Investing in the Future of Jobs and Skills

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

Sector Report

Printing and Publishing

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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 printing and publishing 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. This study on future skills and jobs in the printing and publishing sector has been executed by core team staff in close collaboration with Jan Vroegop (B&O, subcontractor) (see Annex 1 for team composition).

The study was carried out during the period January 2008-May 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.

A draft final version of this report was validated and complemented during a second external, final workshop in Brussels on 8th and 9th January 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 Radek Owczarzak of the European Foundation for the Improvement of Living and Working Conditions who proved to be excellent guides during the project.

Delft, 1 May 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 printing and publishing 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-May 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

Acronyms

BRICs	Brazil, Russia, India, China
CEC	Commission of the European Communities
EMCC	European Monitoring Centre on Change
EU	European Union
EWC	European Works Council
GDP	Gross Domestic Product
IFJ	International Federation of Journalists
IFPI	International Federation of the Phonographic Industry
IFRA	International association for newspaper and media technology
IPR	Intellectual Property Rights
NACE	Nomenclature Generale des Activites Economiques dans I`Union Europeenne
NMS	New Member States
SME	Small and Medium-Sized Enterprises
SWOT	Strengths, Weaknesses, Opportunities, and Threats
VAT	Value Added Tax

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 printing and publishing sector. 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.

2 Defining the sector

Printing and publishing have traditionally been and still are closely related. *Publishing* can be defined as the *process of production and dissemination of information*, i.e. making information available for public view. Traditionally, publishing refers to the production and dissemination of printed works such as books, magazines, newspapers and sound recordings (music). With the emergence of digital means and media (the Internet, digital information systems), publishing has expanded to include electronic resources, such as the electronic versions of books, periodicals and newspapers, as well as websites, blogs, video games and the like. Publishing includes various stages, from the development, acquisition, copy-editing, graphic design and other pre-press activities to the actual production (i.e. printing), marketing and distribution. *Printing* is the *process for reproducing text and image,* including associated support activities, such as bookbinding, plate-making services, and data imaging. Processes used in printing include a variety of methods for transferring an image from a plate, screen or computer file to a medium, such as paper, plastics, metal, textile articles, or wood. The most prominent of these methods entails the transfer of the image from a plate or screen to the medium through lithographic, gravure, screen or flexographic printing. Often a computer file is used to directly 'drive' the printing mechanism to create the image or electrostatic and other types of equipment (digital or non-impact printing) (Eurostat, 2008). Though printing and publishing can be carried out by the same firm or entity (a newspaper, for example), it is less and less the case that these distinct activities are carried out in the same physical location. Publishers usually control the advertising and other marketing tasks, but may subcontract various aspects of the process to specialist publisher marketing agencies. Editing, proofreading, layout, design and other aspects of the production process are often done by freelancers. Publishing and printing might be done by one and the same company – as is often still the case in the newspaper industry - or may be fully independent (i.e. outsourced).

Statistically, following the Eurostat NACE (Rev 1.1) classification, the publishing, printing, and recorded media sector is defined to include the following three clusters of activities:

- Publishing (22.10): books, newspapers, journals, periodicals, sound recordings, and other publishing;
- Printing (22.20): printing of books, newspapers, periodicals, prospectuses and other printed advertising (e.g. business cards, security papers, stationery but also printing onto textiles, plastic, and other materials), binding, pre-press activities (but excluding specialised design activities), and ancillary activities related to printing;
- Reproduction of recorded media (22.30): sound recordings, video recordings, and computer media such as compact discs and software on discs or tapes.

In the new NACE Rev 2 classification (introduced as from January 2008) printing and the reproduction of recorded media are clustered together as 'printing and reproduction of recorded media' (18). Publishing is labelled as 'publishing activities' (58) and *excludes* the publishing of sound recordings but includes related database activities (previously classified under computer and related activities). The publishing of sound recordings is included in 'motion picture, video and television programme production, sound recording and music publishing' (59) as 'sound recording and music publishing activities' (59.2). Given that most of the available data is only available under the old NACE Rev 1.1 classification, we will stick to this classification in this report.

3 Structural characteristics of the sector: past and present

3.1 Employment, value added and trade trends in the EU

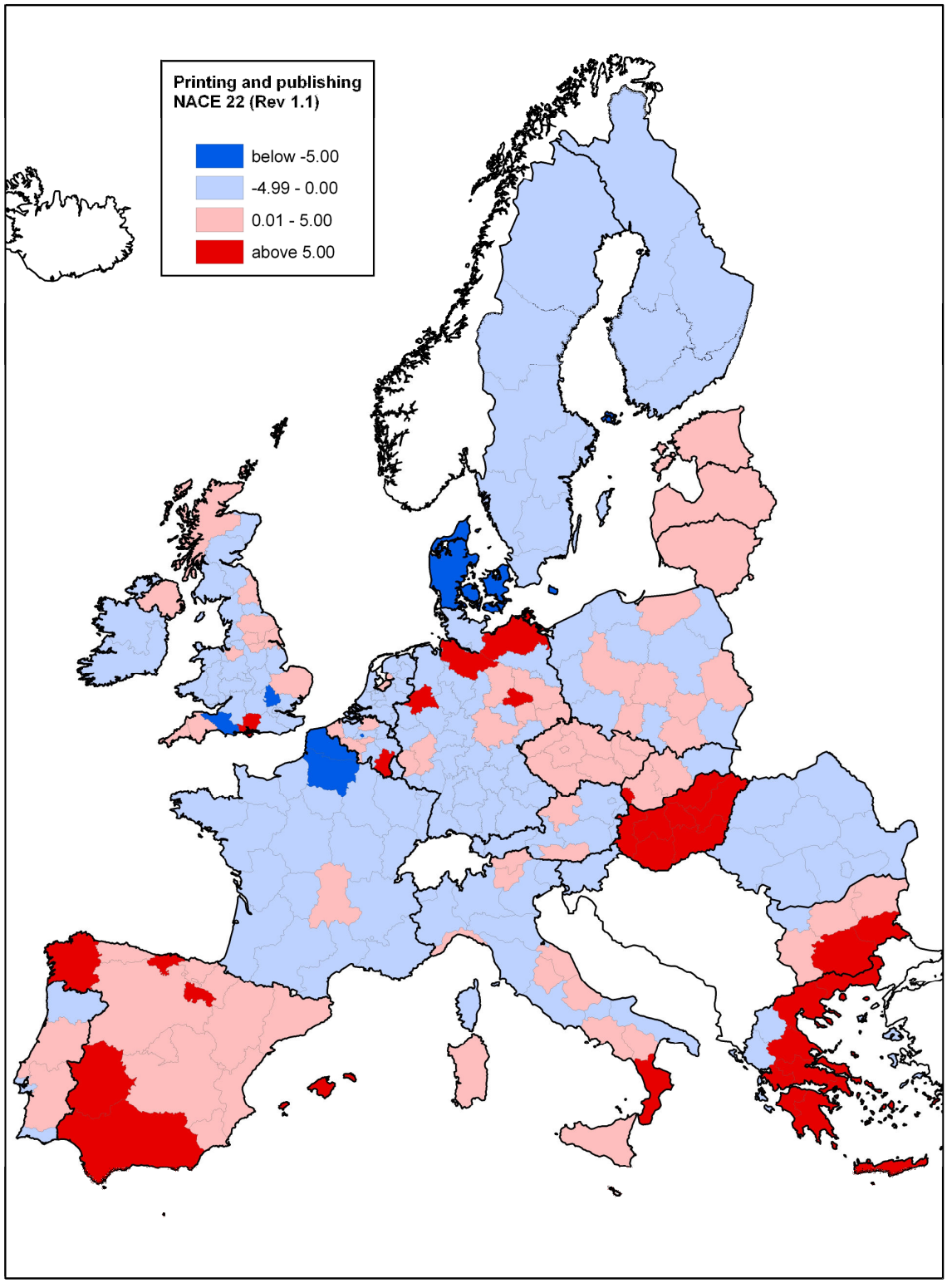
Employment in the printing, publishing, and recorded media industry

Total employment in the printing, publishing, and recorded media industry in 2006 amounted to 1.91 million jobs, which is equivalent to 0.87% of overall EU employment and 5.54% of EU manufacturing employment. 854 thousand of these jobs were in publishing, and 1,053 thousand in printing and recorded media (see also Table 3.1).[1] Between 2000 and 2006 employment in the EU-27 decreased with on average 0.5% per annum. Employment in the EU-15 decreased stronger, but its overall share is still dominant with 84%. Growth in the new Member States (NMS), however, is quite remarkable with an annual average increase of employment of 3.3%. This has led to an increase of the share of the NMS in the overall industry's workforce in the EU from 13 to 16%.

Regional specialisation patterns in employment are shown in Figure 3.2 and 3.3. Figure 3.2 shows the annual employment changes per region in the EU between 1999 and 2005 by on NUTS 2 region. What the figure clearly shows is not only a specialisation of countries within the EU, but also *within* countries. Regions that have a low specialisation in the sector are regions in Eastern and Southern Europe. The printing and publishing sector is a fairly important sector in terms for employment for most regions across the EU. Employment is most concentrated in a number of geographical clusters, predominantly located in the west of Germany, France, Belgium and Northern Italy. On the other hand, Denmark, the UK Sweden and Finland show high levels of specialisation based on employment.

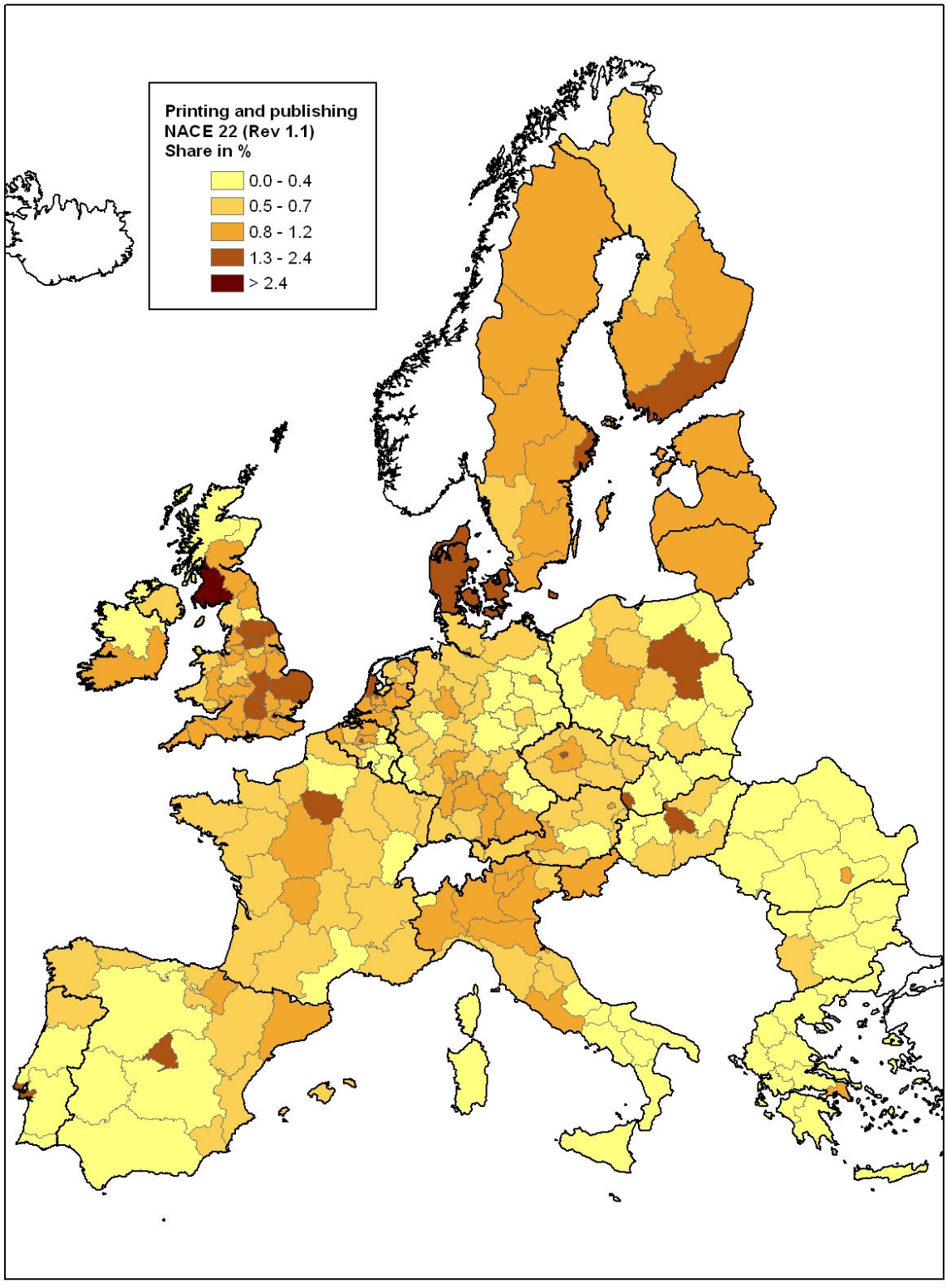
[1] Throughout this report employment is measured in working persons and concerns both employers and employees.

Figure 3.1 Changes in employment in the EU printing, publishing and recorded media industry by region, 1999-2005 (annual % change)



Source: TNO/Eurostat

Figure 3.1 Vertical shares: employment in the EU printing and publishing sector as a share of total employment by NUTS 2 region, 2006



Source: TNO/Eurostat

Table 3.1 Employment in the EU printing, publishing, and recorded media industry, 2000-2006

	Level 2006	Annual growth	Share in EU	Change in share
EU	1 907	-0.5	100	0
EU 15	1 599	-1.2	84	-3
NMS	308	3.3	16	3
Winning	461	1.7	24	3
Losing momentum	534	-2.8	28	-4
Upcoming	418	2.8	22	4
Retreating	494	-1.9	26	-2
Definition	Level (*1000) 2006	Average annual growth[2] (%) 2000-2006	Share in EU employment sector (%) 2006	Change in share in EU employment sector (%) 2000-2006

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

Source: Eurostat/TNO. NMS: new Member States. GDP: Gross Domestic Product.

The lower part of Table 3.1 provides a classification of the EU Member States based on the relative strength of their printing, publishing, and recorded media industry in terms of employment based on data covering the period 2000-2006.

Winning, with a high and increasing concentration index, are Germany, Latvia, and Hungary. This group of countries turn away from the general European trend and saw an increase in employment by the printing, publishing, and recorded media industry of 1.7% annually. Countries in decline regarding printing and publishing are the Netherlands, the UK, Slovenia, and the Scandinavian countries Denmark, Finland, and Sweden. These countries face an above average annual decline of -2.8%, signalling a strong restructuring process. Their share in employment in EU-27 decreased with -4 percent points.

The upcoming countries are concentrated in Southern Europe (Spain, Portugal), Eastern Europe (Poland, Czech Republic, Bulgaria, Estonia, and Lithuania), and Austria. Their increase in employment (+2.8% annually) is on a higher level than in the group of winning.

[2] Note that due to missing data the EU is an approximation of the EU-27 only. GDP and trade data was not available for Bulgaria, Romania, Cyprus, Malta and Latvia. Cyprus and Malta lacked data on employment. This applies to tables 3.2 and following. The list of winning, losing momentum, upcoming, retreating (see subsequent tables in text) indicates for which countries data was available. Throughout this report, a change in volume or absolute number between two years - e.g. the number of jobs - is measured as the *average annual growth*. Similarly, a change of a share or an index is measured as *total change* over the entire period. That is, if the share in 2000 was 10% and in 2006 15%, we report a change of share of 5%.

Table 3.2 Employment in the EU publishing industry, 2000-2006

	Level 2006	Annual growth	Share in EU	Change in share
EU	854	0.3	100	0
EU 15	734	0.3	86	0
NMS	120	0.5	14	0
Winning	396	1.5	46	3
Losing momentum	104	-3.2	12	-3
Upcoming	290	1.5	34	2
Retreating	65	-4.4	8	-3

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:** Germany, United Kingdom, Estonia			**Upcoming:** Spain, Austria, Portugal, Bulgaria, Czech Republic, Estonia, Lithuania, Poland	
Decline	**Losing momentum:** Netherlands, Denmark, Finland, Sweden			**Retreating:** Belgium, Greece, Czech Republic, Romania, Slovenia, Slovakia	

Source: Eurostat/TNO. *Note*: Not included are Luxembourg, Cyprus, Malta, and Latvia due to lack of data.

Box 1. 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*.

Countries that show a trend of retreating from the printing and publishing industry are old EU Member States like Belgium, Greece, France, Luxembourg, and Ireland (the latter despite a strong growth between 1995 and 2000) as well as NMS like Malta, Cyprus, Slovakia, and Romania. Their loss of employment (on average -1.9% per annum) is slower than in the countries that are losing momentum.

In the next paragraphs we will look at employment trends in the publishing industry (NACE 221) and the printing and recorded media industry (NACE 222 and 223) separately, as there are significant differences between the two.

Publishing industry

Like in the previous section, a classification has been made of the EU countries in terms of relative strength of their publishing industry. The result of this exercise is provided in Table 3.2. To a considerable extent this classification differs from the classification of the printing industry (see further Table 3.3), revealing different development patterns between the two.

Total employment in the publishing industry in the EU-27 yielded some 854,000 in 2006 and has grown with an average of 0.3% per annum between 2000 and 2006 (see Table 3.2). In the NMS this growth has been only slightly higher than in the EU-15. However, these moderate average growth figures hide strong differences between Member States, which is revealed when clustering member countries on the basis of the relative strength of their publishing industry.

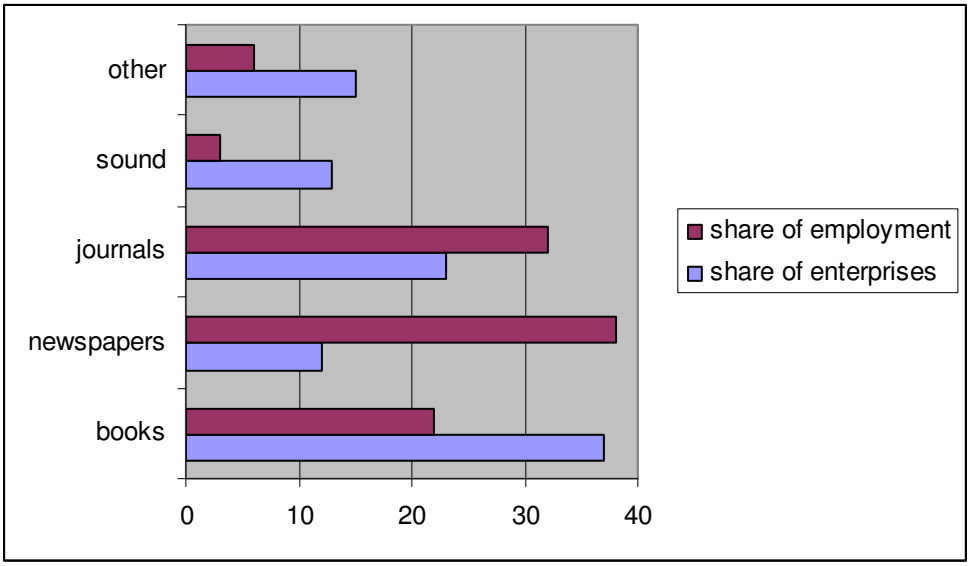
The winners in the publishing industry are Germany, the United Kingdom, Estonia, and Latvia. Their employment growth (+1.5%) outnumbers the EU-27 annual average, causing an increase of share of 3 percent points. These countries are able to use their competitive advantages even in an increasing competitive global market for printed products.

The upcoming countries show an identical relative growth of employment. This can be seen both in the older EU members (France, Italy, Ireland, Spain, and Portugal) and in the NMS (Poland, Hungary, Bulgaria, and Lithuania).

In countries losing employment in the publishing industry, the decline is relatively strong. The publishing industry is labeled ‘losing momentum’ in the Netherlands, Finland, Sweden, and Denmark. In these countries the publishing industry has lost 3.2% of jobs per annum between 2000 and 2006. It has diminished their share in employment in the EU publishing industry from 15% in 2000 to 12% in 2006. The countries retreating from the publishing industry did not have a strong position in publishing to begin with and are losing their position even further, with an annual average loss of employment of -4.4% (Belgium, Greece, Czech Republic, Romania, Slovenia, and Slovakia). Their share has dropped from 11% in 2000 to 8% in 2006.

Figure 3.3 provides a further breakdown of the publishing sub-sector in terms of shares of enterprises and employment by category. The largest share of companies is active in the publication of books (37%) and journals (23%). However, in terms of employment the publication of newspapers is the largest activity, representing 38% of employment. The sound and other publications have a great deal of enterprises, but a low employment share, which means that these are mostly smaller companies.

Figure 3.3 Breakdown of the EU publishing sector, 2005



Source: Eurostat Industry, Trade and Services database (2008).

Printing and recorded media industry

As in the previous section, a classification of EU Member States has been made in terms of relative performance of their printing and recorded media industry in employment. The results of this exercise are provided in Table 3.3. To a considerable extent this classification differs from the publishing industry, revealing different development patterns between the two.

Total employment in printing and recorded media in the EU-27 stood at slightly more than a million in 2006. However, employment in these industries is declining rapidly for the EU-27 as a whole (on average a decline in employment of 1.2% per annum between 2000 and 2006). Without exception, all the older Member States are losing ground (on average a decline in employment of 2.3% per annum between 2000 and 2006). This contrasts sharply with the increase of jobs in the NMS. These countries report an annual growth of employment in printing and recorded media of 5.3% over the same period. The shift in share between the EU-15 and the NMS of 6 percentage points over the period 2000-2006 is quite remarkable.

Winning, with already a strong position and growth, are the Czech Republic and Hungary. Their share in employment more than doubled. The upcoming countries are Bulgaria, Romania, Poland, and the Baltic area (Estonia, Latvia, and Lithuania). Average growth in employment in these countries has been 3.6% per annum over the period 2000-2006. Except for Slovakia and Slovenia, all NMS fall in the winning and upcoming categories. Regarding the printing and recorded media industry these countries clearly show a catching up with the rest of Europe.

Table 3.3 Employment in the EU printing and recorded media industry, 2000-2006

	Level 2006	Annual growth	Share in EU	Change in share
EU	1 053	-1.2	100	0
EU 15	865	-2.3	82	-6
NMS	188	5.3	18	6
Winning	72	11.2	7	3
Losing momentum	701	-1.9	67	-3
Upcoming	106	3.6	10	2
Retreating	173	-4.0	16	-3

Definition	Level (*1000) 2006	Average annual growth (%) 2000-2006	Share in EU employment sector (%) 2006	Change in share in EU employment sector (%) 2000-2006

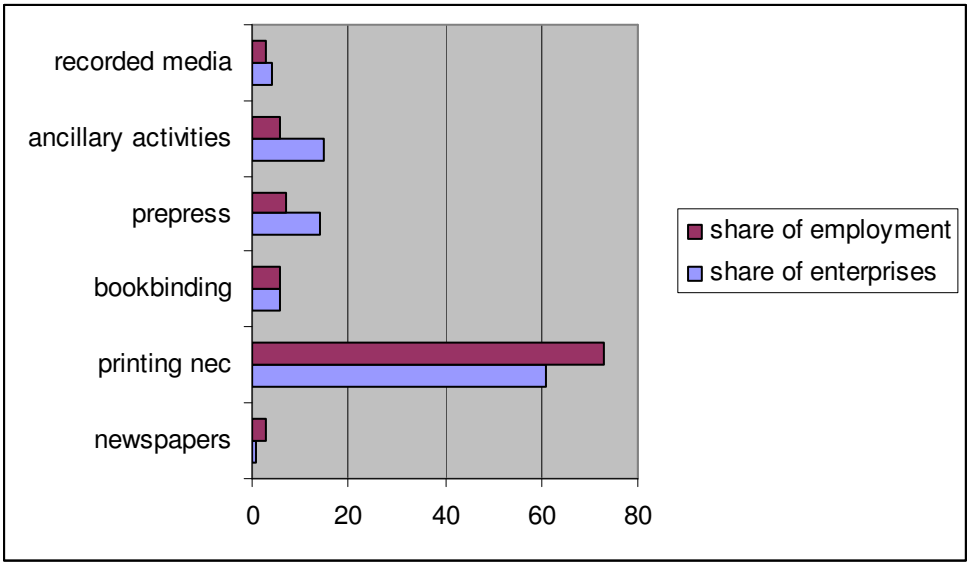
	Concentration >100	Concentration <100
Growth	**Winning:** Czech Republic, Hungary	**Upcoming:** Bulgaria, Estonia, Latvia, Lithuania, Poland, Romania
Decline	**Losing momentum:** Belgium, Germany, Italy, Netherlands, Ireland, Spain, Portugal, Finland, United Kingdom, Slovenia	**Retreating:** France,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

Source: Eurostat/TNO. *Note*: Not included are Luxembourg, Cyprus, and Malta due to lack of data.

The printing and recorded media industry in the older Member States is more mature and, due to international competition and shifting media consumption, is losing jobs. Countries with a relatively strong position have lost 1.9% of employment annually. This counts for a large group of countries consisting of Belgium, Germany, Italy, the Netherlands, the United Kingdom, Ireland, Spain, Portugal, Finland, and Slovenia. Countries with a relatively weak position lose jobs even faster, with an annual job loss of 4%. In this category we find France, Greece, Denmark, Sweden, Austria, and Slovakia.

The activity 'printing n.e.c' (i.e., journals, periodicals, books, promotional, packaging and other) is by far the largest in terms of employment (73%) and number of enterprises (61%). Companies dealing with pre-press and ancillary activities have a share of 14% and 15% respectively, although they only employ 7% and 6% of the printing workforce (Figure 3.3).

Figure 3.3 Breakdown of the EU printing and recorded media industry, 2005



Source: Eurostat Industry, Trade and Services database (2008).

The activity printing n.e.c. is the main printing activity and can be broken down further into subdivisions such as by product category, which contains books, newspapers, catalogues, advertising material and commercial or promotional. The largest segments in the printing industry are packaging printing (30% of production value in 2005), Advertising (17% of production value in 2005). Magazines and books contain 11% and 6% of 2005 production value, while catalogue, newspaper and commercial printing all had a share of roughly 4.5% of the printing production value in 2005 (CEC, 2007a).

Commercial printing is also described as general printing producing promotional matter (brochures, leaflets etc.), business stationery and business forms. These companies are generally small, family owned and serve a local business market. Because flexibility if key they employ off-the-shelf print technology. In many cases the small printing companies are under-capitalised (EMCC, 2003d).

Printers of books, security printing and printers of high quality or unusual promotional work requiring special machinery are usually small to medium sized printers serving a national market. These companies provide technically innovative but also specialized services. Most are dependent on large clients and their ability to retain these clients (EMCC, 2003d).

Finally, magazines and large catalogues printed by heat set web, offset or gravure and other specialized products are printed by larger companies. Most are technically innovative and compete internationally, providing low unit costs, achieved through economies of scale (EMCC, 2003d).

Value added in printing, publishing and recorded media industry

Like in the previous section, the value added data are presented for groups of EU countries in two ways: (i) a breakdown by old and new EU Member States; and (ii) a classification of the EU Member States in terms of the relative strength of their printing, publishing, and recorded media industry in terms of value added.

Table 3.4 Value added in printing, publishing and recorded media, 2006 and 1995-2006

	Value added		Share in country		Share in EU	
	Level	Change	Level	Change	Level	Change
EU	124.8	2.2	1.1	0.0	100	0
EU 15	120.6	2.2	1.1	0.0	97	0
NMS	4.2	2.1	0.7	-0.2	3	0
Winning	22.8	10.2	1.7	0.7	17	9
Losing momentum	38.5	1.2	1.5	-0.2	31	-2
Upcoming	20.6	3.1	0.8	0.1	16	1
Retreating	42.9	0.2	0.9	-0.2	35	-7
Definition	Value added billion euro 2006	Annual average growth 1995-2006	Share in national GDP 2006	Total change in share 1995-2006	Share in value added sector EU 2006	Total change in share 1995-2006

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

Source: Eurostat/TNO. *Note*: No data available for Luxembourg, Bulgaria, Romania, Cyprus, Malta, and Latvia.

Value added in the EU-27 in printing, publishing, and recorded media totalled about € 125 billion in 2006 (Table 3.4). The EU-15 provided for 97% of the industry's value added. Focusing on the geographical distribution of the development of value added, we see that the annual increase for the period 1995-2006 in the EU-15 nearly equals the increase in the NMS. However, the over time growth pattern reveals significant differences between the EU-15 and the NMS (Table 3.5). In the EU-15, value added grew with an annual average of 3.4% during the period 1995-2000 and with 1.3% during the period 2000-2006. In the NMS, these figures were respectively 5.3% and -0.6%. This shows a vulnerability of the printing and publishing industry in the NMS.

More alarming is the fact that two-thirds of value added in printing, publishing and recorded media is generated in countries losing momentum or even retreating. In both groups of countries printing and publishing industry performs worse than the overall economy.

Table 3.5 Timeline of value added in printing, publishing and recorded media compared to overall economy, 1995-2006

	Printing, publishing and recorded media				Overall economy			
	Value added	Annual growth 95-00	Annual growth 00-06	Annual growth 95-06	Value added	Annual growth 95-00	Annual growth 00-06	Annual growth 95-06
EU-27	124.8	3.4	1.2	2.2	11,469.0	2.8	2.0	2.3
EU-15	120.6	3.4	1.3	2.2	10,883.2	2.8	1.9	2.3
NMS	4.2	5.3	-0.6	2.1	585.7	2.7	3.7	3.2
Winning	22.8	12.4	8.3	10.2	1,326.2	4.8	3.5	4.1
Losing momentum	38.5	2.4	0.3	1.2	2,668.3	3.5	2.3	2.8
Upcoming	20.6	3.4	2.9	3.1	2,471.6	1.9	1.3	1.6
Retreating	42.9	2.3	-1.5	0.2	4,968.9	2.4	1.7	2.0
Definition	Value added in billion euros 2006	Annual growth rate 95-00 (%)	Annual growth rate 00-06 (%)	Annual growth rate 95-06 (%)	Value added in billion euros 2006	Annual growth rate 95-00 (%)	Annual growth rate 00-06 (%)	Annual growth rate 95-06 (%)

Source: Eurostat/TNO

Exports, imports and trade balance in printing, publishing and recorded media

Tables 3.6 and 3.7 show that both exports and imports of printing, publishing and recorded media industry are increasing. The traditional situation that printing and publishing industries only serve home markets, does no longer exist. The growth in export is especially remarkable for the NMS, whereas Germany and Austria still stand out as winners in the EU-15.

Table 3.6 Exports EU printing, publishing and recorded media, 1995-2006

	Level	Change	Share	Change
EU	44.8	5.2	36	7
EU 15	42.5	4.9	35	6
NMS	2.3	15.5	55	32
Winning	19	10.3	70	35
Losing momentum	7.5	2.1	92	-280
Upcoming	5.3	6.7	27	4
Retreating	13	1.8	19	0
Definition	Export in billion euro 2006	Annual change % 1995-2006	Exports divided by value added (%) 2006	Total change % 1995-2006

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

Source: Eurostat/TNO. *Note*: No data available for Luxembourg, Bulgaria, Romania, Cyprus, Malta, and Latvia.

