Printing and Publishing

Comprehensive sectoral analysis of emerging competences and economic activities in the European Union

European Commission

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Executive Summary

The full study is available under the link
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Preface

Education and training, in the context of a life-long learning perspective, are an indispensable means for promoting adaptability and employability, active citizenship, personal and professional fulfilment.

Investment in human capital through better education, and the development of skills and competences should be increased. It is important to anticipate skills needs — and also skills gaps — which are emerging in the European labour market, as well as to improve the matching of knowledge, skills and competences with the needs of society and the economy, as a means to increased competitiveness and growth, as well as to greater social cohesion, in Europe.

This is more important than ever in the current situation of crisis that will undoubtedly lead to substantial changes in economic activities in Europe coming years.

With this in mind, the Commission has elaborated a set of analysis of emerging competences in 18 sectors. Those analysis are available to all economic, social and professional organisations, educations and training institutions, etc. They can help them to refine their strategies and to engage into forward-looking actions.

Robert Verrue

Director-General, Employment,
Social Affairs and Equal Opportunities DG

Aims and methodology

The renewed Lisbon strategy and European Employment strategy stress the need for Europe to place more emphasis on a better anticipation of skill needs together with the need to reduce labour markets mismatches. These policies aims also at minimising social costs and facilitating adaptation during restructuring processes through a better anticipation and positive management of change. Globalisation, technological change, climate change and demographic developments (including ageing and migration) in that respect pose huge challenges, comprising both risks and opportunities. In that context, the Commission has launched recently the New Skills for New Jobs initiative together with other related European projects aimed at identifying future job and skills needs using quantitative modelling approaches. While having advantages of robustness, stakeholders as well as the European Commission identified a clear need for complementary more qualitative forward-looking analysis. Consequently, the European Commission commissioned in 2007 a series of 18 future-oriented sector studies (horizon 2020) on skills and jobs following a uniform, qualitative methodology. Results of these studies have become available in summer 2009, and will be followed by a number of other initiatives over the oncoming year and beyond. The current economic crisis calls for the reinforcement of policies aimed at developing the employability of the workforce. This project fits within this policy objective.

18 sector studies, one methodology

The results of this study aim to serve as a guide in launching further EU and other actions to promote the strategic management of human resources and to foster stronger synergies between innovation, skills and jobs, taking into account the global context and encouraging adaptations to national and regional level.

To validate, add and complement the findings of the project and to make sure that results are disseminated as broadly as possible across Europe, relevant stakeholders including European social partners, other services from the Commission with the expertise in the sectors analysed, representatives from the European Parliament, the European Economic and Social Committee, the Committee of the Regions, Eurofound and Cedefop were involved in the project from the beginning.

Sectors Covered
Automotive industry
Defence
Textiles, wearing apparel and leather products
Printing and publishing
Chemicals, pharmaceuticals, rubber and plastic products
Non-metallic materials (glass, cement, ceramic…)
Electromechanical engineering
Computer, electronic and optical products
Building of ships and boats
Furniture and others
Electricity, gas, water & waste
Distribution, trade
Hotels, restaurants, catering and related services
Transport
Post and telecommunications
Financial services (bank, insurance and others)
Health and social work
Other services, maintenance and cleaning

A standard predefined methodology was developed by a panel of experts under the direction of Prof Maria João Rodrigues and applied to all 18 studies to ensure consistency and comparability of the results, the studies being produced by different contractors.

Based on the basic methodological framework, each contractor executed 7 defined steps, starting with the mapping of main trends, key drivers of change, leading to scenarios of plausible evolution and their implication for employment at the year 2020 time horizon, the identification of implications for emerging competences and occupation profiles in terms of jobs expanding, transforming or declining, and their implications in terms of strategic choices and subsequent recommendations for companies, education and training systems, social partners and public authorities at all levels. This foresight methodology implies an approach combining desk research and expert knowledge.

At the end of each sector study a final European workshop for the sector was organised by the Commission to validate results as well as refine recommendations. In

addition to European Commission and Eurofound staff, about 20 experts per workshop from industry, academia and sector organisations including workers and employers' representatives with a sound knowledge of jobs and skills were invited to comment and provide recommendations to the report as part of the methodology.

Brief description of the methodological steps

Mapping

The main purpose of this analysis was to provide factual background to identify key drivers used in the subsequent scenario development. Consequently, the Report analysed recent 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. It was based on an analysis of available time series data and relevant existing studies. It analysed 1) structural characteristics (production, value added, employment in various dimensions, and related factors); 2) the value chain; 3) technological change and innovation; 4) trade and international competition as well as 5) regulation. The results of all sections were summarised in a SWOT analysis and were used as input to identify key drivers.

