward-looking in nature. It analyses recent relevant sector developments and trends and, at the same time, depicts the current state of play in the sector with an emphasis on innovation, skills and jobs. Current trends and developments form the stepping stone and fundament for the second and third future-oriented part of the study which is scenario-based, forward-looking and exploratory in nature.

Background and context
The study should be placed against the background of the EU's renewed Lisbon strategy in which securing and improving EU competitiveness and redeploying the European economy to new activities with more value-added and new and better jobs are key. In the process of change and restructuring to adapt to new realities, there is a need for a more strategic management of human resources, encouraging a more dynamic and future-oriented interaction between labour supply and demand. Without there is the risk that bigger shortages, gaps and mismatches of skills will result not only in structural unemployment but also hamper longer-term competitiveness.
Skills and jobs are of vital importance for the future of the European economy and have recently gained increasing attention, both at national and EU level. As stressed by the European Council in March 2008, investing in people and modernising labour markets is one of the four priority areas of the Lisbon Strategy for Growth and Jobs. The New Skills for New Jobs initiative launched in December 2008 (European Commission, 2008) elaborates on how this could best be done. The initiative aims to enhance human capital and promote employability by upgrading skills, as well as to ensure a better match between the supply of skills and labour market demand. More transparent information on labour market trends and skills requirements, but also the removal of obstacles to the free movement of workers in the EU, including administrative barriers would help achieve this goal, and improve occupational, sector and geographical mobility. The initiative also stresses the need to improve the Union's capacity for skills assessment (by improved monitoring and forecasting), anticipation (by better orientating skills development) and matching with existing vacancies. The current financial and economic crisis makes these challenges even more pressing. Further strengthening the economic resilience and flexibility of the European economy and its Member States calls, along with other measures, for support of employment and further facilitation of labour market transitions (European Commission, 2008a:10).

Approach and methodology

The study takes a longer term future perspective, and looks ahead to 2020, but also back, and takes a highly aggregated European perspective. While it is fully acknowledged that more detailed Member State and regional analyses are important and vitally important for anticipating future skills and knowledge needs, the European perspective has been central in this analysis. Key to the study and a common point of departure was the use of a pre-defined methodological framework on innovation, skills and jobs (Rodrigues, 2007). During the course of this study this framework has been further developed, operationalised and applied to the sector. The approach combined desk research and expert knowledge available in a broad and dedicated research team with the knowledge and expertise of 'external' sector experts. The purpose of this *common uniform methodology* is to deliver results that enable comparisons across and between sectors and hence enable the preparation of possible future actions to investigate the topic of new future jobs and skills for Europe, by encouraging a more effective interaction between innovation, skills development and jobs creation. The methodology is structured along various steps, each step providing inputs and insights for next steps to come. Overall, the methodology covers the following steps:

Step 1. Identification of economic activities to be considered (i.e. sector selection)
Step 2. Main economic and employment trends and structures by sector
Step 3. Main drivers of change
Step 4. Main scenarios
Step 5. Main implications for employment – changes by job function
Step 6. Main implications for skills – emerging needs by job function
Step 7. Main strategic choices to meet future skills and knowledge needs
Step 8. Main implications for education and training
Step 9. Main recommendations
Step 10. Final Workshop.

Further and next steps

The results of this study – along with 15 other sector studies using the same approach and being released at the same time - will serve as a guide in launching further EU-led but also other actions, by industry, sectoral partners, education and training institutes and others. One important aim of the study is to promote the strategic management of human resources and to foster stronger synergies between innovation, skills and jobs in the sector in the medium and longer run, taking into account the global context and encouraging adaptations to national and regional specificities. A very important element in further enabling and facilitating these goals is sound and continuous monitoring together with a uniform and consistent way of analysing future skills and knowledge needs for the various decision-making levels involved. The approach taken in this study aims to provide a broader framework that does exactly this. Further dissemination and explanation of the methodology at the Member State, regional and local level are therefore vital in the follow-up of this EU level study, as is its actual take-up. The results of the study include implications, conclusions and recommendations to anticipate future skills and knowledge needs. It does not in any way, however, assess or evaluate current or planned policies. Conclusions and recommendations may therefore coincide but may also oppose current policies and/or policy plans at the EU, national or regional level. The implications, conclusions and recommendations logically follow from scenarios – credible plausible sector futures – meant to better structure and anticipate possible future developments.

Looking ahead in times of crisis

Even though the year 2020 may currently seem far off for most of us, the future will announce itself earlier than we think. In times of financial and economic crisis there is a logical tendency to focus on the now and tomorrow; withstanding and surviving the crisis are prime. Nevertheless, at the same time the medium and longer term ask for adequate attention. In this current age of continuing and pervasive globalisation, strong technological change and innovation affecting production and consumption around the globe, timely preparations to be able meet future skills and job needs are called for more than ever before. This is even more true in the face of an ageing European society and ditto workforce.

Contents in three parts

The report consists of three main parts. Part I analyses recent relevant sector developments and trends and depicts the current state of play in the sector, with an emphasis on innovation, skills and jobs. The findings of Part I of the report combine original data analysis using Eurostat structural business statistics and labour force survey data with results from an extensive literature review of relevant already existing studies. While giving a clear and concise overview of the most important trends and developments, the prime function of Part I is to provide the fundaments and building blocks for Part II of the study. The findings of Part I are based on the present and the recent past. The second part of the report is future-oriented and looks at sectoral developments and more specifically developments in skills and jobs in and towards 2020. The core of part II consists of plausible future scenarios and their implications for jobs, skills and knowledge. These implications have been analysed for various job functions. In a final part III, a range of main strategic options ('choices') to meet the future skills and knowledge needs is reviewed, including implications for education and training. The study concludes with a number of recommendations for the sector (individual firms, sector organizations, sectoral partners), education and training institutes and intermediary organisations, and last but not least, policy-makers at various levels, ranging from the EU to the local level. Terminology used in this report is further explained and defined in a Glossary at the end of this report.

Part I

Trends, Developments and State-of-Play

Part I. Trends, Developments and State-of-Play

Guide to the reader

Part I presents the results of steps 1, 2 and 3 of the common methodology applied to the chemicals sector broadly defined. Step 1 delineates and defines the sector. Step 2 presents the main economic and employment trends and developments in the sector (mapping) and reports the results of a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. Step 3 analyses the main drivers of change of relevance for the sector based on a meta-driver approach and expert opinion. Part I of the report consists of 8 chapters. Chapter 2 identifies and statistically defines the sector. Chapter 3 provides an overview of the structural characteristics of the sector, including developments and trends in employment, production and value added. It contains information on work organisation (part-time/full-time, gender, age), and industrial relations, but also on emergent trends by function. It also addresses existing partnerships for innovation, skills and jobs, one of the possible policy instruments to better prepare for and adapt to the future, facilitate mutual learning and boost innovative capacity both at the sector and firm level. While not part of the methodology as such, partnerships form an interesting example of how the development of skills and jobs can be linked to innovation. Chapter 4 discusses the value chain (network) and its evolution over time, including issues of restructuring and relocation. Chapter 5 focuses on innovation, R&D and technological change, while chapter 6 analyses the impact of globalisation and trade on and for the sector. Chapter 7 highlights the importance of regulation especially in relation to employment. Chapter 8 provides the results of a SWOT analysis of the sector. Chapter 9 concludes with an overview of the most important drivers for the sector.

Defining the sector

The sector 'Health and social services' is a very important sector both measured in the share of costs in GDP and the level of employment. The share in GDP is between 5% and 13% for EU countries and rising (EMCC, 2003), while in 2006 20 million people worked in this sector. According to the NACE codes (85 in rev 1.1 and 86, 87, 88 and 75 in rev 2), the sector comprises human health activities (hospitals and medical and dental practices), residential care activities (nursing, mental health, elderly, disabled), social services activities without accommodation (elderly, disabled, child day-care) and veterinary activities.

Traditionally, health care and social services are treated separately, but the last years an increasing integration of both sectors took place due to demands for integrated service, ageing and a larger focus on prevention. This follows in fact from the bio-psycho-social model. This model entails that biological, psychological and social factors are important to include when discussing the incidence of and solutions to illness. Prevention is becoming increasingly important as a cost effective strategy in a situation of escalating health care costs.

The sector is very complex as differences between subsectors and countries are often very large. However, this report has not the ambition to describe the sector properly with respect to very important issues like regulation, the role of liberalisation, insurance and medical practice. Instead, the focus is on trends that are important for employment and skills only. For this goal, trends are much more homogeneous between subsectors and countries as they are all confronted with rising levels of employment and skills. Therefore, the analysis is focussed on the sector as a total. This focus is also driven by the fact that all available data from the past are not differentiated with respect to subsectors.

It should be noted that all quantitative figures are about formal care and social services, while informal activities are very important.

2 Structural characteristics of the sector: past and present[1]

2.1 Employment, production and value-added trends in the EU

Employment

The EU employs about 20 million health and social services workers in 2006, the majority of which live in the EU 15 countries (Table 3.1). The new member states employ 2.3 million health and social services workers. Moreover, the workforce grew much faster in the EU 15 than in the new member states. Hence the share of the EU 15 in the health and social services workforce grew by 2% between 1995 and 2006.

Winning countries are mainly located in Northwest-Europe: Netherlands, Germany, Belgium and Ireland. The average growth is 2.6% in these countries. Upcoming countries are located across the EU and include differing member states like Luxembourg, Greece, and Slovenia. In

[1] As health and social services represents a sheltered sector, international trade figures are very small. Therefore, the trade balance is left out of the quantitative analysis. For the same reason no comparison is given with countries like China, Japan or the United States. Note that major points like sharp increasing budgets and labor shortages, discussed in following paragraphs, play also role in these countries. See e.g. McKinsey (2008).

these countries growth was not less than 4.4%. Countries losing momentum include the United Kingdom and France, where employment growth was 1.4%. These countries represent a large share of the EU population. Retreating countries include member states are dominated by new member states, but also Italy and Spain fall in this category. Here, growth was only 1.2%.

Table 3.1 Employment health and social services, 2000-2006

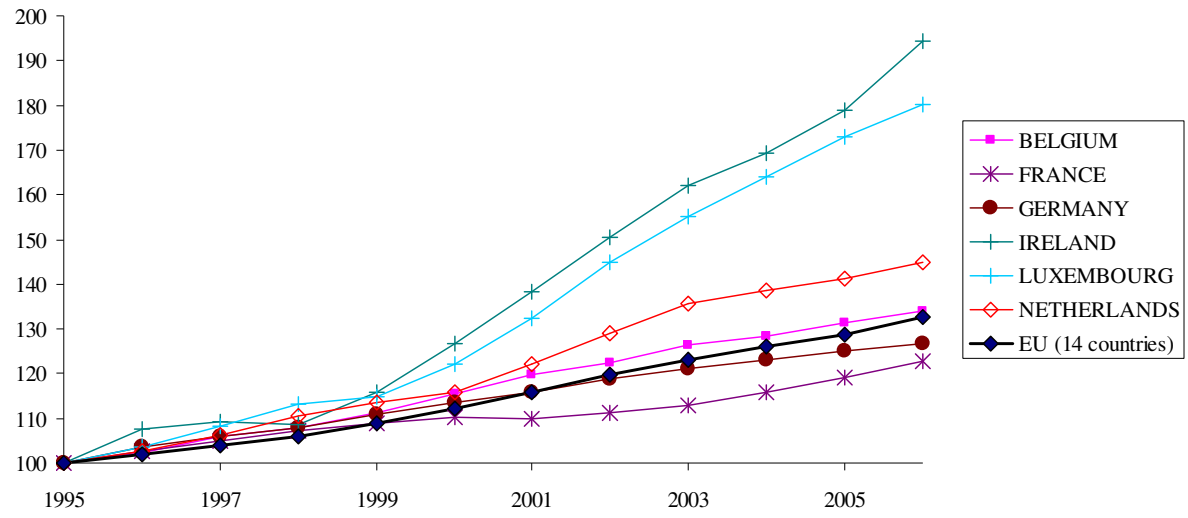
	Level	Annual growth	Share in EU	Change in share
EU	20 303	1.9	100	0
EU 15	17 989	2.1	89	2
EU 12	2 314	0.4	11	-2
Winning	5 952	2.6	29	2
Losing momentum	8 206	1.4	41	-1
Upcoming	1 506	4.4	7	1
Retreating	4 639	1.2	23	-2
Definition	Level (*1000) 2006	Average annual growth (%) 2000-2006	Share in EU employment sector (%) 2006	Change in share in EU employment sector (%) 2000-2006

	Concentration >100	Concentration <100
Growth	**Winning**: Belgium, Germany, Netherlands, Ireland	**Upcoming**: Luxembourg, Austria, Greece, Portugal, Romania, Slovenia
Decline	**Losing momentum:** France, Denmark, Finland, Sweden, United Kingdom	**Retreating:** Italy, Spain, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia

Source: Eurostat/TNO

Although major differences are present between countries with respect to growth in employment, all categories of countries show employment growth. Figure 3.1 illustrates this for six countries and for the average of 14 EU countries. In all countries a growth in employment is clearly visible between 1995 and 2005, although the growth is much higher in some countries.

Figure 3.1 Trends in employment in the health sector (1995=100)

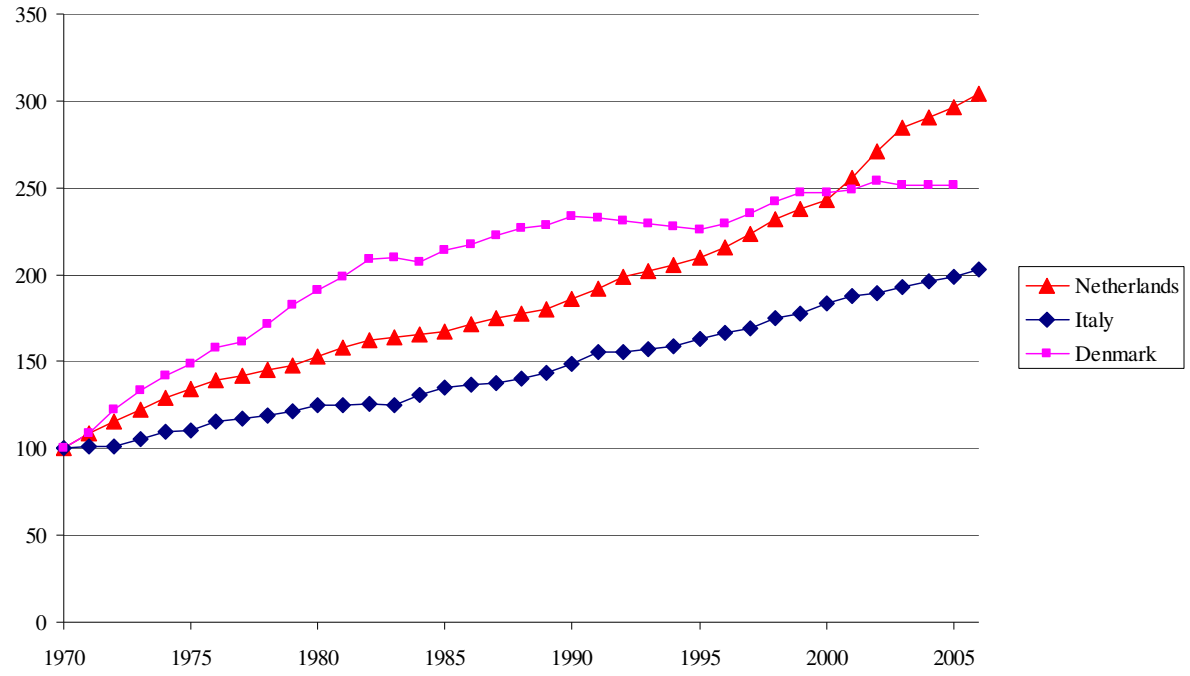


Source: OECD (2008)

That the growth is in fact part of an already much longer history is illustrated in figure 3.2 for the Denmark, Italy and the Netherlands. Between 1970 and 2006 a long term growth is visible in all three countries. The most stable growth is visible in the Netherlands and Italy, while employment shows more variation in Denmark. In neither case, however, a period of serious decline is visible.

In the EU social services have a share in the total sector of around 30% (Lepic, 2008). The share is, however, very different per member state. In most new member states the share is less than 20%, while in some old member states the share even reaches nearly 45% (Denmark). Some old member states, however, also have a relative low share. In Belgium, for instance, the share is only 20%.

Figure 3.2 Trends in employment (1995=100)



Source: OECD (2008)

Value added

Value added in the health and social services sector differs enormously between the EU 15 and the new member states (Table 3.2). The new member states represent only 3% of the EU value added. However, in all member states a growth in value added is present. This growth increased in recent years for the new member states. Whereas value added growth figures after 2000 were slightly lower for the EU and EU 15, in the new member states growth accelerated from 0.2% before 2000 to 2,1% after 2000. Still, the pace of growth is lower than for the EU 15. This picture differs from the overall economy as total GDP increases more in the new member states in recent years compared with the EU 15. This means that the health and social services sector growth faster in the EU 15 compared with GDP, but slower in the new member states.

The only winning country (high level and high growth) is Germany showing value added growth of 4.6% on average between 1995 and 2006. Germany accounts for over 20% of value added in the EU in 2006. The growth of the health and social services sector is much higher than the overall economic growth. Upcoming countries are Italy, Austria and Hungary. Belgium, France, the Netherlands and the Scandinavian member states are classified as losing momentum. Retreating countries include large member states like the United Kingdom, Spain and Poland. However, none of these countries shows negative growth. Remarkable is the low overall economic growth score for countries that are classified as upcoming for their health and social services sector figures. The opposite is true for retreating countries, whose annual average overall economic growth of 3.3%.

Table 3.2 Value added health and social services and overall economy 1995-2006

	Sector				Overall economy			
	Level	95-00	00-06	95-06	Level	95-00	00-06	95-06
EU	818 864	2.9	2.7	2.8	11 468 970	2.8	2.0	2.3
EU 15	792 922	3.0	2.7	2.9	10 883 245	2.8	1.9	2.3
NMS	25 943	0.2	2.1	1.2	585 725	2.7	3.7	3.2
Winning	179 374	5.1	4.1	4.6	2 322 200	2.1	1.0	1.5
Losing mom.	305 870	1.9	2.7	2.3	3 347 827	2.8	2.0	2.3
Upcoming	104 664	3.4	1.8	2.5	1 827 812	1.8	1.0	1.4
Retreating	227 434	2.6	2.2	2.4	3 937 279	3.7	3.0	3.3
Definition	Value added Million euro 2006	Annual average growth % 1995-2000		% 1995-2006	GDP Million euro 2006	Annual average growth % 1995-2000	% 2000-2006	% 1995-2006

	Concentration >100	Concentration <100
Growth	**Winning:** Germany	**Upcoming**: Italy, Austria, Hungary
Decline	**Losing momentum:** Belgium, France, Netherlands, Denmark, Finland, Sweden	**Retreating:** Greece, Ireland, Portugal, Spain, United Kingdom, Czech Republic, Estonia, Lithuania, Poland, Slovenia, Slovakia

Source: Eurostat/TNO

Box 2. Concentration index: what it is and what it measures

The concentration index assesses the relative contribution of a specific sector to the national economy compared to a greater entity, such as the EU, thereby correcting for the size of the country. In more general terms, the concentration index is a measure of comparative advantage, with changes over time revealing changes in the production structure of a country. An increase of the concentration index for a sector signifies relatively fast growth of that particular sector in the country concerned compared to the same sector in the EU.

How does the concentration index work in practice? We'll give a few examples: if sector x represents a 5% share of the German economy and a 5% share of the EU economy, the concentration index of sector x equals a 100. If sector x represents 5% of the German economy, but 10% of the EU economy, the concentration index of sector x is 50. If the same sector x represents 10% of the German economy and 5% of the EU economy, the concentration index of sector x is 200.

The concentration index concept can be applied using different indicators (variables). In our study we measure the concentration index using employment, value added and trade, in order to make a distinction between the relative performance of countries EU-wide. We distinguish between four country groupings, each signifying a different sector performance over time. If a sector in a country has a strong position (hence showing a concentration index higher than 100) and has experienced a clear index growth over the last years, the sector is defined as *winning* in that country. If the sector has a strong position, but experienced a decline of the concentration index, we say the sector is *losing momentum*. If the sector has a weak position, but gained in the past, we say that the sector in that country is *upcoming*. If the sector has a weak position and experienced a decline of the index, we say that the sector is *retreating*.

As noticed before and illustrated further in Table 3.3, the health and social services sector is much smaller in the new member states (4.5% of total GDP) than it is for the EU as a whole (7.1%). The country shares for the new member states have even declined, by 0.9% between 1995 and 2006. Apparently other sectors grew faster in the new member states. The concentration index (63) points at a low score in 2006 for these states.

The only winning country, Germany, shows a quick improving share of the health and social services sector in the country's value added. The share of Germany's health and social services value added in the EU total improved even more, by 3% between 1995 and 2006 resulting in a concentration index of somewhat over 100. Countries that are classified as losing momentum feature high country shares (9% average). These countries comprise 37% o the health and social services value added in the EU. Their concentration index amounts to 127 which is relatively high. Only retreating countries (such as Greece, Ireland, the United Kingdom, and Poland) saw decreasing sectoral country shares (-0.5% between 1995 and 2006) and a low concentration index for 2006 of 82.

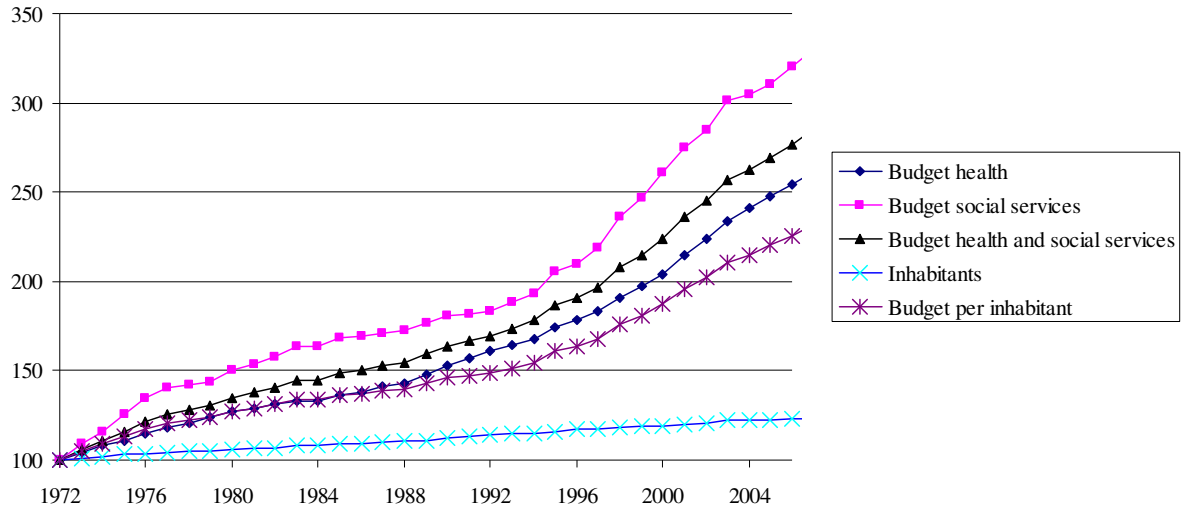
Table 3.3 Value added health and social services, 1995-2006

	Share in country		Share in EU		Concentration index	
	Level	Change	Level	Change	Level	Change
EU	7.1	0.4	100	0	100	0
EU 15	7.2	0.4	97	1	102	1
NMS	4.5	-0.9	3	-1	63	-16
Winning	7.5	1.8	22	3	106	21
Losing momentum	9.0	0.1	37	-1	127	-5
Upcoming	5.8	0.6	13	0	82	5
Retreating	5.8	-0.5	28	-1	82	-12
Definition	Share in national GDP	Total change in share	Share in value added sector EU	Total change in share	Share in country divided by share in EU	Total change in index
	2006	1995-2006	2006	1995-2006	2006	1995-2006

Source: Eurostat/TNO

That growth in budgets for health and social services is also seen in former years, can be illustrated using figures for the Netherlands (figure 3.3). The total budget for health and social services increased from 1972 to 2006 with 185%. Note that this increase is calculated in constant prices! The increase for social services is even higher with a total growth of 230%, while the growth for health is somewhat lower with 162%. Given the limited growth in the number of inhabitants (23%), the growth in budget is dominated by the increase per inhabitant (132%).

Figure 3.3 Trends in Dutch budget health and social services (constant prices)



Source: CBS (2008)

Several developments drive the growth in budgets and employment. First, ageing acts as a demand increasing factor. Figure 3.4 shows the increasing life expectancy in the OECD. This growing expectancy results in higher levels of care needed. This is one of the reasons why the sector is under pressure. Ageing in combination with a decrease in the number of children results in a higher share of older people. This increases the health burden as not only costs increase, but also possibilities decrease to finance these costs. Figure 3.5 shows that in all EU member states the share of people above 65 increases between 2010 and 2020. Still, important differences in levels and change exist between member states. While Ireland has only 23 older people per 100 younger people between 15 and 64, this figure is 37 in Italy and Finland. Growth in the dependency ratio is especially high in countries like Malta (+47%), Finland (+46%) and Czech Republic (+44%). Countries like Latvia and Lithuania show a much smaller increase (+11%).

