



Jobs and Competences in the Furniture Sector in the EU: Future scenarios and Implications

Final Report, Part II

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1 Introduction

This *Future scenarios and main implications* report is the second main deliverable of the project ‘Comprehensive sectoral analysis of emerging competences and economic activities in the European Union.’ It completes the draft final report, which consists of two parts. Part I contains a description of main trends, developments and the state-of-play in the European furniture sector. The present report, Part II, focuses on the expected changes in the content and importance of the main occupation categories in the furniture industry over the next decade (i.e., up to 2020). In terms of the methodology described by Rodrigues (2007), this report focuses on steps 6 to 10. Step 6 describes the main scenarios and their implications for the employment trends. Step 7 assesses the implications of scenarios for competences and occupation profiles. Step 8 highlights the various strategic choices in response to the emerging skills needs, with step 9 focusing on specific implications for education and training. Step 10 concludes by providing a number of key recommendations for the future. These steps are discussed in the following seven sections:

- Translation of the different assumptions concerning the developments in the main drivers of change into a number of scenarios (section 2);
- Determination of the job function structure in the sector with the statistical job classification as a starting point (section 3);
- Translation of scenarios into expected volume changes per function (section 4);
- Translation of scenarios into emerging competences per function (section 5);
- Overview of strategic choices to meet emerging competence needs (section 6);
- Overview of specific implications for education and training (section 7);
- Recommendations (section 8).

A slight extension of the Rodrigues methodology was made in that already in describing emerging skills and competences, a clear link with the scenarios is established. Although the content of this study remains the responsibility of the authors, valuable discussions were held and inputs received from a number of experts. It is important for the reader to be aware that this report is meant as a stepping stone for further discussion about emerging competences in the EU and its Member States. These discussions will take place at a final workshop with 20-30 mostly European sector experts scheduled for 22 and 23 January 2009. The present report is to be used as a principal input for this final sector workshop, which has the aim of validating, amending and complementing the study.

2 Scenarios

2.1 Overview of scenarios and main underlying drivers

This section presents the main scenarios for the furniture sector. The scenarios take a medium-long range time perspective, taking 2020 as the focal year. It is important to understand what scenarios can deliver and what not. Scenarios are plausible future paths of development rather than predictions or forecasts. Scenarios are not wishful pictures ('dreams', 'crystal ball gazing') of the future but are grounded in existing data and trends and derived in a logical and deductive way, in which inferences about plausible future developments are made.

Figure 2.1 summarizes the four different scenarios for the furniture sector, each of which representing a plausible future for the year 2020. The four scenarios have been based on a clustering of relevant drivers that were identified in part I of this study, with the x-axis reflecting the relevant exogenous drivers and the y-axis reflecting the relevant endogenous drivers.

Figure 2.1 Drivers and scenarios for the furniture sector

		Endogenous, sector specific drivers: <ul style="list-style-type: none"> • Environmental, health and safety regulations • Market segmentation, customisation, different consumer types 		
		Full customisation		
Exogenous drivers: <ul style="list-style-type: none"> • Globalisation: competition, emerging markets • Outsourcing and off-shoring • International production networks • Technology: new materials (hi-tech furniture, ICT) 	Local: Slow growth Low importance Small Slow growth	(3) Local customisation	(4) Global design and customisation	Global: Fast growth High importance Large Rapid growth
		(1) Local mass production	(2) Global mass production	
		Mass production		

2.2 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 that 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 European level. Two sets of drivers - which *a priori* might also be labelled endogenous factors - are not included in the scenarios,

namely: (a) Possible actions and measures at the industry and company level itself; and (b) Actions and measures directed towards the educational and training system. The reason for excluding these drivers in the formulation of the scenarios is that they have to be regarded as solutions (or so-called strategic options), which logically follow from the scenarios as implications rather than as building blocks for the scenarios. These strategic options represent the degrees of freedom for policy measures and other actions (see further section 6: main strategic choices to meet emerging skills needs).

The drivers were selected during the previous phase of the project on the basis of a number of criteria, the most important being relevance and significance for the furniture sector, potential impact and degree of uncertainty. Only those drivers with the highest overall ranking with scores from eight to 10 were taken into consideration.