Drivers of change

On the basis of the mapping of the sector, a set of key drivers, sector specific or not, was identified. Literature review and expert knowledge of the sector were then used to define a conclusive list of sector-specific drivers. Drivers were classified as exogenous or endogenous depending on the ability for the sector's stakeholders and policymakers to influence them. These lists of drivers were also discussed in the experts' panel workshops.

Qualitative scenarios and implications for employment trends

The set of selected sectoral drivers of change served as an input to develop scenarios for the evolution of the sector and implications for different occupations (composition of employment / emerging competences) in the period 2008 to 2020.

Implications of scenarios and emerging competences

Scenarios were built to assess the implications for the level (absolute

demand) and composition (relative demand compared to other job functions) of employment of different job functions by 2020. New and emergent skills required by different job functions were identified based on the analysis of the evolution of past data on employment by occupation, on the analysis from the present situation and of experts' comments during the workshop. The focus was on identifying and describing key and critical competences for the future for each of the major occupational function in relation to the different scenarios elaborated. These formed the basis for the strategic choices identified in a next step.

Strategic choices for companies to meet emergent competence needs

Each sector study assessed possible strategic choices in terms of feasibility and actor involvement. The options comprised recruiting workers from other sectors, countries, recruiting graduates, re-training employed workers as well as changing work organisation.

Specific implications for education and training

Options to improve or to adapt education and training systems were looked at in this step of the methodology, focussing more particularly on the specific role to be played by sectoral organisations, educational institutions and governments such as a stronger cooperation between stakeholders or an increased flexibility through modularisation of education and training.

Recommendations

Each sector study contains specific recommendations to the sector. However, with the studies analysing Europe as a whole, the recommendations remain general and need a follow-up at the national and regional level. The intention of the project especially in the follow up phase is to use the results to stimulate stakeholders at lower territorial levels (national / regional) to work out results in more details, repeat and adapt this exercise to local needs rather than providing standardised solutions. Some general recommendations call for an intensified co-operation between relevant stakeholders, the need to invest strongly in human capital, more standardised regulations, enhanced VET to increase social mobility and coordinated National and European Vocational Qualifications.

The printing and publishing sector – main characterisation

Printing and publishing have traditionally been - and to a certain degree still are - closely related industries. Publishing can be defined as the process of production and dissemination of information, i.e. making information available for public view. It refers to the distribution of works such as books, magazines, newspapers and sound recordings in printed or electronic form. 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. In recent years the ties between both sectors are diminishing, as printed material has become less important for publishing companies, and digitization, Internet and new media have found their way in. Boundaries between publishing and other industries have started to blur, with publishers, printers and others converging but at the same time diversifying their product portfolios.

Note:

The statistical material contained in the report covers printing activities as a whole (NACE 22.2).The analytical part of the report focuses exclusively on the print market for publishing products, excluding commercial printing activities.

Main economic and employment trends

Value added of the printing, publishing and recorded media sector as a whole amounted to 124.8 bn euro in the EU in 2006, of which 120.6 bn euro was generated in the EU-15, with publishing being the biggest sub-sector, closely followed by printing, and at large distance by recorded media. Value added annual growth was - with 2.2% - almost equal to the 2.3% growth of the EU economy as a whole during the period 1995-2006, but substantially lower during the 2000-2006 period (1.2%). In the new Member States (NMS) growth was, with 2.1%, *slower* than the overall economy (3.2%), and even negative during the 2000-2006 period (-0.6%, against 5.3% annually during 1995-2000). In absolute terms value added of the NMS accounted for only 3.5% of the value added generated by the EU-15. Trade amounted to €44.8 bn in exports and €28.4 bn in imports in 2006, which is equivalent to 36% and 23%, respectively, of value added. Exports grew marginally faster than imports over the period 1995-2006, with 5.2% against 5.1% annually for the EU as a whole. Trade growth in the NMS was explosive, with exports growing at a rate of 15.5%, and imports growing with 9.0% annually.

The printing, publishing and recorded media sector accounted for 217,000 firms (figures 2005), which together employed 1.91 million people, 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. 86%, respectively 82% of the jobs in both sub-sectors were located in the EU-15. Employment in publishing in the EU grew with 0.3% annually during the period 2000-2006, and with 0.5% in the new Member States. In printing negative growth of -1.2% was observed, however, with strong annual *growth* in the new Member States (5.6% against -2.3% in the EU-15).

Employment, state-of-play 2006 and changes 2000-2006

Publishing	Level 2006 (times 1,000)	Annual growth	Share in EU	Change in share
EU	854	0.3	100	0
EU15	734	0.3	86	0
NMS	120	0.5	14	0
Printing / recorded media	**Level 2006**	**Annual growth**	**Share in EU**	**Change in share**
EU	1 053	-1.2	100	0
EU15	865	-2.3	82	-6
NMS	188	5.3	18	6

Source: Eurostat/TNO. Publishing: NACE 221. Printing and recorded media: NACE 222+223.