Figure 3.4 Trends in life expectancy OECD (number of years expected at certain age)

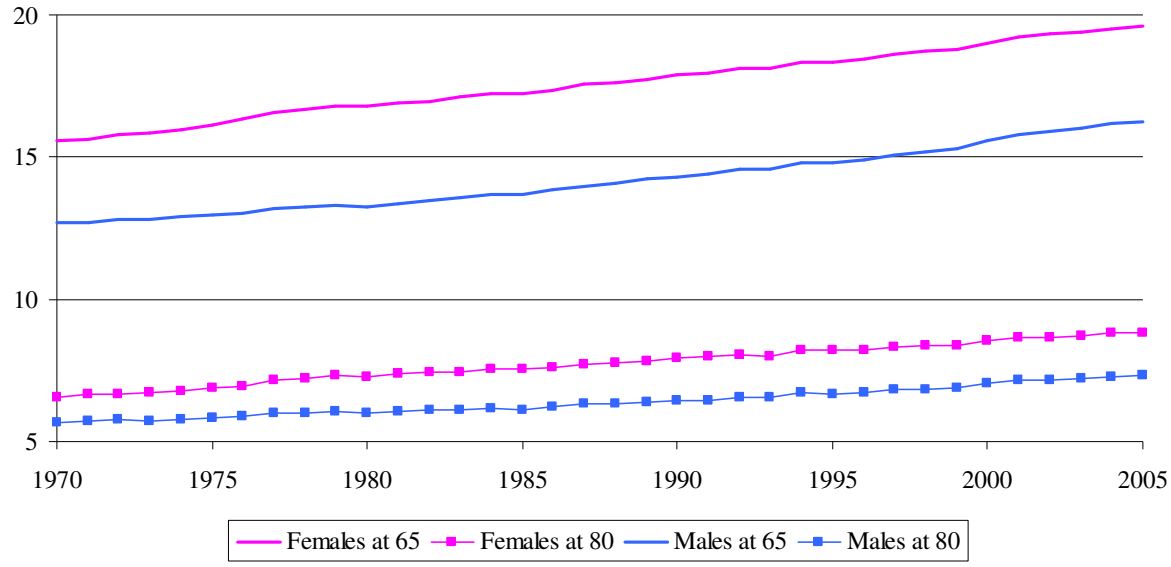
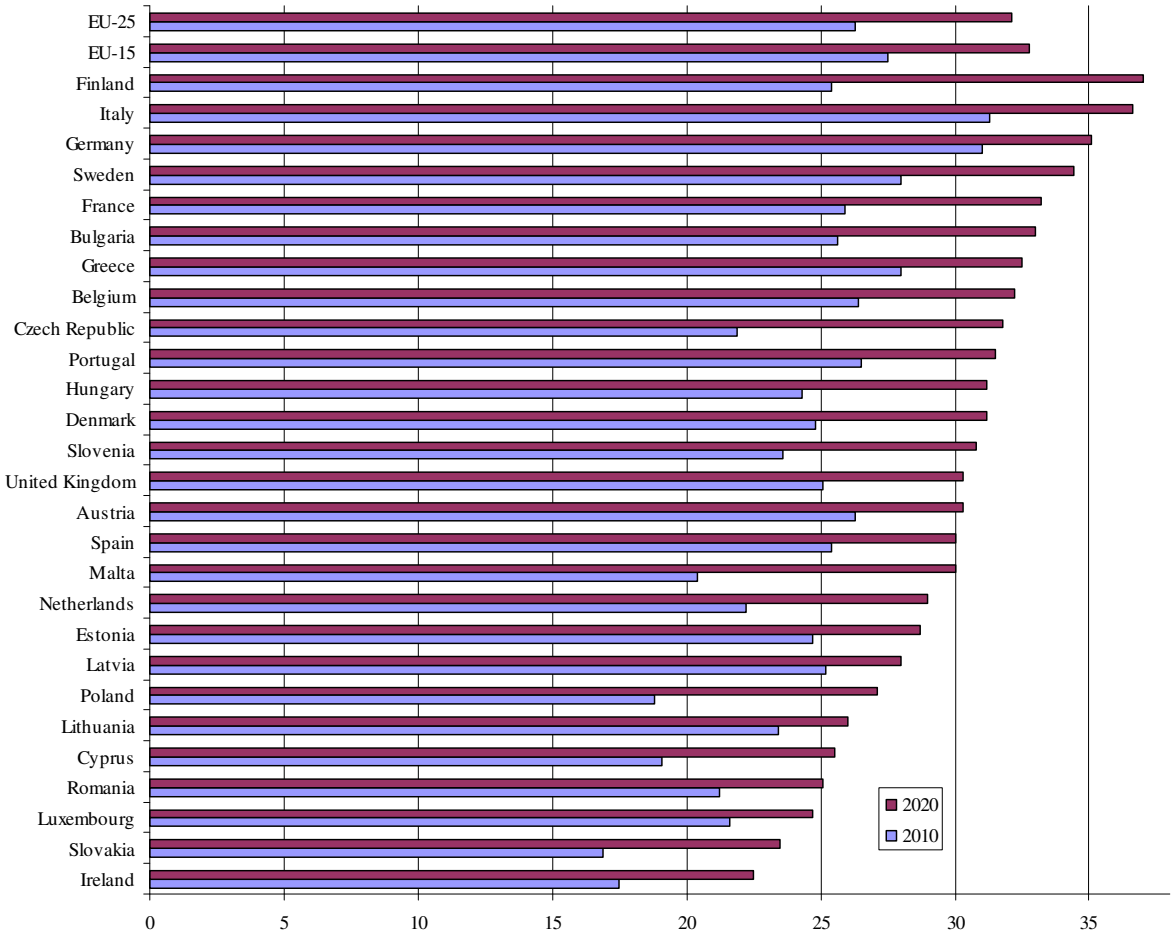


Figure 3.5 Dependency ratio (people older than 64 divided by people between 15 and 64)



Source: Eurostat

For the Netherlands an interesting study is done that analyses the effects of the different main determinants on future growth in the health and social services sector (Table 3.4). This study is interesting as all scenarios arrive at a positive growth that is around 3% in volume terms per year. Technology can have a (small) decreasing effect if development is characterised by demand reducing instead of demand inducing technologies (that dominate the other three scenarios). Finally, regulation increasing efficiency or reducing demand can have a volume decreasing effect. However, this effect is small if compared with the effect of income, technology and ageing.

Table 3.4 Effect of determinants on future growth health and social services

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Income per capita	1.49	1.08	1.08	0.74
Population growth	0.20	0.20	0.20	0.20
Technology	-0.11	0.68	0.82	1.07
Ageing (share 65+)	1.42	1.04	0.76	0.76
Regulation	0.00	-0.34	-0.33	-0.24
Volume effect (except regulation)	3.00	3.00	2.86	2.76

Source: Ligthart (CPB), 2007

Finally, it should be noted that value added is of course only a part of the real added value in the sector. Many things cannot be, properly, valued with economic valuations. This means that final decisions about changes always should incorporate the true 'social value added'.

Conclusions

Three major conclusions can be drawn from this analysis:

- All countries show an increasing trend in both employment and value added. Several developments indicate that this trend is also representative for the future. This is a major challenge as the health care and social services sector is a public sector with large impacts on budgets of households and governments. All countries face a challenge in terms of budgets and possible shortages in employment and skills.
- A few countries (especially Germany, but also Belgium, Ireland and the Netherlands) are winning in the sense that both current volume and growth in employment and/or value added are high. These countries face the largest challenge.
- The new member states face, relatively, less challenges as they far more often show a much smaller increase in employment and value added. However, income growth in the future will probably increase this challenge (EMCC, 2003).
- The share of social work in the total sector is on average around 30%, but fluctuates largely between member states.

2.2 Employment structure and work organisation

Gender

The workforce in health and social services is dominated by women (Table 2.5). Not less than 78% of workers is female. This share has risen marginally in the EU 15 from 79% in 2000 to 80% in 2006. In the new member states the opposite change is visible, from 81% in 2000 to 80% in 2006.

Age

Workers are relatively young in health and social services (Table 3.5). Both in the EU 15 and the new member states 43% of workers is younger than 40 years. However, in the EU 15 this share has decreased sharply as it was 48% in 2000. In the new member states the decrease was smaller as the share was 45% in 2000. The share of workers older than 50 has increased with 5%. While in 2000 22% of workers were above 50 years, in 2006 this was 27%. In the EU 15 no change in the share of workers between 40 and 50 is visible. In the new member states, however, this share decreased between 2000 and 2006 with 3%.

Education

Workers in health and social services have often a medium or high education level (Table 3.5). Not less than 40% of the workers have a high education level in the EU 15. This is 13% higher than for the whole economy. In the new member states the share is somewhat lower with 32% and exactly equal to the economy average. However, in these countries we see less low educated workers and dominance by medium educated workers.

Table 3.5 Employment by gender, age and education health and social services

	EU		EU 15		NMS	
	Level	Change	Level	Change	Level	Change
Women	78	1	78	1	80	-1
Age < 40	43	-5	43	-5	43	-2
Age 40 – 50	30	0	30	0	30	-3
Age > 50	27	5	26	5	27	5
Low education	16	-3	18	-4	6	-3
Mid education	45	2	42	2	62	2
High education	39	1	40	2	32	1

Definition	Level % 2006	Total change % 2000-2006	Level % 2006	Total change % 2000-2006	Level % 2006	Total change % 2000-2006

Source: Alphametrics/Eurostat/TNO.

2.3 Employment: main trends by job function

One of the most interesting indicators for the second future-oriented part of this study is the trends and developments that can be identified at the (micro) level of job functions. More than aggregate employment and more than figures about gender and age distribution can changes in job functions tell us something about ongoing change and restructuring in the sector. Changes in (the need for) competences and changes in the distribution of job functions are

closely linked to each other, both at the level of the sector and at the level of the firm. Competences are combined in occupation profiles, and can be distinguished in core competences, specialization competences or complementary competences (Rodrigues, 2007:34). Another distinction is between theoretical, technical and social competences (i.e. knowledge, skills and competences in ECVET) (ibidem). Identifying the changes in job functions by sector is a first step towards a better understanding of the changing competence needs in the sector. Competences for the purpose of this study are assumed to be located in a general grid defined by the main occupation functions: general management, marketing, financial and administrative management, R&D, logistics, production management, production, quality and maintenance (Rodrigues, 2007:35).

As a first step towards identifying trends in competences, the observed changes in the distribution of job functions over time will be analysed. In the second part of the study (i.e. the scenario-based future-oriented part, to appear in February 2009), a further elaboration of these changes on the need for new and existing competences will be provided. The analysis starts with an analysis of the state-of-play, i.e. the situation as per 2006. Subsequently, changes in job functions over time are discussed, in general (overall) and for different categories of workers classified according to educational level.

Employment by occupation

Personal care and related workers have the largest share (27%) in the health and social services sector in the EU 15 (see Table 3.6 for absolute values and 3.7 for shares). For the new member states nursing and midwifery professionals are the most common occupation (23%). Other important occupations include other professionals and technicians, social science professionals, health associate professionals and health professionals. Low occupation shares are represented by other service workers, craft trades workers and machine operators, domestic helpers and elementary occupations.

Remarkable is that retreating countries have the highest share of managers (5%), while this is much lower in the other categories. Retreating countries have also many clerks. Retreating and losing momentum countries feature the largest shares of personal care and related workers (25% and 32%). In losing momentum countries there is a large share of helpers, cleaners and launderers. Upcoming countries feature high shares for health associate professionals and health professionals excluding nursing (26% and 14%). Social science professionals and nursing and midwifery professionals represent a relatively large share of the workforce in Germany, the winning country (14% and 19%).

Table 3.6 Employment level by occupation health and social services 2006 (*1000)

	EU 15	NMS	EU	Winning	Losing momentum	Upcoming	Retreating
Total	17 989	2 314	20 303	4 088	6 145	2 258	7 812
Managers	575	62	637	36	137	57	418
Health professionals excl. nursing	1 642	366	2 008	391	417	322	893
Nursing and midwifery professionals	2 799	524	3 323	756	1 070	137	1 298
Health associate professionals	1 452	305	1 757	274	318	592	631
Social science professionals	1 440	97	1 536	593	352	128	455
Other professionals & technicians	1 764	221	1 984	437	686	259	576
Clerks	1 376	98	1 474	201	417	154	706
Personal care and related	4 772	286	5 058	780	1 996	368	1 947
Other service	518	69	587	208	114	48	212
Craft trades, machine operators	399	101	500	133	108	72	188
Helpers, cleaners, launderers	941	143	1 084	153	444	85	386
Elementary occupations	313	42	355	124	87	36	103

Note: The country grouping is based on value added (Table 2.2).

Table 3.7 Occupation shares health and social services 2006

	EU 15	NMS	EU	Winning	Losing momentum	Upcoming	Retreating
Total	100	100	100	100	100	100	100
Managers	3	3	3	1	2	3	5
Health professionals excl. nursing	9	16	10	10	7	14	11
Nursing and midwifery professionals	16	23	16	19	17	6	17
Health associate professionals	8	13	9	7	5	26	8
Social science professionals	8	4	8	14	6	6	6
Other professionals & technicians	10	10	10	11	11	11	7
Clerks	8	4	7	5	7	7	9
Personal care and related	27	12	25	19	32	16	25
Other service	3	3	3	5	2	2	3
Craft trades, machine operators	2	4	2	3	2	3	2
Helpers, cleaners, launderers	5	6	5	4	7	4	5
Elementary occupations	2	2	2	3	1	2	1

Note: The country grouping is based on value added (Table 2.2).

This picture indicates that in countries where health and social services is growing quickly, a much larger share of workers is dedicated to health and social services itself. In the other countries there is larger share of support functions and personal care. Note, however, that the winning and upcoming countries consist only of four countries together.

Table 3.8 Occupation share changes health and social services, 2000-2006

	EU 15	NMS	EU	Winning	Losing momentum	Upcoming	Retreating
Managers	1	0	1	0	0	1	1
Health professionals excl. nursing	-1	4	0	-1	0	-3	1
Nursing and midwifery professionals	-5	1	-4	-3	-1	-19	-3
Health associate professionals	3	4	3	1	0	15	3
Social science professionals	0	2	0	1	0	2	-1
Other professionals & technicians	0	-11	-1	0	0	3	-3
Clerks	0	0	0	0	-1	-1	0
Personal care and related	2	6	2	0	0	3	4
Other service	0	-5	-1	0	0	1	-2
Craft trades, machine operators	0	-1	0	0	-1	0	0
Helpers, cleaners, launderers	1	0	1	0	4	0	-1
Elementary occupations	0	-2	0	1	-1	0	0

Note: The country grouping is based on value added (Table 2.2).

Generally speaking there have been no major changes in shares of occupations between 2000 and 2006 (Table 3.8). Some exceptions exist, however. The most obvious one being a decline of 11% for other professionals and technicians in the new member states, as well as a decline of 5% for other service workers in these countries. This was offset by a 6% increase in occupations for personal care and related workers, health professionals and health associate professionals. It is possible that these large changes are the result of improved administration resulting in less people assigned to the 'other' categories. For the EU 15 only a 5% decrease in the share of nursing and midwifery professionals was remarkable. Upcoming countries showed a major increase of occupations for health associate professionals, at the cost of the share of nursing and midwifery professionals (-19%).

Occupations and education level

Almost all health and social services occupations showed negative trends for low educated workers (Table 3.9). Especially elementary occupations, helpers, cleaners and launderers experienced double digit decline in the new member states as well as decline of about 10% in the EU 15. Other service workers experienced decline of 16% in the new member states. Only health associate professionals (+1%) and health professionals (constant) did not experience decline for the EU as a whole. Germany, the winning country, showed an increase of 7% for craft trades workers & machine operators. Increases prevailed in this country also for managers, clerks and elementary occupations. Countries losing momentum featured mainly declines less than 13%, except constant shares for health professionals and nursing and midwifery professionals. Moreover, other service workers' share of occupations grew by a modest 1%. Upcoming countries featured a large increase for other service workers (14%).

Shrinking occupations were personal care and related workers as well as nursing and midwifery professionals (both -11%). Retreating countries featured mainly large declines, especially for clerks (-11%), personal care and related workers (-17%), domestic helpers, cleaners and launderers (-17%) and elementary occupations (-18%). In total all EU countries faced decline except for Germany. The largest decline occurred in retreating countries (-9%).

Table 3.9 Occupation share changes low education health and social services, 2000-2006

	EU 15	NMS	EU	Winning	Losing momentum	Upcoming	Retreating
Managers	-2	0	-2	2	1	-1	-5
Health professionals excl. nursing	0	0	0	0	0	0	-1
Nursing and midwifery professionals	-4	-2	-4	-3	0	-11	-5
Health associate professionals	1	-3	1	-1	-1	3	-3
Social science professionals	-2	-6	-3	0	-3	1	-8
Other professionals & technicians	-2	-1	-1	0	-1	-3	-2
Clerks	-4	-5	-4	1	-2	-5	-11
Personal care and related	-6	-6	-6	-1	-4	-11	-17
Other service	-3	-16	-2	-2	1	14	-8
Craft trades, machine operators	-1	-5	-1	7	-5	-2	-7
Helpers, cleaners, launderers	-13	-14	-12	-5	-13	-5	-17
Elementary occupations	-8	-17	-6	4	-8	-8	-18
Total	-3	-4	-3	0	-2	-2	-9

Note: The country grouping is based on value added (Table 2.2).

Table 3.10 Occupation share changes mid education health and social services, 2000-2006

	EU 15	NMS	EU	Winning	Losing momentum	Upcoming	Retreating
Managers	-2	5	-2	2	-3	4	-2
Health professionals excl. nursing	2	-2	1	0	4	0	1
Nursing and midwifery professionals	-5	9	-2	8	-2	4	9
Health associate professionals	4	14	6	4	0	-12	25
Social science professionals	-1	-11	-1	1	5	-33	-1
Other professionals & technicians	3	-12	-2	8	0	6	-10
Clerks	1	1	1	-3	-3	1	8
Personal care and related	4	7	4	2	3	8	14
Other service	2	14	0	3	-3	-15	5
Craft trades, machine operators	1	6	1	-1	4	3	5
Helpers, cleaners, launderers	12	17	12	5	11	6	18
Elementary occupations	6	15	4	-4	7	10	11
Total	2	2	2	3	1	-4	8

Note: The country grouping is based on value added (Table 2.2).

The overall employment occupation share for middle educated workers in health and social services increases by 2% between 2000 and 2006, both in the EU 15 and the new member states (Table 3.10). For the EU as a whole, helpers, cleaners & launderers showed large increases in occupation shares for middle educated workers. This was especially true for the new member states. Other significant increases included health associate professionals (6% for the EU as a whole), personal care and related workers and elementary occupations. The largest changes occurred in the new member states, mainly in health associate professionals (+14%), other service workers (+14%), helpers, cleaners & launderers and elementary occupations (+15%). Major declines occurred for middle educated social science professionals (-11%) and other professionals and technicians (-12%).

All country categories except upcoming countries show increasing occupation shares for middle educated workers. Mainly, the upcoming countries featured a loss of 32% for social science professionals. Other important declining occupations were health associate professionals and other service workers. Only elementary occupations increased significantly (+10%). Winning country Germany featured major increases in nursing and midwifery professionals (8%) and other professionals and technicians (8%). Retreating countries show large increase for health associate professionals (25%), personal care and related workers (14%), domestic helpers, cleaners & launderers (18%) and elementary occupations (11%). Significant decline occurred for other professionals & technicians in retreating countries (-10%).

EU-wide highly educated workers experienced only a modest increase in occupations (Table 3.11). Underneath these modest figures major shifts prevail, mostly in the new member states.

Table 3.11 Occupation share changes high education health and social services, '00-'06

	EU 15	NMS	EU	Winning	Losing momentum	Upcoming	Retreating
Managers	5	-5	3	-4	2	-2	7
Health professionals excl. nursing	-1	2	-1	0	-3	-1	0
Nursing and midwifery professionals	9	-7	5	-5	2	8	-4
Health associate professionals	-6	-11	-6	-3	1	9	-22
Social science professionals	3	17	4	0	-2	32	9
Other professionals & technicians	-1	13	3	-8	1	-3	13
Clerks	4	4	4	2	4	4	3
Personal care and related	2	-1	2	0	1	3	3
Other service	1	3	2	-1	3	1	3
Craft trades, machine operators	0	-1	0	-6	2	-1	2
Helpers, cleaners, launderers	0	-3	0	0	1	-1	-1
Elementary occupations	2	2	2	0	2	-2	7
Total	1	2	1	-3	0	5	1

Note: The country grouping is based on value added (Table 2.2).

For the EU, the largest decline occurred for health associate professionals (-6%). The most significant increase occurred for nursing and midwifery professionals (5%). Major shifts occurred for health associate professionals (-11%), social science professionals (17%) and other professionals & technicians (13%). Manager's occupations increased in the EU 15 and

declined in the new member states. In the EU 15, the largest change was an increase in nursing and midwifery professionals (9%) and a decline for health associate professionals (-6%). Clerks experienced a modest growth (4%).

Looking at categories of countries, Germany, the winning country, showed fairly considerable decline for other professionals & technicians (-8%) and craft trades workers & machine operators (-6%). Countries losing momentum showed no major changes. Upcoming countries showed a large increase in the share of highly educated social science professionals (32%). Nursing and midwifery professionals (8%) and health associate professionals (9%) increased significantly, too. Other occupations showed quite modest changes in occupation shares. Retreating countries showed a major decline for health associate professionals (-22%) and a modest decline for nursing and midwifery professionals (-4%). Social science professionals (9%) and other professionals & technicians (13%) showed an increased share in highly educated occupations. As well, elementary occupations show an increase (7%). Overall, winning countries represented 3% decline in employment share, whereas upcoming countries represented a 5% increase.

Interestingly, the combination of data for low, middle and high education show no major changes at the total level. Low education is decreasing somewhat and middle and high education are increasing. However, at the occupational level much larger changes took place. No simple picture can be drawn here. Where in some cases low education is substituted for middle education (e.g. helpers, cleaners and launderers), in other cases high education is substituted for middle education (e.g. health associate professionals and in still other cases middle education is substituted for high education (e.g. other professional & technicians). Note again, however, the remark about the overestimation of figures included in the beginning of this paragraph.

Occupations and gender

Although the sector is very diverse in nature, gender balance appears to be highly uneven in the health and social services sector. More women then men work in health and social services (EMCC 2007). Table 3.12 shows that since 2000 still more women started working in the sector at EU level. In 2006 the share of women increased with 1% compared with 2000. Only for elementary occupations the share of women decreased. However, for the new member states a decrease is visible for more occupations and even at the total level.

Table 3.12 Occupation share changes women health and social services, 2000-2006

	EU	EU 15	NMS
Managers	4	4	6
Health professionals excl. nursing	4	2	1
Nursing and midwifery professionals	2	2	0
Health associate professionals	1	0	-1
Social science professionals	2	2	1
Other professionals & technicians	1	1	0
Clerks	0	0	-2
Personal care and related	0	0	0
Other service	1	4	-17
Craft trades, machine operators	0	2	-3
Helpers, cleaners, launderers	0	0	1
Elementary occupations	-7	-5	-29
Total	1	1	-1

Source: Eurostat/TNO

Gender plays not only a role by influencing the worker side, but also by demand effects. Emancipation and stimulation of formal work can play a major role in the sector. For example, care for the elderly traditionally carried out by family members will prospectively be carried out by a professional social worker because female family members will increasingly be working and not have time for carrying out care tasks for elderly family members (see EMCC 2005b).

Table 3.13 Occupation share changes age categories health and social services, 2000-2006

	15-39			40-49			50+		
	EU	EU 15	NMS	EU	EU 15	NMS	EU	EU 15	NMS
Managers	-3	-3	-3	-4	-3	-10	7	6	13
Health professionals excl. nursing	-4	-5	2	-5	-5	-6	9	10	4
Nursing & midwifery profess.	-6	-5	-4	2	1	1	4	4	3
Health associate professionals	-4	-6	9	0	2	-13	4	4	4
Social science professionals	-2	-3	7	-1	-1	-10	3	4	2
Other professionals & technicians	-5	-5	-6	-1	-1	0	6	6	7
Clerks	-5	-5	2	0	0	-1	5	5	-1
Personal care and related	-5	-5	-6	1	1	3	4	4	3
Other service	-9	-9	-6	1	2	0	8	7	6
Craft trades, machine operators	-5	-5	-3	-2	-1	-5	7	6	8
Helpers, cleaners, launderers	-8	-7	-8	3	3	2	4	4	7
Elementary occupations	-12	-12	-14	3	4	-2	9	8	16
Total	-5	-5	-2	0	0	-3	5	5	5

Source: Eurostat/TNO

Age

The last years ageing of staff occurred in the sector (Table 3.13). The share of workers younger than 40 years declined between 2000 and 2006 with 5% at the EU level. The opposite effect is visible for workers older than 50 years. For some functions a much larger effect is visible. Especially for managers and elementary occupations the share of older workers increased considerably. Because of ageing a large share of the labour force will leave the profession shortly. There will probably be a shortage of care professionals in the near future (Driest, 2006).

2.4 Industrial relations

The general relation between employer and employee in health and social services is characterised by government versus civil servant. Important exceptions are present, however. Medical specialists, for instance, have in some countries an independent status. Although they are working in a hospital, they have their own private firm, which has a contract with the hospital. In most countries, however, the wage and other labour circumstances are decided upon by governments. Furthermore, the civil servant status is more common for social work compared with workers in the health sector.

Some parts of health and social services are privatised, liberalised or discussions about these changes are going on. In these circumstances, employees are often against these plans as long as they fear that they hurt job security, wage levels and other labour circumstances (e.g. Kovac, 2001).

Labour unions are often organised by profession. Physicians and nurses, for instance, have very often different labour unions. This stimulates the effective representation of the interests of the different types of people working in the sector (as they often conflict). For discussions about the system as a whole, however, this is sometimes counterproductive. This might be even more important when the relations between health and social work are discussed. In other countries, however, unions exists for the whole sector. In Finland, Latvia and the United Kingdom, for instance, a 'Health and Social Workers' union exists.

As health and social services are a very essential service, labour unions might use strikes (or the threat to strike) as a very effective weapon. In 2006, for instance, 15,000 of the 20,000 university physicians went on strike when the government decided that working hours were increased without a rise in pay (Nowak, 2006). Strikes and other protests are also stimulated by large differences in wages between countries. German doctors earn, for instance, only 25% of doctors in the Netherlands and only 50% of doctors in France.