High-scoring *endogenous* drivers for the furniture sector are:

- Increasing market segmentation: changing consumer characteristics, needs of different types of consumers, changing lifestyles, demand for environmentally friendly products, use of non-traditional materials, etc.;
- Environmental regulation; and
- Security and safety regulation.

High-scoring *external* drivers for the furniture sector are:

- Outsourcing and off-shoring;
- Increasing global competition;
- Global / regional production networks (clusters); and
- New materials.

Externally, globalization and increased international competition (mainly from China at the moment, but later also from other emerging countries), and related processes of outsourcing of production, the segmentation of the production chain and the emergence of international production networks will have a major impact on the European furniture industry. This trend leads to a growing role of global furniture companies. These companies may produce furniture themselves, or they may be design and retail companies who outsource the actual furniture production to a range of different suppliers (e.g., IKEA).

Endogenous drivers are more directly related to the dynamics of the furniture sector itself. Traditionally, the sector has been characterized by mass production of a limited number of standard furniture models. An important trend is away from traditional mass production of furniture and towards new, more flexible models of production where individual customer preferences play an important role and where customers are also involved in the design and finishing of the furniture. This customisation trend is also a strategy for the furniture industry to generate value added.

2.3 The scenarios – detailed discussion

Based on the combination of endogenous and exogenous drivers identified above, we discriminate between four sector scenarios for the European furniture sector, namely:

- **Scenario I: Traditional (local) mass production.** This scenario is essentially a continuation of the status quo. The importance of globalization in this scenario is not very high as result of measures to protect the position of EU producers. European producers (many of them small- and medium-sized enterprise [SMEs]) continue to

produce along traditional lines. Although there is some protection for EU producers, this scenario will result in closure of firms and reduced employment because the industry fails to renew itself and will not be able to cater to the demands of an increasingly segmented market, consisting of a large number of small niches.

- **Scenario II: Global mass production – Ikea style.** This scenario maintains the traditional approach to furniture design and manufacturing, but open markets speed up the processes of delocalization, outsourcing and the growth of global furniture value chains. Global mass production will be controlled by a few large companies who are not necessarily producing furniture themselves, but will concentrate on design, logistics, integration of the production chain and marketing. Implications for EU employment are mixed with reductions in the old Member States and possible gains in the NMS based on low labour cost. Eventually, as labour costs in the NMS rise, production will shift to lower wage countries
- **Scenario III: Local customisation.** This scenario combines the two trends of relatively low levels of international competition and a much more important role of consumers in design and customisation. The EU furniture industry tailors its production to an increasingly segmented market of different types of consumers (young and old, middle class and upmarket, etc.). Customers themselves become involved in design and adaptation, using web-based tools. Shops provide advice to customers on design and help with practical support. This scenario emphasizes up-market, high-value and quality production, tailored to a wide range of different customers. It requires the development of new systems of production organisation(e.g., lean manufacturing, mass customisation).
- **Scenario IV: Global customisation.** The process of mass customisation and catering to the demands of very different types of consumers is extended to the global level in this scenario. Chinese and other Asian companies who started producing cheap furniture for the mass market are following the example of European producers and increasingly provide tailor-made designs for individual consumers. Conversely, up-market European companies will start to cater to the demands of increasingly affluent upper and middle classes in the BRIC countries. Internet, web-based design tools, advanced logistics and systems of quality control allow customers to order tailor made designs directly from companies across the globe at very competitive prices.

3 Determination of function 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 3.1). 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 coming years, or are strategic and vital for growth of the sector as a whole, even if small in size.

However, the LFS job classification cannot be taken over one to one. First, the definitions of the job function groups given by LFS are highly aggregated and tend to cover very heterogeneous job functions. Reporting at the most aggregate level therefore would not be very illuminating. Second, some job functions that may be strategic for the sector when looking at the future can be ‘hidden’ in a broader statistical category. This also includes ‘new’ emerging 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.

Box 3.1 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 (2008)

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 aggregating these job functions, 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 in Table 3.1 below.