The majority of firms in the printing and publishing industry (97.6%) are small firms employing less than 50 employees; 2.0% is medium-sized and only 0.4% are large firms with more than 250 employees. Small firms account for about 48% of all employment and their employment share has, together with that of medium enterprises, increased by 0.7% point. Employment in large firms declined with 0.9%-point.

Employment trends by job function: shares (2006) and changes in shares (in%), 2000-2006

Employment trends by job function: shares (2006) and changes in shares (in%), 2000-2006

Printing and Publishing	Shares, 2006			Changes in shares, 2000-2006		
	EU15	NMS	EU	EU15	NMS	EU
Managers	11	8	10	0	2	0
Computer professionals	2	4	4	1	2	1
Engineers, technicians	3	4	3	0	1	0
Business professionals	5	6	5	1	3	1
Other professionals	25	22	25	4	-13	3
Office clerks and secretaries	11	9	10	-2	-4	-2
Service workers	3	2	3	0	0	0
Craft printing and related trades	18	19	18	-5	4	-4
Other craft and trades workers	1	2	2	0	0	0
Printing, binding, paper machine operators	7	14	8	-1	6	0
Other plant and machine operators	3	4	3	0	3	0
Labourers	11	4	10	3	-3	2

Source: Eurostat Labour Force Survey/TNO

Printing and publishing are fast-changing, dynamic sub-sectors, with ICT (notably electronic media; Internet; ICT-embedded technologies and automation) and strong global competition (Asia, viz. Singapore, China, others) profoundly impacting and changing the industry. Changes in business structure and business models, with new competitors (new media, but also free newspapers for example) coming to the stage, new product portfolios (diversification) but also

downstream integration and convergence in different information and communications markets (i.e. one content base that can be distributed through different channels with important economies of scale and scope), obviously influence both job volumes and skills mix in the industry. The pre-press function, for example, 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.

Most jobs are in the function categories other professionals (i.e. journalists, editors and writers), pre-press workers (category craft printing and related trades), office clerks, managers and labourers, the last accounting for 10% of the workforce. The new Member States have considerably more printing, binding and paper machine operators, less managers and considerably less labourers than the EU-15. The share of women in overall employment is with 41% is high compared to other manufacturing sectors.

Employment by gender, age and education: printing and publishing, 2006 and 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
Entre-preneurs	13	n.a.	12	n.a.	21	n.a.
Definition	Level % 2006	Total change %, 2000-06	Level % 2006	Total change %, 2000-06	Level % 2006	Total change %, 2000-06

Source: Alphametrics/TNO based on Eurostat Labour Force Survey

Employment is dominated by medium educated employees; this is true for the EU-15 (47%), but especially for the new Member States (67%). Low educated workers, with a share of 25% in the EU-15 and only 5% in the new Member States, lost ground, with decreases in the EU-15 and NMS of 4%- and 3% points over the last 7 years. 52% of all employees is younger than 40 years. During the period 2000-2006 most job change was observed among journalists, editors and writers (minus 13% points in the NMS and +4% points in the EU-15), pre-press workers (minus 5% points in the EU-15 and +4% in the NMS), printing, binding and paper machine operators (up by 6% points in the NMS and down minus 1% point in the EU-15) and office clerks and assemblers (down by 4%, respectively 2% points). The lower educated ('blue collar' jobs) lost ground overall; the share of mid-educated decreased in the EU-15, but increased strongly in the NMS (+10% points). The reverse applies to the high-educated with a substantial increase in the EU-15, but an even bigger decrease in the NMS.

SWOT analysis and Identification of Main Drivers

SWOT analysis Printing and Publishing	
Strengths	**Weaknesses**
• Small businesses more flexible to satisfy customer demands. In publishing production networks characterised through flexible specialisation already visible. • Knowledge of and experience in how to target audiences.	• Small businesses lower absorptive capacity regarding process and product innovation 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. • Property rights not always secured properly. (publishing). • Heavy investments to keep both printed and online versions (publishing). • Attracting young readers remains a challenge (publishing).
Opportunities	**Threats**
• Added services in communication services. • 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 CO_2, inks, and paper use. • Growing environmental awareness with the public. • Growing importance of electronic delivery of media content (commercial and non-commercial information), causing substitution of printed media by Internet and mobile devices. • Consolidation upstream and downstream in the value chain (counts for printing). • High consolidation in the media market, with large global players. • Piracy of online, but also offline content, also in traditionally "safe sectors", such as newspapers.

Source: TNO/SEOR.

The Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis and the expert-based search for main drivers of change (see Tables) both yield important building bricks for the design and construction of the scenarios. A further differentiation was made been exogenous drivers (drivers that form a "given" at sector level[1]) and endogenous drivers (drivers that can be influenced at the sector level, for instance by national or European policy-making, or by collective effort from within the sector.