Table 3.7 Imports printing, publishing and recorded media, 1995-2006

	Level	Change
EU	28.4	5.1
EU 15	26.6	4.9
NMS	1.8	9.0
Winning	18.6	7.2
Losing momentum	3.7	4.2
Upcoming	0.6	13.3
Retreating	5.5	0.4
Definition	Imports in million euro, 2006	Annual change (%), 1995-2006

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

Source: Eurostat/TNO. *Note*: No data available for Luxembourg, Bulgaria, Romania, Cyprus, Malta, and Latvia.

Table 3.8 shows the trade balance for groups of countries. The trade balance for EU-27 is positive: the export exceeds import by € 16.4 billion. The revenues for 97 percent flow to EU-15, the group of countries generating 97 percent of value added. Looking at the absolute changes between 1995 and 2006, especially the development of the new Member States draws attention: the negative trade balance turned into a positive one.

Grouping the countries according to their performances, one country draws attention. The United Kingdom is, regarding its trade balance in printing and publishing, the only country at risk with a loss of more than € 900 million compared to the situation in 1995. This indicates a shift of production to Ireland, considering the fact that the printing industry in Ireland and the UK serve the same language area and home market. The upcoming countries (Greece, Sweden and Lithuania) improved their trade balance by € 176 million, resulting in a less negative trade balance than in 1995. The retreating countries (France, Denmark, Finland, Portugal, Hungary) saw their common trade balance in printing and publishing worsen, and nearly doubled their negative position. A large group of countries however, can be considered winners when looking at their printing and publishing trade balance. This group already had a positive trade balance and improved their position further.

Table 3.8 Trade balance publishing, printing and recorded media industry, 1995-2006

	Trade balance	1995-2006
EU 27	16 352	5 240
EU 15	15 892	4 694
NMS	460	546
Winners	17 705	7 054
At Risk	831	-918
Upcoming	-285	176
Retreat	-1 899	-1 072
Definition	Million Euro 2006	Absolute change

	Concentration >100	Concentration <100
growth	***Winners:*** Belgium, Germany, Italy, Luxemburg, Netherlands, Austria, Ireland, Spain, Czech Republic, Estonia, Poland, Slovenia, Slovakia	***Upcoming:*** Greece, Sweden, Lithuania
decline	***At Risk:*** United Kingdom	***Retreat***: France, Denmark, Finland, Portugal, Hungary

Source: Eurostat/TNO. *Note*: No data available for Luxembourg, Bulgaria, Romania, Cyprus, Malta, and Latvia.

Table 3.9 represents an analysis of the trade balance in printing and publishing as compared to the total trade balance. Scores may vary from -100 (no contribution of the industry to the national trade balance) to +100 (full contribution of the industry to the trade balance). These scores reveal the comparative advantage of the industry in international trade. In EU-27 the printing and publishing industry reveal a moderate comparative advantage, with only modest change between 1995 and 2006. The new Member States however, show a large improvement of their comparative advantage in printing and publishing in this period.

The group of countries at risk in terms of comparative advantage do not only comprise United Kingdom, but also Ireland and Slovakia. This has to be understood that the importance of printing and publishing in the Irish (and Slovakian) trade balance is declining. Nevertheless they still reveal the highest comparative advantage. The group of countries retreating (France, Denmark, Finland, Portugal, Hungary) already showed low scores on comparative advantage for printing and publishing, and the industry lost ground further. Upcoming countries (Sweden, Lithuania) improved their comparative advantage in printing and publishing. A large group of winners already had high scores for comparative advantage of their printing and publishing industry, and managed to improve these scores: Belgium, Germany, Italy, the Netherlands, Austria, Greece, Spain, Czech Republic, Estonia, Poland and Slovenia.

Table 3.9 Revealed comparative advantage, 2006, and absolute change, 1995-2006

	Revealed comparative advantage	1995-2006
EU 27	42	3
EU 15	43	2
NMS	23	57
Winners	48	26
At Risk	69	-15
Upcoming	-48	13
Retreat	-34	-10
Definition	*2006*	*Abs. change*

	Concentration >100	Concentration <100
growth	***Winners:*** Belgium, Germany, Italy, the Netherlands, Austria, Greece, Spain, Czech Republic, Estonia, Poland, Slovenia	***Upcoming:*** Sweden, Lithuania
decline	***At Risk:*** United Kingdom, Ireland, Slovakia	***Retreat***: France, Denmark, Finland, Portugal, Hungary

Source: Eurostat/TNO. *Note*: No data available for Luxembourg, Bulgaria, Romania, Cyprus, Malta, and Latvia.

3.2 Employment structure and work organisation

Work organisation

The number of firms in the printing, publishing, and recorded media industry totals about 217.000 for the EU-27. The EU-15 Member States have a share of 79% in the number of firms. In the EU-15 however, the growth in the number of firms is low compared to that in the new Member States (+1.9% compared to +9.4% between 1999 and 2005). This difference in growth has also led to a change in share of EU-15 and new Member States. The overwhelming majority of the firms in the industry have less than 50 employees (Table 3.10). In the NMS the share of small enterprises is even slightly higher. Only 0.4% of the firms in the EU-27 in printing, publishing, and recorded media employ more than 250 people.

Gender and age

Regarding the gender distribution the majority of employees in printing, publishing and recorded media is male (59 percent in EU25). The differences between groups of countries are very modest. The only exception is the new Member States, where the share of female workers is larger (46 percent compared to 41 percent in EU25). The share of female workers has increased in the older Member States and has decreased in the newer ones. Regarding age distribution, we find that in the old Member States the majority of employees (51 percent) are over 40. The workforce in the older Member States clearly shows its ageing problem: the share of younger employees has decreased by 4 percent point since 2000, while at the same time the share of employees over 50 years has increased by 3 percent point. The largest share of youngsters can be found in the new Member States (58 percent of employment). In the new

Member States the share of youngsters increased by 9 percent point. In the old Member States (EU-15) the share of part-time workers in the industry is four times as high as in the NMS.

Table 3.10 Printing, publishing and recorded media: share and change in shares in number of firms, sorted by firm size, year 2005 and period 1999-2005

	2005	growth	<50 employees	50-249 employees	>250 employees	share	change in share
EU-27	217	3.2	97.6	2.0	0.4	100	0
EU-15	171	1.9	97.5	2.1	0.4	79	-6
NMS	46	9.4	98.2	1.6	0.2	21	6
Winner	49	1.0	98.2	1.5	0.3	23	-3
At Risk	69	2.3	97.6	2.1	0.4	32	-2
Upcoming	39	17.5	98.3	1.5	0.2	18	10
Retreat	59	1.4	96.6	2.8	0.5	27	-3
Definition	Number of firms *1000	Average annual growth 1999-2005 (%)	Share in number of firms 2005 (%)	Share in number of firms 2005 (%)	Share in number of firms 2005 (%)	Share in total number of European enterprises (%)	Change of share in EU 1999-2005

Source: Eurostat/TNO. * employers and employees

Table 3.11 Employment by education, age and gender, 2000-2006

	EU		EU 15		NMS	
	Level	Change	Level	Change	Level	Change
Women	41	2	40	2	46	-5
Age < 40	52	-3	50	-4	58	9
Age 40 – 50	25	0	26	1	22	-8
Age > 50	24	2	24	3	20	-1
Low education	22	-5	25	-4	5	-3
Mid education	50	1	47	-2	67	10
High education	28	5	28	6	27	-7
Full-time	86	n.a.	84	n.a.	96	n.a.
Definition	Level % 2006	Total change % 2000-2006	Level % 2006	Total change % 2000-2006	Level % 2006	Total change % 2000-2006

Source: Alphametrics/Eurostat/TNO.

3.3 Employment - main trends by job function

One of the most interesting indicators for analysing the future on jobs and skills 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, using Labour Force Survey (LFS) data.[3] In the second part (the scenario-based future-oriented part), 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: state-of-play and main changes

The grouping of the EU countries into winning, losing momentum, etc. used in this section is based on that of the relative strength of employment in the printing, publishing, and recorded media industry presented in the previous tables.

Using the occupational distribution of employment (Table 3.12), it is possible to draw the following profile of the workforce of industries in countries losing momentum (i.e., Netherlands, Denmark, Finland, Sweden, United Kingdom, and Slovenia):

- The share of managers is above the EU-27 average;
- The share of service workers is above the EU-27 average;
- The share of engineers and technicians is below the EU-27 average; and
- The share of craftsmen, operators, and labourers altogether is below the EU-27 average.

In these countries the industries seem to suffer from a relatively large overhead (management and service workers), whereas the operating workforce has been reduced. However, countries in which the industry is losing momentum do not have an over time trend in occupational distribution that deviates from the European average.

[3] Data on occupational structure follow the availability of overall employment figures presented earlier.

Table 3.12 Occupation shares in printing, publishing and recorded media, 2006

	EU 15	NMS	EU	Winning	Losing momentum	Upcoming	Retreating
Managers	11	8	10	8	16	8	10
Computer professionals	2	4	4	2	3	3	2
Engineers, technicians	3	4	3	2	1	4	5
Business professionals	5	6	5	3	7	8	3
Other professionals	25	22	25	24	24	22	28
Office clerks and secretaries	11	9	10	12	11	9	10
Service workers	3	2	3	1	6	2	1
Craft printing and related trades	18	19	18	20	14	21	20
Other craft and trades workers	1	2	2	2	1	2	2
Printing, binding, paper machine operators	7	14	8	2	5	14	11
Other plant and machine operators	3	4	3	3	3	4	5
Labourers	11	4	10	22	9	4	3

Source: Eurostat/TNO. *Note*: Country groupings are based on employment.

Table 3.13 sheds further light on the trends in employment in the four groups of countries by differentiating by educational level (Low, Medium, and High) and focusing on the change in education level over time (2000-2006). In the upcoming countries the shares of low educated personnel in all occupations (except computer professionals) diminish; they are replaced by mid educated employees. This trend of losing low educated workforce can also be seen in other categories (retreating countries, and to a lesser extent in winning countries and countries losing momentum). The replacement, however, is strongest in upcoming countries. Remarkably industries in countries losing momentum also turn out highly educated employees, especially in operational functions. This is a way to lose innovative capacity. The upcoming countries, on the contrary, upgrade their workforce and thus add innovative capacity, even for operational functions.

Labour represents 29% of the costs of printed products (excluding investment depreciation) in the EU-15 (CEC, 2007). Work organisation and labour costs are the levers through which European printers and publishers are trying to improve their competitiveness. Labour costs are in particular under pressure in sectors such as pre-press and finishing, where they represent a higher share than in printing itself.

Traditionally in the publishing sector employees who work in a specific sub-sector used to stay within this sub-sector, except for advertising and sales (CEC, 2005b). However, within the online divisions of the companies this tendency is breaking down, as skills required in online publishing are more similar throughout the sub-sectors than was previously the case.

Table 3.13 Changes in the educational level of the workforce in printing, publishing, and recorded media industry, 2000-2006

Type of occupation	*Winning*			*Losing momentum*			*Upcoming*			*Retreating*		
	L	**M**	**H**	**L**	**M**	**H**	**L**	**M**	**H**	**L**	**M**	**H**
	(percentage change)											
Managers	0	8	-8	1	-9	7	-5	3	2	0	2	-2
Computer professionals	3	-3	-1	1	-9	8	4	-13	9	8	-27	19
Engineers. Technicians	-4	-1	5	-8	4	4	-11	18	-7	-3	-2	5
Business professionals	-5	-22	27	3	2	-6	-15	-7	22	-6	-26	32
Other professionals	-3	0	3	-4	-3	8	0	0	0	4	-4	1
Office clerks and secretaries	1	0	-1	3	-6	3	-14	15	-1	-3	-1	3
Service workers	13	-7	-6	6	-2	-4	-22	46	-24	4	-17	13
Craft printing and related trades	-5	4	1	-4	-2	5	-21	22	0	-6	2	4
Other craft and trades workers	7	1	-8	5	-2	-2	-11	13	-2	-25	11	14
Printing, binding, paper machine operators	-12	13	-1	-5	7	-2	-25	23	3	-16	13	3
Other plant & machine operators	-16	12	4	-12	17	-5	-25	27	-1	-23	21	2
Labourers	10	-6	-3	-23	24	-1	-23	21	1	-15	14	2
Total	1	-1	1	-3	-2	5	-17	12	4	-6	0	7

Source: Eurostat/TNO. Note: L, M, and H stands for a low, medium, and high level of education.

Employment is decreasing in the printing and publishing sector overall. This general trend hides a shift of employment from traditional production activities to new tasks. The decrease in employment takes place in a context of downward pressures on prices due to a concentration of buyers (for printers) and of decreased revenues from advertising (for publishers). Concentration is a way to reduce the costs by using economies of scale. This often implies plant closures and collective redundancies. To limit the social costs of such restructurings, employees often negotiate plans in which those leaving voluntarily are not replaced. This contributes to an increased age profile of the workforce. Continuing investment and automation of processes is expected to increase productivity and competitiveness, but also contributes to the decrease in employment. In fact, employment is decreasing in the production area and expanding in the non-production (or production support) area. New jobs are being created in association with online media in the publishing sector; in the printing sector, businesses which go further than just paper prints are the ones expected to create employment. This means that the skills requirements for workers in the printing and publishing sector are changing and expanding.

These changes in the structure of employment reflect the fact that, to remain competitive on the global market, European printers and publishers have to offer more and more diversity and flexibility to their clients. In the publishing sector, this means that companies have to find appropriate and sustainable ways to use Internet and without losing their revenue base, to develop electronic formats and means of communication, and to provide fast and flexible adjustment to changing needs of clients. For printing companies, this means that they can no longer attract clients only on the basis of prices and delivery times, but that they have to offer a diversity of services around the provision of printed goods, such as database management, a greater flexibility in the delivery of products, the ability to react quickly to changes in orders, etc. In this context, employers in the printing sector are trying to obtain increases in working time, reductions in overtime and shift rate premiums, and willing to employ more part-time and temporary workers. They are using shift work to fight overcapacity problems. Also in publishing, workers are asked to adapt to the ’24-hour society’ by being more and more

flexible. It seems important, however, to negotiate such flexibility arrangements within the framework of social dialogue, so as to limit the negative effects perceived by employees. This is all the more important since there is an interesting possibility for European printers to develop quality of work and the respect of environmental standards as a differentiation strategy on the global market, as a response to the increased ethical and environmental concerns of consumers.

With an ageing workforce the printing industry has difficulty recruiting young and/or qualified workers. On average in Europe, only 20% of workers in the graphic industry are under 26 (Gennard, 2006). An important share of graphic workers are 'baby boomers' and are going to retire in the coming years, creating an important replacement demand. Demand cannot easily be met by the graphic workers who are unemployed at present as a consequence of collective redundancies, because their qualifications often do not match the needs of employers (skills mismatch). There is a lack of qualified young people in the printing sector: not only do fewer young people choose for a technical education than before, but also the graphic industry is little attractive because of the decreasing employment trend. Also the number of apprenticeships available is decreasing (Kenniscentrum GOC, 2007). As a consequence of the will to increase flexibility, the share of part-time and temporary (or agency) workers is increasing (Gennard, 2006).

For the same reason, publishers also increasingly tend to use teleworking and freelance workers for prepress and multimedia operations (Danielson et al., 2004). The publishing sector is also undergoing important changes in its skills requirements: the workforce increasingly needs to be able to work with ICT and have marketing and business skills for the sector to remain attractive for customers. (EMCC, 2003b; Pira International, 2003).

In order to meet the new expectations of their clients and to overcome skill gaps and skill shortages, printers and publishers could apply more effective internal strategies as regards on the job training, a lifecycle approach, and employment possibilities for distinct and diverse population groups (women, young people, migrants, etc.) (Kenniscentrum, GOC 2007).

3.4 Productivity and labour costs

Apparent labour productivity (defined here as value added divided by the number of persons employed) for the European printing, publishing, and reproduction of recorded media industry was on average € 51,000 in 2004 (Table 3.14). This equals the European manufacturing average. Broken down per sub-sector, these figures were € 41,200 for printing, € 57,800 for publishing, and € 143,000 for reproduction of recorded media. Of these three sub-sectors, the wage-adjusted labour productivity (= apparent labour productivity / average personnel costs) of the reproduction of recorded media industry was especially high: 394%. This was the third highest wage adjusted labour productivity ratio recorded among all economic sub-sectors of the non-financial business economy (Eurostat, 2007). This is due to the fact that labour costs are low, while productivity is high. The wage-adjusted labour productivity of the other two sub-sectors was below the average of the non-financial business economy (183.2%). The wage adjusted labour productivity of the publishing sector, however, is slightly above the manufacturing average, but lower than the average of all European sectors. The Printing subsector has a rather low wage adjusted productivity, as well as a low apparent labour productivity. The labour costs are highest in the publishing sector.

Table 3.14 Apparent labour productivity and wage-adjusted labour productivity, 2004

Economic sector	Apparent labour productivity	Average personnel costs	Wage-adjusted labour productivity
Printing, publishing, and reproduction of recorded media	51.0	34.7	146.0
Printing and service activities related to printing	41.2	30.7	134.2
Publishing	57.8	39.2	147.4
Reproduction of recorded media	143.0	36.3	394.0
Total Manufacturing*	45.5	31	146.6
Total EU**	51.8	27.5	183.2
Definition	€ * 1000	€ * 1000	%

*Manufacturing includes all activities under D of NACE rev 1.1. **Total EU contains all sectors in the NACE rev 1.1 code, except financial services. *Source*: Eurostat (2007).

3.5 Industrial relations

Trade union membership has sharply decreased in the European Graphical Industry over the past decade or so. On the one hand, this is linked with the shift of employment from production to production-support functions. This creates an unfavourable trend for Union membership, because the production area is traditionally more unionized than the service industry. In addition, Trade Unions in the printing sector have difficulties recruiting young workers. The main causes of this phenomenon seem to be membership fees, a growing individualism among younger workers (who believe that they can better succeed through their own efforts rather than through committing themselves to a Union), and dissuasive practice from the employer's side.

Table 3.15 Trade Union Membership in the graphical industry in selected European countries, 1995 and 2006

Country	Membership		Fall in membership 1995-2006		Membership density	
	1995	2006	Absolute	Percentage	1995	2006
France	50	22	-28	-56	14	7
Germany	140	90	-50	-36	70	56
Italy	50	20	-30	-60	40	21
Netherlands	36	29	-7	-19	55	64
Spain	16	10	-6	-38	20	15
United Kingdom	155	85	-70	-45	52	43
Norway	9	5	-4	-44	90	72
Sweden	35	23	-12	-32	88	77
Finland	25	15	-10	-40	83	75
Croatia	13	5	-8	-62	50	38
Czech Republic	5	1	-4	-80	33	4
Hungary	7	2	-5	-71	47	25
Definition	(thousands)	(thousands)	(thousands)	%	%	%

Source: Gennard (2006)

Mergers and acquisitions often result in problematic situations for the European Works Councils (EWC).[4] Employers do not always adapt the structure of the EWC to the new corporate structure, or they attempt to weaken the position of employee's representatives following the acquisition. They sometimes omit to consult the EWC on re-structuring following the acquisition. Similarly, EWC are not always sufficiently and timely informed about transfers of work and investment from one production location to another.

It is important for the European printing and publishing sector to recognize the important role that Trade Unions can play. In a context of evolving technology, the management of human resources is crucial. If the negotiation balance is not favourable, there is a risk that employees adopt a more defensive than pro-active attitude. This would be detrimental to a good working climate, to the development of new skills, and therefore to productivity and competitiveness.

3.6 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, p. 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 further improvement of governance in the fields of entrepreneurial innovation, cluster management, innovation financing are promoted at all levels – from the local to the regional, the national and the EU level as well as across sectors. Partnerships for innovation, skills and jobs, in connection with technology platforms, industrial high level groups, as well as lead market and cluster initiatives are being promoted at both European and national level.

Existing partnerships for innovation, skills and jobs generally show a number of characteristics, which include:

- *Involvement of all relevant actors,* ranging from companies, research organisations, education and training institutes to public administration and others.
- *Cross-sectoral approach:* even though partnerships may be assigned to a specific sector, they often work across different business sectors.
- *Cross-thematic approach, i.e.* linking innovation, skills and jobs.
- *Inclusion of general human needs into the partnership strategy:* human needs, such as housing, health or mobility can be part of the formulated partnership vision or strategy
- *Long term commitment of actors (members).*
- *Joint problem solving,* i.e. working on problems that cannot be met by one member alone
- *European dimension,* i.e. being established at the European level.

4 The Works Council Directive (94/45/EC) applies to companies with 1,000 or more employees, including at least 150 in two or more Member States. It gives employees the right to information and consultation on company decisions.

Partnerships for innovation, skills and jobs can create a leverage effect for innovation, especially if broader *general human needs* are taken into consideration.[5] For instance, partnerships in the tourism sector aiming at developing 'leisure' should combine knowledge in tourism with, e.g., culture, sports 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.[6] It is likely to find more inclusive partnerships on the national and regional level.

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 job 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 similar barriers and 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, are 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.
- *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 for innovation, skills, and jobs in the printing and publishing sector

The printing and publishing sector with its different branches, publishing of pre-printing activities, printing newspapers, books, and software publishing is quite heterogeneous. Hence, at the European level, no partnerships comprising all branches could be found. Even in the

[5] 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.

[6] Outside the scope of the current series of studies, there is at least there is one good example, the European Construction technology platform (see http://www.ectp.org/default.asp).

different NACE sub-groups no real partnerships, networks, or clusters in the precise definition laid down in the proposal was found.

However, on a local level -the city of London- and on a global level there are two partnerships that might be examples for further study. The London partnership covering printing and publishing aims at business development and regeneration. The global partnership provides research on media technology and newspapers, thus supporting the modernization of business models in printed media.

The City Fringe Partnership (www.cityfringe.org.uk) is a good example for an inclusive regional partnership in the City of London focussing on several sectors including the printing and publishing sector. The partnership focuses on economic development and regeneration in northern and eastern London and comprises business actors of the sector, regional development agencies, public administration, education and training institutions, as well as financial institutions. The objectives of the partnership are to encourage growth of SMEs and to improve the labour market situation in specific industries. For this purpose a mid-term strategic action plan was set up between all members.

In the printing and publishing sector the main objectives are:

- to improve effective management and business development;
- to foster environmental sustainability;
- to improve job opportunities in the sector;
- to up-skill the existing workforce; and
- to build up additional networks of print firms within the area.

In the region of City Fringe the sector components are magazine, newspaper and book publishing, and book retailing. The partnership in printing and publishing is more focussed on skill development and job opportunities, the competitiveness of the sector, and regional development than on technological innovation. Process innovations are also of minor priority. The partnership is funded by means of the European Regional Development Funds.

IFRA, the International association for newspaper and media technology, is not a partnership or network in the precise meaning of the definition. It is also not only working in Europe, but it has a worldwide mandate. Members of IFRA are representatives of printing and publishing associations as well as newspapers. IFRA was set up to develop colour printing in newspapers between European partners. Now it serves as information hub for the newspaper technology, publishing organisation, process optimisation, and leads in co-operation with international working groups and R&D institutions research projects to gain knowledge and new insights about present and possible future developments in the sector.

In our context, the “Where News?” research project conducted by IFRA is of major interest. It was set up “...to predict changing media consumption in the coming 5, 10, and 15 years, which in turn will help newspapers formulate their business development strategies. The predictions will be based on analyses of developments in society, technology, and markets in the saturated newspaper markets.”[7] In the project researchers and practice experts from IFRA jointly develop scenarios of publishing and develop further steps for adapting the sector.

7 http://www.ifra.com/website/website.nsf/html/CONT_WHERENEWS?OpenDocument&WN&E&, (14.03.2008)

3.7 Conclusions

The number of employees in printing, publishing and recorded media amounts about 1.9 million, 55% of which are employed in printing and recorded media. Value added of printing and publishing totals € 125 billion in 2006, an average share of 1,1% in national economies. The industry shows a declining trend regarding employment, but sees a continuous rise of its number of enterprises and its value added.

Old Member States are dominant in terms of employment, firms and value added, but their performance is in sharp contrast with the new Member States:

* the number of employees in printing and recorded media industry in the older Member States is declining rapidly (-2.3% per annum between 2000 and 2006) whereas the number of jobs in the new Member States increases with 5.3% annually. However, the share of these new Member States in European printing employment is only 18%.

* the older Member States account for 97% of value added in European printing and publishing industry. The growth of value added in new Member States lies on a higher level but also appears to be more volatile, reacting quickly to economic cycles. More alarming is the fact that two-thirds of value added is generated in countries losing momentum or retreating. In these countries printing, publishing and recorded media industry performs worse than overall economy.

The increase in both import and export reveal the growing internationalization of printing and publishing. The labour productivity between sub-sectors in printing and publishing differs strongly. Labour productivity in printing lies below the industrial average and reflects the difficulties of the industry. In printing and publishing low educated personnel is reduced in favour of mid educated personnel. In the new Member States also high educated personnel is replaced by mid educated employees. Industries in countries losing momentum also turn out highly educated employees, especially in operational functions. This reinforces their loss of innovative capacity. The upcoming countries, on the contrary, upgrade their workforce and thus add innovative capacity, even for operational functions.

Unions face declining membership, making it more difficult to arrange social contracts when needed in times of restructuring. Partnerships, networks or clusters tackling the challenges on innovation, jobs and skills are rare. Partnerships are non-existent on a European level and covering all sub-sectors in printing, publishing and recorded media. However, on a local level -the city of London- and on a global level there are two partnerships that might be examples for further study. The London partnership covering printing and publishing aims at business development and regeneration. The global partnership provides research on media technology and newspapers, thus supporting the modernization of business models in printed media.

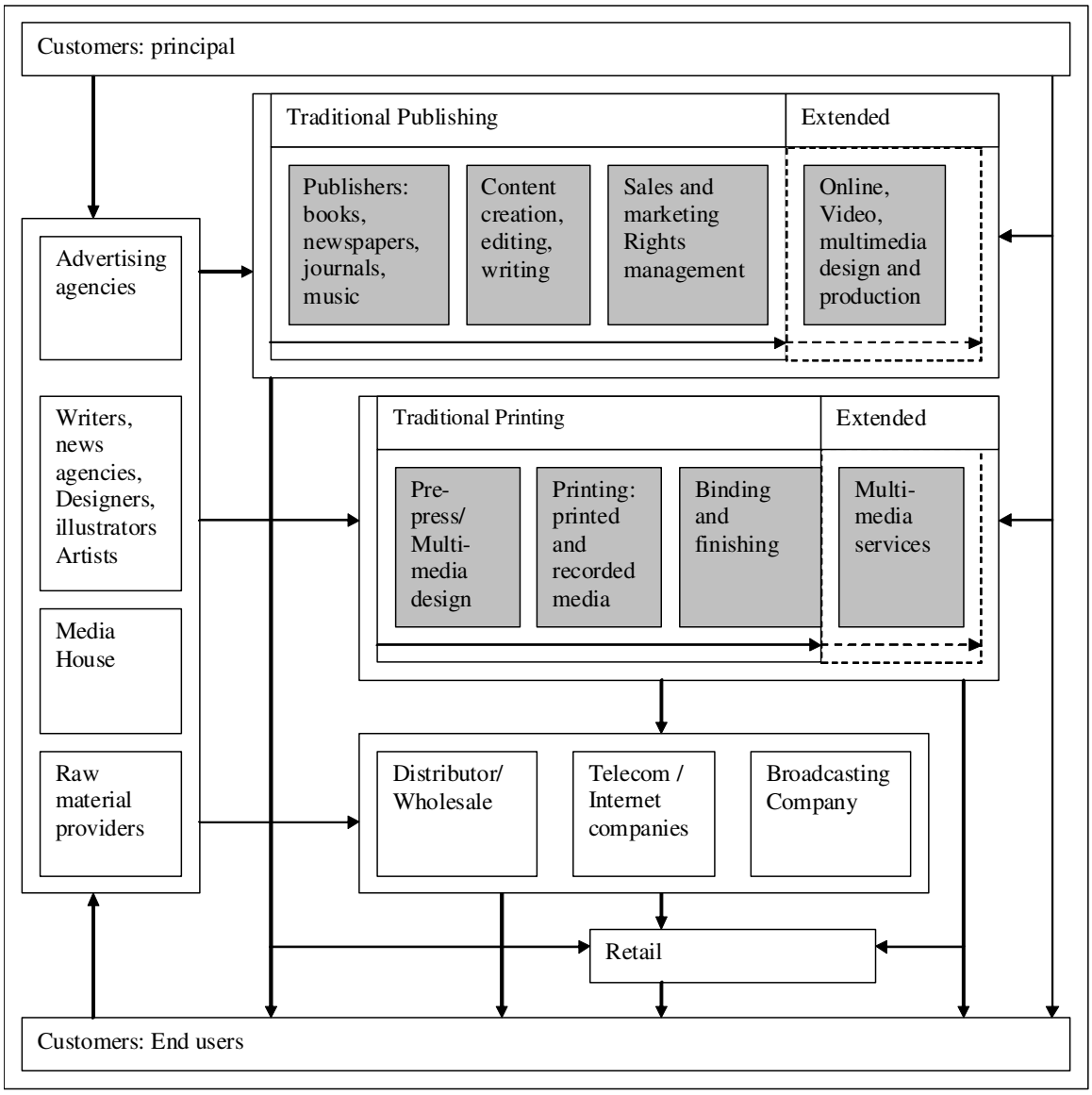
The number of firms in printing, publishing and recorded media is still increasing. The overwhelming majority of firms (98%) is smaller than 50 employees. The ageing of workforce is especially a problem for firms in the older Member States, where half of the workforce is now older than 40 compared to 42% in the new Member States. The industry structure in combination with ageing workforce and the lack of innovation networks raises questions about the adaptive capability to face growing international competition, technological development and socio-economic trends towards a digital society and ditto business environment.

4 Mapping and analysis of the value chain

4.1 Identification and analysis of the value chain characterising the sector

The printing and publishing sectors are traditionally closely related. Publishing companies take up about half the production of printed material (Leisink, 2002), as the printers' major clients, and printing and publishing are and have been inextricably linked in the value chain. This is especially the case for printers of newspapers, books and magazines. In some cases printing and publishing are even combined in one firm, as is still the case with many newspapers. Printing and publishing are also found as different business entities or subsidiaries within one and the same holding firm. For the majority of printers, especially for commercial, advertising, catalogue and packaging printers, the main customers are either businesses from other sectors or consumers.

Figure 4.1 Value network Printing and Publishing



A difference between newspaper and other publishing companies is that newspapers in most cases employ their own journalists and writers, while book and journal publishers rely on content provided by outsiders, who are remunerated based on their rights. In magazine publishing, however, many companies also employ their own writers. The value network of the printing and publishing sector is shown in Figure 4.1.