2.5 Partnerships for innovation, skills and jobs

One of the central tenets of the renewed Lisbon Strategy is the partnership concept; by building a European partnership for growth and employment, the reforms needed to boost growth and employment will be facilitated and speeded up (European Commission, 2005). Partnership in this view "mobilises support" (mobilisation) and "gets the different players at work together" (collective effort), as well as "makes sure that the(se) objectives and reforms are taken on board by all the various players" (thus spreading ownership) (ibidem, page 14). In the implementation of the European Cohesion Policy, the partnership principle is fundamental as well. The EU recognises the importance of involving local and regional actors, in particular in areas where greater proximity is essential such as innovation, the knowledge economy and new information and communication technologies, employment, human capital, entrepreneurship, support for SMEs and access to capital financing. Beyond that public-private partnerships and the improvement of governance in the fields of entrepreneurial innovation, cluster management, innovation financing are promoted at all EU levels – from the local to the regional, the national as well as the European level and across economic sectors. Partnerships for innovation, skills and jobs, in connection with the industrial high level groups, clusters, lead markets and technology platforms are being promoted at European and national level.

For the purpose of the project, examples of functioning partnerships for innovation, skills and jobs have been identified, showing the following characteristics:

- *Involvement of all relevant actors:* companies, research organisations, education and training institutions, financial institutions, public administration, etc.
- *Cross-sectoral approach:* Partnerships which are assigned to a specific business sector, but work across different business sectors
- *Cross-thematic approach:* Partnerships linking innovation, skills and jobs
- *Inclusion of general human needs into the partnership strategy:* Partnerships including general human needs, such as housing, health or mobility into their formulated (broad) vision or strategy
- *Long term commitment of actors:* Partnerships which are characterised by a long term commitment of its members

- *Joint problem solving:* Partnerships working on problems which can not be met by one member alone
- *European dimension:* Partnerships which are established at the European level. Weher no good examples at the European level could be found, inspring and credible examples at the national or regional level were identified which could serve as a role model or best practiece example for establishing a similar partnership at the European level.

On several occasions partnerships (networks or clusters) for innovation, skills and jobs can create a leverage effect for innovation, especially if they take strong(er) account of general human needs.[2] For instance, partnerships in the tourism sector aiming at developing 'leisure' should have knowledge in, e.g., tourism, culture, sport and environment. A partnership aiming at developing the quality of habitat consequently should combine knowledge on at least construction, furniture, electronics and urban management. Partnerships for Innovation, skills and jobs integrating general human needs on European level are still very rare.[3] It is likely to find more inclusive partnerships on national and regional level, but also on these levels, not all elements of the Rodrigues definition are included.

Whereas the potential benefits of partnerships are clear, finding strong examples that fit the above characteristics at EU level are still difficult to find. There are, however, good examples in various sectors at the national and the regional level. Some of these stand out in terms of partnership approach, innovation capacity, approach for skills development, or their job maintaining and creating capacity. Examples include the City Fringe Partnership for developing regional job opportunities in the printing sector and the ERRAC and EURNEX network in the rail sector where a European approach is combined with a strong effort to integrate latest research results in an virtual European training curriculum.

Partnerships, networks and clusters on innovation, jobs and skills often face specific and similar obstacles, whatever sector is at stake. These include:

- *Restricted scope:* Partnerships often are set up in order to solve problems which can not be met by one partner on its own. The problems, thereby, are either defined bottom-up or articulated by the politics in a top-down process. In the latter case, the scope of partnership is limited to their given geographical scope and/or their thematic focus (If partnerships are established top-down as instrument to address specific problems they are usually restricted to the policy represented by the awarding authority, e.g. a particular Ministry). Similarly, partnerships and networks established at the European level, such as e.g. networks of excellence, technology platforms, etc. have a specific thematic focus (in this case innovation in research and development).
- *Short-term nature:* Partnerships which are built up by means of public funding are often project driven, feature a short term nature and, generally, intend to be not sustainable due to their dependence of a single fund.
- *Weak direct links between skills, jobs and innovation processes:* Skills upgrading and job opportunities are a result of innovation processes. Therefore, partnerships which focus on innovation do seldom focus on skills and jobs with the same strong interest.

[2] An argument put forward by professor Rodrigues at the workshop "Innovation policies for a knowledge intensive economy – assessing the European experience" in 2005 in Brussels.
[3] Outside the scope of the current studies, there is at least there is one good example, the European Construction technology platform (see http://www.ectp.org/default.asp).

- *Sectoral restrictions:* In general partnerships working on international or European level seem to be more likely to occur in strongly internationalised economic sectors with a common universal challenge (e.g. pollution or sustainable development). Then they are mostly limited to the problems they want to address.

Partnerships in the health and social services sector

IMI, the Innovative Medicines Initiative, (imi.europa.eu/index_en.html) is a unique Public-Private Partnership (PPP) between the pharmaceutical industry represented by the European Federation of Pharmaceutical Industries and Associations (EFPIA) and the European Communities represented by the European Commission. It grew out of the European Technology Platform (ETP) on Innovative Medicines. The platform was launched under the 6th Framework Programme for Research (FP6) as a gathering of stakeholders, led by the pharmaceutical industry. Partners of IMI are: private and public research institutions biopharmaceutical companies and SMEs; healthcare providers and clinical centres; regulators and patients' organisations and associations of the sector.

Main objective of IMI is to overcome insufficient research and development investment, technological complexity and fragmentation in European medical research. Therefore members decided to work on key research problems in drug development processes:

- Predicting safety: this addresses bottlenecks related to accurately evaluating the safety of a compound during the pre-clinical phase of the development process, but also impacts the later phases in clinical development.
- Predicting efficacy: this addresses bottlenecks in the ability to predict how a drug will interact in humans and how it may produce a change in function.
- Knowledge management: this addresses the more effective utilisation of information and data for predicting safety and efficacy.
- Education and training: this closes existing training gaps in the drug development process.
- Both knowledge management and education & training aim, as underpinning areas, to improve the information flow between the different phases of the drug development process.

The research activities, to be supported under the IMI, will be open to all research actors, provided that they are performed within Europe.

For the implementation of the research agenda the integrated research project InnoMed was set up. Within InnoMed 16 biopharmaceutical companies are collaborating with 14 Universities and 8 small and medium-sized enterprises (SMEs) to assess the toxicology of potential new treatments and to discover and validate new markers for diagnostics.

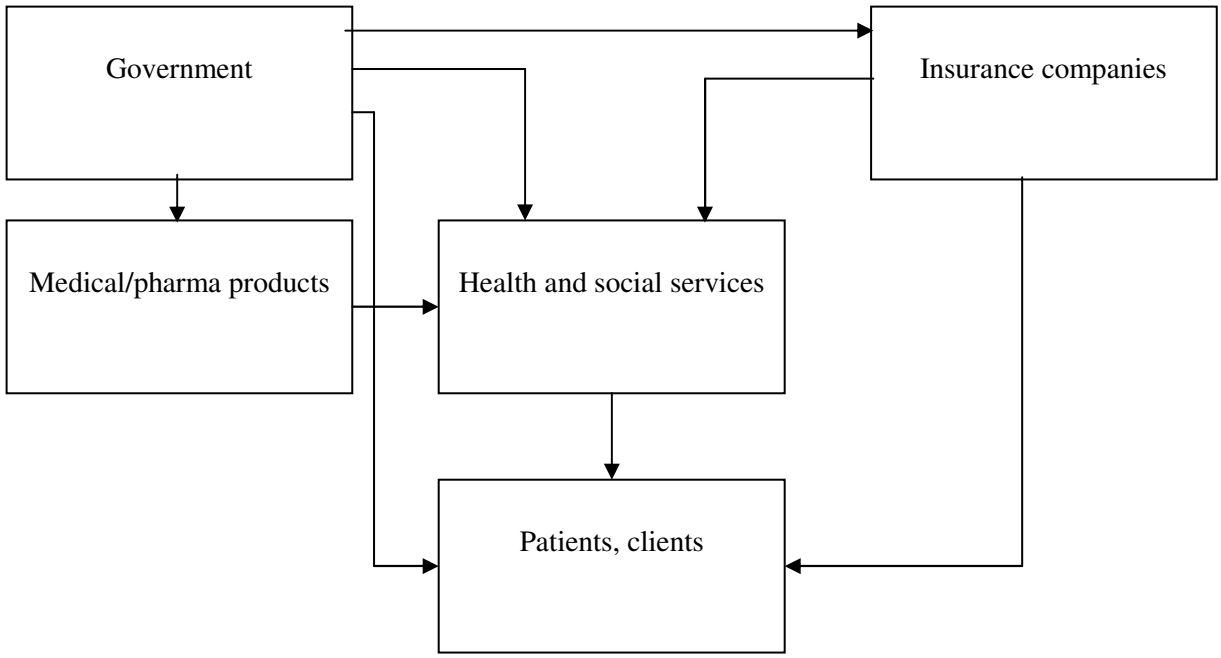
In the education and training pillar, five recommendations are formulated. One, very ambitious recommendation is to found a European Research Academy and to implement multi-disciplinary programmes to develop skills in integrating biology and medicine expertise.

Like other ETPs the focus lies on research and knowledge development and technological innovation with a pillar on education and training.

3 Value chains, networks and actors

The value chain in health and social services differs by country with regard to the sorts of relationships between the relevant value adding parties. Nevertheless, some key elements of the value chain seem common for the EU.

Figure 4.1. Health and social services value chain



Government provides the health and social services sector and suppliers of medical and pharmaceutical products with financial, quality and accessibility regulation. Insurance companies provide patients with insurance of healthcare cost and the healthcare sector with compensation of treatment. In some countries this is done by the government (taxes). This last method dominates financing in the social services sector. The sector provides patients with treatment and clients with social services. Its inputs are regulation by the government, medical products form pharmaceutical suppliers and compensation from insurance companies or the government. Since European countries feature health sectors dominated by governmental regulation, the structure and nature of public regulation determines to a large extent the size and direction of the arrows. Countries differ with regard to regulation, especially with regard to financial regulation.

The sector needs the input of other sectors. Most important are pharmaceuticals and medical equipment suppliers. Lichtenberg (2002), for instance, shows that the use of newer drugs leads to higher pharmaceutical costs, but to much lower costs in the health care sector as hospitalization decreases. This means that shortages in skills in these sectors might increase shortages in health care. These sectors are, however, not included in this chapter.

Health and social services providers are in a number of cases independent providers (public or private). In many cases, however, the government itself is not only regulator but also the provider of health and social services. Especially for social services workers are often employed by (local) governments. As for social services insurance companies play often a minor role, although with exceptions in some member states, and much less medical and

pharma products are needed, value chain is quite simple with the government and clients as main elements.

The sector is used by all other sectors as workers in all sectors need health care and social services. This means that the sector is essential in the sense that skill shortages might influence the whole economy. Therefore, the sector is in general highly regulated by governments (see section 6).

The value chain described above reflects only the formal sector. However, informal care is very important and related to formal care. In Europe informal care by adult children, for example, is a common form of long-term care for older adults and can reduce medical expenditures if it substitutes for formal care. Formally provided home health care benefits are very strong in many European countries, thus families typically turn to formal care services first and then fill in the remaining care needs by appealing to family members to help out in the home (Holly et al., 2007). This means that increasing the budget for formal care decreases informal care and increases labour supply, especially for women (Viitanen, 2007). However, the opposite is also true. Policies that advocate paid work and regulate quality put pressure on informal care. As formal care and informal care are substitutes, diminishing informal care will put immense pressure on health budgets. The European Foundation for the Improvement of Living and Working Conditions (EMCC, 2006), therefore, pleads for support for informal carers. "National policymakers need to develop strategies to reduce the financial burden on their social provision systems. In line with the overall need for more personalised services, the move to more informal care provision seems inevitable. Thus, supporting informal care either through financial incentives or through support services will be one of the major challenges in the coming years."

4 Sector dynamics and the role of technological change, R&D and innovation

New technologies play a major role in the sector, but predominantly in the health part. Technological breakthroughs have large impacts on many items such as life expectancies, pain relief, the duration of care, choices between home and external care. Important examples are:

- A growing arsenal of operation technologies, screening possibilities and pharmaceuticals change the health care sector considerably. The result is a growing demand for advanced services. While some new technologies decrease cost and labour considerably, others result in growing health costs and labour demands. This means that some technologies are demand inducing, while others substitute for labour.
- An important process innovation tool is ICT. Internet is a useful source for gathering information about health and for managing, investigating and monitoring patients via telematics. Furthermore, even home hospitalisation might increase as high bandwith connections make it possible to provide necessary care between hospitals and care centers on the one side and patients on the other side (SATS, 2000). ICT influences transaction costs, resulting in faster and sometimes less expensive health care (EMCC, 2005a). Managing ICT health care applications involves heavy data traffic, altering the demands for qualifications by staff.
- In the long run product innovation may benefit considerable from advances in genomics. This includes monitoring and eventually altering human genes, with the purpose of treating or preventing illness. For most of the applications of genomics, the practice is not expected to be routing until after 2020. Pharmacogenetics might be the first application used in therapeutic practice.
- Another source of product innovation is biotechnology. Bio-appliances could be a substitute for surgery, for example in heart disease, through regenerative material. However the expected cost of this is very sizeable. Nanomedicine (control of human biologicial systems at the molecular level) is very interesting as well.
- New medical appliances are a major driving force of change in the sector.
- A special form of innovation is the growing emphasis on prevention. While traditionally the focus was on care, now prevention gets more attention in some countries. Experience with prevention is mixed. While in theory the effect is positive in the sense that less problems occur, there are also examples that prevention is demand-inducing by increasing the awareness of health and social problems. Important is also that prevention is directed at cost-effective issues, leaving aside high-cost options.

Although some technologies, such as ICT, can be used to decrease costs, others stimulate budget growth. In many countries rising budgets invoke discussions about the desirability of new technologies.

Another consequence of technology is specialisation, resulting in differentiation, delegation and transformation of tasks as well as adding new tasks.

For social services much fewer technologies are important. The exception, of course, is ICT. This makes it possible to increase contacts with (potential) clients, to provide clients with more information and to increase the effectiveness of the internal process (filing, tracking, billing).

5 Trade, globalization and international competition

5.1 An overview of international competition

Health care and social services are currently organised on national scale. This does not mean, however, that international competition does not play a role. This is especially the case in health care. First, developments show that patients increasingly use facilities in other countries if in their home country shortages exists, for instance resulting in long waiting lists, or when perceived quality of health care is better in other countries. Quality of care differs heavily between countries (OECD, 2007). International mobility plays also a role in case of rare diseases or new treatments. Also relevant for international competition are bilateral initiatives for residents in border regions. In border regions projects between health care service providers and insurers have taken place to cooperate internationally (EU, 2001). These projects in general apply to services using advanced technologies. The EU concluded that in 2006 1% of total health care expenditure is spent on cross border care and this share is expected to increase stimulating international competition. In 1993 this figure was only 0.3% of total expenditure (EU, 2001).

Second, the international competition of workers is very important for essential segments. Kuehn (2007), for instance, shows that international migration plays an increasing role in health care. Especially developing countries have shortages as medical practitioners migrate to developed countries with higher wages, more opportunities to develop their skills and better living conditions. This type of competition plays not only a role between the EU and developing countries, both also within the EU. Buchan (2007), for instance, shows that migration plays a larger role since new member states joined the EU. According to his analysis the international recruitment of health workers has become a 'solution' to the health professional skill shortages. As training takes a long time, hiring people from other countries make it possible to increase the speed of supply increases and to decrease training costs. Moreover graduation of doctors on average declined in OECD countries in the period 1985 to 2005 (OECD, 2007). In some countries however, an upturn can be seen. A decline in graduation makes the inflow of foreign workers more important to match demand in the future. No figures are available, however, to estimate the importance of migration of health workers.

International mobility of health professionals also takes place through networks that provide references and means of transferring expertise (EU, 2006). New information technology (e-health) makes mobility of professional knowledge higher, while professionals do not have to leave their country. However, incommensurable rules between member states provide barriers to increasing mobility (EU, 2006).

Diagnostic services are becoming more international, especially in markets where privatisation is more widespread. In some countries diagnostic services are mostly provided by hospitals, such as Denmark, Sweden and the UK. In the Netherlands, general practitioners cooperate with independent laboratories that provide a growing range of diagnostic services. Here international competition is emerging. In Finland, health centers can purchase diagnostic services from hospitals. In Germany diagnostic services are insourced again in hospitals to increase efficiency, as the fee based services did not contain any incentive to become more efficient (WHO, 2006).

In long term care international competition is already taking place due to the mobility of pensioners. Some care providers are expanding their services to regions where pensioners are retiring. For instance Dutch providers have started offering services in Spain (Driest, 2006). In general patients mobility is likely to become more important in the future and there is a need to transparently address their cross border rights.

5.2 Trade

Miles (2008) shows that in the EU the government is responsible for 85% of all health and social services, a figure which is only larger for public administration and defence. Public authorities and voluntary organizations play a major role in the sector, but the role of the private sector is increasing (EMCC, 2003).

Where trade is organised by the market mechanism in most other sectors, this mechanism is often absent in health and social services. Although several countries experiment with the introduction of competition in the sector (e.g. the Netherlands), the sector is dominated by governmental regulation.

Public provision and the lack of market incentives are the result of historical developments and governmental regulation. As a result of the role of public authorities the lack of competition and regulation, trade barriers are massive in the sector. Important trade barriers are:

- In many sectors and EU countries there is no free entry for companies, specialists, care institutions, hospitals, etc due to legal, economic and qualitative barriers. The general effect in industrial sector of rising demand is an increase in supply. If no free entry is possible, however, demand increases result in shortages.
- Prices are very often regulated and maximized. This means that the price mechanism cannot play its role properly. In normal sectors a shortage in supply results in higher prices, stimulating producers to increase capacity. In health and social services this mechanism does not work.
- To manage costs, many countries maximize budgets. This leads often to increasing waiting lists if demand increases as supply is not able to increase also. For instance, countries with high bed occupancy usually have fewer beds available for acute care (OECD, 2007). These budgets make it also difficult to follow developments of the labour market in situations where shortages arise, as wages are not very flexible. Labour compensation in the sector is therefore often lower than in competitive sectors increasing the unbalance between demand and supply. The remuneration of self employed specialists is also often higher than salaried specialists and variation in remunerations are mostly due to the supply of professionals (OECD, 2007).
- Patients and customers have often no free choice between health care and service deliverers. In Denmark, England and Finland, patients have to register with a general practitioner in the area in which they live, while in the Netherlands they may register with any general practitioner. In France and Sweden patients can choose between going to a generalist or a specialist (WHO, 2006). Although important exceptions exist, they very often have to go to the facility in their neighbourhood. This means deliverers have less incentives to optimize efficiency and affectivity as this regional monopoly position implies that their market share is guaranteed.
- Training of new practitioners is often highly regulated, maximizing the availability of staff. Flexible and quick reactions to changes in demand are difficult to organize in

such a system. Matching supply to demand is complicated by the lags involved in training health professionals. Therefore sudden changes in demand are difficult to match by supply (OECD, 2007). Furthermore, specialists training new practitioners have regularly incentives to guarantee shortages as this increases their scarcity and income. In some countries they can do this by reducing training programmes. Finally, countries that regulate training of staff often have graduation rates below average (OECD, 2007).

- Information is often very scarce, both for clients, patients and regulators (governments). This undermines the crucial role customers play in normal markets, as they are not able to provide suppliers with incentives to improve production. For regulators a lack of information makes it difficult to react on problems of the system.

As a result of these problems EU governments are continually reorganising health care and social services (see section 6). This does not mean, however, that competition, liberalisation and markets are the solution for health and social services. In many cases these instruments are very difficult to combine with public goals like accessibility and quality. Especially for social services a market oriented approach is difficult to follow. But also for major parts of health care public provision will be the main mode in the future. Still, instruments like benchmarking might be used to increase the efficiency of the internal processes.

5.3 Externalisation strategies: outsourcing and offshoring

The health and social services sector is characterized by local production. In nearly all cases service has to be delivered on the place where the patient or client is. Some offshoring takes place, however. This applies to services not related to patient contact, such as diagnostics. Measured in the share of the sector costs, however, this is a very minor development.

Box 3. Defining and measuring relocation and outsourcing

One of the biggest challenges when analysing and discussing offshoring and outsourcing is the definitional issue of what precisely is meant and - closely related – how to measure the phenomenon. Outsourcing covers activities previously carried out in-house sourced to third parties whether abroad or in the home country. Offshoring in its strictest sense relates to activities being discontinued in the home country and transferred to a location abroad managed within the same entity or by an affiliated legal entity (OECD, 2007). Frequently, the political debate mixes the above three and also discusses job losses due to restructuring unrelated to offshoring under the same label. Furthermore, the political debate is fuelled by estimates which are the main source of evidence in the absence of hard statistics. Two broad sources on job relocation have as a result emerged: private consulting estimates and press monitoring estimates (Van der Zee et al., 2007). While consulting estimates have severe limitations (ibidem), the estimates collected by press monitorings such as the ERM are more reliable. The most valid data, however, systematic official statistics on the employment impact of relocation, are not collected anywhere in the world today. As a result, academics who nevertheless want to use official statistical data resort to proxies of indicators of relocation activity, such as trade data, FDI flows and input–output tables (Van der Zee et al., 2007). However, these indicators only measure the indirect effects of relocation and are affected by a number of other factors making hard conclusions difficult to draw.

More important is the role of outsourcing. As a result of the discussion on the costs of the sector, outsourcing is increasingly used. This applies not only to non-core services like a restaurant, cleaning, washing or maintenance, but also to the primary process. An increase is visible in private sector involvement, for example for standard procedure operations (e.g. hips and knees), diagnostics, ambulance care and specialists. It should be noted, however, that this

type of outsourcing results in changes within the sector and not in changes between health and social services on the one hand and other sectors on the other hand.

Because of perceived high costs, challenges of delivering hospital care in the future and to guarantee accessibility, in some countries parts of care are taken out of hospitals. An important example is the role of gate keeping. Key question is whether patients have the right to go to a hospital directly. Health systems vary in the degree to which gate keeping is practised. Countries with direct access to specialists in general offer greater choice of specialist care and faster access. This is often associated with fragmentation and less continuity of care, (higher) user charges and lower levels of equity and efficiency. Systems with more extensive gate keeping through primary care physicians and other providers generally require patient enrolment and restrict the choice of providers, but have greater potential to provide enhanced continuity of care and integration of services. These systems are more likely to avoid duplication, thus enhancing the efficient use of resources. In addition, they generally tend to have a stronger division between generalist and specialist providers, and a longer tradition of general practice/family medicine separate from specialist medicine (WHO, 2006). This example shows that it is important to which segments certain tasks are 'outsourced'.

Moreover access to specialists can be further restricted by a first diagnosis by nurses or pharmacists. Until recently, care by nurses was generally supervised by a doctor, according to strict protocols. Now, however, especially in England, nurses and pharmacists are increasingly working as independent practitioners. The corresponding regulations have recently been changed, greatly increasing the range of pharmaceuticals that a nurse may prescribe. Access to specialists is restricted by financing reimbursements. In Denmark however, patients can choose to pay a higher fee in case they wish to contact a specialist directly. In France and Germany access to specialists is being restricted in order to contain the costs of specialists. Changes in systems of access to specialists are also due to the availability of specialists. Some countries are relaxing access to specialists such as in Denmark and the UK, where some specialists can be directly accessed, or non physicians can refer people to specialists (WHO, 2006).

The types of care providers supply differ also between countries. Although this does not imply de jure a contractual form of outsourcing, de facto it does as it implies another division of labour between the providers. Examples are:

- Increased gate keeping, new technological developments and demographic changes increase demand for social and long term care services. At the same time the number of beds for long term care in hospitals has decreased (OECD, 2007). Long term care is shifting towards nursing homes, or home based care. Total nursing home expenditure per nursing home bed rose at an average rate of 3.8% per year in real terms between 1995 and 2005 (OECD, 2007) In many European countries (mostly in the Mediterranean) this type of care is practiced in the informal sector, or by families. It is however expected that these services will increasingly shift towards the formal sector. Studies done by the EU all assume that supply of services will meet demand conditions, as they expect wages to increase (e.g. Comas-Herrera and Wittenberg, 2003). Countries that provide these services through the formal sector will increasingly rely on the informal sector, as far as this is available. Financial arrangements are already facilitating families to take part in long term care, such as in Germany and The Netherlands.
- Long term care is mostly developed in the Northern European countries. The share of long term care is around 3 to 5% while total health care is around 10% of overall

European employment (Driest, 2006). Nordic countries started to develop social care services already during the 1950s. The most developed countries are undergoing marked differentiation between different types of services and institutions, professional concepts and approaches. Southern-European countries are still in a pioneering phase and experience difficulties regarding funding and staffing.

- The scope of services that general practitioners are expected to provide varies from country to country. In Finland and the UK these services are the most comprehensive. In the UK, fewer specialists operate and general practitioners receive more specialists training. In countries that have a social insurance system (France, Germany, Netherlands) people are more likely to seek specialists services for contact care (WHO 2006)
- In many European countries facilities for out of hour services, are increasingly centralized either through on-site physicians or call centers.

These examples show that the structure of the sector is extremely diverse and dynamic. Many discussions are going on about reorganizing the sector to improve efficiency and to guarantee accessibility in the long term.

6 Regulation

The sector is characterized by massive regulation. Each country tries to optimize the system to decrease costs and increase quality and availability. Ageing, technology and exogenous demand increases, however, confronts each country with immense challenges that are incomparable with nearly all other sectors. Both employment and costs rise yearly, on average with 3% (EMCC, 2003).