1 With the exception here of Technology, parts of which can be influenced at firm level. For reasons of internal consistency of the scenarios, this driver is nevertheless categorised as exogenous.

Main drivers of change 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 employ-ment? Y / N	Are substantial impacts expected on employ-ment compo-sition? Y / N	Are substantial impacts expected on new skills? Y / N	Short, medium or long run impact? S M L	Substantial differences expected between countries? Y / N	Substantial differences expected between sectors? Y / N
D*	Ageing – declining labour force	Y	7	8	Y	N	N	X	Y	
Economic	Income per capita and household	Y	7	3	N	N	N	X	N	
	Income distribution	Y	7	3	N	N	N	X	N	
	Increasing global compe-tition	Y	7	8	N	Y	Y	X	N	

Source: TNO-SEOR-ZSI. Note: * Demographic ; ^ Environment

Economic	Global / regional production networks (dispersed production locations, transport)	Y	8	2	N	Y	Y	X			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
R&D, Technology & Innovation	Advances in IT impacting on organizational structures & new business models	Y	10	1	N	Y	Y	X			N

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 employ-ment? Y / N	Are substantial impacts expected on employ-ment compo-sition? Y / N	Are substantial impacts expected on new skills? Y / N	Short, medium or long run impact? S	M	L	Substantial differences expected between countries? Y / N	Substantial differences expected between sectors? Y / N
R&D, Technology & Innovation	Internet changing production and consum-ption patterns (e-business; etc.)	Y	10	1	N	Y	Y	X			N	
	New types of work organisation (teams-based, socio-technique, etc.)	Y	10	1	N	Y	Y	X			N	

	New/ additional value-added services	Y	10	1	Y	Y	Y	X			Y	
Ex	Availability and price of other natural resources	Y	8	3	N	N	N		X		Y	
Political	Trade and market libera-lisation (national level)	Y	10	1	N	Y	Y		X		N	
	Quality of institutions (judiciary, transpa-rency, lack of corruption, viable business climate, structural rigidities)	Y	8	3	Y	N	N	X			N	
	Property rights (copyright)	Y	8	5	N	N	N		X		Y	Y

Main drivers of change: 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	Substantial impacts expected on the volume of employ-ment? Y / N	Substantial impacts expected on employ-ment compo-sition? Y / N	Are substantial impacts expected on new skills? Y / N	Short, medium or long run impact? S M L			Substantial differences expected between countries? Y / N	Substantial differences expected between sectors? Y / N
D*	Ageing – declining labour force	Y	8	2	Y	Y	Y			X	N	
Economic	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, esp. BRICs)	Y	8	4	Y	Y	Y			X	N	Y*

Source: TNO-SEOR-ZSI. Note: * Demographic ; ^ Environment

Economic	Global / regional production networks (dispersed production locations, transport)	Y	8	6	Y	Y	Y	X	N	Y*
Cultural values	Increasing market segmentation (tailor made production, mass customization)	Y	8	5	N	Y	Y	X	N	Y
	Increasing demand for environmentally friendly products	Y	7	7	N	Y	Y	X	N	N
R&D, Technology & Innovation	Advances in IT impacting organizational structures & new business models	Y	8	1	Y	Y	Y	X	N	N

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 employ-ment? Y / N	Are substantial impacts expected on employ-ment compo-sition? Y / N	Are substantial impacts expected on new skills? Y / N	Short, medium or long run impact? S	M	L	Substantial differences expected between countries? Y / N	Substantial differences expected between sectors? Y / N
R&D, Technology & Innovation	Internet changing production and consum-ption patterns (e-business; etc.)	Y	9	3	Y	Y	Y	X			Y (EU15 more mature)	Y (specia-lization)
	New types of work organisation (teams-based, socio-technique, 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)
Env^	Availability/ price oil and energy resources	Y	8	3	Y	N	N	X			N	N
	Availability / price other natural resources	Y	10	1	Y	N	N	X			N	N
Political	Trade and market liberalisation (national)	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

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 employ-ment? Y / N	Are substantial impacts expected on employ-ment compo-sition? Y / N	Are substantial impacts expected on new skills? Y / N	Short, medium or long run impact? S	M	L	Substantial differences expected between countries? Y / N	Substantial differences expected between sectors? Y / N
	Environ-mental regulation	Y	8	2	Y	Y	Y	X			Y	Y (effect of special-ization)