In recent years the ties between both sectors are diminishing, as printed material has become less important for the publishing companies. Moreover boundaries between publishers and other industries are beginning to blur, as publishers are diversifying their products and services. Also the printing sector is diversifying their product base, towards new multimedia services. This is depicted in the figure of the value network above, which shows both the traditional value chain, as well as the extended value chain. The dotted line represents the fact that not all companies have extended their services, which are mainly smaller niche players. One of the major effects of ICT on company structures has been the 'squeezing' out of companies providing prepress services (repro houses). The pre-press function has been absorbed both by publishers and designers who can now perform their own layout with DTP software, and by printers who have brought these services in-house (EMCC, 2003d).

A central element within the value network within the publishing and printing sector is that every sector in the value network has the possibility to deal directly with customers, without going through the whole value network. The most extreme is where principal consumers, through desktop printing, can directly supply printed material to other end users.

Another central element in the value chain is the advertising segment, here represented by the advertising agencies. Advertising agencies have had a strong impact on the development of new products and services, which for both the printing and publishing industry is driven by advertising possibilities. For instance, more than 50 to 60% of newspaper revenue comes from advertising (EMCC, 2003f). For some free newspapers only advertising drives revenue and poses considerable threats to subscription based newspapers. Moreover advertising industries have been organised around accounts, rather than different media, emphasising convergence of different media (EMCC, 2003e). Advertising is a highly pro-cyclical business. Usually the first expenses to be cut, but also the first to be taken up again.

The magazines, newspapers and communications sectors of print are very dependent on advertising. The print market share as a percentage of total advertising expenditure has been falling steadily since 1990, from around 62% in 1990 to 52% in 2001, to 40% in 2006, in favour of spending on radio, television and the internet. Internet advertising has increased from around 5% in 2005 and to around 7% in 2006 and is expected to grow up to 10% in 2008 (ZentihOptimedia, 2006). Overall, however, total advertising expenditure increased over the period 1990 to 2001 (EMCC, 2003e).

Diversification and integration

Globalisation, convergence of different information and communications markets, technological and demographic changes, and strategic efforts to increase competitiveness led publishing companies to diversify their products (Kranenburg et al, 2004). For the publishing industry diversification of the product range has led to various forms of downstream integration, such as vertical, horizontal, and diagonal integration of related and unrelated businesses. Most new services are centred on the core business, which means that one content base can be distributed through different channels. These channels include media such as internet, radio, and television.

The main economic reason for diversification and integration is that economies of scale play an important factor in publishing. Publications in any form can be disseminated at relatively low costs. Moreover by utilising more communication channels, also economies of scope can be achieved. Diversification can evolve by in-house development of new products and services, but also by means of mergers and acquisitions. In the 1990s a wave of mergers has shaped the publishing market (Kranenburg et al, 2004). In most cases, different services are placed within a subsidiary of a holding company.

The majority of publishing companies are not engaged in audiovisual services (EMCC, 2003) and diversification of services for many publishing companies relies on networks with other companies. Integration is most important for the larger corporations in the publishing sector. Especially German corporations have a large stake in other European countries in all segments (IFJ, 2005).

The largest media company in Europe is Bertelsmann. Bertelsmann owns BMG (Music publishing), Arvato (printing and CD and DVD production), Gruner + Jahr (printing and publishing of magazines and online publishing), Random house (world's largest consumer book publishing company), and has a stake in RTL (Broadcasting company). Other major companies active in Europe include: Lagadere (TV, film, newspapers, magazine, educational books), Axel Springer Verlag (newspapers, magazines, printing, TV), News Corporation (newspapers, books, pay-TV), Grupo Prisa (TV, radio, newspapers and magazines), Emap (magazines, radio, TV channel packaging), BBC (TV, books and magazines), Guardian Media Group (newspapers and radio), Schibsted (TV, newspapers, books, film production), Westdeutsche Allgemeine Zeitung (newspapers, magazines), and Vivendi (games, TV, music, film and magazine publishing) (IFJ, 2005; EMCC, 2003f).

Activities of the traditional publishing sub-sectors – like books, newspapers, magazines, and journals- have extended to information databases and overlap with databases and information provided by other book, magazine, and journal publishers. Magazine publishers, especially in the business-to-business market have extended their brand into directory publishing and exhibitions and conferences (CEC, 2003) Also the supply of content through broadband and mobile devices has become more important for various publishing sub-sectors. For book publishers retail networks are the major sales outlets (CEC, 2004a). Increasing concentration of retailers is putting pressure on prices book publishers can charge.

However, also upstream integration has taken place, as retailers publish their own content, both recorded audio as printed material. Internet companies and broadcasting companies have acquired publishing companies. For instance, SBS broadcasting publishes Veronica magazine, the largest weekly publication in The Netherlands (IFJ, 2005). Through internet, blogs, and podcasts, many people can become publishers. These developments make changes in business models necessary. Some companies rely on their end users for their content, making them de facto employees, without actually having to pay them.

Companies in non-publishing industries, like retailers or professional service providers, disguise their marketing tools as information or news in on- and offline publications or downloadable podcasts. Especially the Internet breaks down barriers between traditional suppliers of different types of content (i.e., news, books, magazines, commercial information, documentaries, TV-shows) as well as between content suppliers and content distributors (CEC, 2005b; CEC, 2007).

The printing industry has been facing intensive concentration both in supplier markets (paper and ink industry, printing machinery) as well as in client markets (publishers, other businesses, editors, retailers). The effect on the printing industry is that suppliers have the negotiating power to push prices up, while clients have the size to push prices down. As a

result the printing industry is suffering from decreasing margins. The smaller and medium sized specialised printing companies rely heavily on larger clients and therefore lack credible market power. Smaller commercial printers, however, are not very dependent on a few larger clients, but face increasing competition, as improvements in desktop publishing and printing erodes demand for their services. Due to limited demand, prices and therefore margins are under pressure. Printers try to enhance their market position by intensifying their investments in production capacity to lower marginal costs. Both lead to heavy price competition, as opportunities for product differentiation are limited in the printing industry. In addition to price-based competition, printers are facing increasing demands in terms of time and flexibility of delivery.

Within the printing industry hardly any possibilities exist for strategic positioning. Most printers depend heavily on their largest clients,. Overcapacity has exacerbated unfavourable market conditions for many printers. Moreover the industry is very cyclical, heavily depending on the total economy. This is however not the case for packaging printers. Even in developed markets significant growth is expected within this segment (PIRA, 2006)

There are situations when important clients, such as publishing companies, buy paper supplies directly from paper producers, using their purchasing power to lower prices. The paper is then distributed to selected printing enterprises. This practice can moderate the restructuring of the weakest printers on the one hand and affect the efficiency of the printing process on the other hand (CEC, 2007).

Pre-press, printing, and binding can be separate activities, but these activities are increasingly combined in one enterprise. Printers extending their services to multimedia and Internet services have been able to diversify and accordingly position themselves in a higher growth market or markets with higher operating margins. The new services provide a higher value added than the traditional printing services. Moreover, the printers have the means to bypass publishers by using digital printers, but also to bypass retailers and wholesalers downstream in the supply chain and shorten time-to-market.

Especially the pre-press departments of printers play an ever more important role in the whole value chain. In the view of changing technology their role as bridge between principal customers and the production department is becoming more important.

Networks

The printing and publishing industries are dominated by the larger European countries (Sánchez Ruipérez, 1990). Germany and the United Kingdom produce around 40% of total European production value in both sectors. With France, Spain and Italy, the five countries produce 74% of the total European production value in the printing sector and 76% of the total publishing production value. When Belgium and the Netherlands are included, these figures rise to 83% and 84% respectively (Eurostat, 2008a).

Production networks can be of importance for both sectors, especially when geographic spread of publishing and readers or target groups can lead to publishing and printing in different geographic regions. The extent to which this occurs or is important for the sector is unknown.

In the publishing industry (also termed media or content industry) networks are important resources for news, information, and entertainment opportunities. A new role for the publishing companies has emerged, which can be defined as ‘aggregator’: combining and recombining flows of information from different sources (pictures, news, stories, commercial information) by means of different products (websites, magazines, newspapers, books, TV-programmes) distributing and redistributing it through different media (internet, broad casting

channels, newspaper sellers) (TNO, 2007). This new role will stimulate the formation of networks across the media even further (connecting both traditional sub-sectors and traditional and new media) as well as up- and downstream the value chain.

Especially the academic magazine sector is a global publishing sector where writers can supply input across the globe. The main difference with newspapers is that in academic journals, writers are not employed by the publishing companies (CEC, 2004c).

The publishing market for recorded music is dominated by four large companies: Universal, EMI, Sony BMG, and Warner Music. Smaller labels are usually active in small niche markets for upcoming talent. In the recorded music sector local markets and especially knowledge of local markets is important for the promotion of artists. Moreover, the distributional infrastructure (i.e., radio and television broadcasting companies, magazines, etc.) is mostly organised nationally. Artists who are active internationally have in most cases separate contracts with publishing companies in various countries (SEOR, 2008). For artists production is therefore spread amongst different companies geographically.

For the printing industry networks are not very important, although networks enable smaller companies to respond quickly to niche requirements and local needs. In some cases networks can become important for the supply of very specific needs of customers, even for some of the larger companies. For instance, Arvato AG, Gruner+Jahr AG and Co., and Axel Springer AG agreed on a joint venture that combines their five German rotogravure printing operations (IFJ, 2005).

4.2 Restructuring and relocation: analysis of sector history and trends

Publishing industry

In mature industries like the publishing industry, niches and new markets are difficult to find so mergers and acquisitions are the most plausible ways to expand market share. Like any other enterprise, media companies can expand horizontally (with the same kind of activity), vertically (to create integrated firms) or diagonally (acquiring different kinds of media). However, mergers and acquisitions in the media industries are difficult to accomplish. The European publishing market has traditionally been splintered and diversified. Factors like language barriers, different reading habits, tax variety and differences in distribution networks create barriers for cross border mergers and acquisitions. Knowledge of local markets is vital for successful business operations. Within countries ownership of media industries is regulated to ensure plurality and diversity in press. Cross-media ownership (radio, TV and newspapers) and the concentration of ownership of these media are generally subject to regulation which varies across countries and differs in levels of restriction (Pira International, 2003). This ownership regulation enhances the barrier for mergers and acquisitions. The potential of economies of scale and scope and globalisation opportunities cannot be fully used.

It is not only maturity forcing publishing enterprises to merge. An important second factor is the shrinking of both consumer and advertising markets. Reader base for daily newspapers is decreasing, as mostly younger turn to online sources. This is eroding advertising base. Newspaper circulation for subscription daily newspapers declines, as is the number of titles. Advertising revenue is a major factor within the publishing industry, especially within the directory, magazine and newspaper segments. Advertising expenditure has been slowing down, especially for newspapers and magazines. Internet advertising is the fastest growing advertising segment, although it plays a minor role in total advertising (CEC, 2005b).

Restructuring in the form of mergers and acquisitions has therefore intensified from 1990 onwards. Between 1990 and 1999 more than 700 media firms were involved in mergers. In terms of transaction value mergers of newspapers and cable TV services were the most important sub-sectors, followed by book publishers and periodicals. (Pira International, 2003). The ongoing concentration of media firms raises concern among journalists, who perceive that their independence is endangered now their publishing company has to compete not only for readers in general but for readers who divide their time between different media and leisure activities (IFJ, 2005). Mergers in the publishing industries were mostly in the consumer markets, mostly affecting middle-sized enterprises. Due to the natural restrictions of linguistic areas in consumer markets there were hardly any cross border acquisitions. This trend differs from the one in professional publishing, with internationally operating professionals as target audiences. In business-to-business publishing the majority of acquisitions was cross border, to both broaden the sourcing of content and the market. In both market segments there was a tendency to acquire enterprises with a position in online publishing, as to extend the number of platforms where content can be offered to different audiences (Pira International, 2003).

Publishing industries seem, as a consequence of their attachment to their home markets defined by linguistic areas, not highly vulnerable to relocation of production or parts of production. However, since 2005 news agencies like Reuters and US and UK newspapers have outsourced advertisement production, graphic design, data processing, research and text and photo editing to India. The low language barriers of course facilitate offshoring in the extended English linguistic area.

Box 2. 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.

Printing industry

Like the publishing industry the printing industry is a mature sector. The large differences, however, are in value added and profit margins. In printing industries these are very small: overcapacity caused by overinvestment in printing equipment causes serious price dumping. Value added by means of added services is relatively rare, as is margin rise based on specialization. Every opportunity to relieve margin crunching is taken. The enlargement of the EU gave way to make use of low cost countries close to home markets. Only products with a short time-to-market -newspapers, magazines, bestseller books- are not affected by relocation. For printed trade materials and catalogues low cost production in NMS is preferred, relatively close to home markets and providing flexibility to adjust production to marketing schemes. China in 10 years time has become the largest supplier of diaries, calendars, dictionaries, manuals, colour and children's books for the European market. Also the segments of brochures and luxury books are affected by relocation. All these products have a long time-to-market for which geographical proximity is not necessary: production and delivery can be planned on a long-term basis. The situation for bestseller books is different: this segment is characterised by high volume, high turnover. As retailers do not keep large stocks, production and delivery are organized following a just-in-time structure. This causes the need for production close to markets (CEC, 2007a).

Although it seems that small printing businesses are most vulnerable to relocation, margin crunching and international competition, also large enterprises are affected.

Restructuring, with significant cutbacks in terms of firms and employees, is needed to reshape European printing industry (CEC, 2007a). However, the figures show a constant increase of enterprises, indicating that there are hardly any entry barriers apart from the initial investment in equipment. The accomplishment of overcapacity is stimulated by the so-called vicious investment cycle: structural investments in equipment lead to increasing equipment productivity, in its turn leading to decreasing costs which calls for more productivity. The industry's answer to this call is reinforced investment in printing capacity, supported by bank loans using the equipment as collateral. In the countries where printing industry is concentrated, the utilized production capacity varies from 73 percent (Spain) to 85 percent (Belgium) (CEC, 2007a). The challenge is to push productivity by other means than investments in equipment.

The development of employment in publishing on the one hand (increasing) and printing/recorded media on the other hand (decreasing), is possibly caused by rising productivity levels in the printing and recorded media industry. The printing industry is, to a larger extent than the publishing industry, exposed to international competition and is more capital intensive. So, to meet competition and to maintain profit levels, a higher capital intensity may be the result. That implies layoffs and is consistent with the observed decrease of employment in the printing and recorded media industry. Relocation to low wage countries is an alternative to maintain profit levels.

The first steps in the direction of consolidation or restructuring are taken now that printing giants like Polestar, Quebecor and RSDB are looking for partners. Also mergers occur between smaller printing enterprises. However, according to financial industry experts only printing companies with a specialization and a sizeable turnover are attractive for acquisition.

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

For both the printing and the publishing sub-sectors developments of the Internet have had major consequences. Most notably the boundaries between industries are becoming increasingly diffuse, enabled by new technologies.

First of all, technological changes have affected the demand side of the sector. The industry has witnessed a dramatic change in media consumption. The main characteristic is the diversity in media consumption brought about by the high degree of penetration of broadband in households; consumers are now multimedia consumers who use TV, radio, internet, print, and mobile services. This proliferation of user devices and the arrival of high-capacity, 'open' networks have opened the way for more complex relations and have offered companies more opportunities for the exploitation of content.

On the supply side, new technological developments made possible more efficient production, while digitisation enabled distribution across different channels. A paradoxical situation has emerged where media content is very much diverse and access to media has never been greater, however, due to concentration, most media are owned by a smaller amount of companies (IFJ, 2005).

Printing industry

Within the printing industry the organisation of companies is centred on the operating equipment, in most cases the press. The sector is increasingly integrating services in relation to their equipment and systems (CEC, 2007a).

Investments are traditionally focused on production equipment fostering capacity-based competition. The level of R&D is low. Innovation and developments are stimulated mostly by suppliers, which makes the printing industry a technology buyer instead of developer (CEC, 2007). Strong relationships with the equipment manufacturers has been an important driving force behind the development of technology, production methods and equipment and enables smaller printing companies to tap into knowledge held by their suppliers.

The small size of most businesses and the need to optimize direct productivity of machinery constrains R&D investments within the printing companies. The structure of the industry, mainly consisting of SMEs, is also an important reason for the lack of a common strategic vision and therefore of a vision on collective investment in R&D (CEC, 2007a).

Although process innovations are limited and do not provide printers with a sustainable competitive advantage, improvements in technology have increased processes and overall efficiency. Increased cost-based competition and the focus on reduction of average costs (economies of scale), put additional strain on prices and margins. Investment in new equipment has caused overcapacity and lower prices, leading to more investment in better equipment and further overcapacity (CEC, 2007a).

Technology improvements on presses involve automation, speed, and reduction of setting-up times with features such as automatic plate changing and blanket washing. These have dramatically reduced the time needed for job changeovers and thus increased productivity. The effect is that a press bought today generally has four times the output capability of the

press it is replacing and can be operated with half the number of operators (EMCC, 2003d). The increase in capacity due to replacements has outweighed increases in demand, causing margins to decline as explained above. The reduction of set-up times have increased the profitability of shorter runs and at the same time improved the quality and consistency of work. Due to shorter runs, the average value of a job has decreased. This has made the need for more sales necessary, which at the same time increases overhead costs.

Nevertheless, the overall print manufacturing process still depends on extensive manual intervention by skilled operators. Digitalisation has been a major influence in the sector, on the production process, the value chain, but also on the variety of products produced by the printing industry (Politis, 2004).

Developments have led printers to either broadening their services or going for niche markets. For example, many printers now offer one-stop-shops for marketing, design and print services and related services such as web design and management (EMCC, 2003d). However, there is little room for differentiation in the printing industry, although some niche markets can provide some printers with higher margins. Printers are mostly not able to comply with the customised solutions or innovations asked by clients (CEC, 2007a).

Digitilisation, ICT and new programs have completely transformed pre-press activities. The conventional pre-press process consisted of separate activities (composition, layout, lithography, retouching, etc.) performed by various categories of technicians. These technological developments have resulting into different skill requirements and the loss of certain skill types. These have now been integrated into DTP programmes connecting directly to presses and the digital printing process, also known as computer to plate systems (CTP). This development has pushed the traditional prepress or 'repro house' organization out of the value chain, as these services are taken over by customers themselves or by printers.

Furthermore, pre-press functions increasingly have direct contacts with clients, for instance through remote proofing procedures. Interaction with customers and subcontractors is increasingly based on digital networks and workflows. The complete pre-press production has been digitalised, from incoming data to plate technology. This has various mixed effects. Most importantly, pre-press activities can now be done by non-professionals who have knowledge of graphic design programs. For those who do not have these skills, pre-press activities within printing companies play an important role in translating customer wishes into technological formats. The shift towards more digital media causes integration of job profiles within the printing sector, mainly in the pre-press functions. Therefore fewer functions exist, but these functions have become more multidisciplinary.

In 2004, conventional printing accounted for 88% of the industry's production, while digital printing accounted for only 12% of the production. The principal printing techniques are shown Table 5.1.

Offset printing is still the most common way to print and to print the largest variety of products. Digital printing allows more flexible forms of production with shorter runs, but is still expensive. Digital printing can help printers to adapt to changing customer needs for greater diversity and shorter production times. Entry-level prices of digital presses have decreased sharply, enabling more SMEs to now offer digital services, although not of the same quality as the high-end digital presses. Inkjet technology is expected to grow as throughput rates (i.e. pages per minute) increase but use of electrostatic technology will remain limited by low throughput rates (EMCC, 2003d).

Further technological developments include the increasing use of XML, a mark-up language encoding the structure of a document, which enables the reprocessing of text to suit different

formats, media and applications. Portability of formats is increased due to Digital asset management systems. These are databases that store graphics, text many other types of data (EMCC, 2003). These database systems ensure that all assets can be used in many different publishing channels such as print, web and other multi media products.

Table 5.1 Printing techniques: usage and explanation

Offset printing techniques				
Technique	Share	Process	Features	Characteristic use
Screen	12%	Creates a sharp-edged image using a stencil	Better, brighter and lasting results	Credit/ scratch cards; Clothing; Security images
Offset	44%	The inked image is transferred (or "offset") from a plate to a rubber blanket and then to the printing surface	Small dot structure; Inexpensive for long runs	Newspapers; Books; Directories; Catalogues; Magazines; Security Printing
Flexography	17%	Surface printing using a positive mirrored master of the required image as a 3D relief		Labels; Packaging
Gravure	12%	Printing using an engraved image carrier. Image engraved on press	More pages per impression; Deeper and richer colours	Magazines; Catalogues
Other	3%			
Digital printing techniques				
Technique	Share	Process	Features	Characteristic use
Inkjet	12%	Ink is sprayed onto the paper to create the desired image	Expensive, short runs, jobs	Books; Direct mail addressing
Magneto		A non-impact printing technique whereby an image is printed using a magnetic toner and magnetic fields on a drum		Listings; Forms; Books; Direct Mail
Laser		Printing using a toner consisting primarily of polymer with pigment of the desired colours is melted and applied directly to the paper to create the desired image		Listings; Forms; Books; Direct mail; Brochures; Covers

Source: CEC (2007a) "Competitiveness of the European Graphic Industry. Prospects for the EU Printing Sector to respond to its Structural and Technological Challenges".

In recent years, the market for printed products shows a decreasing trend (Table 5.2). The contraction in production value has been most sharply in the printing of catalogues (-11%). E-commerce (internet) is being used increasingly as a promotion and sales channel for direct marketing instead of printed catalogues or advertising materials. But also magazines and newspapers experience heavy competition from the Internet. In book publishing, the possibilities of on demand or in-store printing of books are increasing and more publishers are experimenting with digital books (e-books). The production of printing still grows in many of the NMS, which reflects a catching up of consumption in these countries.

Table 5.2 The development of the production value in printing sub-sectors, 2001-2004

Type of printing	Growth over the period 2001-2004
Magazines + newspapers (excl. dailies)	-3%
Catalogues	-11%
Other printed trade advertising materials	-6%
Books	-6%

Source: CEC (2007a).

The use of personal computers and personal printers also has a negative effect on the demand for printing services. Falling costs of printers, higher quality, and better quality paper have increased the use of desktop printing at the expense of commercial printing. The prospective is that printing-on-demand will become more important, causing a further decline of the size of batches.

This is different for Packaging and label printers, however. New technologies that integrate digital data on a package, such as Radio-frequency identification (RFID) and Electronic Article Surveillance (EAS) systems offer printing companies means for diversification and increasing growth potential. These developments concern in particular, new materials (such as printed polymers) and tagging applications which are described as "intelligent", "smart" or "active" packaging. One matter of particular interest is how these types of digital information can be integrated and implemented into the existing production workflow of packaging, which is normally consisted by the processes of packaging design, prepress, printing and finishing (Politis, 2006).

Printing industries in the Netherlands and the United Kingdom seem to be most successful in integrating ICT and value added services into traditional printing. These new services include graphic design, communication consultancy, web design, database management, call centres, mailing services, but also handling and logistics (CEC, 2007a).

For an important part, the innovation potential lies in a more market-focused attitude: integration of services like creativity, design, communication expertise, publishing knowledge, and adding sensorial functions to printed products. This requires adaptation of the internal organization, focused not on the production facility, but on the customer.

Publishing

The most important drivers for innovation in the content industry are ICT and the Internet. Developments within these technologies have changed both consumer demand and enabled the content industry to recreate their processes and industrial organization.

The content industry is an information-based industry: it is used for profiling customers and creating medium-independent services-on-demand, and the essence of its service is providing useful information picked and reused from different sources. Statistically, there is no data on innovation in the content industry. It is defined as 'low tech' but cannot develop without technologies (Pira International, 2003). The use of ICT for production processes and the development of e-commerce are higher than the average in the overall economy. This does not mean that e-commerce in publishing is successful in terms of turnover.

The availability of free content stills hampers the selling of content. Newspapers nowadays can have more online than offline readers, but income generation from online readers has been lower than offline losses of subscriptions (Muehlfeld, Rao Sahib, and van Witteloostuijn, 2007). For newspapers online publication changes production times within the sector as content can be provided instantly.

Book publishing still relies heavily on traditional paper printing and digitization has not yet changed business models. E-books have not yet been successful on the European market. In the USA however, the industry is becoming substantial. In 2003, 1.3 million e-books were downloaded generating a value of $ 7.4 million, which is an increase of 22% compared to 2002 (CEC, 2004a).

For book publishers digital printing makes printing on demand more profitable and the risk involved with publishing books. Print-on-demand is already a reality for academic and STM publishers, where the market is characterised by small demand but relatively high value. As the economics of digital printing become more advantageous and the quality of digital printing improves, it will be feasible to print much shorter initial runs of book titles. This will reduce the risk involved in a decision to publish, cut stock levels within the supply chain, remove or reduce warehousing costs, and reduce the costs and wastage involved in the return and destruction of unsold books (EMCC, 2003). Finally, books do not need to go out of print which allows more effective exploitation of backlists and therefore more opportunities for publishers to increase sales.

Innovations within the publishing sector are incremental, although some radical innovations can be seen. The radical element is mostly based on the impact they had on the sector (CEC, 2005). The development of free newspapers is changing the newspaper sector, audio books created a new market in the book publishing sector, and the introduction of XML in the digital workflow changed processes especially in the journal publishing sector (CEC, 2005b)

Increasing economies of scale within companies facilitate innovation and investments in technologies and e-business. Important technologies for the sector relating to digitisation include: broadband, peer-to-peer communication, digital compression technologies, and content management systems (EMCC, 2003). Other innovations have arisen from technological developments in the printing sector. New printing techniques provided publishers with better quality products, while at the same time decreasing costs.

New technologies such as the Internet make it possible to combine traditional and new businesses with an additional element that was missing in the earlier markets: interactivity. In other words, publishing is now part of the global information and communications industries and interacts with many end users that supply additional content. This feature is important to attract new and especially younger customers. However, investments to develop and maintain interactive services are high and online advertising income is not always sufficient to support these investments (CEC, 2005). Moreover, developments in mobile telecommunication systems and interactive television can provide fierce competition for publishing companies.

Within the recorded music sector, music carriers have to a large extent determined the publishing sector. Leading electronics manufacturers have owned various music publishing companies. The publishing companies allowed the manufacturers to supply content on competing audio formats. Sony owns 50% of Sony BMG and Philips owned Polygram, which was sold to Universal after Philips launched the CD recorder. EMI was owned by electronics manufacturer Thorn, but was split off in 1996. With the launch of the CD-R the first decline in recorded sales was set in motion.

The next generation of media is under way. Different formats compete to be the standard feature. Super Audio CD and DVD Audio provide new formats with higher capacity. HD-DVD and Blue ray are new formats set to replace DVDs. The Ipod revolution has decreased attention to replacement of the normal CD. As DVD sales have risen in recent years the “battle” between the DVD formats is more relevant. For the adoption of the formats the availability of music and films is important, but what has become also important is the compatibility with game consoles. New media have to fulfil more diverse functions.

The rise of broadband and networks (most notably peer-to-peer communication) has made file sharing, or downloading of music, films and other media formats very common. This fact is reflected in sales of recorded music, which has been decreasing for several years. This affects both publishers and printers of recorded music a great deal. Part of demand for recorded music has shifted to DVD recordings. Downloads do not necessarily replace existing demand. It can also place an additional demand for music that would not have been demanded if people would have to pay for this. Online sales of musical products are increasing sharply in recent years, but not to such an extent that offline sales are compensated. For issues with rights management we refer to section 7.

In 2007 IFPI recorded a decrease of 8% in sales (IFPI, 2007). Only in India did sales increase, but the Indian market is still very small compared to other countries. The USA is the largest market for recorded music, followed by Japan, the UK, Germany, and France. In many countries legal downloading sites have emerged. Nowadays over 500 downloading sites are active in over 40 countries across the world. In 2007 digital music accounted for 15% of the market for which IFPI collects figures (IFPI, 2007). Some online stores provide digital content for a certain subscription amount, while other sites pay per download. In the last case buyers also become the owners of the music, which is not the case with subscriptions. The cost of producing online are however similar to producing music offline. The advantage for the consumer is flexibility in picking out the music according to his or her own taste.

The Internet poses another challenge for music publishing companies. The internet can function as a stage for various artists, who become less dependent on publishing companies, although already established artists are in need of support from publishing companies. At the same time the risk of promoting new artists has increased due to decreased sales. Both developments influence the position of publishing companies.

6 Trade, globalization, and international competition

At the international level, the performance of the European publishing and printing sectors are very closely linked with each other. Most studies available to date concentrate on the position of the EU-15. Studies focussing on the EU-27 are not yet available. Europe is a major player on the world market, with Germany, the UK, and France in the top 5 exporters of printed matter in 2005, and Italy, Belgium, Spain, and the Netherlands in the top 12 (International Trade Centre). However, it is facing increasing competition from East Asia and from NMS inside the enlarged EU. In order to react to the downward pressure on prices and to conquer emerging new markets, European printers and publishers resort to off-shoring to low-cost locations and to cross-border acquisitions.

6.1 International competition and trade

The trade position of European printing and publishing on the global market is strongly influenced by the rapid development of the printing industry in Eastern Europe and Asia. Paper is the most important cost in printed products. Paper amounted to 53% of the current costs (i.e., excluding fixed capital costs) of printed products in 2006 (CEC, 2007a). As far as raw materials are concerned, demand has expanded dramatically in recent years, because emerging printing countries need more pulp and paper than they are able to produce. Within Europe, the EU-15 has substantially increased exports towards the NMS and at the same time decreased imports from this region. Still, Europe is consuming more pulp than it produces,

and has increased imports from North and South America. Especially imports from South America have skyrocketed. (Intergraf, 2007). At this level, Europe is in direct competition with China, which is a great importer of pulp and also buys on the North and South American markets. The overall increase in demand sustains and increases price instability. Moreover, European buyers are at a disadvantage on the global market, because the European printing industry is very fragmented (i.e., a high number of small firms purchasing inputs individually), while new printing countries practice "bulk buying" to improve their negotiation position on the market. This situation generates important pressure on the sector and consequently on labour costs and work organization (CEC, 2007).

Nevertheless, economic growth in new printing countries is also a good opportunity for Western European printers and publishers to conquer new markets. `The EU-15 exports of published and printed products have expanded quite rapidly with 4.9% a year between 1995 and 2006. Particularly during the last five years, exports by the printing industry grew rapidly with 9.8% per annum (compared to 3.1% for 1990-2000) (Intergraf, 2007). In particular the NMS have become an important export destination for the EU-15 printing industry (Table 6.1). To a large extent these exports consists of promotional products (49%). Also, between 2000 and 2005, exports of Western European printers to China have increased by 64%, even if they still represent a relatively small part of exports of the EU-15. They have benefited from absent import tariffs on printed products. Exports towards China consist of books for an essential part (65%) (CEC, 2007).

The rising import and export figures of EU countries show the increase of international trade in printing and publishing. At the same time, imports have grown even quicker than exports (respectively 60% between 1995 and 2000 and 42% between 2000 and 2005).