Table 3.1 Job classifications

Classification in Labour Force Survey (LFS)	Specific jobs of high relevance to sector falling in LFS classification	Job function categories as used in the next tables*
Managers	Corporate and specialist managers covering all firm functions	Managers
Computing professionals	Computer systems designers, analysts, programmers and computer associate professionals	IT professionals
Architects, engineers		Industrial designers
		Production planners
		Accounting & finance staff
Business professionals	Accounting, finance and sales professionals	Sales & marketing staff
Other professionals & technicians	Lawyers and economists, other science professionals, and associate professionals	(Strategic) buyers
Office clerks and secretaries	Office clerks and secretaries, receptionists and information clerks, transport conductors	Administrative support staff
Service workers		
Extraction and building trades	Machinery mechanics and fitters, metal moulders, welders, tool makers	Plant and machinery maintenance and repair
Metal. Machinery workers	}	Machine operators
Precision. Handicraft. Craft printing		
Food processing., wood treaters		
Textile, garment, pelt, and leather		
Assemblers, craft and related trade workers		
All other craft and trades workers		Skilled handicraft workers
Labourers	Manufacturing labourers; also maintenance and cleaning personnel; porters, etc.	Labourers

In order to establish a meaningful and appropriate classification, the existing LFS occupational classification for the furniture sector has been adapted by either aggregating and/or 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); and
- emerging job functions not yet covered and/or brought fully to light by current statistics.

Table 3.1 shows the detailed job functions for the furniture 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:

- *Managers*: top management and company owners/ entrepreneurs, but also including different specialist managers, such as HRM, finance, production, sales, and R&D management.
- *ICT professionals*: ICT professionals such as system designers and programmers as well as lower computing professions and computer operators, as well as industrial robot controllers.
- *Commercial and industrial designers*: Designers are in most cases hired by furniture manufacturers to design a new furniture collection on project basis, but sometimes are also employed permanently by the furniture manufacturer.
- *Production planner*: professionals who do the contact with clients, plan, schedule and prepare the work for actual manufacturing. They translate the design from the commercial and industrial designers into a production work plan.
- *Accounting & finance professionals*: accountants and bookkeepers.
- *Sales & marketing professionals*: sales and marketing staff and product stewards, capable of marketing and branding local and/or global to retailers, users and buyers.
- *Strategic buyers*: the strategic buyers are responsible for the acquisition of the (raw) materials from suppliers regionally and/or globally. They are responsible for selecting the right quality materials for the right price and under the right delivery conditions.
- *Support staff*: including office clerks, secretaries & other support staff covering administrative functions (including order management and stock keeping), HRM staff, as well as other specialized professionals not covered by the other categories (e.g. lawyers).
- *Plant and machinery maintenance and repair workers*: machinery and precision workers such machinery mechanics and electrical and electronic equipment mechanics: often outsourced to machine manufacturers or service companies
- *Skilled handicraft workers*: skilled workers are capable of skilled manual handicraft work, often specialised in one specific material (e.g. wood).
- *Machine operators*: the skilled production workers, most importantly plant and machine operators, still a relative small share in the sector.
- *Labourers*: low-educated/skilled workers such as manufacturing labourers, caretakers, porters, cleaners and related workers.

4 Implications of scenarios by job function – volume effects

Different futures will have different implications for jobs, both in quantitative and in qualitative terms. In this section the implications of the 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 section 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.

Main volume trends based on the period 2000-2006 are as follows:

- *Managers*: managers are representing around the 7% of employment in the EU furniture sector, with a higher representation in the New Member States (11%). A general trend is the decrease of high-educated managers and an increase in low-educated managers.
- *ICT professionals*: computer professionals are scarce in the furniture sector, representing only 1% of employment; which remained the same over 2000-2006. In the EU-15 the number of high and low educated computing professionals increased at the cost of the medium educated workers. In the New Member States there was an increase of high educated ICT professionals and an equal decrease in medium educated ICT professionals. An increase of importance of ICT professionals, due to a further digitalisation of administration, logistics, sales and an increase of the use of computers in design and production is expected.
- *Commercial and industrial designers*: the commercial and industrial designers form a very small group of total employment and are often hired from outside the furniture manufacturing sector for the design of new furniture-products. Although the importance of design is expected to increase, the absolute number of commercial and industrial designers will remain small. The impact of designers on the product and sales can be very large, especially with established and famous designers.
- *Production planner*: Production planners are people who translate the design into a work plan. These workers form a small percentage of total workers (less than 2%). It is expected that these workers in the future will require higher education levels, due to a more globalised, automated, robotised and digitalised production.
- *Accounting & finance professionals*: the accounting and finance workers form a quite small share of employees in the furniture sector with less than 2% and this is expected to decrease in the future due to a further outsourcing of these tasks to service providing companies.