Regulation differs very much between countries and subsectors. However, all countries focus their attention to ways of limiting expenditure without reducing quality or accessibility. Examples are (e.g. EMCC, 2003):

- Improving information on costs to make regulators and governments better able to regulate the sector. This stimulates also a proper role for insurance companies and service providers. Increased efficiency can be observed in hospitals, where average occupancy of beds has increased from 1990 to 2005 (OECD, 2007).
- Measures are introduced to decrease costs, like the use of generic pharmaceuticals versus brands, the promotion of home-care versus institutionalized care and the stimulation of own responsibility for instance by introducing deductibles (co-payment)
- Deregulation of responsibilities to the regional and local level to ensure that local supply and demand are matched. This is especially the case for social services (e.g. Italy, Netherlands, Spain), while it also is meant to improve the integration of these services with the health sector. On the other hand, however, there is a trend towards recentralization of some health functions. This is most evident in Scandinavia (but also in some Eastern European countries), for instance in Denmark. Operational responsibility of hospitals was moved from local councils to regional entities, while financing became a national responsibility.
- EU member states differ very much in the way they finance the sector. Two main models are provision financed by taxes and by insurance. The first model provides free services at the tHoint of delivery (e.g. Denmark, UK, Ireland). The second model provides services based on insurance systems (e.g. Netherlands, Germany, France, Belgium) where people are reimbursed if they use the system. The countries of Central and Eastern Europe all have a social health insurance system (Horstmann et al, 2002). Cyprus, for instance, has only recently (2005) implemented a social health insurance system. Large differences between EU countries make harmonization and thereby the creation of an internal market difficult.
- Many discussions are going on about the core elements of the sector covered by tax or insurance. The goal is to evaluate whether restricting the system to the core would decrease total costs. Related to this is the discussion about the acceptability of inequalities between socio-economic groups.
- Many EU member states try to introduce market incentives in what are essentially public services. In the Netherlands, the forerunner in the world, the system has been completely revised. Patients now have free choice between insurance companies and care providers. These last two operate on a competitive market for some segments of the sector as they have to negotiate prices, quantities and quality. However, also in the Netherlands most parts are still regulated. Still, also in these parts discussions are

going on about introduction of competition between providers or more light-handed instruments like contracting out and benchmarking. Note that this short description of the Netherlands is only an example of much wider discussions going on in the Netherlands and other EU countries.

- For long-term care, for instance, a major difference exists between a new member state as Slovakia and countries like Denmark, Germany and the Netherlands. While in Slovakia long-term care within the public service system does not exist, these last countries have an integrated system helping people with disabilities, chronic conditions and traumas which limit them in their daily tasks (Lezovic and Kovac, 2008). However, all countries are building up their systems and are evolving the last years to an encompassing system providing more services than ever in history.
- In light of an increase in patient mobility and in terms of free movement of people within the EU, the EU is taking measures to ensure that patient have the possibility to use health care in various parts of the EU. Regulation 1408/71 provides reimbursements for certain types of costs for cross border care. The European Court of Justice rulings made reimbursements of care in other EU countries possible subject to local insurance schemes.
- Long term care is a sector that is least regulated in most European countries. Regulation has arisen only since 1990. In this sector national regulation is often lacking. The lack of clarity has given rise to new professionals who do know their way in the system, providing a link between the provision of finances and services and demand.
- Organising the role patients play in the sector. Often patients' empowerment is missing. Although there are good reasons for this in some sectors, the specific knowledge and experience of patients might increase the quality and effectiveness of the health and social services sector.

It is rather an understatement to observe that this list is not limitative. One thing is for sure, that many things have changed in the preceding years and that many things will change in the near future. The exact route, however, will also depend on experiences of forerunners, the role of pressure-groups and politics.

Currently no specific EU regulation exits for the health care sector related to the system as such. However, several EU directives are developed, e.g. one aimed at promoting more efficient and accessible high-quality healthcare in Europe and one aimed at regulating cross-border treatment of patients. EU-directives are present with respect to regulation of e.g. working hours of doctors, medicines, medical devices and clinical trials.

7 SWOT

SWOT analysis is a tool in management and strategy formulation, used to evaluate the Strengths, Weaknesses, Opportunities, and Threats involved in a project, business venture or – as in this case – a sector, the latter being defined within a well-described geographical entity. The aim of a SWOT analysis is to identify the key internal and external factors that are important to achieving a particular objective or set of objectives. Strengths and weaknesses are internal factors that create or destroy value. For a company these can include assets, skills or resources that a company has at its disposal, compared to competitors. Opportunities and threats are external factors that create or destroy value. They emerge from either the company dynamics of the industry/market or from demographic, economic, political, technical, social, legal or cultural factors (STEEP or DESTEP, see also chapter 9). When applied to the sector level, SWOT has a similar meaning, albeit on a higher, more aggregated level.

The SWOT analysis presented in Table 8.1 is the result of an intensive workshop discussion which was subsequently validated and amended in two external workshops, including the final workshop in Brussels (step 10 in the methodological framework).

Table 8.1. SWOT analysis of the health care sector

Strengths	**Weaknesses**
○ predictable demand (compared with other sectors and not for all segments) ○ public trust ○ accessibility (threat if policies deflate accessibility)	○ organizational change difficult to achieve ○ inefficiencies (cost and labour) ○ limited transparency of quality of service, costs and prices / fees ○ limited capacity to absorb innovations ○ complexity of processes and products ○ bureaucracy and lengthy procedures ○ vested interests of powerful groups ○ empowerment of patients is often missing ○ sometimes inequality in care (urban, rural) ○ supply driven rather than demand driven
Opportunities	**Threats**
○ labour substituting technology (pharma, micro, medical devices, ICT) ○ prevention, health promotion (if effective) ○ quality improving technology ○ stable, transparent and predictable regulation ○ immigration of workers ○ emigration of patients/clients ○ attractive labour market for professionals ○ improving balance of power between different stakeholders (providers, patients, insurance, government) ○ promote preventive health care when cost-effective (based on cost-benefit analysis)	○ increasing demand (affordability) ○ demand inducing technology ○ government budget constraints ○ adverse selection ○ shortage labour supply ○ inflexible labour market ○ emigration of workers ○ illegal immigration of patients/clients
Source: TNO-SEOR-ZSI	

8 Drivers

8.1 Identifying sectoral drivers: methodology and approach

The methodological framework as defined by Rodrigues (2007) serves as the starting point for the identification of drivers. Rodrigues identifies three main driver categories: economic, technological and organizational drivers, with the economic dimension representing the main trends in demand and supply, the technological dimension covering the main trends in process and product innovation (including services) and the organizational dimension representing main trends in job functions (conceptual, executive). The Rodrigues' approach in principle enables the identification of drivers, and especially so at the meso (sector) and micro (firm or company) level. The search and identification procedure of drivers itself is less well defined, however. Implicitly it is assumed that expert opinion and desk study are sufficient tools to come up with a relevant and plausible set of drivers at the sector level.

During the first stage of the project, a methodological tool (approach) has been developed to facilitate and help the identification and further delimitation of Apart from expert opinion mobilised and managed as discussion panel (in a similar manner as SWOT analysis is usually organised), this approach strongly builds on the findings of existing foresight and other future studies. By consistently linking the search for drivers with the findings in existing foresight and other future studies, a more coherent and all-embracive methodology to finding sector-specific drivers can be deployed.[4] This so-called *'meta-driver' approach* of identifying main sectoral drivers starts from a more generic list of meta-drivers derived from a literature survey, and subsequently in a step-wise manner delimits the drivers to a set of most relevant and credible drivers. It does so by combining adequate expert (sector) knowledge in a panel setting. By subsequently asking the expert panel to score the different drivers on a range of characteristics, including relevance, uncertainty, and expected impact (similar to a SWOT procedure), a corroborated and conclusive list of sector-specific drivers can be derived. The meta-driver approach hence enables filtering out in a systematic and consistent way meso and possibly micro (sector-specific) as well as the macro (economy-wide) trends and developments judged relevant and important to the sector, directly and indirectly.

The meta-driver approach includes the following five steps:

Step 1. Drawing up of a list of relevant generic or meta-drivers based on literature review and expert knowledge (check-list: rows)

Step 2. Designing a list of key questions in order to identify the sector relevance and other properties of meta-drivers at sector level (check-list: columns)

Step 3. Filling in the check-list matrix: which meta-drivers do matter most for the sector?

Step 4. Which drivers do matter most for jobs and skills?

Step 5. Does the tailor-made list herewith cover all relevant sectoral drivers, i.e. are there any sector-specific drivers missing (check on completeness)

[4] Common ways to rank trends and drivers are the DESTEP (Demographic-Economic-Social-Technological-Ecological-Political) and STEEP (Social-Technological-Economic-Ecological-Political) categorisations. For our purpose, slightly altered DESTEP definitions are used to reflect the embracing dimension of analysis.

Arguments in favour of the use of the 'meta-driver' approach are:

- The ability and opportunity to use the rich potential of a multitude of already available studies on drivers, determinants of change and key trends
- Circumventing the risk of a too narrow focus on the sector per se while acknowledging sector-specificity, and avoiding the risk of analyzing sectors as if they were isolated (cf the difference between 'general equilibrium' and 'partial equilibrium' approaches)
- Guaranteeing overall consistency, coherence and completeness, as well as warranting a same point of departure important across lots/sectors – i.e. a way of integral assessment, making sure that all important factors are systematically taken on board.

An alternative and second way to arrive at a list of main sector-specific drivers of change is to start with a SWOT and subsequently translating the Opportunities and Threats part into sector-specific drivers. The SWOT is used as a tool to verify and check the resulting list of drivers. By combining the results of both the "from meta-drivers to sector-drivers" and the "from SWOT to sector-drivers" exercises a complete and consistent list of sector-specific drivers can be derived.

8.2 Identification of sectoral drivers

In the next table all meta-drivers are analysed for relevance for the health and social sector.

The most important drivers are:

- Ageing: will cause a major increase in market demands
- Ageing: on the supply side ageing leads to a declining labour force
- Economic: Income per capita – incomes will determine the demand for new services both directly by users and indirectly through government budets
- Institutional: Trade and market liberalisation will have major effect on the organisation of the sector
- Institutional: Quality of institutions (judiciary, transparency, lack of corruption, viable business climate, structural rigidities) determines how the sector can adapt to the major challenges facing it.
- Institutional: Labour market regulation.
- Technology: Technology developments as pharmaceuticals, microscope operations, screening will help to ease the problems caused by future labour shortages
- Technology: Advances in IT impacting on organizational structures & new business models
- Technology: New types of work organisation (teams-based, sociotechnique, etc.)
- Cultural values: Life style changes will affect the demand for cure and care.

Category	Driver	Is this driver relevant for the sector? Y / N	How relevant is this driver for the sector? Scale 0-10	How uncertain is this driver for the sector? Scale 0-10	Are substantial impacts expected on the volume of employment? Y/N	Are substantial impact expected on employment composition? Y/N	Are substantial impacts expected on new skills? Y/N	Short, medium or long run impact?[5] S	M	L	Are substantial differences expected between (groups of) countries? Y / N	Are substantial differences expected between subsectors? Y / N
Ageing / demographics	Ageing - Adapt to the market demands of an ageing and more diversified society	Y	10	0	Y	N	Y	Y	Y	Y	Y	Y
	Ageing – declining labour force	Y	10	0	Y	Y	Y	N	Y	Y	Y	Y
	Population growth (birth and migration)	N										
Economic	Income per capita and household	Y	10	0	Y	Y	Y	Y	Y	Y	Y	Y
	Income distribution	Y	5	5	Y	Y	Y	Y	Y	Y	Y	Y
Globalisation	Outsourcing & offshoring	Y	3	5	N	Y	Y	Y	Y	Y	Y	Y
	Increasing global competition	Y	3	5	N	Y	Y	Y	Y	Y	Y	Y
	Emerging economies driving global growth (new market demand, especially BRIC[6] countries)	N										
	Global / regional production networks (dispersed production locations, transport)	N										
	Counter-trend regionalism / protectionism	N										

[5] Short = 0-3 years; medium = 3-7 years; long = > 7 years. All three categories may apply.
[6] BRIC countries: Brazil, Russia, India, China.

Category	Driver	Is this driver relevant for the sector? Y / N	How relevant is this driver for the sector? Scale 0-10	How uncertain is this driver for the sector? Scale 0-10	Are substantial impacts expected on the volume of employment? Y/N	Are substantial impact expected on employment composition? Y/N	Are substantial impacts expected on new skills? Y/N	Short, medium or long run impact?[5] S	M	L	Are substantial differences expected between (groups of) countries? Y / N	Are substantial differences expected between subsectors? Y / N
Cultural values	Increasing market segmentation (tailor made production, mass customization)	N										
	Lifestyle changes	Y	8	0	Y	Y	Y	N	N	Y	Y	Y
	Increasing demand for environmentally friendly / organic products	N										
Technology, R&D and product and process innovation	Advances in IT impacting on organizational structures & new business models	Y	10	5	Y	Y	Y	Y	Y	Y	Y	Y
	Internet changing production and consumption patterns (e-business; etc.)	Y	3	6	N	N	Y	N	Y	Y	Y	Y
	New types of work organisation (teams-based, sociotechnique, etc.)	Y	10	5	Y	Y	Y	Y	Y	Y	Y	Y
	New/additional value-added services	Y	5	3	N	Y	Y	N	N	Y	Y	Y
	Other (pharmaceuticals, microscope operations, screening)	Y	10	3	Y	Y	Y	Y	Y	Y	Y	Y
Natural resources	Availability (and price developments) of oil and energy	N										
	Availability and price of other natural resources	N										

Category	Driver	Is this driver relevant for the sector?	How relevant is this driver for the sector?	How uncertain is this driver for the sector?	Are substantial impacts expected on the volume of employment?	Are substantial impact expected on employment composition?	Are substantial impacts expected on new skills?	Short, medium or long run impact?[5]			Are substantial differences expected between (groups of) countries?	Are substantial differences expected between subsectors?
		Y / N	Scale 0-10	Scale 0-10	Y/N	Y/N	Y/N	S	M	L	Y / N	Y / N
Institutional / Political	Trade and market liberalisation (national level)	Y	10	10	Y	Y	Y	Y	Y	Y	Y	Y
	EU integration – deepening (single European market etc.)	Y	5	5	N	Y	Y	N	Y	Y	Y	Y
	EU integration – broadening (bigger domestic market)	N										
	Quality of institutions (judiciary, transparency, lack of corruption, viable business climate, structural rigidities)	Y	8	5	Y	Y	Y	N	Y	Y	Y	Y
	Labour market regulation	Y	10	5	Y	Y	Y	Y	Y	Y	Y	Y
	Environmental regulation	N										
	Security and safety regulation	Y	5	5	N	N	Y	Y	Y	Y	Y	Y

Part II.

Future Scenarios and Implications for Jobs, Skills and Knowledge

Part II. Future Scenarios and Implications for Jobs, Skills and Knowledge

Guide to the reader

Part II presents the scenarios and their implications for jobs, skills and knowledge. It reflects steps 4, 5 and 6 of the common methodology. The contents of part II are as follows: Chapter 10 describes the structure and highlights the content of the four main scenarios (step 4). For each of these scenarios plausible yet different assumptions have been made as to how the main drivers of change will develop and add up to different states of the future. In subsequent steps the implications of the scenarios for jobs and skills are analysed. In order to facilitate a translation of these implications to the job function level, first a workable job function structure is proposed. This structure is based on the functions as they appear in Eurostat's Labour Force Survey and further elaborated. Chapter 11 discusses the main implications of the scenarios in terms of future employment volumes by job function (step 5). Chapter 12 assesses the implications of scenarios for future skills and knowledge needs by job function. It translates the implications of the scenarios for skills and knowledge by function (step 6).

9 Scenarios

9.1 Overview of scenarios and main underlying drivers

This section presents the main scenarios for the health and social services sector. The scenarios take a medium-long range time perspective, taking 2020 as the focal year. It is important to understand what scenarios can deliver and what not. Scenarios are plausible future paths of development rather than predictions or forecasts. Scenarios are not wishful pictures ('dreams', 'crystal ball gazing') of the future but are grounded in existing data and trends and derived in a logical and deductive way, in which inferences about plausible future developments are made. The goal of the scenarios presented here is to analyse whether different futures will have different implications for job volumes and skill needs by function. If this is the case, it is clear that the answers to arising volume gaps and skill needs should reckon with these differences, and hence will imply different (sets) of possible answers – i.e. strategic choices – for each scenario. It should be emphasized that by definition it is unknown which scenario will become reality. In fact, there is only a tiny little chance that indeed one of the scenarios will become the 'real' future. Chances are much higher that the future will be a mix (of elements) of the described scenarios. Scenario analysis, however, enables us to get a better view on the wide range of volume effects and skills needed in the future, and therefore also of possible solutions.

Figure 2.1 summarizes the four different scenarios for the health and social services sector, each of which representing a plausible future for the year 2020. The scenarios have been based on a clustering of relevant drivers which were earlier identified in this study (see part I). The drivers were selected on the basis of a number of criteria, the most important being relevance and significance for the health and social services sector, potential impact and degree of uncertainty. Only those drivers with the highest overall ranking, having scores between 8 to 10, were taken into consideration.

9.2 The drivers – building blocks for scenarios

The drivers form the main fundament and can be regarded as the key building blocks for the construction of the scenarios. One of the central tenets of the scenarios identified here is a clear distinction between exogenous and endogenous drivers. The endogenous drivers are defined as those drivers which can be directly influenced by governmental actors, in other words where there is the scope and ability to change the course of action by policy-making, either at the regional/national or the European level. Two sets of drivers - which *a priori* might also be labelled endogenous factors - are not included in the scenarios. These concern those factors that concern possible actions taken at the industry and company level itself and measures directed towards the educational and training system, respectively. The reason for excluding these drivers in the formulation of the scenarios is that these factors have to regarded as solutions, so-called strategic options, that logically follow from the scenarios as implications rather than as building bricks for the scenarios. These strategic options represent the degrees of freedom for policy and other action.

Figure 10.1 summarizes the main drivers, with the horizontal axis reflecting the relevant exogenous drivers and the vertical axis reflecting the relevant endogenous drivers. A further description of each of the individual drivers is given below, followed in section 10.3 by concise descriptions of the four scenarios.

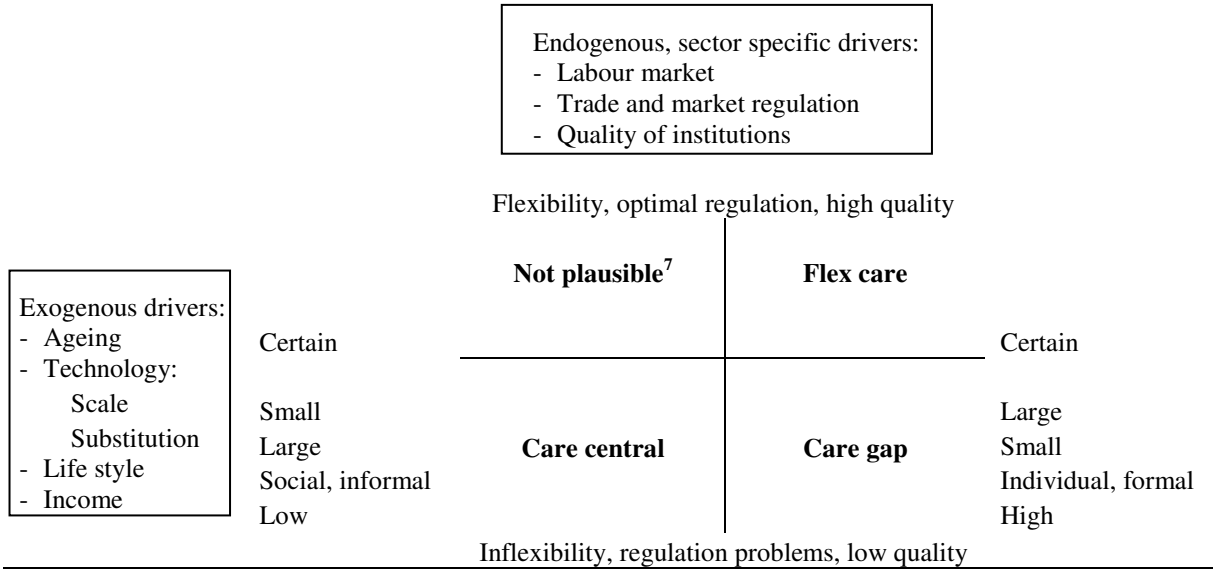
Exogenous drivers for the scenarios are:

- Ageing: It is certain that ageing plays a major role in the sector (see paragraph 2.3 in Part I). In all scenarios we assume that ageing increases demand for health and social work and decreases labour supply.
- Technology: A major difference is present between demand inducing technologies (especially better diagnostics) for health and social work and technologies substituting for labour (especially ICT, medical and assistive devices, medicines). Since future developments are uncertain and our focus is on the largest possible differences in effects on employment and skills we assume on the right-hand side of the scheme that demand inducing technologies increase significantly and labour substituting technologies increase only modestly. At the left-hand side the counter assumptions are made.
- Life style: Major differences are present between life styles resulting in an individual setting promoting formal and paid care and social services and life styles resulting in a social setting promoting informal care and social services by family, friends and voluntary organisations. On the right-hand side we assume that the former will be present in the future, while on the left-hand side we assume that the latter is present.
- Income: Income is demand inducing in the health and social services sector. On the right-hand side we assume a high income per capita. On the left-hand side we assume a low income per capita.

Endogenous drivers for the scenarios are:

- Labour market: At the top of the scheme we assume that the labour market is flexible and is therefore able to quickly restore imbalances between demand and supply of labour, while at the bottom of the scheme we assume that the labour market is inflexible.
- Trade and market regulation: At the top of the scheme we assume that regulation is optimal in the sense that the institutional setting is organised thus that efficiency is optimized and demand reductions are stimulated (if possible from a health perspective). At the bottom of the scheme we assume that regulation is not optimal. Trade and market regulation is defined broadly and comprises possibilities like better information to customers, revision of the finance system, partial reimbursements, new work organisation forms to increase efficiency, competition in parts of the sector, benchmarking, combining public and private possibilities to produce services and regionalising production at a scale higher than the national level.

Figure 10.1 Drivers and scenarios for health and social services



- Quality of institutions: At the top of the scheme we assume high quality institutions promoting the solution of problems, while at the bottom of the scheme the quality of institutions is low. Institutions are here defined narrowly as legal bodies supervising regulations (e.g. competition authorities).

9.3 The scenarios – detailed discussion

Based on the combination of endogenous and exogenous drivers we discriminate between three sector scenarios for health and social services:

- Scenario I: Care central;
- Scenario II: Care gap;
- Scenario III: Flex care.

a. Care central

In the scenario 'Care central' ageing acts as a pressure variable (as in all scenarios), especially for health care and residential care for the elderly. However, technological developments help to accommodate growing pressure. Technologies that substitute skilled and unskilled labour become available at a large scale. This is especially the case for health care. Examples are special forms of robotics (less labour needed), minimally invasive surgery (lower duration of rehabilitation and internal care) and pharmaceuticals (medicines substituting operations and decreasing duration of internal care). For health care and social services ICT developments help to increase efficiency. Technologies stimulating labour and budgets (dominantly better diagnostics, but also new medical interventions and treatments, operational possibilities, etc.) increase, but at a much smaller scale. At the same time limited income growth result in only small increases in demand for care. The social culture stimulates informal care, resulting in a use of formal care only when informal care is not available. This has especially a large influence on

[7] This scenario ('Not plausible') is not included in the analysis as the demand for optimal regulation is primarily caused by high pressure exogenous drivers.

residential care (disabled and elderly persons are more often in-house with family and friends) and social services (friends and family are more powerful in solving social problems).

In 'Care central', regulation is sub-optimal. The labour market is inflexible, efficiency improving instruments (where possible) are not used, regulation is weak and the quality of institutions is low. This is not a major problem, however, since the exogenous drivers result in low pressure on the system. Furthermore, the system is supply driven guaranteeing that budgets increase enough to accommodate demand increases. This means that care issues are central in this scenario and that future developments are not hindered by major discussions about system change.

b. Care gap

The demand for budget and labour increases as a result of ageing and rising income levels in the scenario 'Care gap'. Demand is further increased by the individual life style ('I have a right to receive high-quality care, right her, right now'). Formal care is preferred as informal care is seen as second-class and is very limited available. Social services are much more used and residential care rises sharply. Technological developments further stimulate a large increase in care demand (e.g. advanced medical devices, assistive devices and appliances). Technologies substituting labour are available, but expensive technologies stimulating budgets and labour increase much faster. The system is strained as budgets and labour demand explodes.

In 'Care gap' regulation is still sub-optimal and not able to address the imbalance between demand and supply. Now, the inflexibility of the labour market becomes a problem. Not enough people are stimulated to work in the healthcare and social services sector. Special sector regulation is not in force, resulting in fast growing waiting lists as a result of shortages in labour due to maximum budgets or in sharp increases in demand for labour and budgets. The system is still supply driven, but the supply of labour or budgets cannot cope with the pace of demand growth. Many parties observe that the system cannot cope with the challenges. However, the quality of institutions is low, resulting in policy reactions that do not solve the problems.

c. Flex care

In 'Flex care' the exogenous drivers are equal to 'Care gap'. The main difference is in the endogenous drivers. Now policies are initiated and successfully implemented in order to solve the main problems identified in the former scenario. The labour market is flexible and helps to accommodate the increasing demand for care. Workers are employable and switch jobs if necessary. Trade and market regulation is implemented to use efficiency improving possibilities, which invokes a relative reduction in demand. The system is now demand driven, allowing the supply of care to more effectively and efficiently adapt to changes in demand. However, absolute demand still increases due to ageing, technology, life style and income. The quality of institutions is high, resulting in adequate policy reactions to remaining problems. Main question is whether the demand for labour and skills can be accommodated.

It should be very clear, that what is meant by 'trade and market regulation' does not imply at all that the whole sector is governed by private firms. Instead, large parts of the sector (e.g. main parts of social services) will be organised as a public service. However, what is meant is that regulation is used to increase efficiency as much as possible whether

privatisation or liberalisation takes place or not. Benchmarking, for instance, could provide efficiency incentives when other market oriented options are not possible. Given the health and social nature of most services it is of course essential to implement policy changes that are in line with this nature. In some cases this will mean that the market itself can be used to fulfil public goals. In other cases economic forces will undermine public goals. But in all cases the maximum should be done to increase efficiency as long as it is not hindering other public goals.

9.4 Care and cure

Throughout this report on the health and social services sector it is important to keep in mind that it is common practice in health care to make a distinction in cure and care. Cure refers to medical general practitioners and their staff, hospital care and short stay psychiatric care, while the care sector refers to long stay psychiatric care, nursing homes and residential care. Especially in the latter sector there exist substantial institutional differences between countries in Europe. Education and vocational training may coincide between cure and care but may also differ. Whenever we find the differentiation between cure and care essential in the next chapters we will make the distinction explicit, for instance, when addressing expected competence changes in the nursing profession. However, it is important to keep this differentiation in mind throughout the next chapter, also for issues where this distinction plays a less prominent role on first sight.