Table 6.1 Exports of printed products to selected countries, EU-15 (% share)

Country	Share in exports by the EU-15	
	1995	2005
Argentina	1.90%	0.56%
Australia	3.89%	3.37%
Brazil	1.44%	1.01%
Canada	2.86%	3.22%
Switzerland	24.28%	17.87%
China	0.57%	1.38%
Czech Republic	2.26%	6.06%
Hong Kong	1.13%	1.20%
Hungary	1.40%	1.79%
India	0.82%	2.17%
Japan	3.12%	2.76%
Mexico	1.20%	2.24%
Norway	4.20%	5.37%
Poland	3.32%	3.55%
Romania	0.66%	1.23%
Russian Federation	3.84%	4.40%
Singapore	1.16%	1.36%
South Africa	1.78%	2.15%
Turkey	0.90%	1.64%
United States	14.09%	13.64%
Total	100.00%	100.00%

Source: Eurostat / TNO

Both the new Member States and Asia have strongly increased their exports to Western Europe. The trade balance of the EU-15 with Far East Asia has been constantly decreasing. The biggest players in the region are clearly Hong Kong and China (respectively the world's 5th and 8th biggest exporter of printed materials in 2005), but also Singapore, Japan, Korea, Taiwan, Malaysia, and India (31st) play a non-negligible role.[8] The deterioration of the trade balance concerns mainly books and children's books, because the constraints on delivery time for these products are not too high. The increase in imports is facilitated by the absence of trade barriers for importation of printed products into Europe. The trade balance of the EU-15 with NMS remains positive, even if imports from NMS (and in particular from the Czech Republic and Poland) of magazines and promotional material have increased exponentially (CEC, 2007).

Table 6.2 Imports of printed products from selected countries, EU-15 (% share)

Country	Share in imports by the EU-15	
	1995	2005
Canada	3.18%	2.80%
China	3.64%	17.56%
Czech Republic	2.36%	9.26%
Hong Kong	6.90%	6.03%
Hungary	0.99%	0.64%
India	0.29%	1.00%
Japan	5.14%	2.23%
Malta	0.98%	1.12%
Norway	1.82%	1.46%
Poland	0.57%	3.40%
Singapore	4.37%	3.09%
Slovenia	1.35%	1.10%
Slovakia	0.78%	0.85%
Switzerland	17.30%	9.55%
United States	42.11%	29.32%
Total imports from outside EU-15	100.00%	100.00%

Source: Eurostat / TNO

6.2 Trade issues of relevance and importance to the sector

Both publishing and printing can be characterised as mature markets with many well established players. Various barriers to entry can decrease competition. Newcomers have difficulty in establishing themselves, especially when new entrants are not centred on a strong brand (CEC, 2005b). E-commerce and digitisation of content enabled publishers to expand the number of distribution channels or so-called platforms. The expansion of larger corporations offering more platforms increases concentration and restricts access for smaller firms.

However, in other publishing sectors barriers to entry are low as hardly any capital is needed and networks or outsourcing can provide additional services that are required to publish. The main bottleneck is access to distribution or retail networks as traditional retail is still the major selling point for traditional printed published items (CEC, 2005b). Moreover retailers are also concentrating as they have to compete with unrelated larger corporations, such as supermarkets, that have started selling printed material.

8 Ranking: www.intracen.org/tradstat/sitc3-3d/ep892.htm

For newspapers, magazines, and journals, the local or national market plays an important role. Competition in national markets is decreasing due to concentration, but internationally competition is fierce. Also, competition within the EU has increased with the enlargement of the EU due to the differences in social and tax systems among Member States.

European printers face increased competition from countries in which the costs of production are particularly low. This is the case with Asian countries and in particular China. The book sector is particularly exposed to Asian competition, because the biggest disadvantage of Asian producers, delivery time, is not a very important factor for most books. In addition, the relatively high proportion of manufacturing in the cost structure for books permits to take full advantage of low labour costs. Colour books, children's books, and diaries are typical products to be imported from China to Europe. Asian imports are less of a problem in the market segments black and white books and best-sellers, because they need to reach the market quicker and retailers are not willing to manage big stocks.

As most printers are small to medium sized companies, the focus of companies is on the regional market. Moreover because of financial restraints, lack of strategic vision many companies do not anticipate global competition (CEC, 2007a).

Table 6.3 Share of selected countries in international exports of printed matter

Countries	2001 Value (million US$)	2001 Share (%)	2004 Value (million US$)	2004 Share (%)
United States	5 061	18.44	5 695	14.99
Germany	3 522	12.83	5 370	14.14
United Kingdom	2 825	10.30	4 254	11.20
France	1 619	5.90	2 220	5.84
Hong Kong	1 279	4.66	1 985	5.23
Italy	1 366	4.98	1 808	4.76
Canada	1 426	5.20	1 772	4.66
Belgium	1 073	3.91	1 535	4.04
China	540	1.97	1 301	3.42
Spain	1 131	4.12	1 298	3.42
Netherlands	748	2.73	1 124	2.96
Singapore	694	2.53	1 007	2.65
Czech Republic	340	1.24	757	1.99
Japan	411	1.50	648	1.71
Poland	126	0.46	420	1.11
Russian Federation	317	1.16	325	0.86
South Korea	284	1.04	285	0.75
Taiwan	172	0.63	234	0.61
Slovakia	118	0.43	208	0.55
Malaysia	115	0.42	201	0.53
India	59	0.22	157	0.41
Total	27 441	100.00	37 981	100.00

Source: Own calculations using data from the International Trade Centre.

Compared to the USA, labour costs are 20% higher in the European graphics industry and compared to Asia, labour costs are 100% higher (CEC, 2007a). Labour represents 29% of the total costs of printed products in 2006. Higher costs are also due to environmental regulation. European producers could differentiate their products, as the demand for green products

increases. However, unclear is to which extent European printers differentiate themselves based on green products.

The NMS are also able to offer very competitive prices due to low costs of production, in particular labour costs. In particular the Czech Republic and Poland have considerably improved their position on the world market since 2000, to become respectively 13th and 20th biggest exporter of printed products in 2005 (Table 6.3). As they are mostly very close to Western European markets, they are also able to deliver printed products which need to reach the market very quickly. Their exports towards Western European countries are for a great part magazines and promotional products.

With emerging printing countries making more and more use of the most advanced technologies, technology itself is no longer a way for (Western) European printers to compete with others. As a consequence, Western European printers are often exposed to a risk of overinvestment. They invest in their production capacities to be able to cut prices, but this results in the end in a decrease in profit, which will lead to another investment, in order to increase productivity again. Such a strategy is not viable indefinitely. In order to retain and gain markets, European printers have to innovate on other aspects, such as providing services around the printed product (CEC, 2007).

As far as publishing and recorded media are concerned, the emergence of electronic media is an opportunity to seize if European publishers want to remain big players on the international scene. VAT taxation, however, places European publisher of digitised publications at a disadvantage. The EU taxes digitised publications with a high VAT rate, while the US has adopted a moratorium on Internet taxation and does not apply a VAT rate (Pira International, 2003).

In the NMS, foreign investment has played a central role in the development of media corporations. For instance in the case of the Czech Republic, German and Swiss companies own 80% of the Czech newspapers and magazines. Foreign capital (mostly German, Austrian, Swiss, French, and Scandinavian) also dominates print media in Bulgaria, Hungary, Poland, and the Baltic states (IFJ, 2005).

Many European publishers have expanded their activities to other continents. European companies are becoming more focused on acquiring specialized North American companies that have a competitive advantage in state-of-the-art technologies. Moreover, concentration on certain aspects of markets or regions is still important. (Kranenburg et al, 2004)

Especially within the newspaper and media segment of the publishing industry, mergers and acquisitions have been frequent since the 1990s and in many countries the newspapers are dominated by one or two holding companies that own various newspapers (IFJ, 2005). The number of mergers has increased highly from around 100 in 1987 to around 350 in 1995 and 2000. Based on Thomson Financial Securities Data's Worldwide Mergers & Acquisitions database, 2,632 mergers took place in the publishing industry worldwide from 1981 to 2000. On average larger companies have attempted to merge 6 times, while the number of finalized mergers and acquisitions per firm are 2.6 within this period (ibidem). The largest number of worldwide mergers was between European companies (49%), while only 5% was between European and North American newspapers. 11% of all mergers was outside Europe and North America (Muehlfeld, Rao Sahib, and van Witteloostuijn, 2007). In 40% of the cases a merger occurred between two newspapers. In 11% of the cases, a newspaper was taken over by an unrelated company. In the majority of cases (49%) a newspaper acquired a firm outside the newspaper industry (ibidem).

National dominance provides barriers for entry for smaller competitors. Since the newspaper segment is mainly a national business and local content has become more important in recent years, international competition does not play an important role. However, larger corporations have foreign subsidiaries in many countries.

6.3 Role of externalisation strategies - outsourcing and offshoring

Printing is much more affected by off-shoring than publishing. Most of businesses in the European graphic industry are small businesses and are therefore not ready to externalise production to another country. However, a small number of very large multinational companies are prepared to transfer work and investment across national borders. This development is far from negligible because these few companies account for a large proportion of employment and turnover at national and/or European level. Medium and large enterprises with more than 250 employees only represent 5% of the enterprises in the EU-15, but employ 44% of employees (CEC, 2007).

In printing and publishing, time to market is a very important factor for the choice of a production location. In general, products such as diaries, dictionaries, calendars, and colour books are much more likely to be affected by relocation than newspapers, printed trade and advertisement material, catalogues, and magazines, which need to reach their target market quickly. Short delivery time is a competitive advantage for Central European countries relative to Asia: the German market, for instance, is quite easy to reach from Poland or the Czech Republic. This makes them very attractive locations for production because of lower costs.

Indeed, one of the most obvious reasons for a transfer of work and/or investment from one location to another is the will to reduce costs by taking advantage of differentials in wages or labour costs, in company taxation, of government subsidies or of less strict social regulation. It is also often more cost-effective to have fewer but bigger plants, located close to a bigger market, so as to ensure flexibility and quick delivery to meet the clients' needs. Relocations within (Western) Europe are mainly part of a rationalisation process, with job losses in the plant losing work and investment, but no substantial job creation in the plants to which work is transferred (Gennard, 2005b).

Other motivations to transfer work or investment can be the will to follow the main customers. If an important producer of goods relocates its production to Asia, there are strong incentives for the printer of the packaging or of the manuals associated with the product to move with him, so as to reduce delays, transport costs, and remain an attractive supplier (Gennard, 2005b).

Broadband capabilities and associated electronic pre-press software systems have allowed ever more complex and sophisticated graphics projects to be produced in lower labour cost regions around the world.

Cross border acquisitions are also a fast and cheap way to extend activity to new markets, because it enables acquisition of production capacity and market share at quite a low risk. An additional advantage is that, in the case of low-cost locations, capacity can be further expanded at reasonable cost. In Central and Eastern Europe, due to growing markets and lower labour costs, a number of printing, packaging, or publishing companies (especially German firms) have established a dominant position on markets through acquisition of local businesses. This is particularly true in the Czech Republic and in Hungary, where German firms control respectively 80% and 100% of the newspaper market. This extension of their

activity enables them to strengthen their consumer base, increase their market share, and therefore reduce competition. This also provides a good base for them to increase their market shares in Europe as well, thanks to competitive production capacities (Gennard, 2005a).

Outsourcing is mostly not an option for small printing businesses. In general, the trend seems rather to go in the opposite direction, meaning that mergers and acquisitions are used by bigger companies to increase the range of their products and to include operations along the entire value chain, so as to be able to better meet customer requirements. Rather than outsourcing their production, they acquire plants in low-cost locations. This is true both for printing and publishing (Gennard, 2005a). However, newspapers publishers, under the pressure of electronic media and changing consumer behaviour, tend to externalize their printing activities to low-cost suppliers.

7 Regulation

Printing industry

For the printing industry managing their environmental impact becomes more and more important. The printing sector has a significant environmental impact, such as the use of chemicals in the production process, but also in terms of energy efficiency. Many companies are already trying to limit their impact and with success. At the same time regulation plays an important role in diminishing pollution.

The main legislative instruments regulating the printing industry are the Solvent Emission Directive and the Integrated Pollution Prevention and Control Directive. Both of these directives relate to two types of printing techniques (heatset offset and gravure) but not to sheetfed offset (CEC, 2007). These legal instruments do not cause disparities between national printing industries. At individual company level, medium and large enterprises are most affected by legislation. The small companies stay below the legislative thresholds.

Divergence is caused by additional ‘green’ policies of individual EU Member States such as threshold values for air, sewage, and waste (Germany, Denmark), eco-taxes for non-requested printed advertising material (France, Belgium, Hungary), and eco-taxes for waste water treatment, energy, and waste paper collection.

Publishing industry

The role of the publishing sector is vital in a democracy. For this reason ownership and competition within the publishing industry is regulated, either through European or national regulations. The main reason is to safeguard plurality and diversity. Regulation can have various forms subject to: ownership, foreign ownership, cross-media ownership, capital structure and concentration. Most commonly regulated is cross-media ownership (CEC, 2003), restricting ownership of various media, such as TV, newspapers, and radio in a single entity. In some cases these regulations can provide barriers to entry for foreign competitors, but also for established competitors to enter a new market. In other cases smaller companies can have an advantage as their access in not limited, or in some cases even stimulated to stimulate competition.

Besides limiting access, these regulations can impede the exploitation of economies of scale and scope and in comparison with international (mainly USA dominated) companies restrict international opportunities for European companies. However, as media concentration increases, national legislation becomes less relevant. Moreover, ownership has become more diffuse, spread over more actors.

The EU does not provide legislation in order to protect plurality. This is left to national governments. In this respect concentration and owner ship issues may fall within the scope of the concentration regime of the EC Merger Regulation (provided it meets certain dimension thresholds) and thereby requires appraisal by the Commission. However, for EU regulations to be effective a dominant position on a specific media market needs to be established first.

The publishing industry is affected by different types of European legislation, ranging from a ban on tobacco advertisements to protection of intellectual property rights (IPRs). The 2001 EU Copyright Directive, for example, tries to create a balance between the rights of content producers and those of consumers. This directive is based on the 1996 WIPO Copyright Treaty (WCT). An important element of the WCT and the EU copyright directive is that Digital rights management systems have received some international legal backing because of these acts. 'Digital Right' management systems are increasingly used as access controls; technological solutions to control the delivery and consumption of digital content. Especially for book publishing, the trading possibilities for IPRs and related rights like translation and merchandising rights are vital.

Article 11 of the Treaty requires nations party to the treaties to enact laws against DRM circumvention. Digital rights management systems are usually set up by distribution companies, or by the software providers used for the different formats, such as acrobat for e-books.

Music publishers publish and promote music, but the music itself is distributed by (online) retailers and broadcasting companies. Due to technological developments broadcasting companies and retailers have emerged from various sectors, such as mobile operators, internet companies and equipment manufacturers. For instance, DRM systems have been important for Apple, as tracks sold in their I-tunes Stores were only playable on I-tunes. Many other online stores do not use access controls. Reasons might be consumer acceptability, user friendliness and implementation costs. Also Apple has recently abolished their DRM system on iTunes stores (Gibault 2007).

The platform for which a DRM system is designed and for which music bought online can therefore decrease competition from other distribution companies, or even from publishing companies who would like to sell online themselves. DRM systems are vital for enforcement of intellectual property rights and therefore for the position of publishing companies, at the same time, DRM systems can be a threat for the position of publishing companies.

Unaddressed post remains a way for companies to reach consumers, is due to privacy regulations. This segment is important for publishing companies and printers. However, digitalisation has decreased demand for unaddressed mail. Finally, liberalisation of postal services will be of great importance to publishing companies as 90% of the circulation of consumer magazines relies on postal services.

8 SWOT analysis

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). The printing and publishing sectors experience a turbulent period. Changes in media consumption, enabled through technologies like Internet and mobile devices, undermine traditional business models in publishing. As the natural and long-term partner, the printing industry is affected by this trend as well. In the printing industry itself technologies like workflow management systems, digitisation, and improving press capacity enhance productivity and flexibility. Customers of the printing industry (not only publishing companies but also consumer industries and retailers) expect the industry to make use of these technologies and enhanced flexibility.

The industry structure with a large number of small enterprises limits the possibilities for innovation of processes and products. However, this industry structure can stimulate the creation of production networks with a high level of specialisation and flexibility – just what customers need. This possible shift to a structure of flexible specialisation might be a competitive advantage in the light of increasing global competition especially in printing.

The growing substitution of printed media by electronic and audiovisual media and mobile devices providing free information has caused serious problems in the traditional publishing industry and therefore also in the related printing industry segments (newspapers, magazines). New business models based on digital media and interactivity have not yet proven their sustainability. Media enterprises now search for economies of scale and scope and choose the traditional way of consolidation and outsourcing.

The new media offer opportunities to create new markets and audiences (in the form of ‘communities’) that can be served with new combinations of information. However, this demands the ability of publishing companies to think in terms of communities, to know their need for information, their media consumption, and their substitutes. These communities will be more footloose then ever, asking for enhanced flexibility of information providers to keep up pace. The knowledge of and experience in how to reach target audiences is still a strength of the publishing industry, supported by customer databases. However, this experience needs to be permanently updated according to new insights in media consumption. These insights also call for development of other types of media content. If the technological form of media consumption and information consumption changes, the content has to undergo a co-evolutionary process of change as well. If less people read magazines and newspapers (long

copy), but more people read Internet news sites (short copy), the content production will shift from long to short copy, or from long copy to online video.

Table 8.1 SWOT Analysis of the Printing and Publishing Industry

Strengths	**Weaknesses**
High quality of products and services * Growing online audiences * Small businesses are expected to be more flexible to customer demands. In publishing the formation of production networks characterised through flexible specialisation is already visible. * Knowledge of and experience in how to target audiences.	* Small businesses are expected to have a smaller absorptive capacity regarding innovation of processes and products due to lack of economies of scale and scope. * Short term contracts limit investments and innovation. * Individualisation of consumer markets leads to decrease of economies of scale. * Inability of publishing companies to develop new successful (online) business models. * Infringement of property rights (publishing). * High investment costs to keep both printed and online versions (publishing). * Attracting young readers remains a challenge (publishing).
Opportunities	**Threats**
* Added services in communication services. * Growing online advertising revenues * Creation of value and production networks providing both specialisation and flexibility. * Individualisation of consumers leads to new and more differentiated market segments with differentiated profiles and media demands. * New media enable publishers to reach these target audiences. * Multimedia content development, multimedia design and distribution due to shift in media consumption. * Digitisation leads to lower printing costs and may enhance printing demand in small runs. * Catching up process in media and paper consumption in NMS.	* Stronger competition, both intra-European and global. * Printing with a long-to-market vulnerable to relocation. * Restrictive legislation in advertising. * Environmental regulation regarding CO2, inks, and paper use. * Cannibalisation of distribution channels: printed vs electronic (internet and mobile devices). * Consolidation upstream and downstream in the value chain (printing). * Strong competition from related, converging media sectors (search engines, telecoms, etc.) * Piracy of online, but also offline content, also in traditionally “safe sectors”, such as newspapers.

Source: TNO, SEOR, ZSI, B&O

The European printing industry sees its position endangered due to decreasing consumption of printed media on the one hand and globalization on the other. Printing of products that have a long time-to-market, like children’s books, is easily transferred to e.g. China. The products

that are expected to be left, have a short time-to-market, and are limited to the home market defined by the boundaries of the language area. Possibilities to enhance productivity are diversification (adding services) and specialisation within production networks, thus responding to demanding customers. This does not only demand technological advancements in printing equipment (more digitisation for printing-on-demand and smaller runs), but much more it calls for advancements in industrial organizational and management of networks. Part of the publishing industry, especially in newspaper and magazine production, is already adopting this model, with a relatively lean core enterprise and a large circle of flexible production capacity (small, self-employed and specialised enterprises) surrounding it.

Both the printing and publishing industry are mature industries but the publishing industry seems to be one step ahead in innovation of industrial organization as an answer to altering market circumstances. Economies of scale may play a catalyzing role, which is lacking in the printing industry.

For the printing industry environmental regulations, partly caused by growing environmental awareness with the public, may be a serious threat. It forces the industry to invest in less polluting production systems, but it also makes paper printing less attractive for customers due to the image of pollution.

9 Drivers

9.1 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 drivers, to arrive at a set of key drivers. Apart from expert opinion mobilised and managed as discussion panel (in a similar manner as a 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.[9] 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

[9] 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.

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)

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.

9.2 Identification and discussion of sectoral drivers

For an analysis of the kind of drivers for structural change in printing and publishing industries it was necessary to split up the industries. Reasons for this action are the following:

* the printing and publishing industries have different positions in the value chain and this goes with different client groups: the printing industry is a business-to-business industry whereas the publishing industry is dichotomous, serving primarily the business-to-consumer market and the business-to-business market by targeting consumers. Therefore the effect of socio-economic drivers differ between the industries.

* the input and output differ between printing and publishing industries. The printing industry works with tangible assets and resources whereas the publishing industry can work with non-tangible resources and also can have non-tangible output, like online information and

entertainment Changes in price and availability of tangible resources therefore has more consequences in printing industry than in publishing.

The main drivers for change in publishing are:

- advances in technology, fostering the organization of work, media consumption of target audiences and therefore basic business models. In this area there is a close connection to lifestyle changes: especially young people can be considered as digital natives, which can be seen by the frequent use of mobile devices and their use of internet technology.
- developments in property rights.

The main drivers for change in printing industry are:

- globalisation: printing is already vulnerable to outsourcing and offshoring on a European scale, increasing global competition will make printing industry in EU even more vulnerable, especially combined with already existing overcapacity.
- advances in technology, causing a constant need for training and reinforcing the need to develop e-business and value added services in printing industry
- the price and availability of paper is crucial to the printing industry.

More elaborate listings of drivers in a structured format are given in tables 9.1 and 9.2.

Table 9.1 From meta-drivers to sector-specific drivers. Relevant check-list questions PUBLISHING

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?10 S	M	L	Are substantial differences expected between (groups of) countries? Y/ N
Ageing / demographics	Ageing - Adapt to the market demands of an ageing and more diversified society	Y	6	8	Y	N	N	X			Y*
	Ageing – declining labour force	Y	7	8	Y	N	N		X		Y**
	Population growth (birth and migration)	Y	4	8	Y	N	N			X	N
Economic	Income per capita and household	Y	7	3	N	N	N	X			N
	Income distribution	Y	7	3	N	N	N	X			N
Globalisation	Outsourcing & offshoring	N									
	Increasing global competition	Y	7	8	N	Y	Y	X			N
	Emerging economies driving global growth (new market demand, especially BRICs	Y	3	3	N	N	N			X	Y
	Global / regional production networks (dispersed production locations, transport)	Y	8	2	N	Y	Y	X			N

* Publishing as an industry in EU15 is more mature than in EU12. ** Labour force in EU15 (therefore) is older than in EU12.
10 Short = 0-3 years; medium = 3-7 years; long = > 7 years. All three categories may apply.

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?10 S	M	L	Are substantial differences expected between (groups of) countries? Y/ N
	Counter-trend regionalism / protectionism	N									
Cultural values	Increasing market segmentation (tailor made production, mass customization)	Y	8	1	Y	Y	Y	X			Y
	Lifestyle changes	Y	8	1	Y	Y	Y	X			Y
	Increasing demand for environmentally friendly / organic products	Y	5	8	N	N	N		X		N
Technology, R&D and product and process innovation	Advances in IT impacting on organizational structures & new business models	Y	10	1	N	Y	Y	X			N
	Internet changing production and consumption patterns (e-business; mobile content, etc.)	Y	10	1	N	Y	Y	X			N
	New types of work organisation (teams-based, sociotechnique, etc.)	Y	10	1	N	Y	Y	X			N
	New/additional value-added services	Y	10	1	Y	Y	Y	X			Y
	Other (sector specific)										

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?10 S	M	L	Are substantial differences expected between (groups of) countries? Y/ N
Natural resources	Availability (and price developments) of oil and energy	Y	4	3	N	N	N	X			N
	Availability and price of other natural resources	Y	8	3	N	N	N		X		Y
Institutional / Political	Trade and market liberalisation (national level)	Y	7	8	N	N	N		X		N
	EU integration – deepening (single European market etc.)	Y	5	8	N	N	N		X		N
	EU integration – broadening (bigger domestic market)	Y	5	8	N	N	N		X		Y
	Quality of institutions (judiciary, transparency, lack of corruption, viable business climate, structural rigidities)	Y	8	3	Y	N	N	X			N
	Labour market regulation	Y	4	8	N	N	N		X		N
	Environmental regulation	N									
	Security and safety regulation	N									
	Security of property rights	Y	10	5	N	N	N		X		Y

Source: TNO, SEOR, ZSI, B&O (methodology see section 9.1)

Table 9.2 From meta-drivers to sector-specific drivers. Relevant check-list questions PRINTING

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?11 S	M	L	Are substantial differences expected between (groups of) countries? Y / N	Are substantial differences expected between sub-sectors? Y / N[2]
Ageing / demographics	Ageing - Adapt to the market demands of an ageing and more diversified society	N										
	Ageing – declining labour force	Y	8	2	Y	Y	Y	X			N	N
	Population growth (birth and migration)	N										
Economic	Income per capita and household	Y	4	8	N	N	N		X		N	N
	Income distribution	Y	3	8	N	N	N			X	N	N
Globalisation	Outsourcing & offshoring	Y	9	2	Y	Y	Y	X			N	Y*
	Increasing global competition	Y	9	2	Y	Y	Y	X			N	Y*
	Emerging economies driving global growth (new market demand, especially BRICs	Y	8	4	Y	Y	Y	X			N	Y*
	Global / regional production networks (dispersed production locations, transport)	Y	8	6	Y	Y	Y	X			N	Y*

* Differences depend on market segments; non-time critical items are more vulnerable to outsourcing and offshoring.
11 Short = 0-3 years; medium = 3-7 years; long = > 7 years. All three categories may apply

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?11 S	M	L	Are substantial differences expected between (groups of) countries? Y / N	Are substantial differences expected between sub-sectors? Y / N[2]
	Counter-trend regionalism / protectionism	N										
Cultural values	Increasing market segmentation(tailor made production, mass customization)	Y	8	5	N	Y	Y	X			N	Y
	Lifestyle changes	Y	3	5	N	N	N		X		N	Y
	Increasing demand for environmentally friendly / organic products	Y	7	7	N	Y	Y		X		N	N
Technology, R&D and product and process innovation	Advances in IT impacting on organizational structures & new business models	Y	8	1	Y	Y	Y	X			N	N
	Internet changing production and consumption patterns (e-business; etc.)	Y	9	3	Y	Y	Y	X			Y(EU-15: more mature customers)	Y (specialization effect)
	New types of work organisation (teams-based, sociotechnique, etc.)	Y	7	4	N	Y	Y		X		N	N
	New/additional value-added services	Y	9	1	Y	Y	Y	X			Y (see above)	Y (see above)
	Other (sector specific)											

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?11 S	M	L	Are substantial differences expected between (groups of) countries? Y / N	Are substantial differences expected between sub-sectors? Y / N[2]
Natural resources	Availability / price of oil and energy	Y	8	3	Y	N	N	X			N	N
	Availability and price of other natural resources	Y	10	1	Y	N	N	X			N	N
Institutional / Political	Trade and market liberalisation (national level)	Y	7	8	Y	Y	Y		X		N	N
	EU integration – deepening (single European market etc.)	Y	8	3	Y	Y	Y	X			N	N
	EU integration – broadening (bigger domestic market)	Y	8	2	Y	Y	Y	X			N	N
	Quality of institutions (judiciary, transparency, lack of corruption, viable business climate, structural rigidities)	Y	6	4	N	N	N			X	N	N
	Labour market regulation	Y	6	4	N	N	N			X	N	N
	Environmental regulation	Y	8	2	Y	Y	Y	X			Y	Y: specialization

Source: TNO, SEOR, ZSI, B&O (methodology: see section 9.1)

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

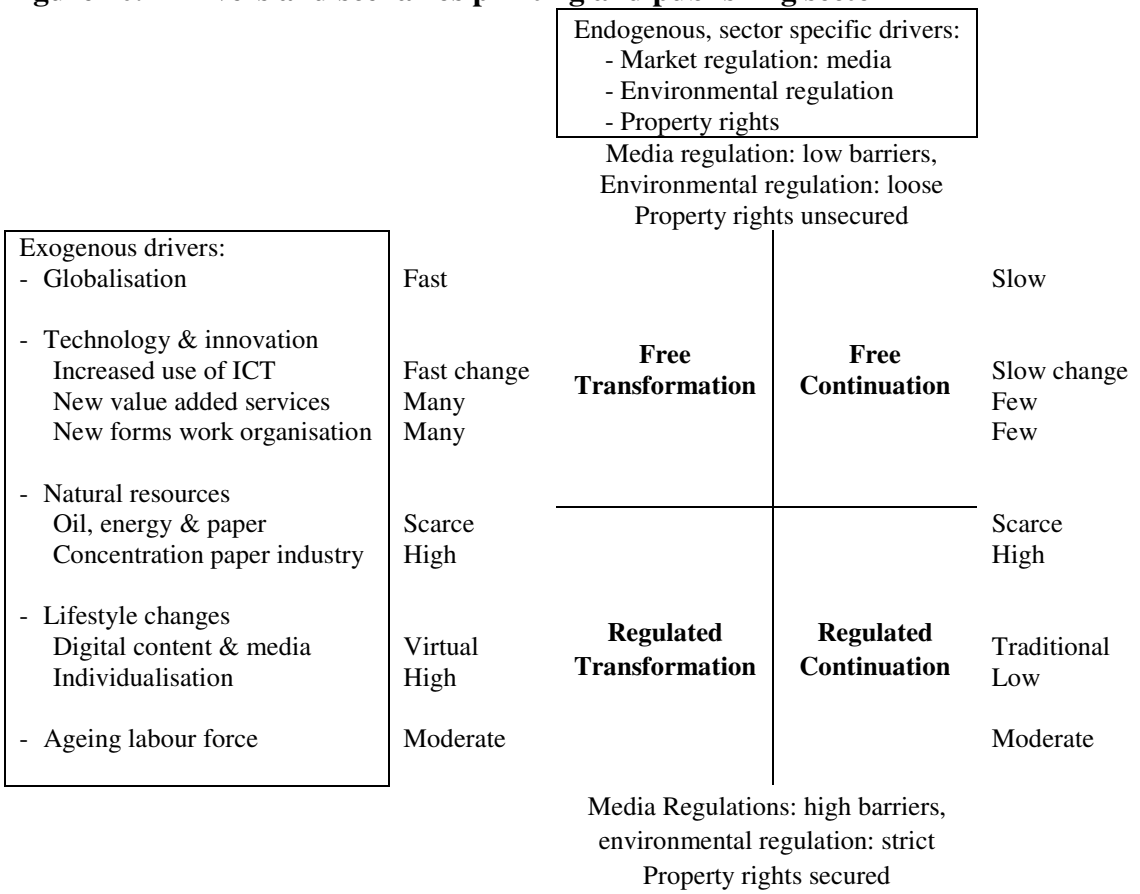
Part II presents the scenarios and their implications for jobs, skills and knowledge. It reflects steps 4, 5 and 6 of the common methodology. The contents of part II are as follows: Chapter 10 describes the structure and highlights the content of the four main scenarios (step 4). For each of these scenarios 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 10 discusses the main implications of the scenarios in terms of future employment volumes by job function (step 5). Chapter 11 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).