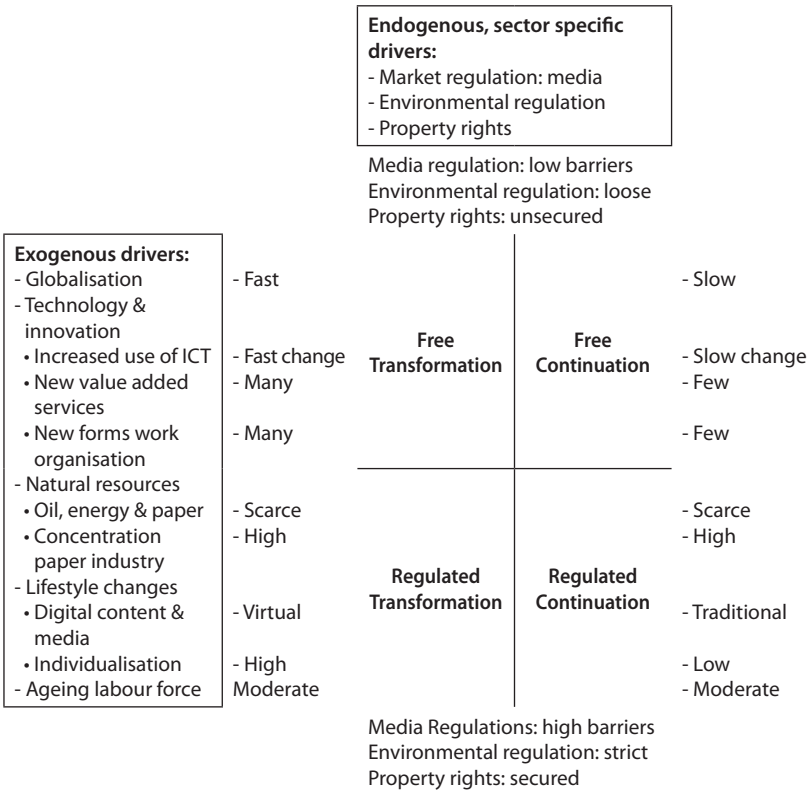
Scenarios and implications for employment

Four future scenarios have been constructed and explored: 1) *Free Transformation*, 2) *Free Continuation*, 3) *Transformation*, and 4), *Regulated Continuation* (see also Figure). The scenarios depict plausible and credible futures for the printing and publishing sector in Europe by 2020. Rather than wishful pictures ('dreams', 'crystal ball gazing') of the future, scenarios are founded on drivers and trends observed and are derived in a logical and deductive way, hence making inferences about plausible future developments. Rather than predictions or forecasts based on a model, the scenarios outcomes in this study are based on expert opinion. The bandwidth between the most extreme scenarios can be interpreted as indicative for the degree of uncertainty indicating possible paths for flexible anticipation.

Construction, hypotheses and use of the scenarios

In constructing the scenarios, a clear distinction has been made between exogenous and endogenous drivers, the main difference being the scope and ability for direct influence. Exogenous drivers are drivers that form a "given" for the sector without much room for influence for and by individual actors. Endogenous drivers are drivers that can be influenced at the sector level, for instance by national or European policy-making, or collective effort from within the sector. In constructing the scenarios, those drivers have been selected that scored high on the criteria relevance, impact and uncertainty. The relevance criterion was used to focus and tailor the scenarios to the aim at hand, i.e. drawing inferences on the future of jobs and skills and knowledge needs by 2020. Impact and uncertainty were used to define distinct directions in the four scenarios which have been depicted in the figure below, with the exogenous drivers on the horizontal axis and the endogenous drivers on the vertical axis.

Four future scenarios for the printing and publishing sector and main underlying drivers



Source: TNO-SEOR-ZSI

The scenarios apply to both printing and publishing. This does neither imply that future developments in both sub-sectors are to be taken as one and the same, nor that development paths between Member States need to be similar. The sectors will face different dynamics in terms of market structure and developments, while driven by similar but differently impacting drivers. The way the scenarios have been constructed enables such differentiation. Note that the demographics – ageing (less young, more retirees) – and its effects on labour supply have not explicitly been identified in selecting the drivers, as demographics in the time frame of 2009-2020 are relatively certain (i.e. predictable) and play a role across all scenarios. Education and training, which stricto sensu could be perceived as endogenous factors, have been excluded. They form - together with a number of other strategies and/or policies - the solutions and hence a possible response to the impact of the scenario on skills, knowledge and jobs. The key features of the four scenarios can be described as follows:

Scenario I: *Free Transformation*

Free Transformation depicts a world characterised by strong technological development, high rates of substitution from traditional to new media, and strong global and intra-EU competition. Some of the existing EU companies are able to expand internationally. M&As are manifold; many new entrants emerge and thrive, especially in publishing, as they have the ability to respond quickly to changing lifestyles. Some entrants are able to grow into powerful diversified players within several years; others are taken over by larger firms (consolidation). Deregulation means that companies are not faced with barriers imposed by media policy: they can grow and diversify without limitation. Innovation is important for staying competitive. However, as property rights are unsecured, publishing companies have difficulty in collecting revenues for their new products. Companies extensively use ICT possibilities and new forms of work organisation to increase efficiency. Fast successful development in publishing attracts a young workforce, neutralising the impact of an ageing labour force. Substitution of printed matter and technological developments decreases

the need for natural resources, such as paper and energy; even so, producing environmentally friendly ('green') provides opportunities for diversification. The market is more difficult for printers, many of whom go bankrupt because of less demand and other companies being better equipped to perform the newly demanded high value added services. Lower skilled work is outsourced or taken over by foreign competitors. Printers that are able to convert themselves to online communication or design are able to stay in business.