10 Job functions – towards a workable structure

In order to determine the quantitative and qualitative implications of the scenarios for jobs and skills, a workable job classification is needed. The occupational classification of the available sector data derived from the Eurostat Labour Force Survey (LFS) is used as a starting point (see Box 3). The advantage of using this classification is that developments in the past as observed in the LFS can help to foresee likely trends for the future. For example, it might be expected that future developments in new Member States in some cases will follow similar paths as old Member States in the recent past. Moreover, where strong growth of certain job functions appeared in most recent years, one might have a reason to cautiously weigh and re-assess any further increases in future years, as the situation (markets and other factors) might have stabilised in the mean time. The share of job functions in total sector employment is not unimportant either; sizeable shares call for adequate attention. This does not imply that job functions with only very minor shares of the total should be ignored altogether. It might well be that occupations that have small shares now will face strong growth in the oncoming years, or are strategic and vital for growth of the sector as a whole, even if small in size.

However, the statistical job classification cannot be taken over one to one. Certain functions can be closely related, which makes it logical to combine them, especially if the share of each functional group in total employment is not large.

Table 11.1 shows the adaption of job functions for the health and social services sector, as well as the names we gave the functions that will be used during the foresight analysis.

Box 3 The European Labour Force Survey

The European Union Labour Force Survey (LFS) is conducted in the 27 Member States of the European Union and 2 countries of the European Free Trade Association (EFTA) in accordance with Council Regulation (EEC) No. 577/98 of 9 March 1998. The data collection covers in total the years 1983 to 2006 and covers all industries and occupations. The national statistical institutes are responsible for selecting the sample, preparing the questionnaires, conducting the direct interviews among households. The Labour Force Surveys are centrally processed by Eurostat, using the same concepts and definition, based on the International Labour Organisations guidelines and common classifications: (NACE (rev 1), ISCO-88 (COM), ISCED, NUTS).

Although the LFS can be used for comparative purposes, the relative small sample size (in 2002 the sample size was about 1.5 million of individuals, which represents 0.3% of the EU population) means that error margins can be high, especially when the industry itself is rather small.

Source: Eurostat (2008)

Table 11.1 Adaption of the original job classification

Classification in statistical data	*Adapted classification and names in table*
Managers	Managers
Health professionals excl. nursing	Medical doctors
Health associate professionals	Health associate professionals (including technicians)
Other professionals & technicians	
Nursing and midwifery professionals	Nursing and midwifery
Social science professionals	Social workers
Personal care and related	
Clerks	Support workers
Other service	
Craft trades, machine operators	
Helpers, cleaners, launderers	
Elementary occupations	

The functions used in this analysis can be described as follows:

- The category managers contains top management, but also entrepreneurs and different management occupations, such as HRM, finance and production management.
- The category medical doctors are formed by the category health professionals (e.g. dentists, medical doctors, veterinarians, pharmacists)
- The category health associate professionals comprise medical assistants, hygienists, dieticians, opticians, dental assistants, physiotherapists, veterinary assistants, pharmaceuticals assistants and technicians.
- The category social workers form the workers in the social sector and include social science professionals and personal care workers.
- The category nursing and midwifery comprise nurses and midwifes.

- The last category is formed by low support workers: clerks, service providers, craft traders, machine operators, helpers, cleaner, launders and elementary occupations.

11 Implications of scenarios by job function – volume effects

Different futures will have different implications for jobs, both in quantitative and in qualitative terms. In this section the implications of the three scenarios in terms of volume effects for each of the identified job functions are assessed. Trends and developments of the recent past provide an important starting point in forming an idea about these future developments. This quantitative trend information has been combined with expert opinions of a core expert team and has been further supplemented with insights from invited sector experts in a dedicated workshop to assess which volume effects would be likely to occur for which job functions. It should be emphasized that the referred expected changes are qualitative in nature, reflecting the outcome of expert judgements and expert discussion as well as desk research taking into account the results of other studies. The outcome of the following results should therefore be used as a supplement and an independent expert assessment in addition to other more formal analyses, e.g. based on mathematical and/or econometric modelling and simulation.

Table 12.1 Expected volume changes in job function structure till 2020

	Care central	Care gap	Flex care
Managers	I	I+	I
Medical doctors	I	I+	I
Health associalte professionals	I	I+	I
Nursing and midwifery	I	I+	I
Social workers	I	I+	I
Support workers	I	M	M

Note: D=decrease, I=increase, I+=large increase, M=maintain

The results for the health and social services sector are presented in Table 12.1. The table shows the different occupations selected and the changes expected for each of the scenarios. We expect that for nearly all functions and scenarios volume changes are positive. However, the reasons behind the volume increases are often different. Ageing plays a dominant role in all scenarios stimulating demand for health and social services. This is amplified in all scenarios by income effects and new technologies making more treatments possible, although these effects are larger in ‘Care gap’ and ‘Flex care’. Technologies substituting labour play a major role in ‘Care central’ helping to decrease the volume effects. Regulation is dominating the effects in ‘Flex care’ as all types of regulation are used to maximize efficiency. All in all, we expect a general increase in all function in ‘Care central’, an even larger increase in ‘Care gap’, while in ‘Flex care’ regulation helps to bring this large increase back to ‘normal’ positive figures. Only for support workers we expect less positive figures in ‘Care gap’ and ‘Flex care’ as these functions are more easily substituted.

12 Implications of scenarios - main emergent competences

12.1 Introduction

Determining emergent competences is at the very heart of this study. The starting point for the analysis is step 5 of the Rodrigues (2007) methodology. In order to identify the main emergent competences by occupational function, Rodrigues refers to three main competences: theoretical, technical and social competences. This distinction builds on the European Qualifications Framework (EQF) and the European Credit system for Vocational Education and Training (ECVET) distinction between knowledge, skills and competences, respectively (see box 13.1 below). The term human capital broadly defined by the OECD as 'the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being' (OECD, 2001:18) captures all three. The use of the term 'capital' leads one to think in terms of investments in education and training which are often necessary in order to acquire skills and knowledge. However, skills and knowledge can also be acquired through work experience, informal on-the-job learning and a variety of other means.

In the actual identification of future competences, the EQF/ECVET definitions are used as indicative. It is noted that the difference between competences and skills is not always clear-cut, for instance where 'soft skills' come into play. A similar comment holds for what determines job or occupational qualifications.[8] Adequate measurement of competences, knowledge and skills is notoriously difficult. In some of the literature, the problem of skills measurement is avoided by using various indicators as a proxy focusing on qualifications (high-level, intermediate-level, low-level) as well as occupations. For the purpose of future research this is obviously not a feasible solution. For it is the knowledge and skills as such behind that we need to identify.

Rather than to produce a full and exhaustive list of all competences for each job function, the key focus in this section is on identifying key and critical competences for the future. Especially changes in the set of competences to meet 'new' emergent job function needs will be discussed. The description will be focused but general enough to be meaningful across countries. A slight extension of the original Rodrigues methodology is that together with the identification of critical competences, a differentiation by scenario is made.

Throughout this report the term competences is defined as the "proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development." (see Box 4 for definitions). In the practical elaboration of competence needs hereafter the focus is predominantly on knowledge and skills needs, with a further distinction to what is usually described as 'soft

[8] 'Qualification' denotes the requirements for an individual to enter or progress within an occupation. It also denotes an official record (certificate, diploma) of achievement which recognises successful completion of education or training, or satisfactory performance in a test or examination. The concept of qualification varies from one country to another. It may express the ability – formally defined in work contracts or collective agreements – to perform a certain job or meet the requirements of the workplace. A qualification may give rise to a number of rights and prerogatives which determine the individual's position within the hierarchy of his/her occupational context. (Tessaring, 2004: 235).

skills' such as team working skills, and planning and organising. Note that the 'personal, social and/or methodological abilities' included in the definition of competences (see Box 5) come very close to what is generally understood as 'soft skills'.

Box 4 Definition of skills and competences in EQF and ECVET

Several definitions of knowledge, competences and skills are nationally as well as internationally under discussion. Moreover, Member States of the European Union still have different approaches in defining these terms. The European Union has set up a joint process to co-ordinate the different existing terminologies and to find a common basis. Aims of this process are for example to strengthen the mobility of the labour force within the European Union and to facilitate sectoral developments. In the following reference is made to the definition used by the European Qualification Framework (EQF) and the European Credit System on Vocational Education and Training (ECVET).

The EQF links national qualification systems and tries to make vocational training and lifelong learning more transparent and understandable. Therefore a common terminology was developed. The following descriptors are taken from the EQF (European Commission, 2008)

- *knowledge* means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. In the context of the European Qualifications Framework, knowledge is described as theoretical and/or factual;
- *skills* means the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualifications Framework, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments);
- *competence* means the proven ability to use knowledge, skills and personal, social and/ or methodological abilities, in work or study situations and in professional and personal development. In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy.

For each job function key emergent future competences were identified. This was done in a workshop with a number of invited sector experts; the results therefore remain based on joint expert opinion throughout. The interim report and the data tables formed a 'levelling' starting point for each of the discussants. Key 'new' competences were thus identified for various job functions.

The emergent future competences are identified and clustered with similar competences in a concise overview table per job function (see next sections 13.2 to 13.7). Only substantive key changes are taken into account, which means that only part of the cells in the table is 'filled'. However, if a competence is highlighted in one scenario, but is not addressed in another, this does not mean that the competence is irrelevant in that particular scenario. Rather it means that demand for this competence type in the latter case will not increase substantially within the time frame till 2020.

Box 5 Skills needs, skills shortages and skills gaps defined

Emergent skills needs are defined here as the change in skills that is needed to be capable of adequately fulfill a certain job function in the future. Addressing emergent skills is needed in order to avoid skills shortages and/or skills gaps to arise in the future.
Skills shortages exist where there is a genuine lack of adequately skilled individuals available in the accessible labour market. A skill shortage arises when an employer has a vacancy that is hard-to-fill because applicants lack the necessary skills, qualifications or experience.
Skills gaps arises where an employer judges that an employee is not fully proficient in their job, i.e. that his or her skill levels are lower than necessary to meet the expected skills (competences) for the job. Skills gaps can arise where new entrants to the labour market are hired and although apparently trained and qualified for occupations still lack some of the skills required.

A number of different skills categories have been taken into account, including social skills, problem solving skills, organizational and management skills, skills related to entrepreneurship, as well as knowledge requirements (sometimes labelled as 'hard skills'). Table 13.1 provides an overview of the different skills and knowledge categories taken into consideration.

Table 13.1 Overview of skills clustered in similar skills requirements

Social Skills • Team working skills; social perceptiveness (listening / understanding); communication; networking; language; intercultural
Problem-solving Skills • Analytical skills; interdisciplinary; initiative, multi-skilling; creativity
Self management • Planning; stress and time management; flexibility; multi-tasking
Entrepreneurial skills • Understanding supplier and customer relationships; business understanding; trend setting/spotting
Management skills • Strategic and visionary; coaching and team building; collegial management style; change management; project management; process optimizing; quality management
Knowledge ('hard skills') • Legislative and regulatory knowledge (environmental / safety / labour / contracting); e-skills; Technical knowledge

12.2 Managers

Managers face completely different surroundings in the three scenarios. In 'Care central' the main challenge is to cope with increases in demand. This results in large costs for governments and clients, but this is not the main problem for managers. They invest in accommodating increasing demand. These investments become more troublesome in 'Care gap' as there is now a shortage in money to finance the growing demand. Managers have to use more skills to cope with demand given the shortage in supply. In 'Flex care' managers are supported by much better regulation. However, this demands a totally different attitude of managers. A large variety in skills is needed to make use of the flexibility that is made possible. Increases in efficiency and effectiveness are needed to cope with the demands of the market and governments.

We expect management skills to change mostly in 'Care gap' and 'Flex care'. Table 13.2 provides a summary of expected future skills and knowledge needs for managers:

- Across all three scenarios, managers will need more e-skills in order to keep up with the increasing ICT use in the sector. The same holds for technical knowledge enabling managers to deal with innovations. A continuous effort is called for to equip managers with up to date e-skills and technical knowledge. Managers are required to keep track of new technical developments within and around the sector. In 'Care gap' managers require regulatory knowledge to optimize the room regulation provides as the system results in high demands and supply falling short. In 'Flex care' more regulatory knowledge is essential as the regulatory systems evolve and change rapidly.
- Communication and team working skills are particularly needed in 'Flex care'. This is due to the more flexible labour market in which managers recruit and manage their personnel from a distance and make more use of temporary workers in changing teams. Social perceptiveness becomes more important in 'Flex care' to deal with migration and to find a balance between medical and economic issues.
- Problem solving skills are needed to cope with the imbalance of demand and supply in 'Care gap' and with the rapid changing external surroundings in 'Flex care'. Managers that solve problems adequately and quick can provide more and better services resulting in shorter waiting lists ('Care gap') or a larger market share ('Flex care').
- The demand boost for high-quality treatment by population ageing under the high income scenarios further require better self-management competences. In 'Care gap', more efficient planning, stress and time management and flexibility are asked from managers. Compared with 'Flex care', legislative regulations and institutions cannot cope with the great demand for health care and treatments leaving this task mainly for managers. In 'Flex care' these skills are needed to cope with changing systems and to guarantee that the new systems result in benefits instead of costs. In both scenarios, the lack of institutional regulation or the rapid changing regulation together with high market demand will require better multi-tasking skills of managers in order to react quickly to a dynamic market as well as to a more dynamic workforce.
- Entrepreneurship skills are especially needed in 'Flex care' for managers working in a market environment, which will entail part of the sector. In parts of the sector efficiency improving instruments like competition are used increasingly. This makes it necessary to understand customers better, to spot trends and to develop business.
- Management skills are both needed in 'Care gap' and 'Flex care', but even more in the last scenario. While management skills are essential to optimize processes and the use of teams to maximize the available capacity, the rapid changing environment in 'Flex care' makes it necessary to manage the whole system adequately. Quality management skills

are needed to guarantee that the system pressure or changes do not result in decreasing quality. .

Table 13.2 Emerging skills and competences for managers till 2020

		Care central	Care gap	Flex care
Knowledge	Legislative, regulatory			
	e-skills			
	Technical knowledge (financial)			
Social	Team working skills			
	Social perceptiveness			
	Communication			
	Networking			
	Language			
	Intercultural			
Problem solving	Analytical skills			
	Interdisciplinary			
	Initiative			
	Multi-skilling			
	Creativity (innovation)			
Self management	Planning			
	Stress and time management			
	Flexibility			
	Multi-tasking			
Entre-preneurship	Understanding suppliers customers			
	Business development			
	Marketing skills			
	Trend setting / spotting			
Management	Strategic and visionary			
	Coaching and team building			
	Collegial management style			
	Change management			
	Project management			
	Process optimizing			
	Quality management			
Total emerging skills and competences		5	15	26
Scenario characteristics:				
- Ageing		Certain	Certain	Certain
- Technology: scale		Small	Large	Large
- Technology: substitution		Large	Small	Small
- Life style		Social,	Individual,	Individual,
- Income		informal	formal	formal
- Labour market regulation		Low	High	High
- Trade and market regulation		Inflexible	Inflexible	Flexible
- Quality of institutions		Problematic	Problematic	Optimal
		Low quality	Low quality	High quality

Note: shaded area means that skills and competences are emerging relatively fast compared with other scenarios.

12.3 Medical doctors

Medical doctors need certain skills just to guarantee that their primary task, provide patients and clients with health services, is done adequately. In all scenarios, therefore, they need:

- e-skills do deal with the increasing role of ICT (both for diagnostics as well as treatment and contact with patients), internet, electronic patient dossiers;
- technical knowledge to perform medical tasks adequately;
- good communication skills and adequately understanding customers as customers and patients require increasingly high quality communication levels;
- analytical skills to solve problems quick and adequately;
- creativity to cope with persisting problems in complex organisations;
- planning to minimize waiting time and lists;
- strategic and visionary skills to show leadership;
- coaching and team building to optimize team capacity and;
- a collegial management style to improve the efficiency of teams;
- change management as in the next years many things change;
- project management as the pressure builds up asking for more efficiency and these skills can be used to promote that contacts between doctors and patients are as good as possible.
- quality management to guarantee state-of-the-art health care quality.

In the scenario 'Care gap' these skills are even more important as the system is under pressure given high increases in demand and budgets that are under pressure. This pressure is lower in 'Flex care', but here governments, regulators, clients and patients require more flexibility from the sector.

Apart from skills needed in all scenarios, Table 13.3 summarizes some skills that are especially needed in 'Care gap' and 'Flex care'. Here an important distinction should be made between doctors working for institutions and doctors that run their own business. The last category needs more legislative and regulatory knowledge and more management and entrepreneurial skills:

- Regulatory knowledge becomes more important in 'Care gap' to make use of all possibilities regulation gives to solve waiting lists and other system problems. In 'Flex care' this knowledge skills are important to make maximal use of the flexibility that the regulation provides.
- Social skills will also become more important with respect to co-workers to optimize the capacity of team work. The ability to delegate the right tasks is very important. Since in 'Care gap' and 'Flex-care' these co-workers will more and more be recruited internationally, intercultural and language skills will also become more important. Social perceptiveness and communication becomes more important as there is a lot of pressure. Doctors need these skills to prevent that the quality of contacts with patients deteriorates.
- In 'Flex care' interdisciplinary problem solving skills and initiative become more important as the system makes more solutions possible.

- With a higher demand for care and cure, medical doctors will have even fuller schedules in the future than they do now, requiring better self-management skills such as stress and time management. This is especially the case in 'Care gap' as institutions and regulations are not able to absorb this need in an adequate manner. In 'Flex care' flexibility is required as regulators, governments, clients and patients demand more flexible solutions. In both cases these skills should promote that the quality of contact between doctors and patients does not deteriorate. For primary care multi-tasking is even more important in 'Flex care'.
- In 'Flex care', medical doctors will increasingly be the manager of smaller caring units, institutes or teams/networks. In this scenario, entrepreneurship and management skills become more important for medical doctors. This applies not only to business development, but also to coaching and teambuilding, change management, process optimizing and project management.

Table 13.3 Emerging skills and competences for medical doctors till 2020

		Care central	Care gap	Flex care
Knowledge	Legislative, regulatory			
	e-skills			
	Technical knowledge			
Social	Team working skills			
	Social perceptiveness			
	Communication			
	Networking			
	Language			
	Intercultural			
Problem solving	Analytical skills			
	Interdisciplinary			
	Initiative			
	Multi-skilling			
	Creativity			
Self management	Planning			
	Stress and time management			
	Flexibility			
	Multi-tasking			
Entre-preneurship	Understanding suppliers customers			
	Business development			
	Marketing skills			
	Trend setting / spotting			
Management	Strategic and visionary			
	Coaching and team building			
	Collegial management style			
	Change management			
	Project management			
	Process optimizing			
	Quality management			
Total emerging skills and competences		13	20	26
Scenario characteristics:				
- Ageing		Certain	Certain	Certain
- Technology: scale		Small	Large	Large
- Technology: substitution		Large	Small	Small
- Life style		Social, informal	Individual, formal	Individual, formal
- Income		Low	High	High
- Labour market regulation		Inflexible	Inflexible	Flexible
- Trade and market regulation		Problematic	Problematic	Optimal
- Quality of institutions		Low quality	Low quality	High quality

Note: shaded area means that skills and competences are emerging relatively fast compared with other scenarios.

12.4 Health associate professionals

Skills that are more needed for health associate professionals in the future in all scenarios are:

- e-skills to deal with the increasing role of ICT (both for diagnostics and treatment) and internet (to communicate with clients and patients);
- technical knowledge to guarantee state-of-the-art services, which is of course, essential for the professionals;
- communication to react adequately to rising demands from clients and patients as they require quicker and more contacts;
- intercultural to deal with the increasing diversity in society and;
- flexibility to deal with changing organisations and tasks (more multi-skilled and multi-disciplinary);
- quality management to optimize the quality of services.

In 'Care gap' some extra skills are necessary to deal with the system imbalance between demand and supply. Skills that can help to optimize capacity are better team-working and planning skills and project management and process optimizing skills to minimize waiting time and lists. At the same time better stress and time management skills are needed to cope with the high system pressure.

In 'Flex care' a difference can be made between professionals working in large organisations and professionals working in small units. In the first case the skills needed in 'Flex care' are more or less comparable to 'Care gap'. However, for professional that will start their own business, which is increasingly invoked by the flexibility of the system and regulation, or work in small units more skills are needed:

- in network organisations they deal with several other care providers, requesting good networking skills;
- problem solving skills like initiative are needed to guarantee that actions are taken at the right moment to prevent that the complex system results in problems not adequately dealt with;
- interdisciplinary skills are needed as small organisations need the cooperation of other disciplines;
- entrepreneurship skills are requested for those professionals working in their own business. Especially understanding customers becomes more important in systems where competition plays an increasing role. This requires also adequate trend spotting and transformation of trends in business development using marketing skills that react to the changes in preferences of customers.

Due to technological innovation, part of the health associate professions will be characterized by a shift in functional groups in all scenarios. Whereas some higher educated staff will be upgraded to 'specialists', lower-educated staff will be downgraded to do automated routine-work. For example, as for a medical assistant in the general practitioners office may be split in a nursing and secretary function or the latter may be outsourced. On the other hand, technical innovations will require more health staff to be higher educated and specialized.

Table 13.4 Emerging skills and competences for health associate professionals till 2020

		Care central	Care gap	Flex care
Knowledge	Legislative, regulatory			
	e-skills			
	Technical knowledge			
Social	Team working skills			
	Social perceptiveness			
	Communication			
	Networking			
	Language			
	Intercultural			
Problem solving	Analytical skills			
	Interdisciplinary			
	Initiative			
	Multi-skilling			
	Creativity			
Self management	Planning			
	Stress and time management			
	Flexibility			
	Multi-tasking			
Entre-preneurship	Understanding suppliers customers			
	Business development			
	Marketing skills			
	Trend setting / spotting			
Management	Strategic and visionary			
	Coaching and team building			
	Collegial management style			
	Change management			
	Project management			
	Process optimizing			
	Quality management			
Total emerging skills and competences		6	11	19
Scenario characteristics:				
- Ageing		Certain	Certain	Certain
- Technology: scale		Small	Large	Large
- Technology: substitution		Large	Small	Small
- Life style		Social, informal	Individual,	Individual,
- Income		Low	formal	formal
- Labour market regulation		Inflexible	High	High
- Trade and market regulation		Problematic	Inflexible	Flexible
- Quality of institutions		Low quality	Problematic	Optimal
			Low quality	High quality

Note: shaded area means that skills and competences are emerging relatively fast compared with other scenarios.

12.5 Nursing and midwifery

As with the former job functions, we expect a need for nursing and midwifery staff to keep up with technological and demographical developments. The technology boost will make more sophisticated technical and IC-competences essential for nurses. A decreasing birth rate along with ageing population will generally shift demands and tasks within this profession from midwifery to the care of elderly population. A greater demand by mostly elderly patients requires highly qualified and specialised nursing. Especially in nursing, we expect increasing specialisation to go along with an increasing differentiation of tasks, i.e. cure nursing in hospitals and clinics and care nursing in retirement homes.

Skills that are more needed for nursing and midwifery in the future in all scenarios are:

- e-skills to use ICT in diagnostics, treatment and electronic patient dossiers as well as internet to communicate with patients and clients;
- technical knowledge to use new technologies adequately;
- social perceptiveness as patients and clients increasingly find it important that not only health services are supplied but that these are combined with a social understanding attitude;
- communication as patients and clients attach more value to communication with health care providers;
- intercultural as the diversity in societies increase and patients and clients demand that their cultural identity is respected;
- flexibility (especially in 'Care gap' and 'Flex care') as health care providers are searching for ways to optimize their 'production' process;
- quality management as patients and clients demand that quality is at a relative and absolute high level.

In 'Care gap' an imbalance exists between demand and supply. Also for nurses and midwifes skills are required that makes it possible to increase the capacity of the system. Skills that are required are:

- team working skills that make it possible to work in large and often changing teams without loss of quality and social responsiveness;
- planning skills to guarantee that situations are minimized with overcapacity or undercapacity;
- stress and time management to deal with personal effects of the high system pressure on quality of work and personal welfare;
- project management and process optimizing to increase the capacity.

In 'Flex care' entrepreneurial and management skills are added for those nurses and midwifes that become self-employed or run their own business. For this category the following skills are needed:

- understanding customers as increasingly businesses only survive when they supply the added value customers want;
- business development to cope with the complexity of regulation and to make use of increasing flexibility and;
- marketing skills to attract enough patients and clients.

For all nurses and midwifes, problem solving and change management skills will become more important as they get more tasks. Doctors will delegate more tasks asking for more skills to cope with the new more flexible situation.

Table 13.5 Skills and competences nursing and midwifery till 2020

		Care central	Care gap	Flex care
Knowledge	Legislative, regulatory			
	e-skills			
	Technical knowledge			
Social	Team working skills			
	Social perceptiveness			
	Communication			
	Networking			
	Language			
	Intercultural			
Problem solving	Analytical skills			
	Interdisciplinary			
	Initiative			
	Multi-skilling			
	Creativity (innovation)			
Self management	Planning			
	Stress and time management			
	Flexibility			
	Multi-tasking			
Entre-preneurship	Understanding suppliers customers			
	Business development			
	Marketing skills			
	Trend setting / spotting			
Management	Strategic and visionary			
	Coaching and team building			
	Collegial management style			
	Change management			
	Project management			
	Process optimizing			
	Quality management			
Total emerging skills and competences		8	20	22
Scenario characteristics:				
- Ageing		Certain	Certain	Certain
- Technology: scale		Small	Large	Large
- Technology: substitution		Large	Small	Small
- Life style		Social, informal	Individual,	Individual,
- Income		Low	formal	formal
- Labour market regulation		Inflexible	High	High
- Trade and market regulation		Problematic	Inflexible	Flexible
- Quality of institutions		Low quality	Problematic	Optimal
			Low quality	High quality

Note: shaded area means that skills and competences are emerging relatively fast compared with other scenarios.