- *Sales and marketing*: sales and marketing staff form a quite small share of employees in the furniture sector with less than 2%. An increase in the importance of sales and marketing is expected in the future.
- *Strategic buyers*: the strategic buyers represent only a small share of the total workers in the furniture manufacturing. An increase of the number of strategic buyers is expected with the availability of many new materials that can be applied in the furniture industry.
- *Administrative support staff*: the secretaries and office clerks represent around 10 % of the sector's workforce, although there was a small decline. In the New Member States there was an increase in high educated administrative support staff (9%), with a similar decrease in medium educated office clerks and secretaries (-7%). The share of this job function is expected to decrease, due to rationalisation and digitalisation of the administrative procedures.
- *Plant and machinery maintenance and repair workers*: the plant and machinery maintenance and repair workers form around 6% of the workforce and remained stable over the last period. With the increase of the applications of machines in the furniture industry, the number of maintenance and repair workers is expected to increase. Since the application of self-maintenance machines and maintenance and repair robots is not likely to be high in the furniture industry, this trend is expected to continue in the future.
- *Skilled handicraft workers*: Skilled handicraft workers form the largest share of workers (over 50%). Although the share of skilled handicraft workers remained quite stable over the last period, a shift from low educated to medium educated workers was visible. In the New Member States an increase in skilled handicraft workers was visible. A sharp decline in the number of skilled handicraft workers is expected in the future due to automation and robotisation in the mass-production of furniture in the EU-15.
- *Machine operators*: the machine operators represent around the 4% of the total workforce. There was a small decline (-1%) in the share of machine operators. A decline in low educated workers was compensated with an increase in medium educated workers. In the future a small increase in machine operators is expected because of the increase in the use and application of machines in the mass-fabricated furniture manufacturing.
- *Labourers*: Labourers represent around the 7% of the workers. In the period 2000-2006 the amount of labourers in the furniture manufacturing decreased with 3% and in the New Member States with 17%. Furthermore a shift from low-educated to medium-educated labourers could be observed. A further decrease in the amount of labourers is expected in the future due to rationalisation and outsourcing of tasks typically performed by labourers to service companies.

The results in 4.1 represent the relative expected changes in the volume of workers by job category in the furniture sector per scenario for the period 2008-2020. The table shows the different selected job categories and the changes expected for each of the scenarios. In the last row an assessment of the overall expected job development is given.

The *global customisation* scenario gives the most positive results in terms of overall employment volume in 2020 (see Table 4.1). In this scenario the production of furniture will be based on mass customisation. This means that design, consumer-friendly software,

and automated and robotised production are essential elements of a furniture manufacturer. In this scenario, Europe will be a leading region for well-established brands of furniture, which are suitable for adaptation according to individual consumer preferences. This will result in more managers, ICT professionals and business professionals, specialized in the implementation of robots, rapid manufacturing and advanced, user-friendly (online) software for consumers. For both mass customisation scenarios, a growth is expected in the number of commercial and industrial designers. Designs have to be creative but also adaptable to mass customisation.

Table 4.1 Relative volume changes by job category under different scenarios

Job category	Scenarios			
	Mass Production		Customisation	
	Local	Global	Local	Global
Managers	0	0/+	+	+
ICT professionals	0/+	+	0	+
Commercial and industrial designers	0	0/+	+	+
Production planners	0	+	0	+
Accounting & Finance	0	0/+	0	0
Sales & marketing	0/+	+	+	+
Strategic buyers	+	+	0/+	+
Administrative support staff	0	0	0	0
Plant and machinery maintenance and repair staff	0/+	+	0/+	+
Skilled handicraft workers	-	-	0/-	0/-
Machine operators	0	0	0/+	0/+
Labourers	-	-	-	-
Overall job change	-	0/-	0	0/+

Notes: - =decrease, +=increase, 0=maintain.