Scenario II: *Free Continuation*

Free Continuation depicts a world characterised by slow globalisation, limited international expansion and offshoring, and limited substitution of traditional printed material by new media. With little competition from outside the EU, competition is mostly national and cost-focused, with limited diversification and innovation. Lifestyle changes and individualisation play a lesser role, with customers demanding mostly cheap and generic products. Cost reduction is also achieved by exploiting economies of scale through M&As without limitation to media ownership. Also printers focus on cost-reduction, as many of them feel the increasing competitive pressure from large publishers. Input price increases (e.g. paper, energy) and environmental consumer concerns cause companies to minimise the use of resources. Yet they have few technological options to do so, faced with slow progress in innovation. Margins are low and printers try to enlarge their business operations to exploit economies of scale. Concentration means that the number of companies reduces sharply, but not in production value. Environmental problems thus persist. Printers face severe image problems and have problems in attracting young people, with ageing becoming a serious problem.

Scenario III: *Regulated Transformation*

Regulated Transformation depicts a world characterised by high substitution and globalisation. Media policy, however, limits media ownership with publishers and other firms being restricted in size. The media landscape is hence diversified with many smaller players, each delivering products that have a particular focus group, but using all channels available. In some markets there is less room for new entrants as

companies exploit their home market far more intensively. Printers can profit from the diversified landscape by providing various services specialised for special target groups and forming relationships with publishers. As digital rights are secured, companies can reap the benefits of innovation. Strict environmental regulation does not have a large impact, but with strong substitution and technology improving, environmentally friendly production becomes reality.

Scenario IV: *Regulated Continuation*

Regulated Continuation depicts a world characterised by moderate competition, strong media regulation and media companies facing limits to growth. Companies are strongly focused on one market segment, as diversification possibilities are limited; entry for new competitors is difficult as barriers to entry are high. Still, different market segments compete for customer attention. The number of printers reduces, but to a lesser extent than in *Free Continuation*. Although environmental regulation is in place, technological options for substituting paper are limited. Prices of paper and energy rise and environmental regulations further drive up costs and decrease margins, especially for printers. Secure digital rights have little to no impact, as demand for digital products is limited.

Implications of scenarios: job volume changes by function, 2009-2020

		Free Trans-formation	Regulated Trans-formation	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

Source: TNO-SEOR-ZSI. Note: D = decrease, I = increase, M = maintain. Pub = Publishing; Print = Printing.

Implications of scenarios for jobs, skills and knowledge by job function

In determining job volume changes, a distinction has been drawn between printing and publishing. For both *Free Continuation* and *Regulated Continuation*, expected volume changes will not differ greatly even though the intensity of change will be larger in *Free Continuation*. *Free Transformation* and *Regulated Transformation* show similar changes, with a stronger effect in Free Transformation. The main difference between *Free Transformation* and *Regulated Transformation* on the one hand and *Free Continuation* and *Regulated Continuation* on the other is, however, in expected changes in the *skills mix*.

In all scenarios except the stable *Regulated Transformation* managers in printing will face a decline, as the number of companies is likely to reduce. In publishing there is no obvious trend towards any increase or decrease, however. 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. In all scenarios managers fulfil a prominent role, especially in publishing. Reorganisations in publishing in *Free Continuation* and *Regulated Continuation* will be led by managers. Diversification in *Free Transformation* and *Regulated Transformation* also requires more managers. The demand for ICT & engineering professionals is mostly driven by technological developments and new high value added services. In *Free Transformation* and *Regulated Transformation* therefore, their volume can be expected; in the other scenarios their number will remain the same. It is expected that the number of ICT & engineering professionals will increase more in the strongly developing markets of Eastern and Central Europe than in developed markets. The number of business & finance professionals is expected to increase in scenarios with fast changing demand inducing market conditions and in contexts with a rising number of services and organisational complexity, i.e. in *Free Transformation* and *Regulated Transformation*. Volume changes are expected to be higher in publishing. The number of journalists, editors and writers can be expected to increase in line with the recent trend, especially in the fast paced scenarios. Again demand is driven by the need to supply more value added services, via new media channels; job contracts will, however, become more flexible. In *Free Continuation* and *Regulated Continuation* their