12.6 Social workers

Demand for social workers will increase in all scenario's. This is especially the case in scenarios with a more individual lifestyle and high income growth. Also ageing results in more demand for social workers. For the emerging skills it is more important that the same drivers result in a changing contents of the work. For all scenarios it is expected that the following skills become more important:

- Social skills as networking become more important as it increasingly is vital that all relevant stakeholders and helpers are integrated in one approach;
- Social skills as language and intercultural skills increase in importance due to a more diversified mix of clients;
- Coaching and team building is necessary to cope with the increased complexity due to more disciplines working together;
- As many changes go on, change management is essential.

In 'Care gap' and 'Flex care' additional skills are needed:

- E-skills to use ICT in electronic patient dossiers as well as internet to communicate with patients and clients;
- Legislative and regulatory knowledge in 'Care gap' to use this knowledge to diminish the pressure of the system as demand for help is higher than supply of workers and budgets. In 'Flex care' this is essential as many things change.
- Problem solving and self management skills are increasingly important, again due to the pressure of the system in 'Care gap' and the needed flexibility in 'Flex care'.

It is expected that social workers will dominantly work in a public domain. Entrepreneurship, quite important for some other functions, will therefore not be more important than in the current situation. Important exceptions exist, of course, in subdisciplines and as a result of decisions in certain member states.

Table 13.6 Emerging skills and competences for social workers till 2020

		Care central	Care gap	Flex care
Knowledge	Legislative, regulatory			
	e-skills			
	Technical knowledge			
Social	Team working skills			
	Social perceptiveness			
	Communication			
	Networking			
	Language			
	Intercultural			
Problem solving	Analytical skills			
	Interdisciplinary			
	Initiative			
	Multi-skilling			
	Creativity			
Self management	Planning			
	Stress and time management			
	Flexibility			
	Multi-tasking			
Entre-preneurship	Understanding suppliers customers			
	Business development			
	Marketing skills			
	Trend setting / spotting			
Management	Strategic and visionary			
	Coaching and team building			
	Collegial management style			
	Change management			
	Project management			
	Process optimizing			
	Quality management			
Total emerging skills and competences		8	9	17
Scenario characteristics:				
- Ageing		Certain	Certain	Certain
- Technology: scale		Small	Large	Large
- Technology: substitution		Large	Small	Small
- Life style		Social, informal	Individual, formal	Individual, formal
- Income		Low	High	High
- Labour market regulation		Inflexible	Inflexible	Flexible
- Trade and market regulation		Problematic	Problematic	Optimal
- Quality of institutions		Low quality	Low quality	High quality

Note: shaded area means that skills and competences are emerging relatively fast compared with other scenarios.

12.7 Support workers

Due to the rapid technological development in this sector, job functions are expected to undergo a general upgrading, i.e. better educated and specialised employees are needed. This will make low-educated workers generally less attractive for this sector. The competence catalogue itself is not expected to change substantially for low-educated employees such as cleaning personnel, launders, clerks, helpers. However, as the working environment will become more international and interdependency will increase under the great demand pressure due to population ageing, social skills are likely to be demanded to a higher degree in the future. In 'Flex care' more flexibility is needed from support workers.

Table 13.7 Emerging skills and competences for support workers till 2020

		Care central	Care gap	Flex care
Knowledge	Legislative, regulatory			
	e-skills			
	Technical knowledge			
Social	Team working skills			
	Social perceptiveness			
	Communication			
	Networking			
	Language			
	Intercultural			
Problem solving	Analytical skills			
	Interdisciplinary			
	Initiative			
	Multi-skilling			
	Creativity			
Self management	Planning			
	Stress and time management			
	Flexibility			
	Multi-tasking			
Entre-preneurship	Understanding suppliers customers			
	Business development			
	Marketing skills			
	Trend setting / spotting			
Management	Strategic and visionary			
	Coaching and team building			
	Collegial management style			
	Change management			
	Project management			
	Process optimizing			
	Quality management			
Total emerging skills and competences		3	3	4
Scenario characteristics:				
- Ageing		Certain	Certain	Certain
- Technology: scale		Small	Large	Large
- Technology: substitution		Large	Small	Small
- Life style		Social, informal	Individual, formal	Individual, formal
- Income		Low	High	High
- Labour market regulation		Inflexible	Inflexible	Flexible
- Trade and market regulation		Problematic	Problematic	Optimal
- Quality of institutions		Low quality	Low quality	High quality

Note: shaded area means that skills and competences are emerging relatively fast compared with other scenarios.

12.8 Summary volume effects and emergent competence needs

Both the quantitative and qualitative exercises are summarised in Table 13.8. The volume changes are taken from the preceding tables for each function and the skills changes are taken from the final row in each table summing up the number of emerging skills.

Table 13.8 Summary of quantitative and qualitative effects till 2020

	Scenario 'Care central'	
Job function	**Volume change**	**Change in skills and competences**
Managers	I	5
Medical doctors	I	13
Health associate professionals	I	6
Nursing, midwifery	I	7
Social workers	I	8
Support workers	I	3

	Scenario 'Care gap'	
Job function	**Volume change**	**Change in skills and competences**
Managers	I+	15
Medical doctors	I+	20
Health associate professionals	I+	11
Nursing, midwifery	I+	12
Social workers	I+	9
Support workers	M	3

	Scenario 'Flex care'	
Job function	**Volume change**	**Change in skills and competences**
Managers	I	26
Medical doctors	I	26
Health associate professionals	I	16
Nursing, midwifery	I	22
Social workers	I	17
Support workers	M	4

Note: D=decrease, I=increase, I+=large increase, M=maintain. For quantitative effects see Table 12.1. For qualitative effects see Table 13.2-13.7.

Part III.

Available Options to Address Future Skills and Knowledge Needs, Conclusions and Recommendations

Part III. Available Options to Address Future Skills and Knowledge Needs and Recommendations

Guide to the reader

In the final third part of this report, a range of main strategic options ('choices') is reviewed, including possible actions in education and training. The report concludes with a number of conclusions and recommendations for the sector (individual firms, sector organizations, others) and policy-makers at various levels, ranging from the EU to the local level. Part III reflects steps 7 (Main strategic choices), 8 (Main implications for education and training) and 9 (Main recommendations) of the common methodology. Its contents are as follows: Chapter 14 highlights the various strategic choices in response to future skills and knowledge needs. Chapter 15 focuses on specific implications for education and training. Chapter 16 concludes by providing a number of key recommendations and conclusions.

13 Strategic choices to meet emergent skills and knowledge needs

13.1 Introduction

The objective of this section is to identify the main strategic choices to meet the skills and knowledge needs identified (step 8). In section 8 some of the more specific implications relating to education and training are described (step 9). This section provides a framework to pick and select the most relevant strategic choices – i.e. solutions to meet skills needs - available. Strategic choices refer and relate to the medium- and longer term, even though skills needs may also apply to the now and tomorrow. Essential in seeking appropriate solutions is to keep this time perspective in mind. Rather than focusing on one single solution, a set of linked strategic choices will in most cases be the best strategy to be followed. Prioritising both in time (what first, where to follow up) and in allocation of resources (budgetary focus) and further fine-tuning is a clear necessity to guarantee that skills needs are targeted and solved.

Section 14.2 offers first of all a better insight in the 'menu' of possible strategic choices. It also provides a framework that can identify skills needs at the appropriate level and helps to decide which should be the actual choices to be made (section 14.2). This framework is subsequently applied to the health and social services sector in section 14.3 and following.

13.2 Possible strategic choices

The possible strategic choices analysed in this section come from two sources. First, the strategic choices proposed by the Rodrigues methodology are included. However, as they are short- and medium-term oriented only and directly linked to the labour market system and actors (Rodrigues 2007: 42), several options are added to take also the longer term into consideration. In view of the time horizon, the period up to the year 2020, the strategic choices and instruments with fairly long-term impact need to be addressed as well.

Especially for large enterprises the search for adequate solutions will be an integral part of an overall longer-term business strategy. Some solutions will be found within the company itself, for instance by reorganising functions within or between plants, by offering training trajectories and by active global sourcing of personnel. For SMEs and especially for micro-enterprises[9] such longer-term, more strategic human resource management often is more difficult to organise. It should be emphasized that at all levels identified, different players need to act to address skills needs and offer solutions. These can be individual firms, organised interests at the sector level (employers and employees), educational institutions as well as local, regional and national governments.

First, companies can act actively themselves to implement strategies to meet skill needs. They have the following options:

A. Recruiting workers from other sectors

B. Recruiting workers from other Member States

[9] Defined as firms with less than 10 employees.

C. Recruiting workers from non-Member States
D. Recruiting unemployed workers with or without re-training
E. Recruiting young people coming from the education system, with or without re-training (first job recruits)
F. Training employed workers
G. Changing the work organisation (including collaboration and mergers)
H. Outsourcing and offshoring.

The prime actor for pursuing these options is the company, even though for some options co-operation is needed from other actors. Examples include policy measures for recruiting workers from other countries or support from sector organisations in re-training.

Sectoral organisations, educational institutions and governments also have a role to play. They will be the prime actors in addressing the following options:

I. Changing vocational education
J. Designing and offering new courses (continuing vocational education and training)
K. Providing information about jobs and (emerging) skills: career guidance; updating job profiles regularly.
L. Improve the image of the sector (joint action of companies together)
M. Stronger cooperation with the industry (internships, company visits for participants in education, image improvement)

A more detailed description of these options can be found in annex A.

Box 6 Recruitment from other countries and ethics

In the expert workshop many experts pointed to ethical issues around recruitment of workers from other countries. A volume gap can be disastrous for patients and clients. The incentive to recruit from other countries might be large in this case. This is no problem as long as recruitment takes place from countries where an oversupply is present. In reality recruitment often takes place from countries where working conditions are worse. For the individual worker this might be a gain. However, if a problem in country A is solved by creating a problem in country B, an ethical problem might arise. The workshop experts, therefore, concluded that it is a better option to use alternative solutions before recruitment from other countries is stimulated.

Whether these strategic options are feasible and viable or not depends on a number of factors. In order to discuss and select from the available list of strategic options, one should first know whether and when skills gaps are indeed likely to arise, both in quantitative (job numbers) and in qualitative terms (skills). This step would in principle require extensive and detailed future analysis at the Member State and preferably even regional level of skills demand and supply patterns by each subsector, in a similar way and along the steps provided by the methodology of this study so far. In principle this methodology is also applicable at the national and regional level of analysis. Ideally, these results should subsequently be complemented by the results of labour market model forecasts to corroborate results and identify potential skills gaps. Such an analysis would also need to include an assessment of the numbers and skills composition of currently

being educated, i.e. an assessment of all cohorts of primary, secondary and tertiary pupils and students (and their skills potential) currently in the educational system and arriving at the labour market in the oncoming years. It would need a thorough assessment of the current educational and training system itself, including the already decided changes herein for the oncoming years, to see whether the system as it is now in place is able to satisfy the prevailing and future new skills demands.

In the absence of such an elaborate foresight tool at national and regional level, what is needed is an appropriate targeted short-cut strategic decision tool to enable local decision makers – ranging from the management of companies to regional policy-makers - to decide on strategic options. In the remainder of this section this tool is described.

The strategic option decision tool consists of shortlist of a number of key questions to be addressed, which together form a concise menu to choose between the various options. Each answer will give information about the viability of the available options. The questions need to be answered for the subsector under consideration. The questionnaire should be filled in for each job function. Job function information (e.g. new upcoming functions) can be added where relevant. The filling in of the list should only be done on the basis of an informed discussion between several stakeholders involved, representing together an informed body of knowledge on the various aspects at stake, including labour market developments and prospects at the sub-sector level, skill and competence requirements at job function level and developments in and make up/orientation of the educational and training system.

Question 1. Is the demand for workers expected to decrease or increase between now and 2020? (both related to market prospects and replacement demand due to ageing)

> If decreasing, there is probably less need for recruiting workers from other sectors and (non-) Member States and less need for recruiting unemployed.
> If increasing, analyse whether less radical options are enough to meet demand or whether options should be chosen like recruiting workers from other sectors and (non-) Member States and recruiting unemployed.

Question 2. Are the required qualitative skills expected to be rather stable between now and 2020?

> If there are not many changes in required competences, there is probably no need to apply many strategic options. Please focus on the options that are most effective.
> If many competences are changing, there is probably a need to apply many strategic options. Create a package of strategic options to meet skill needs.

Question 3. Do SME's and especially small companies (including micro enterprises) play a large role in the sector?

> If yes, several options (like recruiting) are less viable for companies themselves as it is often difficult for small companies to organize this. If this is the case, sector organisations or intermediary organisation might play an important role in helping to match supply and demand. Another solution could be found in changing the work organisation. Through cooperation or mergers, for instance, the relevant scale can be increased which makes it easier to use these options. The same holds, more or less, for the organisation of training and re-training. Larger (associations of) companies have less difficulties to organise this and the need for support from other actors is lower.

Question 4. Are companies in general active on Member State level, EU level or global level?

Companies who are active on a larger regional level will have, in general, more opportunities to use the option of recruiting workers from other Member States (for companies active at the EU level) and the option recruiting workers from non-Member States (for companies active at the global level). The same holds for the option offshoring.

Question 5. Are workers in a job function in general low-educated?

If yes, training is less easy to implement as a viable option as difficulties arise in organising this, while the need for training might be even higher.

Question 6. Are workers in a job function in general old (i.e. older than the average age in the subsector and compared to other sectors)?

If yes, training is less easy to implement as a viable option as difficulties arise in organising this and less new knowledge endogenously enters the companies, while the need for training might be even higher.

13.3 Meeting skills needs by choosing the right strategic options

In this section, the list of available strategic options is confronted with the analysis of quantitative and qualitative developments on headlines based on the six questions discussed in the former section. This is done as a first indication which strategic options might be viable options. For each job function identified an assessment is made on whether the available strategic options are relevant or not, and who should be the prime actor to change the current situation into a more favourable direction (see Tables 14.1-14.6). If the strategic option is dependent on the characteristics of the sector or components thereof, this will be included in the table. For example, if recruiting workers from other Member States is only an option for large companies a "Yes, but only for large companies" will be included. Characteristics that are dealt with in the table are based on the six question analysis, representing:

- The change in volume (as a reference we include the scenario 'Flex care', see Table 14.1 for estimated volume effects).
- The change in skills (as a reference we include the scenario with the largest changes, 'Flex care', see Table 13.8 for the number of competences changing).
- Scale of the companies.
- Scale of region the company is working in (see chapter 5 in Part I for a geographical discussion).
- Education level (see Table 2.4 for education shares).
- Age of the workforce (see Table 2.4 for age shares).

13.4 Managers

In the short run, technical and e-skill needs for **managers** can best be met by training and re-training on the job (compare Table 14.1). In the long-run an example is the introduction of new courses about, for instance, sector-specific technological and e-health applications. These should be included in continuing professional development (CPD).

In formulating a recruitment strategy that is aimed at meeting a generally increasing demand of managers in the health sector, three options are thinkable: First, medical doctors can be trained or re-trained in management and health technology courses to take over management tasks. This training could take place both on the job and by including new management and technology courses in the educational curriculum of medical doctors. Second, managers from other sectors and other educational backgrounds such as business administration, social sciences and economics could be recruited to a greater degree. In this case, generalists would need on-the-job training in health care and health technology issues. New study directions such as medical engineering or logistics should be spread more widely or existing traditional curricula complemented with health specific courses as already done in health economics, for instance. Third, health and social services managers may also be hired from other member states. Such an international recruiting strategy would, of course, be easier if accompanied by new visa regulations allowing for a swift recruiting procedure and settlement of the expatriate. Also, education degrees would need to be adjusted to meet international standards (according to the Bologna process).

The overall aim should be to strengthen interdisciplinary competences of managers and to continuously update them with know-how in new technological and e-health applications.

Table 14.1 Strategic options managers

1. What is the maximum volume effect?	Increase
2. What is the maximum change in skills?	26
3. Do SME's play a large role?	Yes
4. Is the sector national/EU/global?	National
5. Is the workforce old?	No
6. Is the workforce low educated?	No

Option	**Is this option viable?**	**Actors[1,2]**
A. Recruiting workers from other sectors	Yes, but limited as specific knowledge is necessary	**C**,I
B. Recruiting workers from other Member States	Yes, but language/culture and ethical issues	**C**,I
C. Recruiting workers from Non-Member States	Yes, but limited and ethical issues	**C**,I
D. Recruiting unemployed with or without re-training	Only very occasionally	
E. Recruiting young people from the education system	No	
F. Training and re-training employed workers	Yes	**C,S,**E,I,U
G. Changing work organisation	Yes, several possibilities are present to delete management layers	**C**
H. Outsourcing and offshoring	No	
I. Changing vocational education	No	**S,** E,G,U
J. Designing and offering new courses	Yes (e.g. CPD)	C,S,**E**,G, U
K. Providing information about emerging skills	Yes	C,S,U
L. Improve the image of the sector	No	
M. Stronger cooperation between stakeholders	Yes	All

Notes: 1. C (company), S (sector organisations, including scientifi associations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (trade unions). 2. Bold actors are the actors that should take the initiative.

13.5 Medical doctors

Table 14.2 shows the strategic options for meeting emerging competences of **medical doctors**. In order to meet future skill needs (particularly in 'Care gap' and 'Flex care'), training and re-training measures seem essential. In the short run, training on the job of medical doctors is a viable option. In the long-run, further changes in the vocational education of medical doctors are required. This includes the incorporation of courses in self-management techniques, team working and social perceptiveness (to improve the doctor-patient-relationship).

As reaction to the expected demand increase for this profession, an adequate recruitment strategy becomes an urgent matter. To this respect, one viable option would be to recruit young people earlier and to a greater degree from the education system. Essential is that enough students enter the education system and that there are enough places where they can increase their practical experience. This strategy would need to be complemented with more on the job training of young professionals. Moreover, recruiting already certified doctors from other and non-member states would be a possibility. Such action will most likely ask for the adaptation and standardisation of visa regulations and doctoral degrees over country's frontiers. Further, courses and training in intercultural communication skills are essential for the integration of foreign colleagues in the working environment. With increasing migration, such intercultural training would also help to improve the doctor-patient-relationship.

However, given that the education of medial specialists is already demanding and longsome, educational curricula should not be endlessly enlarged but adjusted instead, i.e. re-aligned towards new skill demands. For this reason, changing the work organisation and task division between doctors, managers and nurses seems essential for this profession. Particularly, in 'Care gap' and 'Flex care', an effective task division becomes crucial to be able to meet the demand without the loss of treatment quality. In order to disburden doctors and managers, more co-ordinating administrative personnel may therefore additionally be needed.

Table 14.2 Strategic options medical doctors

1. What is the maximum volume effect?	Increase
2. What is the maximum change in skills?	26
3. Do SME's play a large role?	Yes
4. Is the sector national/EU/global?	National
5. Is the workforce old?	No
6. Is the workforce low educated?	No

Option	**Is this option viable?**	**Actors[1,2]**
A. Recruiting workers from other sectors	No	
B. Recruiting workers from other Member States	Yes, but culture and language and ethical issues	**C**,I,G
C. Recruiting workers from Non-Member States	Yes, but culture and language and ethical issues	**C**,I,G
D. Recruiting unemployed with or without re-training	No	
E. Recruiting young people from the education system	Yes, essential. Guarantee that enough students enter education.	**C**,E,**G**
F. Training and re-training employed workers	Yes, but limited	**C,**S,E,U
G. Changing work organisation	Yes, mainly flexcare (task division higher level, medium level) and telemedicine	**C**,P
H. Outsourcing and off shoring	No, but for lab tests and reading images	**C**,U
I. Changing vocational education	Yes	**G,S**,E,U
J. Designing and offering new courses	Yes, see above	**C,S,**E,U
K. Providing information about emerging skills	Yes, always good	C,S,U
L. Improve the image of the sector	For some specialties	C,**S**,**I**
M. Stronger cooperation between stakeholders	Yes	All

Notes: 1. C (company), S (sector organisations, including scientifi associations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (trade unions). 2. Bold actors are the actors that should take the initiative.

13.6 Health associate professionals

For **health associate professionals**, as for the former two professions, a continuous updating of technological know-how and e-skills is essential to keep up with the rapidly growing technological innovations in this sector. This requires training on the job, the adaptation of educational curricula and the design and offer of new courses in technical knowledge and e-skills (in order to use new medical equipment) and also in social competences (Table 14.3).

Viable options to meet the expected increasing demand in health associate professionals are the recruitment of workers from other member and non-member states as well as from other sectors. The latter will probably be possible to a lesser degree as health associate professionals still need to have sector-specific expertise though to a slightly lesser degree than medical doctors. The former might be in conflict with ethical issues. Above this, young graduates could be recruited and then trained on the job.

Moreover, training or re-training highly educated unemployed workers with a generalist background could be a viable option in meeting the increasing demand for health associate professionals. So, for instance, unemployed sociologists could be re-trained and specialised in communication and psychology to become a social work professional or a family counsellor.

Most important option is to use all instruments available to keep workers in the sector. Improving the image might help, as well as improving work conditions.

Table 14.3 Strategic options health associate professionals

1. What is the maximum volume effect?	Increase
2. What is the maximum change in skills?	16
3. Do SME's play a large role?	Yes
4. Is the sector national/EU/global?	National
5. Is the workforce old?	No
6. Is the workforce low educated?	No

Option	**Is this option viable?**	**Actors[1,2]**
A. Recruiting workers from other sectors	Yes, but limited (specific knowledge required)	**C**,S
B. Recruiting workers from other Member States	Yes, but culture, language and ethical issues	**C**,I,G
C. Recruiting workers from Non-Member States	Yes, but culture, language and ethical issues	**C**,I,G
D. Recruiting unemployed with or without re-training	Yes, but limited (specific knowledge required), aim at labour market re-entrants	**C,**I,U
E. Recruiting young people from the education system	Yes, essential	**C**,S,E,G
F. Training and re-training employed workers	Yes, but limited	**C**,E,U
G. Changing work organisation	Yes, especially delegation	**C,U**
H. Outsourcing and offshoring	No, but for lab tests and reading images	**C**,U
I. Changing vocational education	Yes	**C,S,**E,U
J. Designing and offering new courses	Yes	**C,S,**E,U
K. Providing information about emerging skills	Yes	C,S,U
L. Improve the image of the sector	In some countries	C,**S**,I
M. Stronger cooperation between stakeholders	Yes	All

Notes: 1. C (company), S (sector organisations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (trade unions). 2. Bold actors are the actors that should take the initiative.

13.7 Nursing and midwifery

Skills changes and an expected demand boost for high-skilled **nursing and midwifery** personnel make the conceptualisation and implementation of recruitment and training strategies highly necessary. Almost all strategic options displayed in Table 14.4 are thus viable and necessary in order to meet the expected skill demand.

For skills development in particular, training on the job and adaptations of educational curricula becomes essential in order to up-skill nurses. Up-skilling seems especially necessary due to technological and e-health developments e.g. in hospitals but also due to higher expectations of more high-income patients ('Care gap' and 'Flex care') and a general trend towards privatisation of high-quality specialised clinics (especially in 'Flex care'). Nurses are also likely to do more routine health treatments in the future to unburden medical specialists. Above this, social skills and self-management techniques should be strengthened to enable nurses to better cope with an increasing demand for contact and with stress in a strained working environment.

Within 'Flex care', we expect the trend for self-employment to be particularly increasing. Thus, courses and curricula adaptations heading at the development of (self-) management competencies of nurses and midwifes are needed.

Recruitment of nurses and midwifery personnel from other and non-member states appears possible in meeting the extraordinary demand, particularly for nursing of the elderly. Also recruitment from other sectors, after training, is possible. Moreover, recruiting young graduates is a possible solution to meet supply shortages. Training on the job in social and technological skills as well as specialisation assistance should always complement these recruitment strategies.

Further, as the health and social services sector is a classic 'female' sector, gender-specific assistance and re-training of mid-aged women willing to re-enter a career in nursing or midwifery seems to be a possibility.

Table 14.4 Strategic options nursing and midwifery

1. What is the maximum volume effect?	Increase
2. What is the maximum change in skills?	22
3. Do SME's play a large role?	Yes
4. Is the sector national/EU/global?	National
5. Is the workforce old?	No
6. Is the workforce low educated?	No

Option	**Is this option viable?**	**Actors[1,2]**
A. Recruiting workers from other sectors	Yes, but limited (specific knowledge required)	**C**
B. Recruiting workers from other Member States	Yes, but culture, language and ethical issues	**C**,I,G,U
C. Recruiting workers from Non-Member States	Yes, but culture, language and ethical issues	**C**,I,U
D. Recruiting unemployed with or without re-training	Yes, very important, mainly re-entrants currently not working, training necessary at technical, e-skills and intercultural.	**C,I**,U
E. Recruiting young people from the education system	Yes, essential, especially men	**C**,S,E
F. Training and re-training employed workers	Yes	**C**,E,U
G. Changing work organisation	Yes, focus on delegation, hiring self employed, increasing efficiency	**C**
H. Outsourcing and offshoring	Yes, hiring self employed. No offshoring.	**C,I**
I. Changing vocational education	Yes	**C,S,**E,U, G
J. Designing and offering new courses	Yes, include in CPD and get the core courses right	**C,S,**E,U
K. Providing information about emerging skills	Yes	C,S,U
L. Improve the image of the sector	Yes, most important, aim at young and aim at keeping workers	All
M. Stronger cooperation between stakeholders	Yes	All

Notes: 1. C (company), S (sector organisations, including professional organisations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (trade unions). 2. Bold actors are the actors that should take the initiative.

13.8 Social workers

As for all functional groups in this sector, it will become increasingly important for **social workers** to keep up with technological innovation and e-health developments in the future. Therefore, training and re-training these competences seems essential for this occupational group (Table 14.5).

In order to meet the increasing demand for social workers, recruiting young graduates in order to give them first work experience appears essential. As skills and competences partly overlap with nursing and midwifery, providing young care workers with on the job training or re-training to upgrade their education may help to meet the trend of specialisation. It may additionally improve their career opportunities and thus provide incentives to enter this profession from the beginning.