10 Scenarios

10.1 Overview of scenarios and main underlying drivers

Figure 10.1 presents four different scenarios and their underlying drivers for the printing and publishing sector. The scenarios which were specifically constructed for and used in this study are based on a clustering of relevant drivers identified in part I.

Figure 10.1 Drivers and scenarios printing and publishing sector



The scenarios are constructed to 'scan' the future, and are for the purpose of this study used to assess the impact of future developments on jobs, skills and knowledge. It is important to understand what scenarios can deliver and what not. Scenarios depict plausible futures and might reveal possible paths of development towards these futures. They are neither predictions or forecasts, nor wishful pictures ('dreams', 'crystal ball gazing') of the future. Grounded in existing data and trends, scenarios are derived in a logical and deductive way, with different and sometimes opposing presumptions about how key drivers might develop, resulting in inferences about plausible, i.e. credible and imaginable, futures.

In drafting the scenarios, a clear distinction has been made between exogenous and endogenous drivers; the horizontal axis in the figure represents the relevant exogenous drivers, whereas the vertical axis represents the relevant endogenous drivers. The main difference between the two categories of drivers is the scope and ability for direct influence. Exogenous drivers are drivers that form a "given" for the sector without much room for influence for/by individual actors drivers. Endogenous drivers are drivers that

can be influenced at the sector level, for instance by national or European policy-making. Only those drivers that received the highest ranking - a score between 8 to 10 on a scale of 0 to10 (see chapter 9) - have been taken into consideration.

As the printing and publishing sub-sectors are closely interrelated and the main drivers are similar if not identical, the scenarios for sub-sectors have been developed integrally rather than separately. This does not preclude that certain differences between the sub-sectors might apply and certain aspects might develop in alternate directions. In terms of scenario implications for skill needs, differences between the two sub-sectors may apply. Where relevant these are discussed and explained in further detail.

10.2 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 (see further section 6: main strategic choices to meet emergent skill needs).

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.

Overview and description of exogenous drivers

- Globalisation: Globalisation in principle implies a further increase of international competition. Entrants are active on a global scale, offshoring and outsourcing take place for various activities and specialisation and hence globally dispersed production is stimulated. Globalisation is fast on the left-hand side and slower on the right-hand side (see Figure 10.1).
- Technology & innovation: Increased use of ICT gives companies more possibilities to extend their service offerings and hence create higher value added. Process technology creates opportunities for companies to change their work organisation, leading to more efficient production. The scenarios represent fast change in ICT and many new technologies and value added services (left-hand side) opposed to slow change of ICT and a few new technologies (right-hand side).
- Natural resources: Natural resources play an important role in the industry, as it needs large quantities of paper and energy. At the same time, the market structure of the supply chain (among others, the concentration of the paper industry) can influence the sector, especially the printing sector. In both scenarios it is assumed

that natural resources including oil and paper will be increasingly scarce as environmental problems such as climate change and decline of forests will continue further. Furthermore, as the paper industry is highly concentrated and will continue to do so in the near future, it will be increasingly difficult for small firms to negotiate low prices.

- Lifestyle changes: Lifestyle changes can have a major effect on the publishing industry and consequently on the printing industry. Changes in lifestyle can express themselves scenario-wise either by an increasing demand for more virtual products (left-hand side) or by more traditional uses and applications (right-hand side). In the case of more demand for virtual uses, traditional publications are substituted for online or multimedia publications and there is more demand for new content. There is strong change with new trends emerging continuously. Another lifestyle dimension is individualisation. When individualisation is high (left-hand side), companies are expected to further accommodate their products to the wishes and needs of clients (user-centred innovation). Companies will target specific groups with tailor-made products, avail of a highly diversified product portfolio and quickly adapt to changes in needs. On the other right hand of Figure 10.1 traditional uses go together with a slow individualisation trend.
- Ageing: In both scenarios we assume that the labour force is ageing. This will have a moderate impact on both sectors.

Overview and description of endogenous drivers

- Market regulation: This concerns most notably media regulation on media ownership and diversity. Cross-media ownership can be limited through regulation (bottom of Figure 10.1), or not limited by means of regulation (ditto, top).
- Environmental regulation: Environmental regulation can be more or less strict. With strict environmental regulation firms have to adapt their production accordingly (bottom of Figure 10.1). When environmental regulation is less tight, it will not play an overriding role in the industry (ditto, top).
- Property rights: Intellectual property right can be secured or not secured. When digital property rights are not secured producers of digital products cannot assure income to the companies that produce these products.

10.3 The scenarios – detailed discussion

Based on the combination of endogenous and exogenous drivers we discriminate between four sector scenarios for the printing and publishing sector:

- Scenario I: *Free Transformation*,
- Scenario II: *Free Continuation,*
- Scenario III: *Regulated Transformation*, and
- Scenario IV: *Regulated Continuation*.

Scenario I: Free Transformation

In the scenario *Free Transformation* the rate of substitution of traditional publications by new (media) technologies is high and European publishing and printing companies face heavy competition from countries outside the EU as a result of further globalisation. Competition within the EU is also fierce. Foreign and domestic takeovers take place frequently and existing companies are continuously threatened by new entrants, as a result of low barriers to entry. These are small niche players that are highly focused on special publishing market segments. New entrants continuously emerge as individualisation requires companies to adapt to quickly changing lifestyles and perceptions. New entrants find opportunities especially in segments that are upcoming and neglected by the larger firms. New entrants are able to grow into powerful diversified players within several years, or are taken over by the larger firms (consolidation). Some EU companies are internationally expanding to new emerging markets, such as the BRIC markets.

New technological developments and lifestyle changes increasingly replace traditional printed materials in favour of digitalised new media and the Internet. These new media publications decrease demand for traditional printing services and create a highly diversified landscape in which the pace of change is very high. Adoption of innovations is important for maintaining a competitive position in the market. However, as property rights are unsecured publishing companies have difficulty in collecting revenues for the new products, making the market difficult for some larger publishing companies, especially in the musical segment. Companies make extensive use of ICT possibilities and new forms of work organisation to further increase efficiency. As companies are not faced with barriers imposed by media policy they can grow and diversify without limitations. Due to these fast developments young(er) people are attracted to the publishing industry. The impact of an ageing labour force is therefore 'neutralised'.

Although environmental problems exist, such as climate change and the further decline of natural areas, substitution of printed matter and technological developments have decreased the need for resources, such as paper, and have reduced the energy intensity of the sector. Therefore the lack of environmental regulation is not pressing. For some printers and publishers producing environmentally friendly ('green') provides further opportunities for diversification.

The market is difficult for printers, many of whom go bankrupt as there is less demand for their products and other companies are better equipped to perform the newly demanded high value added services. Lower skilled work is outsourced or taken over by foreign competitors. Printing companies that are able to convert themselves to, for example, online communication or design agencies are able to stay in business.

Scenario II: Free Continuation

In the scenario *Free Continuation* globalisation develops slowly and substitution of traditional printed material by new media is limited. Due to slow globalisation, foreign competition from outside the EU is limited, as is international expansion and outsourcing and offshoring. Within Europe competition is mostly nationally organised and is focused on costs, as diversification possibilities are limited. Limited diversification follows from a slow pace of new value added services and innovations and low substitution of traditional publications. New product development augments costs and is therefore minimised. Moreover, lifestyle changes are moderate and individualisation plays a lesser role, which

means that customers demand mostly cheap and generic products. Unsecured property rights also slow down the rate of innovation.

One way of achieving cost reductions is to exploit economies of scale by means of mergers and acquisitions (M&As). Because media ownership is not limited, consolidation takes place up to a stage where competition is eventually limited, as only a few large companies are active in the market. Also for printers the focus is on costs as many of them are under increasing pressure from large publishing companies. The need to reduce cost is increased by high concentration in the supplier market for paper as this leads to higher prices for inputs.

Environmental problems aggravate the price increases. Although (the absence of) environmental regulation does not provide companies with incentives to work more environmentally friendly, the market does. Resources are increasingly scarce, resulting in high energy and paper prices. Companies try to minimise the use of resources in order to decrease costs, but have few technological options to do so as they are faced with slow progress in innovation and demand for traditional products. Margins are low and printing companies thus follow the publishing companies in enlarging their business operations by means of take-overs to exploit economies of scale. The number of companies reduces sharply, but the reduction is smaller in terms of production value. The environmental problems therefore persist.

The printing companies already faced problems with attracting young people, who see the work as dirty and badly paid. The printing industry has a severe image problem. Moreover, low margins have translated into lower wages. The ageing workforce seriously impacts the printing companies.

Scenario III: Regulated Transformation

The exogenous surroundings in the scenario *Regulated Transformation* are equal to the *Free Transformation* scenario, with high substitution and globalisation. The major change is the role of media policy. This limits media ownership. Publishers are restricted in size. The media landscape is therefore more diversified with many smaller players, each delivering products that have a particular focus group, but using all channels available to them. In some markets there is less room for new entrants as companies exploit their home market far more intensively. Printing companies can profit from the diversified landscape by providing various services specialised for special target groups and forming relationships with the publication companies accordingly. This way more printing companies are able to survive than in *Free Transformation*. Moreover, as digital rights are secured companies in this scenario can reap the benefits of their innovations.

The available strict environmental regulation does not have a large influence, as traditional publications are substituted and technology improves environmentally friendly production methods. However, it stimulates further adoption of technology resulting in less environmental pressure.

Scenario IV: Regulated Continuation

The main difference between the *Regulated Continuation* scenario and the *Free Continuation* one is that media companies now face limits to growth, as media ownership is limited. Companies are strongly focused on one market segment, as diversification possibilities are limited. The traditionally strong companies in one segment make entry for new competitors difficult. Therefore barriers to entry are high and also internationally

competition cannot be expected. The level of competition within a segment is moderate. Moreover, the different segments compete indirectly for the customers' attention, as these provide substitutes for each others products. In this scenario the number of printers reduces, but to a lesser extent than in *Free Continuation*.

Another difference with *Free Continuation* is that environmental regulation is now in place. However, technological options for substitution of paper are limited. Prices of paper and energy rise and environmental regulations further drive up costs and decrease margins, especially for printing companies. Secure digital rights have no impact, as demand for digital products is limited.

11 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.

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 two 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 the years 1983 to 2006 and covers all industries and occupations. The national statistical institutes are responsible for selecting the sample, preparing the questionnaires, and 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 (2008a)

However, the LFS job classification cannot be taken over one to one. First, the given LFS definitions of the job function groups are highly aggregated and cover therefore highly heterogeneous but not always comparable job functions. Reporting on this most aggregate

level therefore would not be very illuminating. Second, some functions which may be strategic for the sector when looking at the future can be 'hidden' in a broader statistical category. This also includes 'new' emergent job functions. For both reasons some of the aggregated categories have been split up into separate job function categories, which have been given a more in-depth treatment. The opposite case, where certain job functions may be closely related, but do not fall within the same statistical LFS class, may also apply. Here it would be logical to combine them.

Third, in the trend analysis it was already observed that whereas in some countries employment shares of a particular (production) job function were extremely large, similar shares in other countries appeared extremely low, often with another closely related job function being much higher. A very likely explanation for this phenomenon is that in some countries workers are reported as job function x while in others they are reported as job function y, where basically similar tasks on the job are performed. By taking aggregates for these function types, this sort of reporting bias can be avoided. Fourth, the job functions that appear from statistical data analysis might not always be similar to what a person in or familiar with that sector would rank as the job functions that matter "in reality", i.e. from a work floor perspective. On the basis of discussions with experts and national sector skills studies, an attempt was made to provide a job classification that is both workable and recognisable by the sector in practice. This classification is shown as Table 11.1 below.

Table 11.1 Adaption of the original job classification

Classification in statistical data	Adapted classification used in our analysis	Terms used in job function tables
Managers	Managers	Managers
Computer professionals	Aggregation: ICT & engineering	ICT & engineering professionals
Architects/engineers		
Business/finance professionals	Business & finance professionals	Business & finance professionals
Other professionals	Selection (publishing): journalists, editors, writers	Journalists, editors, writers
Office clerks and secretaries	Selection: order preparation, order administration and order management and other administration	Support staff
Service workers		
Craft printing workers	Selection (mainly printing): pre-press	Pre-press workers
Other craft workers	Aggregation (mainly printing): Production	Production workers
Printing/binding machine operators		
Machine operators/assemblers		
Labourers		

In order to establish a meaningful and appropriate classification, the existing LFS occupational classification for the printing and publishing sector was adapted by either

aggregating and/or selecting further differentiating some professions out of the original LFS statistical classification. This exercise was based on four criteria:

- employment shares (aggregating);
- closely related job functions (aggregating);
- strategic role in sector (disaggregating by further selecting among the occupational groups identified in the statistical classification);
- emergent job functions not yet covered and/or brought fully to light by current statistics.

Table 11.1. shows the detailed job functions for printing and publishing sector, based on the original LFS classification and the classification (third column) used in the remainder of this study. The following functions have been distinguished:

- The category *managers* includes top management, but also entrepreneurs and different more specialised management occupations, such as HRM, Finance and Production management.
- *ICT & engineering professionals* includes ICT professionals and lower ICT professions and computer operators, but also various engineering functions, such as electrical or mechanical engineering.
- *Business & finance professionals* include accountants, financial controllers and finance professionals, but also sales professionals.
- *Journalists, editors and writers* are the category of publishing professionals responsible for the content of publications. This job type is specifically found in the publishing sub-sector.
- *Support staff* means administrative functions, including order management, order preparations.
- *Pre-press workers* are typically related to printing, as their function contains all functions needed in order to prepare content for printing. This means that in the pre-press workers category desktop publishing is included, but also typesetting functions.
- Production means the actual printing, as again this function is related to printing companies. *Production workers* as a job function comprises functions that are mostly relevant for the printing industry, such as machine operators, but also warehouse staff and transport workers.

12 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 chapter the implications of the four 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 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 results of the following chapter 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.

The results for the printing and publishing sector are presented in Table 12.1. The table shows the different occupations selected and the changes expected for each of the scenarios. In the rows the two sub-sectors are explicitly mentioned, as there can be differences in the sub-sectors. In some cases the distinction is not relevant as occupations are only dominant in one sub-sector. The publishing companies, for instance, are mostly knowledge companies having hardly any 'traditional' production workers anymore.

Table 12.1 Expected volume changes in job function structure 2009-2020

	Sector	Free Transformation	Regulated Transformation	Free Continuation	Regulated Continuation
Managers	Pub	M	M	M	M
	Print	D	M	D	D
ICT & engineering profs.	Pub	I	I	M	M
	Print	I	I	M	M
Business & finance profs.	Pub	I	I	M	M
	Print	I	I	M	M
Journalist, editors, writers	Pub	I	I	D	D
Support staff	Pub	D	D	D	D
	Print	D	D	D	D
Pre-press workers	Print	D	I	M	M
Production workers	Print	D	D	D	D

Note: D=decrease, I=increase, M=maintain, Pub=publishing, Print=printing.

For the scenarios *Free Continuation* and *Regulated Continuation*, the expected changes in volume do not differ greatly. The intensity of changes is larger in *Free Continuation* than in *Regulated Continuation*, such that if changes do occur these will be more visible in *Regulated Continuation* than in *Free Continuation*. In the scenarios *Free Transformation* and *Regulated Transformation* some differences can be observed. In case changes are similar, their effect is expected to be bigger in *Free Transformation*. The main differences between scenarios *Free Transformation* and *Regulated Transformation* and between *Free Continuation* and *Regulated Continuation* will be in skills changes.

As regards managers in the printing sector, a decline in the number of companies is likely to reduce the number of managers needed. The exception is *Regulated Transformation* where the number of companies and therefore managers is more or less stable. In the publishing sector there is no obvious trend towards any increase or decrease; influences cancel each other out. Cutting costs will affect the number of managers and the number of companies only marginally. It will be mostly lower layers within the organization that will be affected. It is expected that in most cases managers, especially higher

management, will be able to keep themselves in position. In all four scenarios managers fulfil a prominent role, especially in publishing. Reorganisations in publishing companies that occur in scenarios *Free Continuation* and *Regulated Continuation* will also have to be led by managers. At the same time, diversification in the scenarios *Free Transformation* and *Regulated Transformation* will require also more managers. Therefore the number of managers in the publishing sector is set to maintain. This is in line with the stable and high number of managers observed during the period 2000-2006 within both printing and publishing (for details see Data Annex to this report).

The demand for ICT & engineering professionals is for most part driven by technological developments and supply of new high value added services. Therefore in the scenarios *Free Transformation* and *Regulated Transformation* where technology plays a substantive role, the volume of engineers will increase, while in other scenarios (*Free Continuation* and *Regulated Continuation*) their volume will remain the same. In the EU the number of ICT & engineering professionals has increased slightly in recent years (For details see Data Annex to this report). In the new Member States their number has increased more. It is expected that the number of ICT & engineering professionals will increase more in high developing markets of Eastern and Central Europe than in developed markets.

The volume of business & finance professionals is expected to increase in the scenarios where fast changing market conditions induce demand. The number of business & finance professionals in the period 2000 to 2006 has increased slightly in printing and publishing (For details see Data Annex to this report). Business & finance professionals are required as the number of services and the complexity of organizations increases. This is most apparent in scenarios *Free Transformation* and *Regulated Transformation*. In the other two scenarios there is some upward pressure because of reorganizations, but the need for cutting costs and the lack of new services that need to be marketed causes demand to decrease. As was the case with managers, it is expected that in these scenarios the number of business & finance professionals will be stable, as professionals will be able to maintain their position due to their insights in the business. The main difference between the sub-sectors is that volume changes are expected to be higher in the publishing sub-sector.

Journalists, editors and writers are only relevant for the publishing sector. An increase in these functions can be expected in line with the trend observed in recent years. Only the new Member States witnessed a large decline (13%) (For details see Data Annex to this report). Again demand is driven by the need to supply more value added services, by means of new media channels. This means the number of journalists, editors and writers will increase in the fast paced scenarios, although contracts will become more flexible. In the scenarios *Free Continuation* and *Regulated Continuation* the number of journalists, editors and writers is expected to decrease, as consolidation is expected to have a negative influence on the occupations.

The expected changes for support staff is to a large extent similar across scenarios and sub-sectors. Increased efficiency will reduce the need for administration, although in scenarios *Free Transformation* and *Regulated Transformation* the decrease is partly offset by an increased need for support staff, as organisations are becoming more complex and more diverse services need more administration. In scenarios *Free Continuation* and *Regulated Continuation* demand only slows down as the need to cut costs is high and consolidation leads to a reduction in administrative tasks. Moreover, there is a lack of

new services to stimulate new demand. Changes have greater (more negative) effect in *Free Continuation* than in *Regulated Continuation*.

The pre-press occupations are relevant only for the printing companies. In the past 2000-2006 period the overall number of pre-press workers in the EU has decreased, although it has increased in the new Member States (For details see Data Annex to this report). Expected changes for this occupation vary across scenarios. In *Free Transformation* the number of printing companies goes down fast, therefore the need for pre-press services decreases. Pre-press is the desktop publishing side within printing companies and is important in the delivery of value added services through different channels. Because of their importance for new services their number will increase in *Regulated Transformation*, as the number of printing offices in this scenario is only expected to change little. In the scenarios *Free Continuation* and *Regulated Continuation* the number of pre-press occupations is expected to maintain, as different factors work in opposite ways: consolidation and little opportunity for diversifications restrain growth, but the central role that pre-press plays in the production and in customer services, can lead to an increase in the number of pre-press workers. Changes in *Free Continuation* will have a larger effect than in *Regulated Continuation*.

The category of production workers is mostly relevant in printing. In all scenarios their number is expected to decrease, albeit for different reasons. In scenarios *Free Transformation* and *Regulated Transformation* their number declines due to further automation and less demand of traditional printed material and outsourcing. In scenarios *Free Continuation* and *Regulated Continuation*, demand decreases because of consolidation and further cost cutting. Figures about recent developments show that the number of production workers has decreased in the EU-15, while their number has increased in the new Member States (for details see Data Annex to this report). However, the category 'other labourers' has decreased in the new Member States, while it has increased in the EU-15. In this part of the study both production workers and other workers have been aggregated. In overall terms the number of production workers and other labourers has increased in the EU in the period 2000-2006. Still, a decrease in the scenarios is expected due to substitution (automation) and consolidation.

For production workers it is important to distinguish between developed or mature markets and developing markets. In developing markets the number will decrease more than in mature markets as in mature markets companies are already producing efficiently, while this is not the case for many developing markets. Here, companies have to ensure the reduction of organisational slack in order to stay competitive.

13 Implications of scenarios - main emergent competences

13.1 Introduction

Determining emergent competences is at the very heart of this study. In order to identify the main emergent competences by occupational function, the Rodrigues (2007) methodology refers to three main competences: theoretical, technical and social competences. This distinction builds on the distinction between knowledge, skills and competences in the European Qualifications Framework (EQF) and the European Credit system for Vocational Education and Training (ECVET) (see Box 4 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.[12] Partly because of these identification issues, adequate measurement of competences, knowledge and skills is notoriously difficult. In some of the literature, the problem of skills measurement is sometimes avoided by using indicators (proxies) focusing on qualifications (high-level, intermediate-level, low-level) as well as occupations. For the purpose of identifying *future* skill needs such approach will not deliver useful results. Instead it is the knowledge and skills behind that need to be identified.

Rather than producing a full and exhaustive list of all competences for each job function, the key focus in this chapter is on identifying and describing key and critical competences for the future. The description will be focused but also general enough to be meaningful across countries. A slight extension of the original Rodrigues methodology is that together with the identification of critical skills and knowledge needs, a differentiation by scenario is made. Skills and knowledge needs are operationalised as expected key changes in specific skills and knowledge categories by occupation.

[12] '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).

Box 4. Definition of competences, skills and knowledge 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, 2008e; see also European Commission, 2008f):

- *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;
- *Skills* refers 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);
- *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;
- *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;
- *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.

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 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* 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* 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.

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 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 4) come very close to what is generally understood as 'soft skills'.

Table 13.1 Overview of skills and knowledge clustered by category

Knowledge ('hard skills')
• Legislative / regulatory knowledge (environmental / safety / labour / contracting); Language*; e-skills; Marketing skills; Technical knowledge; Product knowledge; Product development
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
Management Skills • Strategic & visionary; Coaching and team building; Change management; Project management; Process optimizing; Quality management; people skills crucial for collegial management style
Entrepreneurial Skills • Supplier and customer relationship / understanding; Business understanding; Trend setting / trend spotting

A number of different skills categories have been taken into account, including social skills, problem solving skills, (self) 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. Literacy and numeracy skills are not specifically mentioned in the tables. In practice these skills cannot be taken for granted. However, they are a prerequisite rather than an emerging skill to participate in the workforce.

For each job function key future skills and knowledge needs were identified. This was done in a workshop with a number of invited sector experts, and validated in two

subsequent workshops, including the step 10 final workshop; the results therefore remain based on joint expert opinion. The analysis in Part I and the data tables formed a 'levelling' starting point for each of the discussants.

The emergent future competences – defined as skills and knowledge needs - are identified and clustered together with similar ones in a concise overview table per job function (see next sections 13.2 to 13.8). Only *substantive key changes* in skills and knowledge needs are taken into account, which means that only part of the cells in the table is 'filled'. However, if a certain skill or knowledge type is highlighted in one scenario, but is not addressed in another, this does not mean that it is irrelevant. Rather it means that relative demand for this skill in the latter case will not increase within the time frame 2009-2020.

13.2 Managers

For managers the main difference between the scenarios is that in the fast paced scenarios managers have to focus on quickly picking up new trends and explore new markets and channels, while in the slower paced scenarios managers have to focus on doing better what they were already doing.

For the scenarios *Free Transformation* and *Regulated Transformation* the main emerging competences arise within the printing companies. In recent years, most of the printing companies have been focused on increasing output by investment in machinery (see Part I of this study). In a world dominated by technological change, substitution and diverse demands and supply, printing companies need strategic vision, especially among the bulk of smaller companies, as demand for their traditional products is lagging behind and their future at risk.

Still, the skills needs identified here are required as well for the publishing companies, but for the most part these skills are already present, as the publishing market has seen quite a few changes already. Moreover, as most publishing companies are larger than most printing companies, publishing companies are more formalised and more informed about new management and strategic practises. The emergent attribute of the skill needs is more pressing for printing companies.

Table 13.2 Emerging skills and competences Managers

		Transformation		Continuation	
		Free	Regulated	Free	Regulated
Knowledge	Legislative / regulatory knowledge (environment)				
	e-skills (e-commerce)				
	Technical knowledge (new media and technology)				
	Financial knowledge				
	Environmental management				
	Strategic management				
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		21	22	11	13
Scenario characteristics:					
Globalisation		Fast	Fast	Slow	Slow
Technological change		Fast	Fast	Slow	Slow
Lifestyle new content & media		Virtual	Virtual	Traditional	Traditional
Lifestyle individualisation		High	High	Low	Low
Regulation media		No	Yes	No	Yes
Regulation environment		No	Yes	No	Yes

Note: shaded areas highlight specific skills and knowledge that will become relatively more important in the future, and require up-skilling and knowledge upgrading. This does not mean that blank areas are irrelevant; rather here no change in terms of up-skilling and knowledge upgrading is needed. The darker the area shaded the more important it is in the scenario.

In order to quickly pick up new trends *knowledge* is required: knowledge of IT, internet and e-commerce, but also more technical knowledge, related to new media and techniques for printing and publishing in both transformation scenarios. In order to survive in the high globalisation and technological scenarios, knowledge of strategic management will become increasingly important, as this can provide companies and management with tools and ideas for new services and business lines. In scenarios where ownership is not limited, consolidation will take place. Managers need to be able to assess the worth of their company. They also need financial knowledge in the *Regulated Continuation* scenario, as the market forces companies to economise strongly.

In both the 'regulated' scenarios the government has a great deal of influence. Legislative knowledge is therefore needed in these scenarios to enable companies to influence decisions. In the Free continuation scenarios, environmental problems create pressure on companies, which is not the case in the free transformation scenario. Therefore skills will emerge in relation to knowledge environmental management.

Besides knowledge due to government influence**,** *social skills* such as communications skills and networking skills are important in both 'regulated' scenarios. In all scenarios networking skills to find strategic partners are important, in order to become more efficient (*Free Continuation* and *Regulated Continuation*), or to gain expertise with new markets and technology (*Free Transformation* and *Regulated Transformation*).

Other *social skills* that are changing are skills linked to staying in touch with the environment and the organization itself and be receptive to possible changes. In the scenarios *Free Transformation* and *Regulated Transformation* social perceptiveness becomes important mostly to discover new possibilities. In the scenarios *Free Transformation*, *Free Continuation* and *Regulated Continuation* managers need to be involved with their employees as in these scenarios many changes in terms of volume, meaning that it is possible that many employees will lose their jobs, as a result of ongoing reorganisation. In all scenarios social perceptiveness will be of great influence, expressed by the colour black in the Table. Due to increased globalisation intercultural and language skills will become necessary in the *Transformation* scenarios where globalisation is a specific driver.

In all scenarios *management skills* are needed, such as strategic skills, but the degree to which this becomes more important varies. In the *Continuation* scenarios strategic skills do not vary much from current practice, but in the *Transformation* scenarios the range of possible strategic options become much wider. For instance, whereas in the past many companies were focussed on economies of scale and market size, in technology-driven markets smaller size within a network of companies might be more effective.

In all scenarios printing companies also have to revaluate their role and managers need different strategic skills. The strategic and visionary skills needed in the *Continuation* scenarios are mostly related to finance (corporate finance) and finances (accounting), to find opportunities for cutting costs and exploiting economies of scale. In Free *Transformation* finance skills are also important, as strategic options come with more complicated financing possibilities. Only in Regulated *Transformation* do these skills play a lesser role, as most companies are in a more comfortable position.

The need to become more efficient in both *Continuation* scenarios creates a need for change management and process optimising skills. Process optimising leads to reorganisations which can lead to job losses and resistance within the workforce, for

which change management is needed. In scenarios Free *Transformation* and Regulated *Transformation* changes will likely be more bottom up, as employee initiatives are highly welcome for finding new markets and opportunities. A high pace of innovation and reorganisations creates the need for coaching management style in all scenarios.

Reorganisations in the *Continuation* scenarios and consolidations in the *Free Transformation* scenario require analytic skills, in order to determine which parts of the organisation can be transformed, sold or bought efficiently and effectively. In both the *Transformation* scenarios all *problem solving skills* will be more relevant. These are related to initiative, multi-skilling, creativity and interdisciplinary functioning. Managers need to be creative and able to integrate concepts from various parts of the organisation in order to innovate, but also to be able to act on emerging opportunities.

Furthermore, being able to adapt to changing conditions in both *Transformation* scenarios, requires *self-management skills*, meaning that managers need competences to improve the flexibility and multi tasking. In *Regulated Transformation*, however, these skills are less important, as the number of companies is more stable. In this scenario the focal point is on knowing the customers.

Finally, *entrepreneurial skills* in the printing and publishing sector are related to creating opportunities successfully. This means that management needs to have a strong understanding of the needs of customers and that they need to have strong marketing skills. Furthermore, trend spotting and business development becomes highly important in the more innovative scenarios.

13.3 IT professionals & engineers

The *Transformation* and *Continuation* scenarios are very similar for IT professionals and engineers (see Table 13.3). The most important difference between scenarios *Free Transformation* and *Regulated Transformation* and between *Free Continuation* and *Regulated Continuation* is the focus of the required ICT activities. In the first two scenarios the focus is on developing new services and ICT solutions and keeping up with changes in the environment. In the second two scenarios ICT will be mostly used in order to streamline the organization. In all cases IT professionals and engineers need to adapt to changing working conditions. Moreover, for IT professionals there are little differences between sub-sectors, in terms of skill needs changes.

For ICT & engineering professionals *knowledge* is a major asset and in all scenarios, IT professionals and engineers need to keep up with developments, although in the high technology scenarios these developments will go faster. This means that IT professionals and engineers need more intensive knowledge of ICT, digital workflows, programming and mark-up languages, cross media platforms and products. Furthermore, systems knowledge regarding systems integration will become more demanded as more products and platforms will emerge. Other more *general programming skills* and *other e-skills* will be relevant, particularly so in the high technological scenarios. These developments also mean that for IT-professionals and engineers the ability to learn in all scenarios is vital, but in the both Transformation scenarios knowledge is key.