For both mass production scenarios the number of jobs is expected to decrease. The mass production of standard series of furniture will be much more automated and robotised, which will be at the cost of the skilled handicraft workers and the labourers. In both mass production scenarios, there is a higher demand for ICT professionals, production planners and a strong increase in sales & marketing workers, since the standard-produced products have to be branded and marketed locally or globally. Due to rationalisation and efficiency gains in both scenarios, the number of labourers and skilled handicraft workers is expected to continue to decline.

For the traditional (local) mass production scenario a small increase in ICT professionals is expected, because of further digitalisation of administration, logistics and production. There will be a small increase in staff in sales & marketing, since the marketing and sales is based on a strong regional link with customers from the same region, in which the furniture manufacturer has to build a strong brand with a regional image.

The global mass production scenario foresees an increase in the number of managers that have to organise and manage the global supply-chain as well as global sales. In order to stay competitive with other global furniture manufacturers, European companies in this scenario have to invest in short delivery times and in the automation and robotisation of the mass production of furniture. Both developments require ICT professionals who are able to program and operate the needed software. The global mass production scenario foresees that European furniture manufacturers will not only compete on price but also on design and brand image, which requires high quality designers. A small increase in the number of designers is expected.

For mass customisation (both local and global) many more and different skills are required, leading to an increase in many different job functions. The automation and robotisation required for mass customisation will be at the expense of labourers and to a lesser extent the skilled handicraft workers. The mass customisation requires a higher number of managers to organise the broad range of choices offered to customers in the design, materials and finishing of the product, the supply-chain, and the relationship with customers. For the scenario of global customisation this will require an (online) software tool for customers to customise their furniture. Compared to many other industries, the furniture industry has already quite some experience with customisation of furniture. However, under the customisation scenarios the customer will have a higher degree of freedom with regard to the design, material choice, size and finishing. The higher degree of freedom of choice of materials will require an increase of strategic buyers who are responsible for the acquisition of the right materials from all over the world. Also a global sales and marketing will require a higher number of sales and marketing workers.

For the local customisation scenario the competition will be less fierce and more local oriented. A better understanding of the local customer is needed as well as a stronger orientation on local suppliers of materials. Overall, for both scenarios handicraft workers and labourers will decrease in general and knowledge-based workers increase (managers, designers, strategic people).

5 Main emerging competences

5.1 Introduction

Determining emerging competences is at the very heart of this study. The starting point for the analysis is step 5 of the Rodrigues (2007) methodology. In order to identify the main emerging competences by occupational function, Rodrigues refers to the following three principal competency clusters, namely: theoretical, technical and social. 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 5.1). 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.

Box 5.1 Definition of skills and competences in EQF and ECVET

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

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

- a. *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;
- b. *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);
- c. *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.

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.¹ 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 avoided by using various indicators as a proxy focusing on qualifications (high-level, intermediate-level, low-level) as well as occupations. For the purpose of identifying future skills 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 section is on identifying and describing key and critical competences for the future. Especially changes in the set of competences to meet ‘new’ emerging job function will be discussed. 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 competences, a differentiation by scenario is made.

Throughout the text the term competences is used as the main header, being 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.” In the practical elaboration of competence needs 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 5.2) come very close to what is generally understood as ‘soft skills’.

Box 5.2 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.

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 5.1 provides an overview of the different skills and knowledge categories taken into consideration.

¹ ‘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).