Moreover, as the health and social services sector is a classic 'female' sector, gender-specific assistance and re-training of lower- and medium-educated mid-aged women willing to re-enter a career in social work seems to be a further possibility.

Recruitment of social workers from other and non-member states appears possible in meeting the extraordinary demand, but training in language and culture is necessary and ethical issues might arise. Also recruitment from other sectors, after training, is possible. Moreover, recruiting young graduates is a possible solution to meet supply shortages. Training on the job in social and technological skills as well as specialisation assistance should always complement these recruitment strategies.

For recruitment and retention, improving the image of the sector is very important.

Table 14.5 Strategic options social workers

1. What is the maximum volume effect?	Increase
2. What is the maximum change in skills?	17
3. Do SME's play a large role?	Yes
4. Is the sector national/EU/global?	National
5. Is the workforce old?	No
6. Is the workforce low educated?	No

Option	**Is this option viable?**	**Actors[1,2]**
A. Recruiting workers from other sectors	Yes, after training, but limited	**C,**S,I
B. Recruiting workers from other Member States	Yes, but culture, language and ethical issues	**C**,I,G
C. Recruiting workers from Non-Member States	Yes, but culture, language and ethical issues	**C**,I
D. Recruiting unemployed with or without re-training	Yes, re-entrants, training necessary	**C,I**,U
E. Recruiting young people from the education system	Yes	**C**,S,E
F. Training and re-training employed workers	Yes	**C**,E,U
G. Changing work organisation	Yes, focus on good regulation self employed and small organisations or firms	**C**,**G**
H. Outsourcing and offshoring	Yes, hiring self employed. Offshoring not possible	**C,I**
I. Changing vocational education	Yes	**C,S,**E,U
J. Designing and offering new courses	Yes	**C,S,**E,U
K. Providing information about emerging skills	Yes	C,S,U
L. Improve the image of the sector	Yes, very important option	All
M. Stronger cooperation between stakeholders	Yes	All

Notes: 1. C (company), S (sector organisations, including volunteer organisations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (trade unions). 2. Bold actors are the actors that should take the initiative.

13.9 Support workers

Skill requirements for **support workers** in the health sector are not likely to change substantially in the future. Therefore, no training or educational curriculum adaptations are likely to assert an effect.

However, as replacement demand for work generally rises in this sector due to ageing recruiting low-educated workers from other sectors and countries becomes a viable option. Further, appointing unemployed persons without or with training would be a viable option. Training in social skills seems especially crucial for their re-integration in the working environment. Above this, young people with a lower education background should be given an opportunity to gather some first work experience.

Finally, companies might reduce the use of support workers by changing their work organisation and by increasing the use of contracting out.

Table 14.6 Strategic options support workers

1. What is the maximum volume effect?	Maintain
2. What is the maximum change in skills?	4
3. Do SME's play a large role?	Yes
4. Is the sector national/EU/global?	National
5. Is the workforce old?	No
6. Is the workforce low educated?	No

Option	**Is this option viable?**	**Actors[1,2]**
A. Recruiting workers from other sectors	Yes	**C,**S,I
B. Recruiting workers from other Member States	Yes	**C**,I,G
C. Recruiting workers from Non-Member States	Yes	**C**,I
D. Recruiting unemployed with or without re-training	Yes	**C,**I,U
E. Recruiting young people from the education system	Yes	**C**,S,E
F. Training and re-training employed workers	No	
G. Changing work organisation	Yes, efficiency	**C**
H. Outsourcing and offshoring	Yes, will probably occur increasingly	**C**
I. Changing vocational education	No	
J. Designing and offering new courses	No	
K. Providing information about emerging skills	Yes	**C**,S,U
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	No	All

Notes: 1. C (company), S (sector organisations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (trade unions). 2. Bold actors are the actors that should take the initiative.

13.10 Scenario implications, future skills and knowledge needs and possible solutions: summary and main conclusions

Implications of the scenarios in terms of expected volume changes in employment (jobs), future skills and knowledge needs as well as ways to address and solve these needs (strategic choices) have all been analysed so far at the individual job function level. This section serves to summarise (in Table 14.7) the main implications and solutions for each of the job functions presented in chapters 12, 13 and 14. It serves as a bridge to the next chapter where we shift from a micro perspective (job functions) to a meso (sector and policy) perspective.

Table 14.7 Summary of job volumes, skills changes, strategic choices and main players for anticipatory action by scenario for most important job functions

		Care central	Care gap	Flex care
Managers	1. Employment volume change	I	I+	I
	2. Skills changes counted	Count 5	Count 15	Count 26
	3. Emerging skills needs	E-skills, Management, Social	E-skills, Management, Social, Regulatory	E-skills, Management, Entrepreneurial, Regualtory
	4. Most important solutions	Recruiting, training	Recruiting, training	Recruiting, training
	5. Most important actors	C, S,E	C, S, E	C, S, E
Medical doctors	1. Employment volume change	I	I+	I
	2. Skills changes counted	Count 13	Count 20	Count 26
	3. Emerging skills needs	Technical, e-skills, quality management	Technical, e-skills, quality management, regulatory	Technical, e-skills, quality management, regulatory
	4. Most important solutions	Recruitment, training, organizational change	Recruitment, training, organizational change	Recruitment, training, organizational change
	5. Most important actors	C, S, G	C, S, G	C, S, G
Health associate professionals	1. Employment volume change	I	I+	I
	2. Skills changes counted	Count 6	Count 11	Count 16
	3. Emerging skills needs	Technical, e-skills, communication, quality	Technical, e-skills, communication, quality	Technical, e-skills, communication, quality
	4. Most important solutions	Recruitment from school, organizational change	Recruitment from school, organizational change	Recruitment from school, organizational change
	5. Most important actors	C, S, U	C, S, U	C, S, U
Nursing & midwifery	1. Employment volume change	I	I+	I
	2. Skills changes counted	Count 7	Count 12	Count 22
	3. Emerging skills needs	Technical, e-skills, social, communication, quality	Technical, e-skills, social, communication, quality	Technical, e-skills, social, communication, quality, networking, entrepreneurship
	4. Most important solutions	Recruitment from school, hiring & (re)-training unemployed	Recruitment from school, hiring & (re)-training unemployed	Recruitment from school, hiring & (re)-training unemployed
	5. Most important actors	C, E, S	C, E, S	C, E, S
Social workers	1. Employment volume change	I	I+	I
	2. Skills changes counted	Count 8	Count 9	Count 17
	3. Emerging skills needs	Social, intercultural	Social, intercultural, management	Social, intercultural, management
	4. Most important solutions	Recruitment from school, (re)-training (re)-entrants, changing work organisation	Recruitment from school, (re)-training (re)-entrants, changing work organisation	Recruitment from school, (re)-training (re)-entrants, changing work organisation
	5. Most important actors	C, G, S	C, G, S	C, G, S

14 Conclusions and recommendations for education and training

14.1 Introduction

This chapter presents the main conclusions and recommendations for education and training; chapter 16 presents the main other conclusions and recommendations. Whereas the earlier chapters very much take a micro perspective by focusing on job functions in terms of expected volume changes, skills and knowledge needs and ways to address and solve these needs (strategic choices), chapter 15 takes a *meso* or *sector* perspective. It addresses a number of issues, part of which coming already to the fore in earlier chapters, and part being 'new' issues although much related to those already raised. The conclusions and recommendations are mostly based on the results of the preceding chapters; they were discussed during the final workshop with social partners, the industry and other experts.

The recommendations contained in this chapter should not be seen as fully exhaustive. They rather form the basis for further discussion and elaboration at various decision-making levels, ranging from the European Union and the Member State to the regional and local level. Industry itself – firms – have an important role to play, as do education and training institutes, social partners and the government (EU, national, regional and local). In most cases action should be taken jointly, by involving various actors, sometimes even at different levels. Collaboration and co-operation as buzzwords in today's economy are easily coined. Making collaboration work in practice is, however, a challenge which requires mutual understanding, compromise and perseverance.

14.2 Conclusions and recommendations for education and training

Different systems of Vocational Education and Training (VET), the combination of Initial and Continuing Vocational Education and Training (IVET and CVET), are implemented in the European Member States. Various characteristics of the VET-Systems have to be taken into consideration when discussing possible specific implications for education and training, particularly. In general, the VET-Systems can be grouped by the player who decides about the structure and content of VET. With this distinction three main types of VET Systems can be identified (i) liberal, (ii) state-controlled and (iii) corporatist (see Box 7 and Table 15.1).

Box 7. Vocational education and training– rich variety between Member States

A number of different systems in Vocational Education and Training (VET) as well as Initial and Continuing Vocational Education and Training (IVET and CVET) can be observed throughout the European Union. Various characteristics of these systems have to be taken into consideration when discussing possible specific implications for education and training. Existing VET-systems can be grouped into three main categories ('idealtypes'), (i) liberal, (ii) state-controlled and (iii) corporatist VET-systems, each having a different underlying rationale and distinguishing characteristics. Key in this distinction are those who decide about the structure and content of VET: business itself, the state or the state together with social partners (see Table below). The three VET-systems of Germany, France and the United Kingdom are of special importance as they can be taken as representative for each of the three 'idealtype' categorisations. They are

evidence of the rich variations in existing VET systems and their implementation in Europe. The enterprise-based training system of Germany (the 'Dual System') is implemented by the social partners and the state. Next to this prevailing system other forms of VET exist. In France, a school-based training system is established and implemented by the state. Even though the full-time school-based training system competes to some extent with an upcoming apprenticeship training system, it is still the dominant form of vocational training in France. The system implemented in the UK, the national vocational qualification, is regulated and driven by market forces in several important segments. Although national vocational qualifications (NVQ) and general national vocational qualifications (GNVQ) are regulated at national level, the implementation of training is not yet regulated at national level. Commercial certification systems are still competing with national ones. Work-based, as well as full-time school-based training can be found. Special training schemes for unemployed, such as school-based schemes for unemployed youths or work social enterprises for long-term unemployed, are present in several European Member States. Besides these 'idealtypes' several mixed forms in Europe exist. In Spain, for example, one finds more informal forms of VET and in Central and East European countries the trend can be detected, that VET moves from a state centred model to a stronger corporatist model, while also business driven approaches exist in some sectors.

Table 15.1 Three VET-models

	A. Liberal	**B. State-controlled**	**C. Corporatist**
Decision maker	Business (and individuals)	State	State and social partner organizations
Rational	Liberalistic competitive	Centralistic state-centred	Corporative – social consensus
Programmes	Business and individual	Education and citizen	Occupation
Content	Needs of business and individual, utility oriented, short term and specific	Politically determined, general knowledge, course-oriented, academic	Determined by social partners, occupation centred, traditions
Labour markets VET relates to	Internal (business) labour markets	Occupational and internal labour markets	Occupational labour markets
Strengths	Flexible, cheap for the state, close to the needs of production	Strong linkage to the education system, no lack of training places	Broad vocational educations with status equal to general education
Weaknesses	Under-investment in training and education	Weak linkage to the labour market	Inertia in the institutions
Representatives	United Kingdom, Ireland	France	Germany, Austria, Denmark
Trends	Stronger state involvement in certification and quality	'Dual system' emerging and stronger orientation on business needs	Internal labour markets Marketing of VET

Source: elaboration of Clematide (2005)

Expected future developments in the sector and important differences in how the various VET-Systems function in practice, call for a different set of measures in each of the Member States. More specifically the following recommendations can be made.

1) Improve the information systems on skill needs and job opportunities

The information gap between existing and future education and training needs as well as education and training supply is still obvious. Consequently, a mismatch between actual VET supply and demand in quality as well as - to a lower extent - in quantity is observed for some occupational functions. Training providers are often not meeting the training needs and do not respond on emergent training needs in a sufficient way (especially regarding vocational training systems).

SME's often have difficulties in financing CVET and in finding suitable solutions to training leaves of their staff. Consequently, a major implication for education and training is the establishment of improved information systems on current and emergent skills needs and job opportunities. Information systems on the sectoral level as well as on the regional, the national and the European level assist in minimising information asymmetries in order to overcome skill gaps resulting from information deficits. Facilitating students by entering the labour market and finding a suitable occupation is just as important as assisting employees to find new job opportunities based on their existing skills or guiding them in finding the fitting vocational training course.

2) Collaborate with all relevant stakeholders

A close collaboration between all relevant stakeholders, such as companies, education and training organisations, social partner organisations, research institutions and public authorities, supports minimizing information deficits on current and emergent skills needs. This is for example important in scenario 'Care gap' and 'Flex care' as many volume and skill changes take place. The old system has to adapt to the new situation and collaboration is an effective instrument to stimulate that in VET these changes are implemented. A stronger linkage between industry and education and training is recommended in full-time school-based VET-Systems (Koch and Reuling, 1998). In all countries, and in the new Member States in particular, co-operations are essential to improve the practical orientation in VET (Skjølstrup and Mayen, 2007). The 'Sector skills councils'[10] in the United Kingdom and the 'FreQueNz' research network[11] are examples of this kind of co-operation and are described below.

The 'Sector skill councils' in UK are funded by the Department for Innovation, Universities and Skills and are part of the government's skills strategy for the 21st century. The councils ensure that individuals gain the skills they need so that persons with fitting skills are available. Sector skills strategies are defined for each sector based on the analysis of present and future skills needs.

FreQueNz is a research network located in Germany and funded by public means. The network comprises scientific institutes, education and training organisations, social partner organisations, companies and public authorities and contributes to early identification of qualification needs. This network has conducted a number of evaluative research projects on human and ICT resources, staff qualifications, tests, career guidance

[10] www.sscalliance.org
[11] www.frequenz.net

for adults, computerised career guidance programmes, and beneficiaries of guidance services.

3) Enhance flexibility

Strengthening the information basis on skill demands and supply of training as well as career possibilities are the basis for an enhanced flexibility (and adaptability) of continuing vocational education and training. In our view, flexibility refers to the capability of the VET System to adapt effectively to new training needs in terms of quality and quantity. A flexible VET-System is required in particular in circumstances in which profound changes take place and job functions and occupational profiles are modified quickly (as is the case in the scenario 'Care cap' and 'Flex care'). In order to achieve more flexibility and to respond in-time with altering training contents and enhanced quantity a modularisation of education and training is recommended. Even if problems will occur in the modularisation of training in some IVET-Systems modular systems facilitate the building up of competences and ease the interaction between IVET and CVET Systems. Flexibility is also required for different forms of education and training. Flexible forms of blended learning contribute to enhanced participation of, in particular, SME employees in continuing vocational training (SMEs often face difficulties in releasing workers for training).

Blended learning is a mixture of different learning media, learning methods and forms supporting decentralised, self-directed and efficient learning more independently in time and space. In principle, blended learning combines face-to-face and group-based learning with up-to-date offline media and online e-learning forms, as for example digital learning modules on websites, video conferences, joint learning applications, newsgroups and blogs for interactive online learning. This is not only a possibility to reduce costs of further training and enhance flexibility to combine work with training, but it also has positive effects on skills which will be needed in the future. Because large parts of this training are self-directed and informal, the learner has to build up several competences, like self reflection, self motivation, strength of purposes and an effective information processing.

4) Include multi-skilling

For several occupations multi-skilling becomes important in the scenario 'Flex care'. For medical doctors, for instance, not only up-to-date technical knowledge is essential, but also knowledge about patient demands and patient safety and the ability to communicate with patients on a higher level. Multi-skilling and multi professionalism describes the process of gaining knowledge from different disciplines, so that transmural cooperation can be enhanced and multiple clinical pathways can be taken by one professional. To pursue this goal and be able to offer applicable courses for the health sector, not only co-operations between the training sector and the health and social services sector are needed but also between different training providers. In several countries, there are already stable co-operations between the health sector and universities, colleges and other private training providers, but these could be enhanced and strengthened. The main purpose for this should be to provide combined and interlinked training modules for the health sector.

5) Supply special courses dedicated to sector characteristics

For some job functions special courses are needed. The lack of available courses, the suitability of existing courses and the missing flexibility on offer are currently already pointed out in several studies. This is especially the case in the scenarios with many changes for the existing workforce as they have to operate in a changing environment. This asks for a different attitude and knowledge base. Especially in cases where firms are used to operate in a tranquil environment, the challenges of fast changes in environmental regulation and competition are demanding. Firms that are able to improve the skills of the workforce fast, have a competitive advantage. Education and training institutions can exploit this situation to provide dedicated courses.

Graduate level competencies and special courses should be patient-oriented and aimed at patient safety, multi-professional cooperation, quality improvement (aim at better system performance, better professional development and better patient outcomes), transparency of care (communication), evidence based practice (self evaluation) and variability of care in the sense that different protocols are further developed and guidelines are updated regularly.

On the postgraduate level medical knowledge is core. Next to this professionalism, practice based learning and improving (self evaluation and life long learning), as well as interpersonal and intercultural communication need attention. The latter is aimed at better understanding and communicating with patients as well families and colleagues.

Since in 'Care gap' and 'Flex care' nurses will become more and more specialized, there is also a need for change in the VET programs for this specific profession. The EFN (European Federation of Nurses) has developed a framework for the professional competencies of the so called 'specialist nurse'. A specialist nurse would be considered an expert as well as an educator, a consultant, an innovator and an entrepreneur. The competencies the framework includes are professional values, nursing practice and clinical decision making, technical medical knowledge (specifically new technologies such as gene-therapy and new cures), communication and interpersonal competences and leadership/ team-management skills. The development of specialist nurses probably implies creating a new curriculum for which it is essential that this curriculum is harmonized within EU Member States.

6) Supply special courses for older workers

The workforce in several occupational functions is ageing. Education and training institutions should take this development into account for the design of their further training measures and develop specific courses. Older workers are able to learn, but they learn differently compared with younger workers. Older learners in some cases have more problems with theory-based, upfront teaching only focused on examinations. For older learners this kind of training is less effective, because they can not relate it to their practical knowledge. The practical application is often missing, and the passivity of the situation is not supporting mature age learners. For mature age workers learning is more effective if they can integrate practical experience in training. Practice based learning and improvement and reflection and self evaluation would all suit the older workers better than theory based learning.

7) Increase international and intersectoral acknowledgement of certificates and pensions

For some job functions international and sector mobility is an option to meet future skill needs. To increase the viability of this option, acknowledgement of certificates is helpful. This is also the case for in-house training as several of these training measures are not certified. This prevents a greater mobility of the workforce and hinders the matching of skill demand and supply because of a lack of skills transparency. Educational institutions that are able to provide broad accepted certificates, increase their value added for students. However, they need often governments to build effective acknowledgement systems. While international nursing bodies are focusing on international standards for nurses, more inclusive movements for educational harmonization that involve national governments are under way. One of the most significant is the Bologna process or Bologna accords. The purpose of these accords is to make academic degree standards more comparable throughout Europe. Further harmonization is required.

Academic records now enable European Union (EU) nurses to work in any EU country. Currently, nursing programs that enable nurses to practice in the EU have been subjected to two European directives regarding the qualifications of nurses (Directives 77/453/ECC and 89/595/EEC). However, a survey of nursing education in the EU indicates that programs take place in a variety of universities and that degree structures still vary greatly. Despite all differences, entrance examinations are not required when nurses migrate. The Bologna process offers the opportunity to standardize nursing education, with the bachelor's degree as the entry level to the profession, and the master's and doctoral degrees recognized in all EU countries. Some European countries have already adopted a three-year bachelor's degree as the criterion for entry to practice. Other countries, including some in new Member States, are moving toward this standard.

Pension systems decrease the level of international mobility as pension rights are often not recognized in other countries. International recognition helps to meet volume and skill gaps if there is oversupply in other countries.

8) Provide career guidance for labour market entrants

Regularly, persons equipped with required skills and qualifications are available, but do not apply for vacancies due to the lack of information of the labour market possibilities. Systems for the recognition of prior learning (RPL) support the determination to what extent people possess necessary competences for a new job. The integration of RPL in career guidance and targeted training bridges the gap of hidden competences especially for mature workers. Some Member States included this in their system. In Portugal, for instance, a National System of Recognising, Validating and Certifying Prior Learning (RVCC) is implemented through a network of centres. Adults, whether employed or unemployed, are offered a three-tiered service, namely information, counselling and complementary training, including the accreditation of competencies (OECD/European Communities, 2004, p. 31). Career guidance can be supported by user friendly online-tools, also for self guidance. An extraordinary example in this respect is the Polish multi-dimensional career information system called ‘Counsellor 2000’ (ibidem, p. 44) in which information about educational and training pathways, and the relevant occupations they lead to, is linked to the personal profile of the client using an online-system.

15 Main other conclusions and recommendations

15.1 Introduction

This report concludes with a number of 'other' (i.e. going beyond eduction and training) conclusions and recommendations based on the results and insights gained during the course of this study. They include the results of an intensive two day workshop with various stakeholders and the European Commission during which the draft final results, including preliminary recommendations, were discussed. The conclusions and recommendations apply to the sector at large (including individual firms, sector organisations, chambers of commerce, social partners), intermediary organisations, education and training institutes, as well as policy-makers (EU, Member States, regions).

The recommendations point into viable and useful directions rather than that they represent ready-made proposals for change. Reflection and debate, and finding creative answers to plausible futures in skills and jobs is, in the absence of a crystal ball, the way forward. The bandwidth between the expected developments in the most extreme scenarios is indicative for the degree of uncertainty by which the future should be approached. Solutions to future skills needs should therefore be flexible, smart and encompassing enough to address the differences between the various scenario outcomes, not knowing what real future will eventually emerge.

15.2 Main other recommendations

1) Intensify co-operation between relevant stakeholders

A main general recommendation to better meet emergent skills needs is to intensify co-operation between all relevant stakeholders in the sector, and especially between industry, education and policy-makers. The challenge to overcome sectoral skill gaps and shortages will only be met sufficiently if professional organisations, research institutions, training providers, social partners and public authorities act in close concert, both at the national and the European level. Collaboration is needed on various aspects concerning the matching of future skills demand and supply. This also includes supporting the development of sectoral learning strategies and the establishment of partnerships for innovation and job creation.

2) Invest strongly in human capital

In order to meet the skills needs, enhanced investment in human capital is required. A general upgrading of skill requirements in the health and social services sector makes investment in human capital essential in order to meet the expected demand boost by an ageing population. Cost sharing mechanisms between actors, such as public authorities, employers/ management and individuals, need to be developed and lifelong learning throughout the life cycle promoted. Learning must be made more attractive to all, for example via tax incentives, a change of attitudes need to be initiated in order to integrate learning into all phases of live, and a lifecycle approach to work implemented.

3) Invest in e-skills and technological knowledge

Across job functions and scenarios, technological innovations (demand inducing as well as labour substituting) are driving skills and competence demands in the health and social services sector. Employees at (nearly) all functional levels need to keep track with the newest technological and ICT inventions in order to be able to supply the increasing demand by an ageing population via automation.

4) Invest in social skills
Social skills will play an ever increasing role in this sector both across job functions and scenarios. In the higher income scenarios, patients will increasingly ask for personalized treatment in small- and medium sized private clinics or general hospitals. Doctors and nurses, but also care personnel need to invest more time in the doctor-patient-relationship and be able to commit themselves to their patients. Further, intercultural communication with expat-colleagues or patients with a migration background will increasingly be demanded in the future.

5) Account for care and cure differentiation in educational curricula
Rapid technological advances, up-skilling and the trend towards specialisation make a clear division into care and cure tasks and curricula necessary, for instance cure nursing in hospitals and clinics (e.g. intensive care, trauma treatments) versus care nursing in retirement homes. Any future recruitment and skills-development strategy should take this differentiation into account.

6) Split managerial and contextual work in the case of medical doctors
In order to prevent a task overload for medical doctors, managerial and contextual work needs to be effectively and to a greater degree be split between health and social service managers and doctors. In a strained working environment (due to great demand pressure), medical specialists need to be unburdened in order to provide high-quality, personalised doctoral treatment. Curricula of medical doctors should therefore not be broadened, but re-aligned. Policy-makers will otherwise likely face the opposition of medical doctors unions in the implementation of their strategies.

In some cases it might be good as doctors are included in management. This depend, of course, on their skills, but is meant to guarantee that medical knowledge is present in management teams. This might be a good instrument to promote a good balance between economic and medical items.

7) More entrepreneurship for specific groups
As we expect the trend for self-employment and start-ups to continue in the future, professionals, nurses, midwifes and social workers need to be trained and re-trained to a greater degree in management skills such as business development, accounting and marketing. Therefore, sufficient and sector-specific on the job training course possibilities are needed to enhance the success rate of these entrepreneurial efforts. However, in important subsectors entrepreneurship will not play a role. This means that education should be aligned with expectations about the future role of entrepreneurship.

8) Take account of the market and institutional specificities
Privatization, health and social insurance schemes, cultural differences, accessibility to insurance provisions and much other institutional specificity all influence the way in which competences and skills are organized in the European countries. Although the

medical doctors are internationally oriented, educational curricula and working conditions still differ greatly. It would help if systems are more streamlined making it possible to use excess capacities in regions where a shortage is present.
At the same time market and institutional specificities are thus important, that this study should be followed by Member State, and sometimes even regional, specific analysis before dedicated solutions can be supplied.

9) Take effects on volume and skills into account when regulation is designed

The scenario analysis shows that volume and skill effects depend greatly on regulation of the care and labour market. Governments and major players from the sector should realise that when they are discussing the future regulation of the health and social sector. Regulation increasing flexibility and efficiency helps to overcome volume shortages, but demands more skills from workers. Effective regulation is thus not only aimed at the care market, but should at the same time guarantee that skill shortages are met.

10) Evaluate effect of income and working conditions and take action if necessary

In several Member States the income of different types of workers in health and social services is relatively low, while the working conditions are rather hard. To motivate more people for working in this sector it might be necessary to increase income and to improve working conditions. This is, of course, country and function specific.