number is expected to decrease, as a result of consolidation. For support staff changes are to a large extent similar across scenarios and sub-sectors. Increased efficiency will reduce the need for administration, although in *Free Transformation* and *Regulated Transformation* decreases are partly offset by an increasing demand because of increasing organisational complexity and diversification of services. In *Free Continuation* and *Regulated Continuation* demand slows down as the need to cut costs is high, consolidation leads to a further reduction of administrative tasks and new services do hardly arise. In pre-press expected changes vary across scenarios. Pre-press is the desktop publishing side within printing companies and is important in delivering of value added services through different channels. In *Free Transformation* the number of printing companies goes down fast, and therefore the need for pre-press services. Because of the importance of pre-press workers for new services their number will increase in Regulated Transformation, with little change in the number of printing offices. In Free Continuation and Regulated Continuation their number is expected to be stable, with consolidation and little diversification restraining growth, but with a central role in production and customer services leading to an increased demand. Production workers - mostly relevant in printing - are expected to decrease in all scenarios, albeit for different reasons. In *Free Transformation* and *Regulated Transformation* declines are due to further automation, outsourcing and less demand for traditional printed material. In *Free Continuation* and *Regulated Continuation*, demand decreases because of consolidation and cost cutting. In developing markets the number of production workers will decrease more than in more mature markets where the majority of companies is already producing efficiently; companies have to ensure that (organisational) slack is further reduced in order to stay in business.

Identification of emerging competences, skills and knowledge needs

By taking the scenarios and drivers as a starting point, logical inferences ('guestimates') of skills and knowledge needs were made for each of the identified job functions. *Skills* refer to the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualification Framework (EQF),

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). *Knowledge* refers to the outcome of the accumulation of information through learning. It is the body of facts, principles, theories and practices that is related to a field of work or study. In EQF context, knowledge is described as theoretical and/or factual. Competences refer 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. *Competences* thus defined come actually close to what is generally understood nowadays as 'soft skills'. In EQF context, competences are described in terms of responsibility and autonomy. In the practical elaboration of future skills and knowledge needs for the purpose of this study, both have been further 'disentangled' to result into six clusters of similar and related skills and knowledge needs (see box).

Future skills and knowledge needs by job function

Across all job functions soft skills will become increasingly important, especially so for high skilled professional job functions. The general trend of up-skilling across job functions is bound to continue in the coming years. Due to the changing nature of jobs, predefined technical knowledge capabilities will become somewhat less important while skills to adapt and learn new competences and life-long learning will be put at a premium. Certain knowledge – notably e-skills – will become more important. Emerging competences of higher skilled jobs mostly refer to *how* to learn, communicate, interact and adapt to changing environments in addition to a high quality education. Emerging competences in medium-educated job functions that mostly execute defined tasks and processes refer mostly to specific knowledge sets that can be taught through learning.

Overview of skills and knowledge needs identified for each job function and scenario

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 Skills
• 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 / development; Trend setting / trend spotting

Source: TNO-SEOR-ZSI

We illustrate the key emerging skills and knowledge needs for two vital job functions, notably journalists, editors and writers (key in publishing) and pre-press workers (key in printing). [2]

Journalists, editors and writers – While different though related occupational groups, the function boundaries between the three are blurring; a considerable proportion of work can be relatively easy outsourced to freelancers or other part-time positions. In high-paced technological change scenarios (*Free Transformation and Regulated Transformation*) most of the changes are relevant for this function group. Change offers a variety

2 For a summary of expected changes in skills and knowledge needs for these and other job categories, see the tables at the end of this summary. More extensive and detailed accounts on future skills and knowledge needs can be found in the main report, with further differentiations made by scenario.

of possibilities to publish content and seemingly endless opportunities emerge for those able to capture them. In slow-paced technological scenarios few changes apply, with journalists, editors and writers coming under increasing pressure from management and business professionals to operate even more efficiently. In order to live and stand up to these pressures, management and financial knowledge can be very useful. Most job specific requirements do not vary considerably from what the skills and knowledge needs are at this moment. Competences in *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 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. Furthermore, in the regulated scenarios knowledge about media regulations is an asset. Social skills in international contacts will be necessary (intercultural skills, language, networking), in order to better understand new developments and how to use new media as a way to bring news to a highly diversified audience. Communication skills and social perceptiveness are considered essential in all scenarios, in dealing with co-workers, with other stakeholders and reporting as well as in quickly picking up signals and to be able to cope with change. An important change is the shortening time between writing and publication, brought about by the influence of new technology and globalisation which creates the need for strong to problem solving skills (interdisciplinary skills, multi skilling and creativity), but also more self-management skills. Flexibility and planning are also relevant in the slow change technology and globalisation scenarios, as efficiency pushes journalists, writers and editors to take on diverse tasks, so as to improve efficiency. In both Transformation scenarios new services and new media opportunities need to be taken up, which require entrepreneurial skills and spirit. Project management and strategic and visionary skills should ensure that journalists and writers are successful in setting up new services. In *Free Continuation* and *Regulated Continuation* changes in

competences relate to organisational changes, requiring adaptive capabilities. Training in management skills can help to increase influence on strategic choices.