Table 5.1 Overview of skills clustered in similar skills requirements

Skill category	Skills
Social skills	Team working skills; Social perceptiveness (listening / understanding); Communication; Networking; Languages; 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
Knowledge ('hard skills')	Legislative / regulatory knowledge (environmental / safety / labour / contracting); Languages; ICT related skills and competences (e-skills); Marketing skills; Technical knowledge; Product knowledge; Product development

For each job function key emerging future competences can be identified. Within the four scenarios (traditional [local] mass production, global mass production, local customisation, and global customisation) presented in chapter 2, the *traditional (local) mass production* scenario offers the least challenging in the context of new skills, while the other scenarios each have their own challenges in new skills. The *global mass production* scenario foresees that furniture manufacturers will operate at global level, with production facilities, design, suppliers, etc. all over the world, either close to the market or close to the availability of natural resources. Global trends in design and fashion have to be incorporated into the production in order to stay competitive. The *local* and *global customisation* scenarios are challenging in the change from mass production towards mass customisation, which is a different business model that asks different technical and social skills from employees at all levels within the furniture production chain.

The emerging future competences are identified and clustered with similar competences in a concise overview table per job function (see next sections 5.2 to 5.13). Only substantive key changes are taken into account, which means that not all cells in the tables are filled. However, if a competence is highlighted in one scenario, but is not addressed in another, this does not mean that the competence is irrelevant in that particular scenario. Rather it means that demand for this competence type in the latter case will not increase substantially within the time frame 2008-2020. Furthermore, it is assumed throughout all scenarios that currently existing REACH and environmental regulations will be implemented.

In the case of the *traditional (local) mass production* scenario, we do not foresee any significant increase in the demand for certain competences. Hence, in the discussion per job function (sections 5.2 to 5.13) this particular scenario has been left out.

5.2 Managers

Table 5.2 summarizes the emerging skills and competencies that managers in the furniture sector will need under the different scenarios. Those skills and competences coloured black or grey are the ones that are clearly emerging under a particular scenario and may require attention in terms of additional training and adjustments in the curricula of educational establishments. Those skills and competencies coloured black are the ones that are the most critical, followed by those coloured grey.

Table 5.2 Emerging skills and competences of managers in the European furniture sector under different scenarios

Skill category	Skills	Mass production		Customisation	
		Local	Global	Local	Global
Social skills	Team working skills				
	Social perceptiveness				
	Communication				
	Networking				
	Language				
	Intercultural				
Problem solving skills	Analytical skills				
	Interdisciplinary				
	Initiative				
	Multi-skilling				
	Creativity				
Self management	Planning				
	Stress & time management				
	Flexibility				
	Multi-tasking				
Entre-preneurship	Understanding supplier & customers				
	Business development				
	Marketing skills				
	Trend setting/spotting				
Management skills	Strategic & visionary				
	Coaching & team building				
	Collegial management style				
	Change management				
	Project management				
	Process optimizing				
	Quality management				
Knowledge	Legislative & regulatory knowledge				
	e-skills				
	Technical knowledge				
Total emerging skills and competences		Count: 1	Count: 16	Count: 7	Count: 10

In many smaller companies, the managers are not considered as a separate category and usually do not have a formal background in management. In most instances they have a technical background and have grown into a managerial position over time through on-the-job training and learning-by-doing. This situation, however, is different in large furniture companies.

Specific skills and competencies that stand out as critical for managers in the furniture sector are:

- Entrepreneurial skills of understanding consumer and supplier needs, for both customisation and mass-production scenarios as well as spotting trends and market opportunities arising from structural changes are needed. Similarly the focus in these scenarios is on skills for developing new business in addition to managing and optimising of processes.
- Social skills are required for the managers of SMEs, who often grow into the function of manager from a technical background and often lack the right skills for managing other people.
- Analytical skills are needed to identify new technological and consumer trend, as well as to identify new (niche)-markets.
- Globalisation and outsourcing requires more knowledge of global supply chain management, especially for SMEs in order to strengthen their position in the sector.
- Creativity will become for a manager more important for distinguishing the company and companies brand from others. This can also mean the mobilisation of creativity in the company.
- These skills and work requirements in a competitive global environment and a stronger pressure on lower delivery times require managers to handle severe pressures for which time and stress management are crucial to function well over time.
- e-skills (ICT related skills and competences) are crucial to operate in a modern business environment, also for managers; there is hence a need for continuously updating e-skills.