11) Keep older longer in employment or recruit them

To keep the knowledge and the experience of older workers available and to avoid volume and skill gaps, special part time retirement schemes should be developed by the responsible authorities and applied by the sector. Special training should be given to guarantee that technological developments are integrated in their knowledge. Attracting older workers from other sectors or older people currently not working, might be an option to increase the supply of workers for some functions. It might help to integrate better the different types of caring responsibilities, which may include older parents or family members as well as children. Appropriate forms of caring support might prevent that workers leave the sector too early.

12) Improve working conditions

Working conditions in the health and social services sectors are not always conducive to high performance of workers. Pay is often low, work can be stressful and working hours are irregular including night shifts for many workers. This leads to high rates of staff turnover and people leaving the sector. Rather than just attracting new workers to the sector it is more cost-effective to try and retain workers already employed. The improvement of working conditions (salaries, working hours, recognition and special measures to retain older workers) are very important.

13) Set up a social dialogue in the sector

To address the problems and issues discussed in the sector and to provide a forum for the interaction of and consultation with all relevant stakeholders it is recommended to establish a social dialogue.

References

Buchan, J. (2007), Health worker migration in Europe: assessing the policy options, Eurohealth 13:6-8.

CBS (2008), Statistics on health care and social services, Den Haag.

Cedefop (2008) "Terminology of European Education and Training Policy" Luxembourg: Publications Office, 2008.

Clematide, B., A. Dahl, A. Vind and C. Joergensen (2005), Challenges for the Danish VET-system – on the path towards a future model, in: bwp@issue 7

Comas-Herrera, A. and Wittenberg, R. (2003), European Study of Long-Term Care Expenditure.

Driest, P.F. (2006), Long term care in Europe in: Jan Hassink and Majken van Dijk (eds.), Farming for Health, 101-106 Springer.

Ecotec (2005) "Glossary of key terms" *European Inventory: validation of non-formal and informal learning* Available from: http://www.ecotec.com/europeaninventory/glossary.html [Accessed: 06.03.2009]

EMCC (2003), The future of health and social services in Europe, European Foundation for the Improvement of Living and Working Conditions, European Monitoring Centre on Change, Dublin.

EMCC (2005), The future of health and social services in Europe, European Foundation for the Improvement of Living and Working Conditions, European Monitoring Centre on Change, Dublin.

EMCC (2006), Employment in social care in Europe, European Foundation for the Improvement of Living and Working Conditions, European Monitoring Centre on Change, Dublin.

ETF (1997) "Glossary of labour market terms and standard and curriculum development term" European Training Foundation, Turin.

Europeaan Commission (2001), The Internal market and Health services. EC High level committee on health. DG Health, Brussels, Belgium.

European Commission (2005), Working together for Growth and Jobs. A new Start for the Lisbon Agenda. Communication to the Spring European Council. COM (2005) 24. 02.02.2005.

European Commission (2006), Community action on health services EC DG Health and consumer protection Brussels Belgium.

European Commission (2008), The European Qualification Framework for Lifelong Learning, Brussels.

Eurostat (2008), Labour Force Statistics, Brussels.

Holly, A., T.A. Lufkin, E.C. Norton and C. van Houtven (2007), Informal care and medical care utilization in Europe and the United States, Duke University.

ILO (1998) "ILO thesaurus = Thesaurus BIT = Tesauro OIT: labour, employment and training terminology" *International Labour Organisation,* Available from: http://www.ilo.org/public/english/support/lib/tools/aboutthes.htm

Horstmann, S. et al (2002), Study on the Social Protection Systems in the 13 Applicant Countries GVG Germany.

Koch, R. & Reuling, J. (1998). 'Public Quality Control of Vocational Training in Germany, France and the United Kingdom. In Vocational Education European Journal, Vol. 15, No. 3, 7-12.

Kovac, C. (2001), Hungarian doctors angered by plans to privatise hospitals, British Medical Journal 323:472.

Kuehn, B.M. (2007), Global shortages of health workers, brain drain stress developing countries, Journal of the American Medical Association 298:1853-1855.

Lezovic, M. and R. Kovac (2008), Comparison of long-term care in European developed countries to possible implementation in Slovakia, Bratisl Lek Listy 109:20-24.

Lepic, M. (2008), European health and social work industry profile, Charles University in Prague, paper presented at the Future skill needs in health care, Thessaloniki, 22-23 May 2008.

Lichtenberg, F. (2002), Benefits and costs of newer drugs: An update, NBER Working paper 8995, National Bureau of Economic Research, Cambridge.

Ligthart, M. (2007), Determinanten van de zorguitgaven. Een analyse op basis van paneldata, CPB Memorandum nummer 186, Den Haag.

McKinsey (2008), Addressing Japan's health care cost challenge, The McKinsey Quaterly, 30 May.

Miles, I. (2008), Pattern of innovation in service industries, IBM Systems Journal 47:115-128.

OECD (2001), The Well-Being of Nations: the Role of Human and Social Capital. Paris: OECD

OECD/European Communities (2004): Career Guidance – A handbook for policy makers, p. 31

OECD (2007) Health at a glance, Paris.

OECD (2008), National accounts: Detailed tables, Paris.

OECD (2007) "Qualifications systems: bridges to lifelong learning = Systèmes de certification: des passerelles pour apprendre à tout âge" *Organisation for Economic Cooperation and Development,* Paris.

Rodrigues, M.J. (2007), Innovation, Skills and Jobs. Pilot Project to Develop a European Foresight Methodology to Identify Emergent Jobs and Their Skills Needs. Working Document 2007.03.29.

SATA (2000), Study on the use of advanced telecommunications services by health care establishments and possible implications for telecommunications regulatory policy of the European Union, Empirica and WRC, Bonn/Dublin.

Skjølstrup, K.A. and G. Mayen (2007), Vocational schools in transition: dead end streets or the gate to prosperity? – Key elements for the development of local human

resource development providers, in: ETF Yearbook 2007, Quality in vocational education and training: Modern vocational training policies and learning processes, Turino

Tessaring, M. (2004), Early identification of skill needs: European activities and perspectives, in Susanne Liane Schmidt; Olga Strietska-Ilina; Manfred Tessaring, Bernd Dworschak (eds.), Identifying skill needs for the future: From research to policy and practice Luxembourg: Office for Official Publications of the European Communities, 2004 (Cedefop Reference series, 52), p. 231-240.

Tissot, P. (2004) "Terminology of vocational training policy – A multilingual glossary for an enlarged Europe" *Cedefop*, Luxembourg: Publications Office,.

Viitanen, T.K. (2007), Informal and formal care in Europe, IZA DP 2648.

WHO (2008), World health statistics 2008, WHOSIS.

Annex I. Contributors to this study

This report appears in a series of 11 sector reports on the future jobs and skills commissioned by the European Commission and executed by a core consortium of TNO (Delft/Leiden, the Netherlands), SEOR Erasmus University (Rotterdam, the Netherlands) and ZSI - Zentrum für Soziale Innovation (Vienna, Austria). The consortium was led by Dr F.A. van der Zee (TNO Innovation Policy group; TNO Innovation & Environment).

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Annex III. Strategic options – a detailed description

A. Recruiting workers from other sectors

A possible solution to meet skill needs is to recruit workers from other sectors, which have and can provide the skills and knowledge needs of the sector and more specifically the firm. Whether or not this is a desirable option depends, amongst others, on the job function under consideration. For managers of large corporations it is quite usual to bring their general know-how to bear in different sectors. Also for business professionals (e.g. financial analysts, software engineers) sector specificities are of lesser importance. Sector mobility of low skilled workers is much more limited than the mobility of higher educated employees. The lesser the grade of sector specialisation of the occupational profile, the easier employees are able to change between sectors. In other cases recruiting workers from other sectors will need training of sector specific skills. In some cases it will also be possible for highly specialised workers to change sectors.

B. Recruiting workers from other Member States

Recruiting workers from other Member States could be in some cases a possibility to overcome skills problems. However, owing to language, cultural and other problems, including certain entrance barriers left to the Member States, mobility within the European Union is still underdeveloped. Border regions are attracting workers from other countries mainly because of wage advantages and in this way can succeed in solving their skills shortages and gaps. However, regions that face such outward migration (e.g. Poland, East Germany, Parts of Austria, Hungary, Czech Republic, Slovenia, Bulgaria) at the same time face serious problems in meeting their labour market demands. Some have responded by recruiting workers from non-Member States. Even if this might appear a temporary problem, from a longer term perspective, such developments could have serious consequences for the growth of the regional economy – in what might be termed a 'skills drain' (cf. 'brain drain").

C. Recruiting workers from non-Member States

Recruiting workers from non-Member States is not a zero-sum game for the European economy. Yet this strategic choice is as limited in its overall impact as the strategic choice that proposes to recruit workers from other Member States. On top of this, such recruitment is much more difficult that recruitment from within the EU. In all Member States significant barriers for entering the labour market for workers from outside the EU exist, even for temporary workers. To increase the influx of these workers by, e.g. increasing the immigration quota several political hurdles have to be mastered. Action can be taken here at Member State as well as at EU level, the recent 'blue card' proposal and negotiations serving as an example.

D. Recruiting unemployed workers with or without training

Recruiting unemployed workers without training is a strategic option, especially in case of skill shortages if there are not enough skilled workers to meet the employers demand). This option should in these cases be combined with adequate training. Unemployed

workers might have various placement handicaps, especially skills deficits and poor levels of basic qualifications. Low educated groups are still representing the majority of the unemployed labour force, but also highly skilled workers like engineers could be threatened by unemployment.

E. Recruiting young people coming from the education system, with or without re-training

This strategic choice is always a possibility to overcome skill shortages as well as skill gaps. But demographic change should be taken into account too. While in the next few years, until around 2015, there will be a continuous inflow of students entering the labour market, a significant reduction is expected in 2020. In some EU regions there is already a need for young qualified and skilled workers and apprentices. Even where sectors may pay relatively high wages and offer stable carrier prospects, it is not easy to attract enough labour in critical occupational functions. While in the last years labour in business and finance professionals as well as administrative staff and customer services could be attracted the situation in technical occupations (engineers/technicians, construction workers, plant operators) is still critical. Hence, the recruiting of young people can only be successful, if this measure is supported with the other strategic options such as "Improving the image of the sector" and "Stronger cooperation within the industry". To be more precise, a stronger cooperation between schools, university, training organisations, career managers on the one hand and the industry on the other is needed. The principal aim should be to overcome the mismatch of requirements and wishes of individuals on the one hand and the economy on the other.

F. Training employed workers

In some cases training and re-training could also constitute a strategic choice to meet skill demands. In this case, the employee will be trained for a new working place or task. In general, re-training ends with a formal graduation or certificate. Re-training is an option if the work place or the occupational function is not needed any more. But re-training is only one option. Further education or further training, refresher training and updating courses, or advanced vocational qualification to adapt the workforce to emergent skills needs are also options, which should be taken into account. Re-training or further training of employees can encompass all levels of skills. Training and qualification could be done in-house and on the job as well as by an external education institution. It is more likely that less fundamental variations of up-skilling or re-training will be a strategic choice because re-training has to be regarded as a long term and quite expensive measure compared to the other vocational education forms.

G. Changing the work organisation

Work organisation can be defined in different ways. First, it can be defined as a system of work organisation (e.g. Taylorims, Fordism and Post-Fordism) and second, as a form of division of labour and specialisation. In modern economies productivity is based on the division of labour which by definition implies also a division of skills. There are several instruments of work organisation to react on skill shortages and gaps. Thus, changes in the work organisation can help to overcome skill gaps. In general, work can be reorganised in the following possible ways:

- Group work: A group is a limited number of people who work together over a longer period with a frequent, direct interaction. A group is defined through the

differentiation of roles and joint values. Groups are able to produce better results than single persons due to the combination of different competencies and experiences, the reduction of wrong decisions, stronger work motivation, the direct use of information, new insights and creativity and a better acceptance of decisions, just to mention a few of the many advantages. There are several kinds of group work, like project groups, quality groups and learning circles, as well as committees.

- Job rotation: Within this type of work organisation several people change their work places in a planned alteration. Job rotation enhances the overview of the different production processes, the understanding of different tasks and the feeling for group work. Additionally, monotony and dissatisfaction are reduced.
- Job enlargement: Extension of the scope of work through the combination of several structurally equal or similar tasks. It can produce similar effects as job rotation.
- Job enrichment: Extension of the scope of work through the combination of several structurally different tasks. The scope of decision making and self-control increases, as well as the quality and quantity of work. In general, up skilling of the employee is necessary, but this is also implemented on the job.

Under the influence of new technologies, like information and communication technologies, virtual forms of work organisation, which substitute hierarchies through a horizontal network co-ordination, are also possible. In this sense, mergers and acquisitions as well as project based business colloboration are also available options to change the work organisation. Both measures are strategic possibilities to get access to needed resources or to incorporate new skills. Modern (communication) technology can support the co-ordination and co-operation of labourers working at different places and in combining their respective strengths.

H. Outsourcing and offshoring

In public discussion the terms outsourcing and offshoring are mainly used together, yet it must be emphasised that they describe different technical approaches. While outsourcing means the transfer of management or day-to-day execution of business functions or processes (production, manufacturing, services) to an external service provider, offshoring describes the relocation of business functions or processes from one country to another. Both could be applied as a strategic choice on company level to meet skill needs, by integrating the knowledge, experience and competences of the other firm in the production process.
Outsourcing of personnel as a result of technological change and economic pressure was and still is an ongoing trend. Due to de-regulation and privatisation several tasks and with it skills and competences in the sector were outsourced and in some countries dislocated to other countries to increase labour productivity. Several occupational functions in the production chain have been outsourced nowadays. Skill gaps can be closed by hiring subcontractors with the needed knowledge and competences. If one considers this strategic option to meet skill needs, it has to be taken into account that for subcontracting firms, freelance or contractual workers continuing vocational training often plays a marginal role, because employees are all too often indispensible. One should also bear in mind that freelancers are not available at any time and in unlimited numbers. Outsourcing and offshoring is therefore a limited strategic option to overcome skill gaps. It seems to be more adequate to overcome skill shortages.

I. Changing vocational education

Changing vocational education has a long-term effect. It must be taken into account that changes will have a substantial impact in quality and quantity starting at the earliest within three years time after the changes. The process of changing initial vocational education in content or in structure takes itself several years. The process from defining the needs and problems to the implementation of a new curriculum involves several stakeholders from different expert levels like companies, social partner organisations, training institutes as well as representatives of national and regional education administration. These bargaining processes could take several years and are dependent of the VET-system of the European Member State. Hence, this strategic choice will only be drawn if major structural changes are expected.
Despite these facts, possible changes can be seen in a stronger modularisation of curricula of initial vocational training as well as in building up or strengthening interplant and interregional training infrastructure. The first option could in the long run help to overcome identified skill needs in a sound, flexible and a relatively quick way. The second option is amongst others a possibility to provide the latest high-value equipment for training quickly by sharing resources of several partners.

J. Designing and offering new courses (continuing vocational education and training)

Once it is clear that the current content of vocational training is not up to date and therefore does not address the demands, the development of new courses for continuing vocational education and training could be a strategic option with a short term impact (see also *M. Stronger cooperation between stakeholders).*

K. Providing information about jobs and (emerging) skills

There is still a lack of transparency concerning current and emerging skill needs and job opportunities in different economic sectors. Information systems on regional, sectoral, national or European level could help to minimise information asymmetries and in that way overcome skill gaps resulting from information deficits. As a consequence, it could prove highly effective in helping students to enter the labour market and find a suitable occupation, just as much as in assisting employees to find new job opportunities based on existing skills or guide them in finding the suitable vocational training course.
Career guidance impacts rather short term. Therefore, it can help to overcome the mismatch between the needs and interest of the individual and those of the prevailing economy. The basic assumption of this strategic choice is that there already exist people who are equipped with the required skills and qualifications, but, due to a lack of information about the labour market possibilities, do not apply for these jobs. Career guidance for students and employees can help to overcome this mismatch. In this respect there can be a clear connection to training. Systems for recognition of prior learning (RPL) can help to determine to what extent people possess necessary competences for a new job. Targeted training can bridge the gap for the failing competences.

L. Improving the image of the sector

Improving the image of the sector could be an easy and suitable measure especially to overcome skill and labour market shortages and attract new employees. Several instruments could be implemented by sector organisations in co-operation with different

non sector actors like schools, career management organisations, training organisation, public employment services, and public administration. Instruments could be company visits for pupils, offering internships for pupils and enhanced public relation. Especially in sectors where framework conditions and occupational functions changed fundamentally, due to technological or organisational restructuring or low wage levels, this offers a possibility to overcome stereotypes as much as old fashioned views and to attract more labour. Moreover, this measure does not only provide a chance to overcome stereotypes in relation to the sector but also to some occupational functions. The effect of this strategic option is long-term. In consideration of the apprenticeship system, which can take up five to seven years (if the specialisation of high qualified jobs in the sector is taken into account) until the volume effect is reached, one must arrive at the conclusion that in some occupational functions it has to be initiated right now.

M. Stronger cooperation with the industry

A stronger co-operation between industry and training institutes on a regular basis is one possibility to meet the skill needs in the sector. In some sectors and countries training of employees does not seem to be in line with the industry's emerging needs. New training and teaching solutions are to be developed between the industry, sector representatives, education institutions and research centres, public bodies, etc. Information exchange and a stable cooperation between the relevant stakeholders could improve the matching of training needs and demands. In the long run it will enhance the efficiency of training output, strengthen the quality of training and maximize the individual potential. To build up this kind of cooperation takes time, but in the long run it might well be capable to provide accurate solutions for problems. Networks and partnerships between these stakeholders to forecast skill needs in the sectors also present a long term measure. They could help to define emergent skill needs. While knowledge about the development of skill supply is quite high, the knowledge about the development of skill demand in different sectors is still improvable. These kinds of networks can cooperatively detect the need for action and contribute to the development of recommendation of actions.

Glossary

Apprenticeship. Systematic, long-term training alternating periods at the workplace and in an educational institution or training centre. The apprentice is contractually linked to the employer and receives remuneration (wage or allowance). The employer assumes responsibility for providing the trainee with training leading to a specific occupation. (Cedefop, 2004)

Competence. Competence refers to the proven ability to use knowledge, skills and personal, social and/ or methodological abilities, in work or study situations and in professional and personal development. In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy;

Compulsory education. The minimal legal standards and duration of obligatory schooling. (ILO, 1998)

Concentration index. The concentration index assesses the relative contribution of a specific sector to the national economy compared to a greater entity, such as the EU, thereby correcting for the size of the country. In more general terms, the concentration index is a measure of comparative advantage, with changes over time revealing changes in the production structure of a country. An increase of the concentration index for a sector signifies relatively fast growth of that particular sector in the country concerned compared to the same sector in the EU. How does the concentration index work in practice? A few (hypothetical) examples: if sector x represents a 5% share of the German economy and a 5% share of the EU economy, the concentration index of sector x equals a 100. If sector x represents 5% of the German economy, but 10% of the EU economy, the concentration index of sector x is 50. If the same sector x represents 10% of the German economy and 5% of the EU economy, the concentration index of sector x is 200.

The concentration index concept can be applied using different indicators (variables). In our study we measure the concentration index using employment, value added and trade, in order to make a distinction between the relative performance of countries EU-wide. We distinguish between four country groupings, each signifying a different sector performance over time. If a sector in a country has a strong position (hence showing a concentration index higher than 100) and has experienced a clear index growth over the last years, the sector is defined as winning in that country. If the sector has a strong position, but experienced a decline of the concentration index, we say the sector is losing momentum. If the sector has a weak position, but gained in the past, we say that the sector in that country is upcoming. If the sector has a weak position and experienced a decline of the index, we say that the sector is retreating.

Employability. The degree of adaptability an individual demonstrates in finding and keeping a job, and updating occupational competences. (Cedefop, 2000)

European Credit system for Vocational Education and Training (ECVET). A device in which qualifications are expressed in units of learning outcomes to which credit points are attached, and which is combined with a procedure for validating learning outcomes. The aim of this system is to promote:

- mobility of people undertaking training;

- accumulation, transfer and validation and recognition of learning outcomes (either formal, non-formal or informal) acquired in different countries;
- implementation of lifelong learning;
- transparency of qualifications;
- mutual trust and cooperation between vocational training and education providers in Europe. (Cedefop)

European Qualification Framework for life-long learning (EQF). A reference tool for the description and comparison of qualifi cation levels in qualifi cations systems developed at national, international or sectoral level. (Cedefop)

Full-time Employment. Traditionally means a 'regular job'. Work that is about eight hours a day, five days a week and forty-eight weeks of the year with four weeks paid leave.

Informal learning. Learning resulting from daily activities related to work, family or leisure. It is not organised or structured in terms of objectives, time or learning support. Informal learning is in most cases unintentional from the learner's perspective. (Cedefop, 2008)

Interdisciplinary (multidisciplinary). Interdisciplinary refers to research or study that integrates concepts from different disciplines resulting in a synthesised or co-ordinated coherent whole. New disciplines have arisen as a result of such syntheses. For instance, quantum information processing amalgamates elements of quantum physics and computer science. Bioinformatics combines molecular biology with computer science. An interdisciplinary team is a team of people with training in different fields. Interdisciplinary teams are common in complex environments such as health care.

Job mobility. Any change of job, regardless of where the new job is located.

Knowledge. Knowledge refers to the outcome of the accumulation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. In the context of the European Qualifications Framework, knowledge is described as theoretical and/or factual.

Knowledge society. A society whose processes and practices are based on the production, distribution and use of knowledge. (Cedefop, 2008)

Learning outcomes. Learning outcomes refer to statements of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competence.

Lifelong learning. All learning activity undertaken throughout life, with the aim of improving knowledge, skills/competences and/or qualifications for personal, social and/or professional reasons. (Cedefop, 2008)

Low, medium, high educated. See also under qualifications. The Labour Force Survey (LFS) collects

data for a number of characteristics of employees, one being the level of education of an employee. The LFS is is based on the ISCED 1997 classification (International Standard Classification of Education).

- Low-educated encloses all levels up to the compulsory education (ISCED 1+2). ISCED 1: primary education or first stage of basic education. ISCED 2: lower secondary education or second stage of basic education.
- Medium-educated comprises all the post compulsory education not tertiary (ISCED 3+4). ISCED 3: (upper) secondary education. ISCED 4: post-secondary non tertiary education
- High-educated comprises all tertiary education including university education (ISCED 5+6). ISCED 5: first stage of tertiary education). ISCED 6: second stage of tertiary education (leading to an advanced research qualification).

Low, medium, high skilled. In general this classification refers to the skills required for a specific occupation that an employee currently holds. In existing taxonomies skills levels are usually proxied by educational attainment (see low, medium, high educated).

Mobility, see job mobility.

Multi-skilling. Multi-skilling refers to training an employee to cover a range of different jobs in one workplace. A multiskilled worker is an individual who possesses or acquires a range of skills and knowledge and applies them to work tasks that may fall outside the traditional boundaries of his or her original training. This does not necessarily mean that a worker obtains or possesses high-level skills in multiple technology areas. However, the worker can be an effective and productive contributor to the work output of several traditional training disciplines.

Multi-tasking. The ability of a person to perform more than one task at the same time.

Profession. An occupation which requires knowledge gained through academic study, such as law, medicine or teaching.

Qualification. Qualification refers to a formal outcome of an assessment and validation process which is obtained hen a competent body determines that an individual has achieved learning outcomes to given standards.

Qualifications, Comparability of -. The extent to which it is possible to establish equivalence between the level and content of qualifications (certificates, diplomas or titles) at sectoral, regional, national or international levels. (Cedefop, 2000)

Qualification, level of -. Low: at most lower secondary (ISCED 0-2); medium: upper secondary (ISCED 3-4); high: Tertiary (ISCED 5-6).

Qualification framework. An instrument for the development and classification of qualifications (e.g. at national or sectoral level) according to a set of criteria (e.g. using descriptors) applicable to specified levels of learning outcomes. (OECD, 2007)

Retraining. Training enabling individuals to acquire new skills giving access either to a new occupation or to new professional activities. (Cedefop, 2004)

Revealed Comparative Advantage (RCA). Relative comparative advantage compares the relative contribution of sector x to the comparative advantage of the national economy with other sectors. It is calculated as follows:

RCA = tanh (ln ((Exports S / Imports S) / (Exports C / Imports C))) x 100

Interpretation: 0 = the comparative advantage of sector x equals the average of the comparative advantage of the entire national economy. Near -100: the sector contributes nothing to the comparative advantage of that country. Near + 100: the sector contributes strongly to the comparative advantage of the country.

The use and logic of the country groupings winning, losing momentum, upcoming and retreating in combination with revealed comparative advantage is similar to the concentration index (see above).

Skills. Skills refer to the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualifications Framework, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments).

Skills gaps. Skills gaps arise where an employee does not fully meet the skills requirements for a specific job function but is nevertheless hired. This skills gap needs to be closed through training. Skills gaps can arise where new entrants to the labour market are hired and although apparently trained and qualified for occupations still lack some of the skills required.

Skills needs, emergent -. Emergent skills needs are defined in this study as the change in skills that is needed to adequately fulfil a certain job function in the future. Addressing emergent skills is needed in order to avoid skills shortages and/or skills gaps in the future.

Skills shortages. Skills shortages exist where there is a genuine lack of adequately skilled individuals available in the accessible labour market. A skill shortage arises when an employer has a vacancy that is hard-to-fill because applicants lack the necessary skills, qualifications or experience.

Tertiary education. Tertiary education refers, in most settings to non-compulsory education provided via a specialist institution once secondary schooling is completed, usually labelled as a college, polytechnic or university (in English) with variants of these in other languages. Tertiary education may be delivered virtually or at a distance.

Trade balance. Exports minus imports.

Training. The development of skills or knowledge through instruction or practice; a kind of vocational learning such as an apprenticeship or traineeship which includes both formal education and on-the-job experience.

Unskilled work. Work which lacks specialist training or ability and generally involves simple manual operations which can be learned in a short time.

Up-skilling. Short-term targeted training typically provided following initial education or training, and aimed at supplementing, improving or updating knowledge, skills and/or competences acquired during previous training. (Cedefop, 2004)

Vocational Education and Training (VET). Education and training which aims to equip people with
skills and competences that can be used on the labour market. (adapted from ETF, 1997).