Table 13.3 Emerging skills and competences IT professionals & engineers

		Transformation		Continuation	
		Free	Regulated	Free	Regulated
Knowledge	Legislative / regulatory knowledge				
	e-skills				
	Technical knowledge (new media and products)				
	Programming and mark-up languages				
	Digital workflows				
	Database (publishing), design, management				
	Systems integration				
	General Management				
	Environmental management				
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		22	23	13	12
Scenario characteristics:					
Globalisation		Fast	Fast	Slow	Slow
Technological change		Fast	Fast	Slow	Slow
Lifestyle new content & media		Virtual	Virtual	Traditional	Traditional
Lifestyle individualisation		High	High	Low	Low
Regulation media		No	Yes	No	Yes
Regulation environment		No	Yes	No	Yes

Note: shaded areas highlight specific skills and knowledge that will become relatively more important in the future, and require up-skilling and knowledge upgrading. This does not mean that blank areas are irrelevant; rather here no change in terms of up-skilling and knowledge upgrading is needed. The darker the area shaded the more important it is in the scenario.

Due to change foreseen in all scenarios and the major role management has is these scenarios, IT professionals and engineers need to be able to speak and understand their language, for which they require *management skill*s. Also, in the scenarios where environmental problems play a role, *environmental management skills* are needed.

In all scenarios *social skills*, such as communication, team skills and social perceptiveness are needed. These skills are needed in order to create workable solutions for both customers and colleagues. The difference between the high and low technological scenarios is that in *Free Transformation* and *Regulated Transformation* professionals need to cope with a globalising world and have to overcome language barriers and need to pick up trends and consumer demands easily and most importantly to be able to translate new demands into workable functionalities.

In the scenarios *Free Continuation* and *Regulated Continuation* the internal organization becomes important, with colleagues being the end users of ICT systems. Professionals need to be able to analyse company processes, diagnose problems and translate these into workable solutions. In the *Transformation* scenarios the main emerging *problem solving skils are analytic skills, creativity and* initiative, as fast technological developments demand that those who are able to understand these developments best, are best able to identify and act upon emerging business opportunities in a creative way.

Besides initiative to do something with developments, trend setting and spotting skills are major emerging *entrepreneurial skills* in the high technological scenarios, as well as the ability to understand customers and suppliers. In all scenarios business development skills are required, as in all scenarios companies are forced to react to the changing business environment.

The changing environment creates a need for *self management skills*. Again the two high and the two low technological scenarios are similar. High technological development put additional stress on IT professionals and engineers and require them to work flexibly. As the pace of change in *Regulated Continuation* is slower than in *Free Continuation*, less flexibility skills are required in this scenario.

Finally, *management skills* for IT professionals and engineers that emerge are different in the *Transformation* and the *Continuation* scenarios. Team building and coaching skills and process optimising skills in the *Continuation* scenarios are needed to improve efficiency and to cope with changes related to increased efficiency. In the high technological scenarios team building and strategic and visionary skills are demanded as IT professionals and engineers need to seize opportunities and motivate each other.

13.4 Business & finance professionals

For business & finance professionals the major difference between the scenarios is the distinction between outward-looking (scenarios *Free Transformation* and *Regulated Transformation*) and inward-looking (*Free Continuation* and *Regulated Continuation*). For business & finance professionals scenarios *Free Transformation* and *Regulated Transformation* mean diversification, flexibility and creativity, while *Free Continuation* and *Regulated Continuation* mean specialisation of the organisation, specialisation of the skills of the professionals and the ability to make the organisation more efficient (see Table 13.4). There is some distinction between business professionals and finance professionals, as finance professionals are less involved in developing and marketing of products, while business professionals are only to a certain extent involved in all financing and accounting mechanisms.

Table 13.4 Emerging skills & competences Business & finance professionals

		Transformation		Continuation	
		Free	Regulated	Free	Regulated
Knowledge	Legislative / regulatory knowledge				
	e-skills				
	Technical and product (new media)				
	Digital rights protection				
	Environmental knowledge				
	Finance, accounting				
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		21	22	12	14
Scenario characteristics:					
Globalisation		Fast	Fast	Slow	Slow
Technological change		Fast	Fast	Slow	Slow
Lifestyle new content & media		Virtual	Virtual	Traditional	Traditional
Lifestyle individualisation		High	High	Low	Low
Regulation media		No	Yes	No	Yes
Regulation environment		No	Yes	No	Yes

Note: shaded areas highlight specific skills and knowledge that will become relatively more important in the future, and require up-skilling and knowledge upgrading. This does not mean that blank areas are irrelevant; rather here no change in terms of up-skilling and knowledge upgrading is needed. The darker the area shaded the more important it is in the scenario.

Moreover, there will also be differences between the smaller and larger firms. In the latter tasks are more specialised and formalised. Therefore in smaller firms changes in skills requirements will affect the professionals even more.

In all scenarios *knowledge* becomes more important. Judicial knowledge in the *Transformation* scenarios is needed about the application of new techniques and services, while in the other scenarios the legal knowledge that is required focuses on corporate governance, mergers and acquisitions, contract regulations, needed for consolidations.

Also, in the high technological scenarios, e-skills and technical knowledge are demanded, in order to be able to create new opportunities. Especially for publishing companies knowledge of generating traffic though internet is important. An understanding of new products and services is vital for being able to sell these new services and are therefore especially important for business professionals. Also, due to digitalisation of products, the protection of these products becomes an issue. Knowledge about the protection of digital products has to be improved. As was the case for engineers and IT-professionals, knowledge for higher educated professionals is crucial and therefore these professional have to have a great ability to learn, or be able to learn how to learn.

In both *Continuation* and *Regulated Transformation* knowledge of environmental management and regulation is important and even more important is the ability to strategically use regulations for gaining a better market position, especially when regulation is pushing down margins.

One of the major changing categories are competencies related to *social skills*. Globalisation, technological developments and regulation necessitate communications and networking skills, as business professionals need to be able to promote their company in diverse ways. Language and intercultural skills emerge because of increased globalisation. Social perceptiveness changes in all scenarios, although in the technological scenarios these are directed towards customers and in the low technological scenarios co-workers are the primary object of attention.

Self-management skills and *problem solving skills* provide ways for increasing efficiency and keeping up with developments. Analytical skills and stress management, because of exciting opportunities in the globalisation and technology scenarios and because of downward pressure in the low technology and globalisation scenarios, are used differently in each scenario. Additionally, creativity and flexibility are needed to reap the benefits of new opportunities due to technological change and globalisation. For the same reason are multitasking skills important, in all scenarios, in order to cope with changes in the sector.

Entrepreneurial skills are required in all scenarios, as companies depend on business & finance professionals for the future of their business. Besides differences between the more positive scenarios *Transformation* and the efficiency focused scenarios *Continuation*, there are some differences between scenarios *Free Transformation* and *Regulated Transformation*. In *Free Transformation* the focus is more on establishing new relationships, as customers are very volatile, while in *Regulated Transformation* the focus is on existing customers. In *Free Transformation* the focus on colleagues of business & finance professionals is needed as well, as strong competition will drive many companies out of business.

Finally, *management skills* are different in the high and low technological scenarios. In the high technological scenarios management skills, such as strategic and visionary, project management and team building skills are required in order to stimulate co-workers, handle projects correctly and to be able to grasp opportunities that emerge in the

high paced environment. In the low technological scenarios, team building and coaching, change management and process optimising are increasingly used to increase the chance for company survival and to deal with the consequences of the chosen strategy.

Box 6. Example of changing job profile of a product manager

Internet and modern communication technologies are changing the publishing sector strongly. Hence, in Germany, product managers are not only responsible for books or printed products, but all possible products are in focus. Their responsibility covers the whole process, marketing and distribution, the product development process and serves as interface between production and client. Besides these more classical qualifications of a merchant, there is a stronger pronunciation of knowledge about different data formats for digital media content and their operation. Additionally a stronger emphasis is placed on foreign languages due to the stronger internal competition and co-operation in the sector. These changes are of relevance for publishing as well as multimedia corporations. Source: Verordnung (2006)

13.5 Journalists, editors and writers

As was shown in the discussion of volume changes, the occupational categories of journalists, editors and writers are only relevant for the publishing sector. Although these functions contain different function groups, boundaries between these different functions are blurring. Another aspect of this function is that it is relatively easy to outsource to freelancers or other part-time positions.

In the high technological scenarios (*Free Transformation* and *Regulated Transformation*) most changes are relevant for journalists, editors and writers, while in the low technological scenarios very few changes take place in the competences required. In the high technology scenarios journalists, editors and writers have a variety of possibilities to publish their content and endless possibilities emerge for those able to capture them. In the lower technology scenarios not many changes occur, except for a decrease in the volume as was identified before, meaning that journalists, editors and writers will face unwanted changes and need to adapt accordingly. Most job specific requirements do not vary considerably from what the skills and competences are at this moment.

Box 7. Example of changing competences for journalists

The International Labour Organisation (ILO) prepared a report for the tripartite meeting on the future of work and quality in the information society: the media, culture, graphical sector in 2004. In this report changes within job functions in several sectors as a result of technological progress have been investigated. Digital production and electronic workflows are nowadays common in the publishing sector throughout the world. The merging of print and digital content in newspaper publishing changed the profile of most journalists. They needed to learn various database-driven content management systems, the use of several application programmes as well as carrying out technical production work. Journalists acquired a lot of new skills during the last years which are not necessarily the core of their business, e.g. printing journalists involved in the production of streams for the homepage. 'Multiskilling' is the catchword to describe these recent developments. But on the other hand, the workload increased and quality diminished, one expert stated in the report.

Source: ILO (2004)

Competences in the scenarios *Free Transformation* and *Regulated Transformation* relate mostly to professional *knowledge* and new competences related to new technologies and services. Having the ability to learn continuously is therefore a major strength for journalists, writers and editors. The profession has to get (further) accustomed to new organisational structures and the prolific use of computer programmes and new multimedia options. Knowledge about digital workflows, cross media platforms, and other technical knowledge are necessary in order to perform well in these scenarios. Furthermore, in the regulated scenarios knowledge about media regulations is an asset. In the low technological scenarios the category of journalists, editors and writers are under increasing pressure from management and business professionals to operate even more efficient. In order to live and stand up to these pressures, management and financial knowledge can be very useful.

Due to globalisation, *social skills* related to international contacts will be necessary, such as intercultural skills, language, but also networking. Social skills are necessary in order to better understand new developments, but also to be able to understand how to use new media as a way to bring news to a highly diversified audience. Being able to understand is also related to communication skills, which are considered to be essential in all scenarios. Communications skills are also relevant for dealing with co-workers, but also with other stakeholders and finally for reporting. In the low globalisation as well as in the high globalisation scenarios, *social perceptiveness* becomes more important, in order to quickly pick up signals and to be able to cope with changes.

A different change is the shortening time between writing and publication, brought about by the influence of new technology and globalisation creates the need for journalists, editors and writers to *problem solving skills*, such as interdisciplinary skills, multi skilling and creativity, but also more *self management skills*, such as flexibility. In the low technology and globalisation scenarios, flexibility is still important, as efficiency pushes journalists, writers and editors to take on diverse tasks, so as to improve efficiency. In order to accomplish many different tasks they also require planning skills.

In the *Transformation* scenarios - even though in *Regulated Transformation* changes are less dramatic and require less adaptation - new services and new media opportunities need to be taken up by the journalists, writers and editors. They therefore have to gain more *entrepreneurial skills*. Furthermore, *management skills*, such as project management and strategic and visionary skills should ensure that journalists and writers are successful in setting up new services.

In the scenarios *Free Continuation* and *Regulated Continuation* changes in competences relate to organisational changes. It is unlikely that journalists, editors and writers will have a large influence on the organisational structure. They therefore simply have to adapt to changes within the organisation. They can, however, train themselves in *management skills* to gain more influence in strategic choices. In the Transformation scenarios these skills are also important, as well as project management skills. The management skills relate to strategic and visionary skills and change management, which are also needed to implement changes forced upon the organisations.

Table 13.5 Emerging skills and competences Journalists, editors, writers

		Transformation		Continuation	
		Free	Regulated	Free	Regulated
Knowledge	Legislative / regulatory knowledge				
	e-skills				
	Technical knowledge (new multimedia)				
	Financial, management				
	Software (digital workflows & cross media)				
	Programming and script writing				
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		18	19	7	8
Scenario characteristics:					
- Globalisation		Fast	Fast	Slow	Slow
- Technological change		Fast	Fast	Slow	Slow
- Lifestyle new content & media		Virtual	Virtual	Traditional	Traditional
- Lifestyle individualisation		High	High	Low	Low
- Regulation media		No	Yes	No	Yes
- Regulation environment		No	Yes	No	Yes

Note: shaded areas highlight specific skills and knowledge that will become relatively more important in the future, and require up-skilling and knowledge upgrading. This does not mean that blank areas are irrelevant; rather here no change in terms of up-skilling and knowledge upgrading is needed. The darker the area shaded the more important it is in the scenario.

13.6 Support staff

In all scenarios support staff will be somewhat less affected by changes compared to the functions discussed before (see Table 13.6). The main difference between the scenarios is in the pace of technological development, which makes the speed of operations faster and time constraints and stress levels higher. In the scenarios *Free Continuation* and *Regulated Continuation* developments do not add to increasing speed of operations but to their efficiency. There is a difference for these functions for the different sub-sectors. In the printing sector support staff employees constitute the link between customer planning and production planning. Especially in individualised societies changing fast, people want fast service and are easily dissatisfied.

In terms of skill changes the high technology scenarios mean that support staff employees need to have more *knowledge* and understanding of digital workflows. Moreover, they need knowledge of new software and developments in software.

Shorter production times, higher degrees of customisation and increasing pressure from customers create the need for additional *social skills* and *self management skills* in the high technological and globalisation scenarios. Communication skills and team working skills are needed to be able to adequately play a role as intermediate between customers and the production side of the company. The self management skills are time management skills and flexibility as business is accelerating. In the scenarios *Free Continuation* and *Regulated Continuation* there is only little change in competences, except that support staff generally needs to plan and operate more efficiently, and therefore need to avail of flexibility and planning skills. The reason why flexibility is also an emerging competence in the low technological scenarios, is because the expected decrease of support staff will provide them with additional tasks.

To be able to play their role as intermediate between production and customers, especially in the printing sector, support staff needs to have *entrepreneurial skills* to be able to understand their customers and suppliers. This will increase their effectiveness in dealing with specific requests.

Finally, project management and process optimisation, are emerging *management skills* for the support staff, in the *Transformation* scenarios and the *Continuation* scenarios respectively. Project management enables support staff to successfully manage the short runs and diverse products. Where processes are more likely to continue around the same lines, process optimisation skills will enhance efficiency and the effectiveness of the organisation, in cases where diversification is not possible.

Table 13.6 Emerging skills and competences Support staff

		Transformation		Continuation	
		Free	Regulated	Free	Regulated
Knowledge	Legislative / regulatory knowledge				
	e-skills				
	Applying integrated production system software				
	Digital workflows				
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		9	9	3	3
Scenario characteristics:					
Globalisation		Fast	Fast	Slow	Slow
Technological change		Fast	Fast	Slow	Slow
Lifestyle new content & media		Virtual	Virtual	Traditional	Traditional
Lifestyle individualisation		High	High	Low	Low
Regulation media		No	Yes	No	Yes
Regulation environment		No	Yes	No	Yes

Note: shaded areas highlight specific skills and knowledge that will become relatively more important in the future, and require up-skilling and knowledge upgrading. This does not mean that blank areas are irrelevant; rather here no change in terms of up-skilling and knowledge upgrading is needed. The darker the area shaded the more important it is in the scenario.

13.7 Pre-press workers

In all scenarios changes in the pre-press activities have one element in common, namely that pre-press activities are seen as the major node around which relations between customers and companies form and develop. They are the interface between production and the customers and need to translate customer demand into workable formats. The difference between the high and low technology scenarios is that more technology adds to the number of skills pre-press workers need to acquire, and that pre-press activities are focussed more on new technologies. In the low technology scenarios pre-press workers are responsible for streamlining the whole process from client to production.

In scenarios *Free Continuation* and *Regulated Continuation* this means that pre-press is vital for companies as they struggle to keep themselves afloat. Moreover, as changes do not go very fast it is more likely that customers are themselves to a large extent accustomed to the techniques. Pre-press should realise that they should not bother them with technological details and take this on themselves. Pre-press activities are still too much focussed on technological aspects, rather than commercial and social aspects. Therefore social and communication aspects are central in *Free Continuation* and *Regulated Continuation*.

In all scenarios the importance of technical knowledge and e-skills will increase, however this is more apparent in the scenarios where technology is changing fast. Changing soft- and hardware can give rise to problems if customers do not provide the correct format for their data. The technical orientation of pre-press workers will remain a vital part in to these scenarios. The technological aspect is also related to new electronic workflows, updating of knowledge and improving processes. Employees working in pre-press need to be familiar with different kinds of techniques and multimedia possibilities, also in relation to the use of the product. There is a danger that traditional pre-press skills, related to typesetting, colour picking, more general graphical skills, are neglected due to the rise of new technologies. Although it remains a question to what extent traditional skills are needed in new multimedia settings, companies need to make sure that the more traditional skills are given the attention they deserve.

Improving processes and reduction in the use of natural resources is an important skill in the scenarios *Free Continuation* and *Regulated Continuation*, as the focal point is on providing services efficiently and lack of natural resources is putting pressure on operating margins. In the scenarios *Regulated Transformation*, *Free Continuation* and *Regulated Continuation* also knowledge of environmental management is important. Knowledge of regulations is particularly important in the 'Regulated' scenarios.

Besides the technical component, in all scenarios *social skills* become a vital aspect of the work of pre-press workers. They need to be able to understand both the customers, their co-workers and be able to effectively communicate demands and wishes. For pre-press workers this also relates to translating demands into outputs, which also requires insight into visual communication. Furthermore, in the high technological scenarios, great cooperation is needed between production, support staff and pre-press workers, as production becomes increasingly flexible.

Table 13.7 Emerging skills and competences Pre-press workers

		Transformation		Continuation	
		Free	Regulated	Free	Regulated
Knowledge	Legislative / regulatory knowledge				
	e-skills				
	Digital workflows				
	Environmental management				
	New multimedia knowledge				
	Cross media platforms				
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		20	22	10	11
Scenario characteristics: Globalisation Technological change Lifestyle new content & media Lifestyle individualisation Regulation media Regulation environment		 Fast Fast Virtual High No No	 Fast Fast Virtual High Yes Yes	 Slow Slow Traditional Low No No	 Slow Slow Traditional Low Yes Yes

Note: shaded areas highlight specific skills and knowledge that will become relatively more important in the future, and require up-skilling and knowledge upgrading. This does not mean that blank areas are irrelevant; rather here no change in terms of up-skilling and knowledge upgrading is needed. The darker the area shaded the more important it is in the scenario.

A strong customer orientation furthermore requires *entrepreneurial skills* and *problem solving skills*. Creativity can help pre-press workers to come up with creative ideas for new services and initiative is needed to pursue these ideas. Ideas come from a good understanding of the customers and others and partly from marketing skills. For creating a successful new service, business development skills are a useful tool for pre-press workers. Understanding customers and suppliers is the only entrepreneurial and problem solving skill that emerges in low technological scenarios, as little opportunities exists in these scenarios for new service lines. Finally, as pre-press workers are important in aligning different parts of the organisation with customer wishes, multi skilling is important.

New products put additional demands on pre-press workers in terms of *self-management skills* and *management skills*. Rapid developments and changing circumstances ask for a flexible work attitude and the ability to accomplish different tasks at the same time. Also, project management skills are useful for the accomplishment of a great number and variety of tasks. In order to cope with these developments, new planning skills are required, which provides ways for flexibility and guidance into project progress. Pre-press workers should be able to motivate others into establishing new products and services. Additionally, in all scenarios, pre-press workers should keep track of the quality, safety and environmental impact of the work as they have knowledge of the complete process. In the lower technological scenarios pre-press workers need to focus on doing better what they have been doing so far. This means that they have to be able to plan their activities better and to further optimise their production processes.

Box 8. Example of a changing job profile in pre-press

In 2001 Intergraf and UNI-Europa Graphical undertook a survey about existing job profiles in the European Printing and Publishing industries and their transformation. Trade unions and employer organisations were asked whether there are new job profiles are created or planned and whether there are any skill shortages in the sector. In nearly all countries the survey identified skill shortages in printing and ongoing changes in the job profiles due to new information and communication technology, especially in the pre-press sector.

In Germany, a new job profile was established in pre-press. Most important changes were the integration of the application of new media technology in old job requirements (e.g. reprographer and typographer). This change is reflected in training institutes as well. Nowadays, in the curriculum, there are three different fields of specialisation: counselling and planning; conceptualisation and visualisation; and form layout and technology. Due to ongoing technical changes the work scope of conceptualisation and visualisation is the result of the merging competencies of media design and media operation. The focus of this specialisation is design, but due to the merging of different digital and print media technologies the operation with different data formats is also necessary. Additionally, the application of quality management systems is one of their new tasks. The focus of the last specialisation is production oriented. It also has some design elements in training, but mainly to implement the customer demands. For this reason, co-ordination of results with the customer is one of its new qualifications. In the first specialisation there were no major changes made except of a stronger emphasis on marketing and customer relationship management.

All countries of the survey reported that discussions about similar changes are taking place.

Source: InterGraf, Uni Europa Graphical (2001); Verordnung (2007).

13.8 Production workers

For production workers more tasks and flexibility in performing these tasks are the main emerging competences (see Table 13.8). In all scenarios the number of production workers will decrease and this will affect their skills, as they are given more and different tasks. The main difference in skills and competences is in the causes of change. In *Free Transformation* and *Regulated Transformation* changes are caused by changes in technology and time to market. In the other scenarios changes arise from increased efficiency and lack of new workers. For this reason the number of tasks they have to perform will increase, as they take on tasks that were previously done by others for efficiency reasons.

In the scenarios *Free Transformation* and *Regulated Transformation* production workers have to be more knowledgeable about technology and its possibilities, as they will have to deal a lot more with state of the art technology, which in many cases will not work optimally as yet. Knowledge of digital workflow becomes more important in all scenarios, especially in the high technological scenarios.

Other forms of *knowledge* about health and safety will become important in all scenarios. Production workers are vital for environmental management and reduction of waste. Due to their experience they are able to minimise waste and therefore save costs. In the regulated scenarios, environmental management and regulatory knowledge can help companies comply with regulations but also in *Free Continuation*, knowledge of environmental management can help address environmental problems and prevent loss of sales due to environmental scandals.

In the *Transformation* scenarios, with high globalisation and technological growth, *social skills* will help production to function more effectively. As shorter runs and greater demands are placed upon the production cooperation with other departments is vital, requiring team working skills. Besides team working skills, communication skills will have a more prominent role. As demands become greater, production workers also need to make their view clear to others and be able to communicate in an effective way.

As demands are greater for production workers in all scenarios, initiative and analytical skills are emergent *problem solving skills* that will become more important. Production workers need to be able to signal problems and most importantly to address these problems themselves. Increasing analytical skills are clearly related to this.

In all scenarios the production workers have to gain *self management skills*, to cope with changes and increasing pressure, either from fast developments, or from pressures to reorganise. Flexibility and multitasking is therefore different in the all scenarios, as this means that more tasks are appointed to production workers in the *Free Continuation* and *Regulated Continuation* scenarios. In the scenarios *Free Transformation* and *Regulated Transformation* there is a voluntary element involved, including more responsibility, which is not the case in the other scenarios.

Table 13.8 Emerging skills and competences Production workers

	Transformation	Continuation

		Free	Regulated	Free	Regulated
Knowledge	Legislative / regulatory knowledge				
	e-skills				
	Technical knowledge (new products and services)				
	Digital workflows				
	Environmentally friendly production methods				
	Health and Safety				
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	15	10	11
Scenario characteristics:					
Globalisation		Fast	Fast	Slow	Slow
Technological change		Fast	Fast	Slow	Slow
Lifestyle new content & media		Virtual	Virtual	Traditional	Traditional
Lifestyle individualisation		High	High	Low	Low
Regulation media		No	Yes	No	Yes
Regulation environment		No	Yes	No	Yes

Note: shaded areas highlight specific skills and knowledge that will become relatively more important in the future, and require up-skilling and knowledge upgrading. This does not mean that blank areas are irrelevant; rather here no change in terms of up-skilling and knowledge upgrading is needed. The darker the area shaded the more important it is in the scenario.

Finally, emphasis is placed upon the management skills of production workers. In all scenarios quality management will play a vital role in all companies, as consumer demands grow, as well as legislation and company demands. In the *Transformation* scenarios many different projects need to be dealt with successfully, which means that project management skills are the main emerging management skill, as well as process optimising. The latter is also relevant in the *Continuation* scenarios. The reason for this is that in fast developments, optimisation of processes is difficult to manage. In the scenarios with less change this is the only way to ensure company survival, however.

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.

14 Strategic choices to meet emergent competence needs

14.1 Introduction

This chapter identifies the main strategic choices to meet the skills and knowledge needs identified (step 7). It provides a framework to pick and select the most relevant strategic choices – i.e. solutions to meet future skills and knowledge needs - available. Strategic choices refer and relate to the medium- and longer term, even though emerging skills needs in practice may also apply to the now and tomorrow. Essential in seeking appropriate solutions is to keep this longer 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 follow. Prioritising both in time (what first, where to follow up) and in allocation of resources (budgetary focus) followed by further fine-tuning is a clear necessity to guarantee that skills needs are targeted and solved. Skill needs can be identified at various levels, ranging from assessments at the national or even European sector level - which are by nature rather general - to more precise assessments at the regional and company level. Especially for large enterprises not only the identification of skills needs but also 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 (re)training trajectories and by active global sourcing of personnel. For SMEs and especially for micro-enterprises[13] such longer-term, more strategic human resource management often will be more difficult to organise and operationalise. It should be emphasized that at all possible levels identified different actors need to act to address skills needs and offer solutions and preferably also in close concert. These can be individual firms, organised interests at the sector level (employers and employees), but also others. Local, regional and national governments have also a important role to play. This chapter offers first of all a better insight in the 'menu' of possible strategic choices (section 14.2). It also provides for a framework that can identify skills needs at the appropriate level and helps to decide which should be the actual choices to be made (see section 14.3). This framework is subsequently applied to the printing and publishing sector (section 6.4 and following).

14.2 Possible strategic choices

The possible strategic choices contained in this chapter refer to the strategic choices originally proposed by Rodrigues (2007: 42) as well as a number of other, additional choices. Whereas *strategic* choices mostly refer to the medium and longer term, most of the choices mentioned can also be implemented in the short run, to 'mend' existing skills shortages and/or skills gaps. Each of the solutions at hand differs in whether or not it can resolve direct skills shortages and/or gaps. A longer term horizon, however, means that there is possibility of adapting, steering and fine-tuning the available solutions towards a more optimal allocation of skills supply and demand. In view of the time horizon, the period up to 2020, the strategic choices and instruments with a more long-term impact especially need to be addressed. Identification of possible solutions obviously is not enough. Concrete initiatives, policy and strategic decisions need to be taken at all appropriate levels with each actor having a different responsibility and a different role to play.

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

Strategic choices to meet future skills needs need to be taken by a number of actors and at different levels (firm, local, regional, national, sectoral). For obvious reasons, firms are an important player in finding solutions for the skills needs – both in volume (skills shortages) and in matching any existing skills gaps. Companies avail of a number of options to meet their skills needs. These include:

A. Recruiting workers from other sectors
B. Recruiting workers from other Member States
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 network collaboration and mergers)
H. Outsourcing and offshoring.

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 general and 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 strategic options can be found in annex III. Whether these strategic options are feasible and viable depends on a number of factors. In order to discuss and select from the available list of strategic options, one should first - as described in the introduction - know whether and when skills needs are indeed likely to arise, both in quantitative (number of job functions) and in qualitative terms (what knowledge and skills). An important question that needs to be addressed first is at what level and to whom the skills needs question applies. Obviously for an individual firm different information is required for identifying these needs and taking the right action than for a national ministry or a training institute.

The identification of possible strategic choices would in principle require extensive and detailed future analysis at the Member State and preferably also the regional level of skills and knowledge demand and supply patterns by job function and sub-sector, in a similar way and along the steps provided by the methodology of this study so far. The methodology and step-wise approach followed are applicable at the national and regional level of analysis. Ideally, these results should be complemented by the results of labour market model forecasts to corroborate results. 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 both in terms of numbers of new potential recruits and in terms of skills and knowledge.

14.3 Matching future skills and knowledge needs by making the right choices

In order to address the identified future skills and knowledge needs in an encompassing and timely manner, appropriate joint action is needed by all stakeholders, including the industry (firms, sector organisations and social partners), training and education institutes, intermediary organisations and, last but not least, government at all levels (EU, national, regional and local). Collaboration and co-operation between stakeholders will be needed, at all decision-making levels, in order to agree on and implement a package of feasible solutions. In order to prepare for this, timely, targeted and reliable information is essential.

This section presents a targeted short-cut strategic options decision tool to enable and support decision-makers in making the right (mix of) choices, supported by appropriate and reliable information on actual needs, possible choices and stakeholders to be involved. The strategic options decision tool is aimed to provide answers and solutions at the job function level and consists of a shortlist of a number of key questions - a concise menu of choice -, with answers providing decision-relevant information about the need and viability of available options. The questions need to be answered at the national, and where relevant at the regional level so as to map and identify the specific sector needs. The decision tool can also be used at the level of the firm. New job function information (e.g. new upcoming functions) can be added where thought relevant.

The key question list – consisting of six 'framing' questions, followed by option-specific questions - should be filled in for each job function. The 'framing' questions constitute a summary of main expected quantitative and qualitative skills needs developments. The filling in of the list should, however, 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 knowledge requirements at job function level and developments in and make up/orientation of the educational and training system.

Key questions for identifying skills and knowledge needs

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. *[Note: see Table 12.1 for estimated volume effects per scenario.]*

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

> If there are not many changes in required skills and knowledge, there is probably no need to apply many strategic options. Please focus on the options that are most effective.

If many skills and knowledge categories are changing, there is probably a need to apply many strategic options. Create a package of strategic options to meet skill needs. *[Note: see Table 13.2 and following for the number of competences changing per job function per scenario.]*

Question 3. Do SMEs 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. *[Note: see Table 3.10 for number of firms per size class.]*

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. *[Note: see relevant section in chapter 4.1]*

Question 5. Are workers in a job function in general low-educated (i.e. clearly lower educated than other job functions in the sector and in other sectors)?

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. *[Note: see Table 3.11, for education shares]*

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)? *[Note: see section 3.11, for age structure.]*

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.

Key questions for identifying suitable options and relevant acting stakeholders

The six questions form the first part of the short-cut approach. The second part discusses the viability of strategic options to tackle and solve emergent skills and knowledge needs for each of the job functions identified. It confronts the list of available strategic options with the analysis of quantitative and qualitative developments on headlines based on the preceding six questions. For each job function identified an assessment is made on whether the available strategic options are relevant or not, and who should be prime actors to change the current situation into a more favourable direction. If the strategic option is considered relevant, a "yes" is filled in, else a "no" is included. If the strategic option is dependent on specific characteristics of the sub-sector or components thereof, this is 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 most challenging scenario in terms of change required)
- The change in skills (as a reference we include the most difficult scenario, which is often the scenario with the largest change in skills and knowledge needs)
- Education level
- Age of the workforce
- Scale of the company and region the company is working in.