Pre-press workers - Pre-press is the major node around which relations between customers and companies develop and forms the interface between production and customers, while translating customer demand into workable formats. The difference between the fast and slow technological change scenarios is that more technology adds to the number of technology-related skills pre-press workers need to acquire. In slow change scenarios pre-press workers the focus will be on further streamlining and improving the process from client to production and in reducing the use of natural resources rather than on techniques. In *Free Continuation* and *Regulated Continuation* pre-press is vital for companies as they struggle to keep in business. Customers should not be bothered with technological details. As pre-press activities are still too much focussed on technology, rather than commercial and social aspects, the latter are central. Whereas in all scenarios the importance of technical knowledge and e-skills will increase, the need for these will be far more apparent in fast changing technology scenarios. 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 hence remain a vital part. This is also apparent in new electronic workflows, the updating of knowledge and the improvement of processes. Pre-press workers need to be familiar with different kinds of techniques and multimedia possibilities, also in relation to the use of the product. There is, however, a danger that traditional pre-press skills, related to typesetting, colour picking and more general graphical skills, will be neglected due to the rise of new technologies. Companies still need to make sure that the more traditional skills are given the attention they deserve.

In the scenarios *Regulated Transformation*, *Free Continuation and Regulated Continuation* knowledge of environmental management will become more important. Knowledge of regulations is particularly important in the 'Regulated' scenarios. In all scenarios social skills will become a vital aspect of the work of pre-press workers. This involves the need to understand customers and co-workers and to

be able to effectively communicate demands and translating demands into outputs, which also requires visual communication. In scenarios of fast-paced technological change, strong cooperation is needed between production, support staff and pre-press workers, as production becomes increasingly flexible. Moreover, a strong customer orientation requires entrepreneurial and problem solving skills. Creativity can help pre-press workers to come up with creative ideas for new services linked to a good understanding of customer needs. New successful services also relate to marketing and business development skills. With pre-press workers being important in aligning different parts of the organisation, also with customer wishes, multi-skilling is important. Pre-press workers should be able to motivate others into establishing new products and services. New products will put additional demands on pre-press workers in terms of self-management skills and management skills, notably a flexible work attitude and the ability to multi-task including keeping track of the quality, safety and environmental impacts.

Main strategic choices to meet skill and knowledge needs

In order to meet future skills and knowledge needs, apt and timely solutions – referred to here as strategic choices - are required (see Table below). Strategic choices refer and relate to the medium- and longer term, even though emerging skills and knowledge 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 (including 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 to more precise assessments at the regional and company level. Increasingly the identification of skills and knowledge needs but also the search for adequate solutions will have to become an integral part of an overall longer-term business strategy, also for SMEs. Some solutions w ill be found within the company itself, e.g. through reorganising functions within or between plants, by offering (re)training trajectories or by active global sourcing of personnel. For SMEs and especially for micro-enterprises such longer-term, more strategic human resource management often will be more difficult to organise and operationalise.

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 is needed in order to agree on and implement a package of feasible solutions. Timely, targeted and reliable information to make decisions – i.e. adequate monitoring and analysis - is an essential prerequisite.

Summary of changes in job volumes, skills changes, main 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	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

		Free Transformation	Regulated Transformation	Free Continuation	Regulated Continuation
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[3]	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

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

		Free Transformation	Regulated Transformation	Free Continuation	Regulated Continuation
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); I = Intermediary organizations.

Conclusions and recommendations

Implications, conclusions and recommendations refer to two distinct levels: the individual job function (micro) level focusing on available options by job function and the more aggregate generic 'meso-level' level. They are aimed at sectoral stakeholders (firms, social partner, education and training institutes and others) and policy-makers. The preceding table summarises the micro-level options and highlights the main findings by category. At the meso-level a further distinction has been made between education and training on the one hand and 'other' main conclusions and recommendations on the other.

Conclusions and recommendations on 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;

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

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

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;

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

6) Arrange special training offers to freelance personnel;

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

8) Foster inter- and multidisciplinary competences in education and training;

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

10) 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;

11) Career guidance for labour market entrants and employees.

Main other conclusions and recommendations

1) Foster and promote life-long learning;

2) Keep older workers in employment;

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

4) Strengthen co-operation for sector-specific training measures;

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

6) Promote entrepreneurship and a culture of innovation.

Where to find more information?

The following information can be found on the Europa website under the address:
http://ec.europa.eu/restructuringandjobs

The other 17 sector studies on the analysis of the sector's evolution and future skills needs
The Restructuring in Europe report
The thematic restructuring forums
The checklist and the toolkit on restructuring processes
The training guide for SMEs
The national seminars on restructuring in 27 EU countries
Official documents related to restructuring policies