In principle, the following tables can be made scenario-dependent. In the descriptions below, the Free Transformation scenario has been taken as the point of reference as the most demanding and dynamic in terms of up-skilling, knowledge upgrading and change.

14.4 Managers

Table 14.1 presents viable strategic options for emergent competences of managers in both the free transformation scenario and the regulated transformation scenario for the printing and the publishing sector.[14] While there is no major increase in managers expected in both transformation scenarios and both sectors, no skill shortages are expected in this occupational function (see chapter 12). A decrease of managers in printing is likely to occur in the printing sector in the scenario free transformation. What has been detected are current skill gaps, identified both in the workshops and in the literature (e.g. Skillset, 2005; Proskills, 2006; ILO, 2004).

In principle, all listed strategic options are viable to meet the emergent skill needs of managers in printing and publishing. Still, some of these strategic options are more probable. Viability moreover depends on firm size and identified skill needs. Hence, recruiting managers from other sectors is a more viable option for larger publishing companies where, in general, more management functions are needed. For SMEs, especially those in the printing sector, this is a less viable option. This is related to the identified skill needs, "strategic vision" and "technical understanding", both of which make a deep understanding of the sector and its inherent driving forces necessary. Nevertheless, some experts in the sector consider hiring managers from other sectors as a possibility to gain fresh ideas and new strategic visions for the companies in a fast changing business environment.[15]

Yet, this is not a real possible option due to the fact, that most businesses in the sector are small businesses, with the owner of the business also being the manager. For the same reasons, the recruitment of workers from other Member States and from non-Member States does not present a viable strategic option for SMEs in the printing sector. This is much more practical for larger publishing companies in the sector. Although knowledge about the sector can be expected by recruits from other Member and Non-member States, language barriers and a lack of the profound national publishing market will limit the scope of this strategic option for larger publishing companies. Recruiting unemployed presents an option for all companies but is expected in rare cases only for this occupational function.

[14] Where significant differences are expected in strategic choices between the two sub-sectors printing and publishing, these will be included in the text and accompanying Table.
[15] http://www.jobsinprint.com/store/Article.aspx?pid=69 from October 2008.

Table 14.1 Strategic options for Managers

1. What is the maximum volume effect?	Maintain	
2. What is the maximum change in skills?	22	
3. Do SMEs play a large role?	Yes (key role: about 70% of all employees working in SMEs)	
4. Is the sector national/EU/global?[16]	National/ EU	
5. Is the workforce old?	Yes[17]	
6. Is the workforce low educated?	No	
Option	**Is this option viable?**	**Actors[1]**
A. Recruiting workers from other sectors	Yes, mainly for emerging general management skills and for larger companies.	C
B. Recruiting workers from other Member States	Yes, mainly for large companies in the publishing sector.	C
C. Recruiting workers from Non-Member States	Yes, mainly for large companies in the publishing sector.	C, G
D. Recruiting unemployed with or without re-training	Yes, but only in rare cases. Only for lower and middle management.	C, E
E. Recruiting young people from the education system	Yes, apprenticeships and manager training for young professionals is solution for long term	C, E, S
F. Training and re-training employed workers	Yes, in-house promotion and further training.	C, E, U
G. Changing work organisation	Yes, but limited in scope for expected skill gaps in this occupational function.	C, U
H. Outsourcing and offshoring	Yes, for larger firms, but limited in scope in this occupational function.	C
I. Changing vocational education	No	-
J. Designing and offering new courses	Yes. Flexible forms of training are essential.	C, E
K. Providing information about emerging skills	Yes, mainly about emerging "softer" skills and sector specific qualifications.	C, E
L. Improve the image of the sector	No, not necessary for this occupational function.	-
M. Stronger cooperation between stakeholders	Yes, in particular to develop flexible and suitable training for SMEs managers.	C, S, E, G, I, U

Notes: 1. C (company), S (sector organisations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (Unions).

[16] The degree of internationalisation is different between the printing and the publishing sub-sector. While some products are produced and merchandised globally demand is mainly driven by domestic markets.

[17] 30% are older than 50 years and 28% are between 40 and 49 years (for details see Data Annex). While ageing is increasingly important, it has to be taken into account that age per se is not a barrier for employability or high productivity. This is in particular for management functions true.

The recruitment of young people from the education system and training or re-training of the existing workforce present more viable strategic options for all companies. Recruiting young people can help to keep the work stock stable, balance natural fluctuation and to gain new skills. Training and re-training is an adequate method to cope with the emergent skill gaps provided that the overall workforce in the occupational function is expected to level off or to decrease. The training content differs slightly due to the emergent needs in the different sectors and size of companies. Especially for SMEs in the printing and publishing sector strategic vision and business acumen skills are highly needed. This also holds for customer relationship management and several other soft skills like networking, communication and team building skills (see section 13.2). Training for an ageing group of managers, especially in the printing sector, is an important strategic choice.

While changing the work organisation, e.g. inter-disciplinary team work, is a viable but very limited option for meeting the emergent skills demands, outsourcing and offshoring is even less plausible for this occupational function. Outsourcing and offshoring for junior management functions in larger publishing companies is an even less practicable option because of the language barrier and the mainly national structure and organisation of the publishing markets.

Designing and offering new courses is a necessary and feasible option to meet skills demand for managers in the future. On the one hand the availability of courses, especially for SMEs, has to be improved (Skillset, 2005; Proskills, 2006; Pira 2007). On the other hand courses should refer stronger to the industry's need (CEC, 2007: 18).

Due to a general good reputation of managers and due to the availability of managers on the labour market, improving the image of this occupational function is not really required. However, the overall image of the sector is important and especially for printing the image is somewhat underrated, which might also affect the position of managers. Still, this option is more relevant for other positions.

14.5 IT professionals & engineers

Table 14.2 shows the strategic options for emergent competences of IT professionals. In both transformation scenarios an increase of this occupational function is expected. Hence, in general, all strategic options are within reach to meet the demand for this occupational function. The recruitment of workers from other sectors is a viable option since also generic IT skills are required for IT networks, IT support, maintenance and service. Computer professionals specialised in programming and operating the data processing in printing and publishing are, on the contrary, less likely to be recruited by companies from other sectors due to the specific sector knowledge and programming skills. This will only be a feasible option in combination with a sector specific training.

This is also the case for engineers. They could be recruited from other sectors due to their general knowledge in mechanics and electronics but will need specific training on the sector specific technical equipment. Recruiting members from other and non-Member States is a viable option provided that the language gap can be bridged. Due to an expected European-wide skill shortage these are strategic options mainly in reach for larger companies and Member States with a relative high wage level.

Table 14.2 Strategic options for IT professionals and engineers

1. What is the maximum volume effect? 2. What is the maximum change in skills? 3. Do SME's play a large role? 4. Is the sector national/EU/global? 5. Is the workforce old? 6. Is the workforce low educated?	Increase 23 Yes National/ EU No No	
Option	**Is this option viable?**	**Actors[1]**
A. Recruiting workers from other sectors	Yes, with sector specific training.	C, E
B. Recruiting workers from other Member States	Yes, for larger companies in the publishing sector more viable than for SMEs in the printing sector.	C
C. Recruiting workers from Non-Member States	Yes, for larger companies in the publishing sector more viable than for SMEs in the printing sector.	C, G
D. Recruiting unemployed with or without re-training	Yes, but limited in scope.	C, E, I
E. Recruiting young people from the education system	Yes, especially women could be attracted with special programmes.	C, E
F. Training and re-training employed workers	Yes, through flexible continuous vocational training during the whole working life.	C, E, U, S
G. Changing work organisation	Yes, especially for SMEs but limited in scope.	C
H. Outsourcing and offshoring	Yes, but more viable for ICT professionals than for engineers.	C
I. Changing vocational education	Yes, also important to train the trainers	C, E, I, G
J. Designing and offering new courses	Yes, especially flexible forms of training are essential.	C, E, I
K. Providing information about emerging skills	Yes, in respect to all emerging skills.	C, E, I, S, G, U
L. Improve the image of the sector	Yes, but not so important for this occupational function compared to others in the sector e.g. production	C, S, E, G
M. Stronger cooperation between stakeholders	Yes, in order to better match sector specific skills needs and training supply.	C, S, E, G, I, U

Notes: 1. C (company), S (sector organisations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (unions)

The recruitment of unemployed seems to be a viable option only in combination with sector specific training. In addition, this strategic option will be limited in scope due to the small numbers of unemployed IT professionals and engineers. Recruiting young people from the education system is another viable option to meet the skill gaps and shortages for IT professionals as well as engineers. A particular focus should be directed towards attracting female workers to this occupational function in the sector, which is still dominated by a male

workforce of 84% (for details see Data Annex). In order to overcome existing and emergent skill gaps within this occupational function continuous or life long training is necessary.

In both transformation scenarios technological change is fast as changes in lifestyle lead to the application and use of different media and information carrier. Therefore, the content of specific training (e.g. programming languages and maintenance of printing machines) will also change fast. In the light of these considerations, it will be important to train also the trainers and to develop and supply flexible training solutions to meet the changing skill and knowledge demand easily and to train the necessary soft skills, like flexibility, stress and time management in order to adapt to these changes. Also professional training in the IT area itself is crucial, for example to cope with the increasing needs for data security.

Outsourcing seems to be a limited strategic option for ICT professionals and engineers. In the case of outsourcing engineers in the sector, the whole production process has to be outsourced which means in the case of the printing sector the core of the business. For standard publication with high print runs in the book publishing sub-sector, production is already offshored to low cost countries such as China, or, as in the case of software development, to other Asian countries (India, Taiwan). Outsourcing the maintenance of ICT equipment is a viable option, if there is an around-the-clock service available and affordable. Changing the work organisation may provide a solution to overcome skill shortages especially for SMEs. For example, longer working hours, shift changes, job enlargement and stronger teamwork to combine soft and hard skills are possible strategic options to overcome skill shortages particularly in the engineering professions.

Due to rapid technological change in the transformation scenarios designing and offering new courses and providing information about emerging skills also for this occupational function seems to be a viable strategic option. To achieve suitable changes a stronger co-operation between relevant stakeholders should be developed. Training courses have to be adapted to new technological developments and should be better adjusted especially to the training needs of SMEs in the printing sector. The main challenge in designing and developing new courses will not be the specific content but the design of flexible and adequate forms of training for the more diverse printing and publishing landscape. Information therefore about emerging skill needs (emerging from business needs) is becoming more important, which enables adapting vocational education and further training to newly emerging needs. When aiming to develop and supply up-to-date trainings and training possibilities, strong co-operation between industry, training providers, social partner organisations, and the government is a viable and advisable option. This co-operation can also be used to make the sector more attractive for job entrants, especially for the engineering professions.

14.6 Business & finance professionals

Business and finance professionals are expected to increase in both sectors in both transformation scenarios. Besides the identified skill gaps also skill shortages can be expected in both scenarios. The group of business and finance professionals is quite a heterogeneous group containing accounting, sales, marketing and other business functions. For the purpose of meeting emergent skills demands all strategic options appear to be viable for this occupational function. However, some of these options are more appropriate for the printing sector than for the publishing sector and vice versa.

Recruiting workers from other sectors is a viable option to meet the identified skill needs. This measure could help to bring in fresh ideas and new insights from other sectors just as it is the case with managers. Due to technological changes in the sector and the blurring of sector boundaries vis-à-vis Internet and communication, hiring experts from this sector could be a possibility. Hiring experts from other sectors is supported also by the availability of the general skills needed to exert the tasks of this occupational function. These skills are, to some extent, sector-independent for accounting and finance functions as well as for sales and marketing. What has to be taken into account is, if workers from other sectors are hired, specific training will be necessary, especially for sales and marketing personnel in printing. The faster the change of technology in the sector, the faster the changes in possibilities for meeting customers' demand – sales personnel need to be aware of this.

Recruiting workers from other and Non-member States is a viable option provided that the language barrier can be bridged. In printing, for example, hiring West-European sales and marketing personnel could be a good option for SMEs in East and South East European countries to gain new knowledge and access to new markets. However, this strategic option is strongly dependent on the wage levels and therefore of limited success at the moment. Whether there will be an alignment of the different wage levels between countries until 2020 is quite uncertain. It is more feasible to recruit young people with the necessary language skills, or train the existing staff, or hire free-lance commercial representatives in the respective country. Due to existing national accounting regulations, the recruitment of workers from other countries is limited in this occupational sub-function. Recruiting unemployed is a possible option to overcome skill shortages but is of limited scope for the higher end of this occupational function. More feasible strategic choices are the recruitment of young people from the education system and the training or re-training of the existing staff. In the transformation scenarios a decrease of support staff is expected. This occupational function could be seen as a reservoir to meet the increasing demand for business and finance professionals. The most promising workers from this occupational function could be up-skilled and retrained as they already have special sector knowledge.

Changing the work organisation is a limited option to overcome skill needs. More promising is outsourcing and offshoring. Accounting and finance functions can be outsourced or even offshored and sales and marketing functions can be outsourced either to agencies or free-lance commercial representatives.

Modifications in vocational education (e.g. via tailor-made courses), up-to-date information about emerging skills, improvements of the image of the sector as well as solid co-operation between all stakeholders are viable and important strategic options. Especially, in order to attract skilled sales personnel to the printing sector. Still, updating courses to the latest developments in accounting should be provided. In addition, the sector should improve its visibility for sales and marketing specialists.

Table 14.3 Strategic options for Business and finance professionals

1. What is the maximum volume effect? 2. What is the maximum change in skills? 3. Do SME's play a large role? 4. Is the sector national/EU/global? 5. Is the workforce old? 6. Is the workforce low educated?	Increase 22 Yes National/ EU No No	
Option	**Is this option viable?**	**Actors[1]**
A. Recruiting workers from other sectors	Yes, a viable option due to sector independent general skills, but training needed.	C, E
B. Recruiting workers from other Member States	Yes, but limited due to national accounting regulation. More viable for large firms or Socieatas Europaea. Mostly relevant for business professionals	C
C. Recruiting workers from Non-Member States	Yes, but limited due to national accounting regulation. More viable for large firms and Socieatas Europaea. Mostly relevant for business professionals	C, G
D. Recruiting unemployed with or without re-training	Yes, but limited in scope (training is needed).	C, E, I, U
E. Recruiting young people from the education system	Yes, necessary to meet the expected increase.	C, E
F. Training and re-training employed workers	Yes, in particular to update skills of sales and marketing staff.	C, E, U, S
G. Changing work organisation	Yes, but limited in scope.	C
H. Outsourcing and offshoring	Yes, an option for some functions not only for larger companies.	C
I. Changing vocational education	Yes	C, S,E
J. Designing and offering new courses	Yes, in particular flexible courses for SMEs sales personnel.	C, E, U
K. Providing information about emerging skills	Yes, as part of making some occupational functions more visible to the public.	C, E, S, U
L. Improve the image of the sector	Yes	C, S, I
M. Stronger cooperation between stakeholders	Yes	C, S. E, I. G, U

Notes: 1. C (company), S (sector organisations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (Unions)

14.7 Journalists, editors and writers

Table 14.4 presents the strategic options for addressing the skills needs of journalists, editors and writers. The occupation group of journalists, editors and writers is expected to increase in both the free and the regulated transformation scenarios. Additionally, due to rapid technological change and new customer demands, certain skill needs (see section 13.5) will emerge. Some of these skill demands can be met by recruiting workers from other sectors. Especially the expertise and knowledge needed for writing articles in special interest magazines can be satisfied by recruiting experts from the particular sector (e.g. cycling, tourism and leisure, etc.), but also recruiting experts form the education sector could present a strategic option.

Recruiting workers from other European Member States or non-Member States is a less viable option since the national book, newspaper and magazine markets are bound to pose a language barrier. For some markets it could be necessary to have foreign language skills but these are more likely to be gained by outsourcing to translation services or offshoring. Outsourcing to independent, freelance journalists and writers is already a prevalent practice within this occupational function (ILO, 2004). But this strategic option is mainly used not to overcome skill gaps but to cut labour costs and enhance efficiency. Changing work organisation will also be a viable strategic option to meet skill needs with respective further training. Job enlargement is already used by editorial offices. Besides journalistic work, specific ICT knowledge is already needed to upload own articles to the Internet and combine them with other - flash - media. In some editorial offices this has increased the need of flexibility of journalists and writers. However, the technological development has also strengthened interdisciplinary team work combining technical and creative skills (European Commission, 2003: 144). Recruiting young persons from the education system is an important option to get labour with a wider skills basis ranging from journalism, writing, editing to the needed ICT skills. Recruiting unemployed could present an option but training will be needed and the scope of this strategic option is limited for this occupational function due to its specialised competences.

Vocational education and training could be changed or accordingly better adapted to the extended value chain in the publishing and printing sector (as far as journalist work is concerned). Technical aspects of multimedia journalism and publishing, as well as the adaption of the content to different media should be stronger taken into account. This content should be also considered when designing new courses for further training. Technological change and lifestyle changes in the transformation scenarios make new courses necessary which combine creative with technical skills as well as business skills. Due to the fast pace of technological change in the scenarios, this is absolutely inevitable and therefore an important strategic option to provide information about emerging and changing skills on a regular basis, and, to this end, build a solid co-operation between all relevant stakeholders. Co-operation is also needed for training providers to keep up with technological developments and the latest developments in the sector. Co-operation is also crucial to improve the image of the profession. Journalists themselves also have a role in this. They are the representatives of the profession to their readers.

Table 14.4 Strategic options for journalists, writers and editors

1. What is the maximum volume effect?	Increase	
2. What is the maximum change in skills?	19	
3. Do SME's play a large role?	Yes	
4. Is the sector national/EU/global?	National/ EU	
5. Is the workforce old?	No	
6. Is the workforce low educated?	No	
Option	**Is this option viable?**	**Actors[1]**
A. Recruiting workers from other sectors	Yes, in order to meet skill needs of specialized interest magazines.	C, E
B. Recruiting workers from other Member States	No, only in niches due to language barrier.	C
C. Recruiting workers from Non-Member States	No, only in niches due to language barrier.	C, G
D. Recruiting unemployed with or without re-training	Yes, but very limited in scope, due to training requirements	C, E, I
E. Recruiting young people from the education system	Yes, very important option to gain new skills.	C, E
F. Training and re-training employed workers	Yes, very important option in respect to gain cross-cutting and technical skills.	C, E, U, S
G. Changing work organisation	Yes, to meet the multi-skill demands.	C, U
H. Outsourcing and offshoring	Yes, already in practice especially free lance journalists.	C
I. Changing vocational education	Yes, in respect to integrate multi-media publishing.	C, S, E, G
J. Designing and offering new courses	Yes, cross-cutting and technical skills. Flexible forms of training are essential.	C, E
K. Providing information about emerging skills	Yes, especially in respect to technological skills.	C, E, S, G
L. Improve the image of the sector	Yes	C, I, S
M. Stronger cooperation between stakeholders	Yes, in order to provide information about emerging skills and to keep up training with technological development.	C, S, E, G, I, U

Notes: 1. C (company), S (sector organisations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (Unions)

14.8 Support staff

In Table 14.5 strategic options for emergent competences related to support staff are presented. In both transformation scenarios this occupational function is expected to decrease due to technological changes in the sector and an enhanced efficiency. Consequently, skill gaps will be more prevalent than skill shortages occurring through natural fluctuation. However, the basic skills required in this occupational function such as administrative skills as well as basic internet, spreadsheet and word processing competences are available in other sectors. The most pressing soft skills like time and stress management, and customer relationship management could also be expected from non-sector specific support staff. Thus, recruiting workers from other sectors is a feasible option. Recruiting workers from other states (within or outside the EU) is another alternative. Disadvantages for recruiting workers from other countries are the (often) high hiring costs (when directly recruited in the foreign country) as well as cultural barriers and missing language skills which are important in order and track management in the printing industry. Consequently, this strategic choice will be of limited scope in the printing and publishing sector. Outsourcing and offshoring of some back office tasks (e.g. in accounting services and customer documentation in databases) is a viable option.

In both transformation scenarios customer service and efficient and fast production processes will constitute the relevant drivers for skill demands. Hence, training of the existing workforce and recruiting young people from the education sector are the most viable options meeting the skill gaps in this occupational function. Changing vocational education and training does not appear to be necessary but training and re-training the existing staff especially in soft skills is necessary and a viable option. Due to the changes regarding job requirements, information about the emergent skill needs are vital to enable a perfect matching of future job seekers with the industries' demand and to optimize career management. Changing the work organisation could be also a viable option for meeting the skills demand. For example, team work can be used to pool different skills represented by different occupational functions. A solid co-operation between stakeholders is necessary to define new courses for flexible training and to provide information about emerging skill needs.

Table 14.5 Strategic options for support staff

1. What is the maximum volume effect? 2. What is the maximum change in skills? 3. Do SME's play a large role? 4. Is the sector national/EU/global? 5. Is the workforce old? 6. Is the workforce low educated?	Decrease 9 Yes National/ EU No Mainly	
Option	**Is this option viable?**	**Actors[1]**
A. Recruiting workers from other sectors	Yes, in order to meet general skill demands (e.g. administrative skills).	C, E
B. Recruiting workers from other Member States	Yes, but limited in scope due to language barriers.	C
C. Recruiting workers from Non-Member States	Yes, but limited in scope due to language barriers.	C, G
D. Recruiting unemployed with or without re-training	Yes, together with training for certain skills.	C, E, I, U
E. Recruiting young people from the education system	Yes	C, E
F. Training and re-training employed workers	Yes, especially regarding soft skills.	C, E, U
G. Changing work organisation	Yes	C, U
H. Outsourcing and offshoring	Yes, both are viable options if language barriers can be bridged.	C
I. Changing vocational education	No	
J. Designing and offering new courses	Yes, regarding soft skills training. Flexible forms of training are essential.	C, E, I
K. Providing information about emerging skills	Yes, to enable an optimal placement.	C, E, I
L. Improve the image of the sector	No, not necessary for this function.	-
M. Stronger cooperation between stakeholders	Yes, for designing new courses and enable optimal placement.	C, E, S, I, G, U
Notes: 1. C (company), S (sector organisations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (unions).		

14.9 Pre-press workers

Table 14.6 presents strategic options for pre-press workers. Due to technological change over the last ten years, pre-press work (and printing in general) has changed profoundly (Politis, 2004). The diversification of media use and the need to apply different software fast is expected to rise in the transformation scenarios. Additionally, customers become more demanding and customer needs will be more diverse. In this way flexibility and social aspects become more and more important, particularly in the transformation scenarios.

As a result of these developments together with the specific skill requirements for pre-press workers, hiring workers from other sectors is an unlikely option. This is also true because an increase of pre-press workers is only expected in the regulated transformation scenario. Recruiting pre-press staff from other European Member States or non-Member States presents an optimal option either since language barriers are bound to occur. Communication capabilities and customer relationship management are becoming more and more important for pre-press workers in the transformation scenarios than they presently are.

The most viable options for this occupational function, therefore, are recruitment of young people from the education system and training and re-training of employed workers. To a lesser extent, yet also within reach is the recruitment of unemployed pre-press workers after a respective training and qualification. In the past years some countries experienced a profound change in initial vocational training for pre-press workers and in the printing and publishing sector as a whole, e.g. Germany (ZFA, 2001; Verordnung, 2007). In other European countries changes were planned (e.g. Intergraf and Uni Europa Graphical, 2001). In the course of this development, changes and adaption of further training of employed workers in the field of the digitalisation have also been undertaken. A continuous adaptation and stronger flexibility of vocational training is a very important strategic option. This also provides a very fundamental option for the SMEs in the sector (see also recommendations). New courses will be needed to adapt workers to technological changes and to improve their soft skills, which are needed to improve customer care. Changing work organisation and outsourcing and offshoring can also be seen as important and viable options. However, it has to be taken into account that both are strongly dependent on the company's business strategy, which will impact this occupational function stronger than other occupational functions in the future. Some printing companies are integrating pre-press services in their production to better meet customer demand while others work with several external pre-press companies.

Continuous update and development of new course information about emergent skill needs and a solid co-operation between all relevant stakeholders is an important strategic option.

Table 14.6 Strategic options for pre-press workers

1. What is the maximum volume effect?	Increase (only in regulated transformation)	
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/ EU	
5. Is the workforce old?	No	
6. Is the workforce low educated?	No	
Option	**Is this option viable?**	**Actors[1]**
A. Recruiting workers from other sectors	Yes,, but limited in scope.	C, S, E
B. Recruiting workers from other Member States	Yes, but limited.	C
C. Recruiting workers from Non-Member States	Yes, but limited.	C, G
D. Recruiting unemployed with or without re-training	Yes, together with sector specific training.	C, E, I, U, G
E. Recruiting young people from the education system	Yes	C, E, S, U
F. Training and re-training employed workers	Yes, most important option to update skills especially needed in respect to emergent soft skills and up-to-date technical knowledge.	C, E, S, U
G. Changing work organisation	Yes	C, U
H. Outsourcing and offshoring	Yes	C, U
I. Changing vocational education	Yes	C, E, S
J. Designing and offering new courses	Yes, in respect to soft and hard skills. Flexible forms of training are essential.	C, E, I
K. Providing information about emerging skills	Yes	C, E, I, U
L. Improve the image of the sector	No, pre-press has a good standing within the sector.	-
M. Stronger cooperation between stakeholders	Yes, in order to match skill supply and demand.	C, S, E, G, I, U

Notes: 1. C (company), S (sector organisations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (unions)

14.10 Production workers

Table 14.7 shows the strategic options to meet the skill needs for production workers. In both transformation scenarios a decrease of production workers is expected. Nonetheless, there is already a shortage of skilled and experienced workers in printing, binding and finishing functions. On the one hand, the workforce is ageing and on the verge of retirement, while on the other hand replacements are difficult to obtain due to the poor prestige of labour conditions. Therefore, the strategy to recruit worker from other sectors and from Member States and non-Member States is already chosen by the affected companies. A sector specific training on-the-job is normally given. This is possible because of the repetitive, lower-skilled work in finishing and binding which is mainly based on manual labour. To some extent this is also the case for printing but for this function a continuous trend of up-skilling is already identifiable and will also be necessary as a result of technological change in both transformation scenarios. The recruitment of unemployed presents another viable option.

Recruiting young people from the education system is an important strategic option to balance the retirement of production workers, but due to the poor prestige of the occupational function and the printing sector as a whole this will only be possible if the image of the sector is improved. Therefore, changing work organisation is an important measure to meet replacement demand. Besides team work, job enlargement, extending shift- and overtime work, special part-time working schemes for older workers should be used to maintain knowledge and experience within the firm.

Training and re-training of the existing workforce is a very important and viable strategic option to meet the skill demands in both transformation scenarios. This is necessary to meet expected soft and hard skills. Soft skills such as flexibility and stress management will be needed to quickly react to different production needs and an increased time pressure in both transformation scenarios. Hard skills are needed to respond to the ongoing technological change in printing units and the overall production line. In some European countries changing vocational training, designing and offering new courses could be a feasible option to meet the emergent skill needs. In view of the expected ongoing incremental technological change and diversification in printing, co-operation between companies, using different printing technologies for training apprentices and staff, should be improved (BMBF, 2004: 142). Additionally, flexible and modular training should be developed in order to adapt fast to technological changes and to adjust training to the special needs of SMEs. Moreover, special courses for the ageing workforce of production workers in the sector are needed.

Providing information about emergent skill needs on a regular basis and the improvement of the image of the sector are viable strategic options to attract workers to the sector and to identify and close emergent skills gaps. To successfully implement these strategic choices a solid co-operation between the relevant stakeholders in the sector is needed.

Outsourcing and offshoring of printing, binding and finishing is already used for the production of mass-product-printing goods (books with high print runs and catalogues) as well as for products with lower print runs and short production time in border regions with high wage difference. Although this may provide a strategic option for some companies, it is not a generally applicable option.

Table 14.7 Strategic options for production workers

1. What is the maximum volume effect?	Decrease	
2. What is the maximum change in skills?	15	
3. Do SME's play a large role?	Yes	
4. Is the sector national/EU/global?	National/EU	
5. Is the workforce old?	Yes	
6. Is the workforce low educated?	Yes	
Option	**Is this option viable?**	**Actors[1]**
A. Recruiting workers from other sectors	Yes, with sector training in order to overcome skill shortages.	C, E
B. Recruiting workers from other Member States	Yes, if language barrier can be bridged.	C
C. Recruiting workers from Non-Member States	Yes, if language barrier can be bridged.	C, G
D. Recruiting unemployed with or without re-training	Yes, together with sector specific training.	C, E, I
E. Recruiting young people from the education system	Yes	C, E
F. Training and re-training employed workers	Yes, especially needed in respect to emergent soft skills and up-to-date technical knowledge.	C, E, U, S
G. Changing work organisation	Yes, team work and flexible part time work for older workers	C, U
H. Outsourcing and offshoring	Yes, for high print runs and companies in border regions but not for all companies.	C, U
I. Changing vocational education	Yes, for a more flexible training and regular update to technological change.	C, E, S, G
J. Designing and offering new courses	Yes, in respect to soft and hard skills. Flexible forms of training are essential.	C, E, I
K. Providing information about emerging skills	Yes.	C, E, I
L. Improve the image of the sector	Yes, to meet the replacement demand.	C, S, E, G, I, U
M. Stronger cooperation between stakeholders	Yes, in order to regularly adapt training supply and demand and to improve the image of the sector.	C, S, E, G, I, U

Notes: 1. C (company), S (sector organisations and chambers of commerce), E (education & training), G (governments), I (intermediary organisation, public or private), U (Unions)

14.11 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 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 14.8 Summary of job volumes, skills changes, strategic choices and main players in anticipatory action by scenario					
		Free Transformation	**Regulated Transformation**	**Free Continuation**	**Regulated Continuation**
Managers	1. Employment volume change	M / D[18]	M / M	M / D	M / D
	2. Skills changes counted	21	22	11	13
	3. Emerging skills needs	Entrepreneurship, Social, Knowledge	Entrepreneurship, Social, Knowledge	Entrepreneurship, Social, Management	Entrepreneurship, Social, Management
	4. Most important solutions	Recruiting, Training	Recruiting, Training	Recruiting, Training	Recruiting, Training
	5. Most important actors	C, E	C, E	C, E	C, E
ICT & engineering professionals	1. Employment volume change	I / I	I / I	M / M	M / M
	2. Skills changes counted	22	23	13	12
	3. Emerging skills needs	Knowledge, Problem-solving, Self-management	Knowledge, Problem-solving, Self-management	Social, Knowledge	Social, Knowledge
	4. Most important solutions	Recruiting, (Re)training	Recruiting, (Re)training	Recruiting, (Re)training	Recruiting, (Re)training
	5. Most important actors	C, E, I	C, E, I	C, E, I	C, E, I

[18] M / D = First letter denotes the volume change for the publishing, the second letter for the printing segment.

Business & finance professionals	1. Employment volume change	I / I	I / I	M / M	M / M
	2. Skills changes counted	21	22	12	14
	3. Emerging skills needs	Entrepreneurship, Knowledge, Social	Entrepreneurship, Knowledge, Social	Entrepreneurship, Management	Entrepreneurship, Social, Management
	4. Most important solutions	Recruiting young, Training	Recruiting young, Training	(Re)training	(Re)training
	5. Most important actors	C, E	C, E	C, E	C, E
Journalists, editors, writers	1. Employment volume change	I /	I /	D /	D /
	2. Skills changes counted	18	19	7	7
	3. Emerging skills needs	Social, Knowledge	Social, Knowledge	Social, Self-management	Social, Self-management
	4. Most important solutions	Recruiting (young), Training	Recruiting (young), Training	Training	Training
	5. Most important actors	C, E, G	C, E, G	C, E, G	C, E, G
Support staff	1. Employment volume change	D / D	D / D	D / D	D / D
	2. Skills changes counted	9	9	3	3
	3. Emerging skills needs	Knowledge, Self-management	Knowledge, Self-management	Self-management	Self-management
	4. Most important solutions	Training, New courses	Training, New courses	Training, New courses	Training, New courses
	5. Most important actors	C, E	C, E	C, E	C, E

Pre-press workers	1. Employment volume change	/ D	/ I	/ M	/ M
	2. Skills changes counted	20	22	10	11
	3. Emerging skills needs	Problem-solving, Knowledge, Entrepreneurship, Social	Problem-solving, Knowledge, Entrepreneurship, Social	Knowledge, Social	Knowledge, Social
	4. Most important solutions	Training, Recruiting, New courses	Training, Recruiting, New courses	Training, New courses	Training, New courses
	5. Most important actors	C, E, U	C, E, U	C, E, U	C, E, U
Production workers	1. Employment volume change	/ D	/ D	/ D	/ D
	2. Skills changes counted	13	15	10	11
	3. Emerging skills needs	Knowledge, Self-management, Management	Knowledge, Self-management, Management	Knowledge, Self-management	Knowledge, Self-management
	4. Most important solutions	Training, Changing work organisation, New courses	Training, Changing work organisation, New courses	Training, New courses	Training, New courses
	5. Most important actors	C, E	C, E	C, E	C, E

C=Companies; S=Sectoral organisations, U=trade Unions; E=Education and training institutes; G=Government (EU, Member State, regional, local)

15 Conclusions and recommendations for education and training

15.1 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.

The need for more and better collaboration is the result of inherent sector development (technology, Internet, recent blurring of traditional sector divides, and more) as well as societal developments both of which will even become more pressing in the oncoming future, especially so in the transformation scenarios.

There are six main challenges that will affect the future of education and training, both in terms of course and/or curriculum development requirements and for the education and training system:

- Ongoing technological change and changing consumer preferences lead to profound changes in business strategies and occupational functions – both have not stabilised yet. With large shares of jobs in the sector still based on the traditional paper and media communication, the training systems have to react to the expected changes (cf part I);
- Tough national and European competition leads to low profit margins and little resources for training of employed staff, which strongly affects SMEs in the printing sector. In the light of the importance of training it is necessary to prepare the education and training system to find adequate solutions;
- Mass customization leads to new niches in the sector and a stronger specialisation and differentiation;
- The sector is characterised by an ageing predominantly male workforce, particularly in technical printing occupations (cf Part 1; Proskills, 2007; Skillsnet, 2007);
- The sector suffers from a poor image of some occupations, in particular the technical occupations in printing (Proskills, 2007; Callan, 2007);

- The sector is characterised by low participation of production workers in training (EMCC, 2003a).

Technological change over the past 15 years has led to profound changes in the printing and publishing sector, and has led to different development paths and different business models (see also Part I). For example, in publishing a mixture of classical printed newspapers and online information can be observed, as well as the emergence of newspapers where customers themselves produce and provide articles. In printing, digital print, web to print and database management have given rise to new business pathways as well, for example transitions from printing into communication companies, as distinct from more classical printing companies (e.g. Print21; Callan, 2007). The trend of recent years shows that new technology did not replace existing media forms but widened the possibilities of publishing (and printing) and leads to changes in market shares and business models. In the transformation scenarios this trend will continue at incremental pace and lead to a further integration of the sector into the internet and telecommunication sector and a further blurring of its boundaries (Ducatel, et al. 2000). Due to this – still ongoing - transformation phase in the sector, one major implication for education and training is to cope with these - in some parts heterogeneous - developments flexibly and to adapt fast to the changing skill needs. The main challenge for the education and training system is to keep up pace with the changes in skill needs, caused by technological and subsequent organisational development, and supply adequate courses. The technological change has impact on all job environments and also on all job functions in the sector and therefore presents the biggest challenge. Besides, the sector and therefore the education and training system face additional challenges such as a tough competition they have to handle, too.

The tough national and European competition - which will become even fiercer in the transformation scenarios - has a negative impact on the ability for SMEs to release their staff for training (Proskills, 2006a: 114; Callan, 2007). Due to the prevalence of SMEs in the sector, especially in the printing sub-sector, the limited ability for training participation is a big challenge for the education and training system as training courses have to be adjusted to the little resources for training in the sector. This affects both initial vocational training and even more so further training of employees. The training and education system has to adapt their training forms stronger to the needs of the employer.

The sub-sector printing is facing - and will be faced even more so in the future - a unique challenge. On the one hand the existing production workforce is ageing and replacement needs are becoming stronger and stronger, while on the other hand and concurrently the workforce is shrinking. Due to the poor image of the printing sector and the poor prestige of the production work in the sector, it is quite difficult for companies to bridge the replacement demand. To live up to these challenges, adequate and pro-active reponses of the education and training system are vital.

15.2 Conclusions and recommendations for education and training

1) Adapt and modernise vocational education and training (VET) and general education systems, but do this nationally rather than at the EU level

The expected technological change in the transformation scenarios will lead to profound changes in both business strategies and occupational functions. However, the precise extent of the impact of these changes is hard to predict. The education and training system has to cope and adapt to this uncertainty, amongst others, by offering more flexible training (e.g. by way of modularisation) and by adapting educational curriculum and the training content as much as possible to changing sector realities which include the latest technologies and innovations,

but also knowledge about new business models and new customer demands. There is a need for adapting and modernising the system as the half-life period of skills and knowledge gas gotten shorter because of the various changes. Yet this challenge can hardly be met by one actor alone and hence requires intensive co-operation between training and education institutes, the sector (companies, sector organisations) and other stakeholders.

Especially in printing most of the employees have medium or - still - low qualification levels. The majority of occupational functions are either trained at schools, in apprenticeships or on the job. Less than 50% of the managers in the printing and publishing sector have higher education (for details see Data Annex). The initial vocational training system is important for most of the job functions, e.g. in pre-press, printing production and support. Before outlining several possibilities for improving Initial Vocational Training (IVET), different VET systems will be described and analysed. Different systems of Vocational Education and Training (VET) as well as a combination of Initial and Continuing Vocational Education and Training (IVET and CVET) are implemented in the EU Member States (compare Clematide et al, 2005; Koch and Reuling, 1998).

Various characteristics of the VET-Systems have to be taken into consideration when discussing possible specific implications for education and training. These options imply several changes for the prevalent European initial vocational educational training systems (IVET) and VET systems (see Box 6). As VET systems in terms of strengths and weaknesses differ between Member States, and sector-specific challenges and hence employer needs do too, the necessary changes clearly differ from Member State to Member State.

Box 9. 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 to Box 9. Three 'ideal-type' VET-models (elaborated from Clematide, 2005)			
	A. Liberal	**B. State-controlled**	**C. Corporatist**
Decision maker	Business (and individuals)	State	State and social partner organisations
Rationale	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

2) Enhance the flexibility in education and training by promoting modularisation

Several implications arise due to the strengths and weaknesses of the different VET systems in place, with sector-specific challenges on the one hand and employer needs on the other. Firstly, enhanced flexibility in education and training of technical occupations is needed. Flexibility in this sense 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 alter quickly. 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 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. Enhanced flexibility and a modularisation of IVET is a big challenge for the state-controlled and the corporatist systems. Liberal systems will find their ways easier. However, the liberal market driven systems with their strong focus on technical on-the-job skills lag behind in general education, which in turn becomes an obstacle to the up-skilling of the individual and a higher permeability of the education system. Besides, general and generic skills are not obsolete but become more important as a basis for the ability to react on new training demands emerging from new technologies and changing production processes.

More important and sometimes presenting a deadlock is the consequence for Life Long Learning of the individual following from different VET systems. The corporatist and school

based VET System guarantees a more universal initial vocational training and in the case of combined apprenticeships also a practical training on the job (dual system). However, continuing training is disregarded. The qualification level once acquired leads to reposing on the achieved and Life Long learning is not given a key focus. VET structures are not capable of adapting quickly to the new skill needs. Thus, a solid co-operation between VET suppliers and companies is required to better match skills needed by the industry and the supply throughout the working life cycle.

In the transformation scenarios a broader set of skills in all occupational functions and the ability to choose between the right ones by the individual worker is expected. Over the last years several reforms have taken place or have at least been planned to adapt IVET to the technology driven changes in the economy (Politis, 2004; Intergraf/ Uni-Europa Graphical, 2001). For example, in Germany several apprenticeships in printing and publishing were changed due to the digitalisation of the sector (ZFA, 2002). The content of training in offset as well as digital print and digital media was broadened and integrated (see Box 8). Additionally the training was modularised to better meet the different needs of sector companies. The reform comprised pre-press, printing and also commercial occupational functions (see Box 8) and followed to a certain extent the principle of multi-skilling. For example, for the first time there was a module of business administration for technical occupations. Additionally, due to the modularisation, transparency and connectivity further vocational training in the sector was strengthened. Modularisation and greater flexibility is one possibility to adequately react on emergent skill needs. An alternative option presents the building up of joint training systems.

3) Enhance flexibility in learning forms - e-learning and blended learning

Strengthening the information basis on skills demands, career possibilities and supply of training are prerequisites for enhanced flexibility (and adaptability) of continuous vocational education and training. As already stated, flexibility in this sense refers to the capability of the VET system to adapt effectively to new training needs in terms of quality and quantity. 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. Therewith, costs of further training are reduced and flexibility to combine work with training is enhanced. Other positive effects on skills can also be observed; as large parts of this training are self-directed and informal the learner builds up several competences, like self reflection, self motivation, strength of purposes and an effective information processing. In the course of the last training reforms of the sector in Germany (ZFA, 2004: 19) and the United Kingdom[19], e-learning was strengthened.

A stronger use of *e-learning,* also in apprenticeships, could help to unburden SMEs in this respect. This is also a quite useful tool to support the training supervisors of apprentices in companies and provide latest information about developments in the sector. During the German reform of apprenticeships in the sector an e-learning platform was established with several features[20], e.g. tutorials, blogs, information about literature, etc. It was mainly conceived for trainers but it is also used by apprentices (ZFA, 2004: 30). The Dutch sectoral training organisation GOC is another example where e-learning has been introduced. They have their own digital learning platform, which is the "surrounding" of a number of courses which can be followed. If they want, companies and schools have the possibility to use this

[19] http://www.skillset.org/companies/technology/e_learning/
[20] http://www.lerncenter.mediengestalter2000plus.de/home/ November 2008.

platform to adjust and add courses. Most useful of e-learning is the possibility of self directed learning which considers the limited resources for off the job training in SMEs and micro enterprises. Moreover, it offers more flexibility in time and place of learning, which can be a big advantage if training is difficult to combine with work schedules and/or home responsibilities.

4) Promote the establishment of Joint Training Networks and Joint Training Facilities to keep knowledge and skills of workers up-to-date and to better foster apprenticeships in the sector

Due to technological change and the development of different business niches, *joint training networks* between companies for job entrants – as well as for those already having a job - will become more important in the future. Only few companies will provide all printing services and have the ability to use the latest printing equipment. Hence, only few companies will provide all necessary technical equipment and resources for the best training for job entrants. This is a particular disadvantage for the large number of SMEs, especially in the printing sector.

Regional based joint training networks between companies are one possibility to provide the comprehensive training job entrants need. In Germany, there are also several different models established for joint training of media designers (ZFA w. D.). A main purpose of joint training networks is that apprentices pass through all necessary stages of an apprenticeship, although the main training company can only provide some of these stages. This kind of joint training networks are also recommended by a recent Australian study (Callan, 2007). The Australian printing industry faces similar challenges to that of the European (Print21, 2001). The latter study recommends to rethink existing training models, especially with regard to the duration of off-the-job training in apprenticeships. Particular SMEs may run continuity problems, as of small size and limited back-up, in sending workers to training.

Joint training networks are most applicable in regional centres of the sector where the density of companies is high. Regional and communal authorities can support the sector actors to build up such regional joint training networks. Joint training facilities with the latest equipment available for initial vocational and further training can be built up in cooperation with training providers, social partners and the public authorities. The “Printhouse” in the German region North-Rhine Westphalia is such an institute and also has the equipment of a fully integrated real printing company (practice firm). The “Printhouse” enables to simulate the whole printing value chain in all different printing techniques and should provide up-to-date training for vocational school teachers, apprentices, training supervisors of companies, employers and employees (VDM NRW, 2008: 26). To establish such training facilities the combined effort of sector organisations, component suppliers and public authorities is needed.

5) Stimulate continuing vocational training: multi-skilling, re-training and up-skilling

As has been shown in this study, the production workforce especially in printing is relatively low educated compared to other job functions, ageing and mostly employed in SMEs. Employment numbers are expected to decrease in the future although skill shortages are already occurring. This leads to several implications for the education and training system. Besides training the existing production workforce in emergent skills (and particularly in flexibility in applying new techniques, especially the growing digital print workflows and its technologies), and soft skills like communication, stress management, quality management, health and safety, due to a broader work scope, there is also the necessity for upskilling and even re-training in occupational functions like sales and business staff. For this reason

certification of skills and knowledge obtained at the work place should be recognized and skills assessments of production workers should be offered by training providers to optimize the re-placement of these workers (see also recognition of prior learning, section 7.1.3). To overcome skill shortages and gaps in the printing production apprenticeships for adult unskilled labourers in binding and finishing production are also conceivable to fill the vacancies and give insiders and also outsiders a new perspective (Callan, 2007: 30).

Training, up-skilling and re-training support staff of the printing sector for higher occupational functions such as sales is needed and also possible. Continuing vocational training is needed to prepare support staff for operating the emerging ancillary services. This includes general computer skills, operating digital printing workflows, databank management, marketing, customer care and sales knowledge and full logistic services etc.

Multi-skilling will become more important also for occupations in the publishing sector. As a result of technological change not only excellent writing and editing skills are required but also knowledge about cross-media publishing, archival storage and different software applications including mobile devices. Due to the fact that the there is already a large amount of freelance personnel in the sector, business skills and project management skills will become more important in the future. This will also be the case for pre-press workers because of their strong role as information hub and their position at the interface between costumer and production. The main challenge for education and training will be to provide suitable courses as according to the transformation scenarios the work of both occupations will be done by freelancers more frequently than today (EMCC, 2003).

6) Use of temporary workers to increase training possibilities

Increasing flexibility of training is one way of increasing possibilities for training. Other means are the use of temporary workers, or even unemployed to alleviate pressure on production and to free capacity for training. This is especially important for the smaller printing companies. In order to make these kind of activities to a succes, selection, preparation and guidance of temporary workers should be organised and managed properly. Other ways companies can keep production running, while at the same time upskilling their employees is by increasing the multiskilling capacities of their workforce.

7) Arrange special training offers to freelance personnel

Freelancers in general as well as in the sector face specific problems to keep up with skill developments (Skillset 2001; ILO, 2004). The main barriers to adequately train freelancers or for them to enrol in courses, respectively, are a lack of suitable courses due to the already high specialisation; high fees; the loss of earnings during the participation and a lack of information about content and quality of training. To some extent these are also general problems SMEs face. Normally, there is either no time to release employees for training or a lack of sufficient financial resources. In SMEs in printing, in-house technical training by colleagues or equipment producers is the prevalent form of training (Proskills, 2006:114; EMCC, 2003a; Callan, 2007). Unions and professional sector organisations already provide continuous vocational training for employees and freelancers in the sector in some European countries (EMCC, 2003: 14). These courses are in some cases approved and accredited by these organisations. This should be generally developed by sector representatives in all European Member States. In the United Kingdom special subsidised training funds for freelancers are available - but only for the television sub-sector.[21] Special funding schemes could help to increase the participation of freelancers in continuing vocational training.

[21] http://www.skillset.org/training/article_2595_1.asp from November 2008

Another possibility would be to support companies who allow freelancers to their in-house training, in particular those they are regularly working together with.

8) Promote sector specific skills at an early stage – by renewing forms of education

Ongoing technological change and fierce competition in the sector make it necessary to combine early on theoretical, academic and vocational knowledge at all education levels and in all forms. The transferability and connectivity of the different education and training systems should be fostered.

To improve the matching of skills taught at schools and skills needed by the industry, the British department for children, schools and families has created a new education pathway for children from 14 to 19 years.[22] The so-called `Diploma´ was jointly founded by education officials and the industry and tries to bridge general academic and vocational education. For both sectors, printing and publishing, relevant skill councils participate in the programme; `Proskills´[23] for the printing industry (in cooperation with other skill councils) and `Skillset´[24], the sector skill council for the Creative Media Industry and therefore responsible for some job functions for the printing industries (e.g. pre-press: photo imaging) and the publishing industry (e.g. journalism, web publishing). The sector skills councils contributed to the design of the sector specific vocational education part of this education pathway which will complement the existing pathways in the British education and vocational training system and lead to accepted school leaving certificates. The diplomas combine principal learning (knowledge about the chosen sector endorsed by employers and universities), learning of generic functional (English, Maths and Computer skills) and social skills, and additional and specialised learning: selected courses from the classical pathways of the General Certificate of Secondary Education (like Accounting, Art, Biology, Business Studies, Chemistry, Economics, Geography, Natural Economy and Physics) or A-level examinations. The diplomas are rounded off with mandatory placements of at least ten days in a company of the respective sector.

9) Foster inter- and multidisciplinary competences in education and training

Convergence of technologies and markets are particularly prevalent in the printing and publishing sector, making inter- and multidisciplinary competences of workers a key asset to adapt to quickly changing customer needs, technologies and structures. Consequently, vocational education and training should pay more attention to inter- and multidisciplinary studies as different technical skills need to be combined with the required non-technical skills. Even though a sound technical education still provides the basis, attention will have to be paid to enhance other skills such as project management, languages and competencies in business development. Such elements should also be an integral part of apprenticeship and traineeship programmes.

10) Stimulate image and awareness about the value and importance of continuing vocational training, especially among SMEs and micro-enterprises

To enhance training in especially the printing sector, the image and value of training has to be promoted improved, especially among SMEs and micro-enterprises. The awareness of the importance of *continuous* vocational training for business development has to be raised. So far, most training is only given in a piecemeal way, on-the-job and mainly for the purpose of

[22] http://www.dcsf.gov.uk/14-19/index.cfm?go=site.home&sid=47 from October 2008 and http://yp.direct.gov.uk/diplomas/ from October 2008

[23] http://www.manufacturingdiploma.co.uk/ from November 2008

[24] http://www.skillset.org/qualifications/diploma/ from November 2008

adapting workers to new equipment (Callan, 2007; EMCC, 2003a: 14). To enhance CVET, specialised financing or training models for employees (e.g. job rotation) in the sector should be introduced and/or better tailored to the needs and capacity of especially among SMEs and micro-enterprises.

11) Stimulate co-operation between all stakeholders in order to improve the supply of information to trainers on (changes) in skills and knowledge needs in the sector and use up-to-date information to adapt existing courses

Information gaps between present and future education and training needs and their supply are still evident. 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.

In some countries one of the main problems in vocational training in the printing sector (Proskills, 2006b: 117; CEC, 2007: 18) is the mismatch between training provision and demand. While positive approaches exist, for example the German reform of apprentice training (and with it also vocational training) was evaluated as quite successful in this respect (Krämer et al., 2003: 4), there is still need for training institutions to keep up pace with technology driven skills demanded by the industry.

Moreover, commercial training providers are often not meeting real training needs and do not respond to them in a sufficient way. In Germany and the United Kingdom this mismatch was recognised by the sector stakeholders and several reforms undertaken. Information systems on the sectoral as well as on the regional level, the national and the European level, assist in minimising information asymmetries in order to overcome skill gaps resulting from information deficits. Supporting students entering the labour market in finding a suitable occupation is equally important as assisting employees to find new job opportunities based on their existing skills or guiding them in finding the fitting vocational training course.

Close collaboration between all relevant stakeholders, companies, education and training organisations, social partners, research institutions and public authorities, will help to reduce information deficits on current and emergent skills needs. The traditional training system has to adapt to the new situation and collaboration is an effective instrument to stimulate the implementation of changes in VET. A strong linkage between industry and education and training is recommended in state driven full-time school-based VET-Systems (Koch and Reuling, 1998). In all countries and, in particular, in the new Member States, co-operation is essential to improve the practical orientation in VET (Skjølstrup and Mayen, 2007). The 'Sector skills councils'[25] in the United Kingdom - in particular Proskills for the printing and skillset for the publishing and media industries - are an example how to organise VET differently.

12) Career guidance for labour market entrants and employees

Career guidance can be used to pursue the following two objectives. First of all, it can help to redirect pupils and students to occupations where an increased demand is expected and to the sector in particular. Second, career guidance assists in supporting the placement of those mature workers which are threatened of becoming unemployed. In the sector scenarios, it is

[25] www.sscalliance.org; 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 and that are required so that persons with adequate skills are available for industry. Sector skills strategies are defined for each sector based on the analysis of present and future skills needs.

expected that lower skilled occupations like production workers and support staff as well as managers in print will decrease either by natural fluctuation or by layoffs. Career guidance assists in finding new job possibilities within or outside the sector. In combining career guidance with skills assessments (e.g. potential analysis) as well as with the recognition of soft skills by companies, the scope for placements can be expanded for the employed as well as for labour market entrants.

Career guidance for pupils is undertaken in most countries by several different actors such as schools, training organisations, public employment services and related career information centres, trade unions, universities, sector organisations and companies. To enhance career guidance for pupils a solid regional co-ordination between these actors can be very effective as this helps in counselling and directing students into a profession suitable for them.

Regularly, persons equipped with required skills and qualifications are available but do not apply for vacancies due to the lack of information on the labour market possibilities. Career guidance and personal development for mature lower-skilled workers could be supported by an assessment of those skills which are not certified or documented so far. Systems for the recognition of prior learning (RPL) support the determination to what extent people possess necessary competences for a new job (Duarte 2004). The integration of RPL in career guidance and targeted training bridges the gap of hidden competences especially for mature workers. Some Member States have included RPL in their system. In Portugal, for instance, a national system of **R**ecognising, **V**alidating and **C**ertifying 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 competences (OECD/European Communities, 2004, p. 31). The centres are supported by the Ministry of Education and are run by training organisations or universities. The certification and validation of skills is undertaken by a jury with an external evaluator.

Another conceivable option is co-operation between companies, sector representatives, training institutes and external human resource counsellors, especially to further develop or up-skill the lower skilled workforce of SMEs in the sector. One of the implications of the scenarios is that there will be less demand for support staff and production workers in the future. In order to prevent skill gaps in other occupations within the sector and to prevent unemployment of these workers, career management by way of such networked co-operation could be helpful. This kind of human resource development could especially be led by training institutions yet jointly implemented with the other actors. Especially for the small companies in the printing sector this could be a possibility to develop their - in general underdeveloped, if at all existing - human resource management. A mature human resource management combined with carrier planning could also aid to attract more labour into the sector because job entrants may realise that employment in the sector is not a dead-end street, but opens up several possibilities.

16 Main other conclusions and recommendations

16.1 Introduction

This report concludes with a number of 'other' (i.e. going beyond education 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.

16.2 Main other recommendations

1) Promote entrepreneurship and a culture of innovation

With large structural changes in the printing and publishing sector ahead, driven by a convergence of technologies and market segments, entrepreneurship and innovation are key to exploit new niches and adapt to a changing environment. Rather than a set of technical skills, entrepreneurial spirit and innovation require a conducive environment and culture. This should be fostered and needed changes should be communicated by stakeholders as positive developments and opportunities rather than threats. All too often actors focus on protecting old and established interests rather than exploiting new opportunities. Furthermore technical innovations for a large part come from suppliers. Companies, in collaboration with suppliers, need internalise this knowledge in order to stimulate innovations and maintain greater control over innovations. Companies should also use resources on education and training of their production workers to work with new working and management methods. A culture of innovation and entrepreneurship is a key element to successfully exploit future opportunities, create new jobs and secure the competitiveness of European firms and employment in the future.

2) Foster and promote life-long learning

Lifelong learning is the key to keep up competitiveness and to prevent less favourable scenarios. Enhanced investment in human capital is required. Cost sharing mechanisms between actors such as public authorities, companies and individuals need to be developed and lifelong learning (LLL) throughout the life cycle should be promoted. Learning must be made more attractive to all, e.g. via tax incentives or a change of attitudes in order to integrate learning into all phases of life and to incorporate a lifecycle approach to work. Governments should further develop the legal framework for supporting life long learning at all ages. The

programmes should be tailored to the specific needs of SMEs in the sector. Lifelong learning should encompass all skills levels aiming at raising basic social skills as well as technical sector skills. All available international, national and, if available, regional and local pathways should be used in order to finance lifelong learning.

3) Keep older workers in employment

Especially the printing production in the sector is confronted with an ageing workforce, but investment in further training of older workers is still underdeveloped. To keep the knowledge and the experience of older workers available and to avoid skill gaps, special part time retirement schemes should be developed by the responsible authorities and applied by the companies. Additionally, further training of older workers in SMEs should be supported by public authorities as recommended in the previous section. Training is more effective if this is really targeted towards the needs of the individual concerned and possible future career steps. Therefore, instruments like regular performance and career interviews, career scans and recognition of prior learning (RPL) help to reach more targeted training choices. These instruments can be developed by companies, sectors, training institutes, sometimes with support of the government. These instruments fit within an age aware personnel policy in which companies have in mind that strengths, weaknesses and needs of their individual employees partly depend on their age. For example the popularity and suitability of certain types of shift patterns will partly depend on the age of the individual. Function mobility patterns can be important to prevent problems and use relative strong points of older workers. Good practices of companies in this area should be communicated.

4) Enhance transparency of the quality of training, improve the trans-sectoral and trans-national recognition of vocational qualifications and provide for the possibility of an individual skills assessment

Due to the fact that a there is no common European certification system, vocational qualifications are not recognised in all countries. In addition training often takes place in form of non-standardised and not-certified courses, which limits the possibility to assess its quality and to include it in worker skills profiles. Difficulties in assessing workers' skills also occur when workers are recruited from other countries or sectors. The implications of the missing certification system are crucial. The setting up of a common certification system is a necessity in order to also make the quality of further training more transparent and to increase mobility of the workforce. Programmes to stimulate mobility as such (by short- and mid-term exchange programmes) might help in this respect. This sheds light on the need to make better use of existing European programmes (e.g. Leonardo da Vinci) and of support made available by the Structural Funds.

The possibility of an independent skills assessment can help to increase trans-sectoral and trans-national recognition of qualifications. In Germany, within the framework of the broad sector qualification approach ("Qualifizierungsoffensive"), standardised and federally recognized further training was established in the sector. Additionally, the so-called "competence scan" was introduced, an instrument to assess existing competences and skill deficits of the workforce in the printing sector. Following an assessment an individual training plan is worked out to overcome the diagnosed skill gaps (ZFA 2002: 6). Combined with individual training plans such an assessment instrument offers a viable solution to identify and resolve existing skill gaps, in particular for employees of SMEs in the printing sector.

5) Strengthen co-operation for sector-specific training measures

In order to keep pace with technological and subsequent organisational developments flexible and up-to-date training offers are required in the sector. The need for building up co-operation

between companies, social partners, training providers and research institutions is well accepted. Interactions between the actors involved should take place on a regular basis and should be implemented in a dynamic way. Such cooperation would help to implement the concept of the "knowledge triangle", that is to say, to connect education with research and the innovation processes. Thus, trainings should aim to make workers acquainted with emergent processes in sector-specific innovations, research processes, and new educational settings (such as micro-learning, the use of social software and other networking practices). Since the trainings should especially meet the specific demands of SMEs, the participation of SMEs in the design process of the trainings should be promoted and encouraged. Chambers of Commerce and training providers are expected to play a major role in organising joint efforts.

One crucial cooperation is the one between social partners (social dialogue). Initiatives to adapt the sector to necessary changes, will be far more fruitful if they are supported by all parties concerned. Various forums in which these parties meet should be used to put skills and training needs on the agenda in context of a modernized collective agreement. Examples are sectoral committees or platforms for discussing the collective agreements. The latter type of platforms offer possibilities to discuss more experimental types of training facilities for companies or workers, for example career scans for older workers, individual learning accounts, recognition of prior learning etc.

6) Improve the image of the printing sector and attract more women to technical occupations

The expected skill shortages in the two transformation scenarios, the expected increase of the ICT and engineering professionals, of business and finance professionals and journalists, editors and writers, as well as the replacement demand for production workers, makes it necessary to improve the image of the sector. News of restructuring activities in the printing and publishing sector create a negative public perception of limited long term job opportunities. However, while restructuring leads to the decline of certain job functions it also creates new, interesting and highly skilled jobs. This message should be extended to the young generation.

In the United Kingdom and Germany several initiatives exist to improve the visibility of the sector and to improve its image in schools, especially the image of the printing sector. In recent years, efforts have been made to attract more job entrants into the sector because apprenticeship numbers decreased, in particular the number of applicants in printing production. For example, the `printIT!´ initiative of the `proskills´ sector skills councils in the United Kingdom[26] provides schools with information about the sector and offers placements through its members. Moreover, in Germany, there are several regional initiatives of the German printing and media industries federation, like school visits websites and placements for pupils.[27] These initiatives can also be exploited for career guidance. These initiatives should be also used to attract more female labour in the technical occupation functions of the sector such as printing production and ICT professionals.

Campaigns to improve the image of the sector should also integrate the objective to attract more women to technical occupation functions in the sector. This approach is recommended where skill gaps are expected to occur. Such campaigns can be carried out in regions with a high density of sector companies but also at national level. Besides sector representatives also

[26] www.printit.org.uk (October 2008)
[27] http://www.bvdm-online.de/Aktuelles/ (October 2008)

public actors such as regional governments and education system should play an active role in such campaigns. These campaigns can include open days on schools, exhibitions and competitions. An example of the latter are competitions of young people making a printing or publishing product. These types of competitions underline that this type of work demand craftsmanship, creating something, on which one can be proud if these skills and competences are present.

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 educated 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.

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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 qualification levels in qualifications 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, 2007a)

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:

$$RCA = \tanh\left(\ln\left(\left(\text{Exports S} / \text{Imports S}\right) / \left(\text{Exports C} / \text{Imports C}\right)\right)\right) \times 100$$

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 also 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).

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The seven-year Programme targets all stakeholders who can help shape the development of appropriate and effective employment and social legislation and policies, across the EU-27, EFTA-EEA and EU candidate and pre-candidate countries.

PROGRESS' mission is to strengthen the EU contribution in support of Member States' commitment. PROGRESS is instrumental in providing analysis and policy advice on PROGRESS policy areas:

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