Global mass production is the most challenging scenario, necessitating more creativity, planning abilities and marketing skills. In contrast to the *customisation* scenarios, there is a need to distinguish from non-European furniture manufacturers based on design, planning, etc. In the *customisation* scenarios, customer relations skills will become more important. In both global scenarios, social and (inter)cultural skills will become more important. The *local mass production* scenario is more-or-less business as usual, requiring few additional skills and competences.

5.3 ICT professionals

Table 5.3 summarizes the emerging skills and competencies that ICT professionals in the furniture sector will need under the different scenarios. Those skills and competences coloured black or grey are the ones that are clearly emerging under a particular scenario and may require attention in terms of additional training and adjustments in the curricula of educational establishments. Those skills and competencies coloured black are the ones that are the most critical, followed by those coloured grey.

IT professionals in small enterprises often combine this job function with other administrative jobs. These people are responsible for:

- ICT support (logistics, administration, electronic ordering systems shared with suppliers and retailers).
- E-commerce (marketing, public website).
- Specific ICT solutions to sector – modelling / simulation of products in the design phase and the software required for operating the machines and robots in the

production process (often part of plant and machinery maintenance and repair workers).`

For the *customisation* scenarios the functioning of a user-friendly website that is adapted for customers to indicate their preferences is necessary for a good functioning business. In the mass production scenarios a further decrease of delivery time will become an increasing factor for competitiveness and will require an integration of software systems.

IT professionals have to deal with people from logistics, management, administration and machine operators and therefore require more and more key soft skills like team work and communication skills.

Table 5.3 Emerging skills and competences of ICT professionals in the European furniture sector under different scenarios

Skill category	Skills	Mass production		Customisation	
		Local	Global	Local	Global
Social skills	Team working skills				
	Social perceptiveness				
	Communication				
	Networking				
	Language				
	Intercultural				
Problem solving skills	Analytical skills				
	Interdisciplinary				
	Initiative				
	Multi-skilling				
	Creativity				
Self management	Planning				
	Stress & time management				
	Flexibility				
	Multi-tasking				
Entrepreneurship	Understanding supplier & customers				
	Business development				
	Marketing skills				
	Trend setting / spotting				
Management skills	Strategic & visionary				
	Coaching & team building				
	Collegial management style				
	Change management				
	Project management				
	Process optimizing				
	Quality management				
Knowledge	Legislative & regulatory knowledge				
	e-skills				
	Technical knowledge				
Total emerging skills and competences		Count: 5	Count: 10	Count: 11	Count: 14

5.4 Commercial and industrial designers

Table 5.4 summarizes the emerging skills and competencies that commercial and industrial designers in the furniture industry will need under the different scenarios. Those skills and competences coloured black or grey are the ones that are clearly emerging under a particular scenario and may require attention in terms of additional training and adjustments in the curricula of educational establishments. Those skills and competencies coloured black are the ones that are the most critical, followed by those coloured grey.

Table 5.4 Emerging skills and competences of commercial and industrial designers in the European furniture sector under different scenarios

Skill category	Skills	Mass production		Customisation	
		Local	Global	Local	Global
Social skills	Team working skills				
	Social perceptiveness				
	Communication				
	Networking				
	Language				
	Intercultural				
Problem solving skills	Analytical skills				
	Interdisciplinary				
	Initiative				
	Multi-skilling				
	Creativity				
Self management	Planning				
	Stress & time management				
	Flexibility				
	Multi-tasking				
Entrepreneurship	Understanding supplier & customers				
	Business development				
	Marketing skills				
	Trend setting / spotting				
Management skills	Strategic & visionary				
	Coaching & team building				
	Collegial management style				
	Change management				
	Project management				
	Process optimizing				
	Quality management				
Knowledge	Legislative & regulatory knowledge				
	e-skills				
	Technical knowledge				
Total emerging skills and competences		Count: 5	Count: 12	Count: 11	Count: 14

Especially in smaller companies, designers are often external employees and have project-based contracts. Larger companies often have their own design departments.

In general the role of commercial and industrial designers will be different, depending on the different scenarios. For the global mass-production scenario, the creativity of the

designers will be very important for creating unique designs, while for mass-customisation creativity is needed to make designs that are adaptable for customers. In the *customisation* scenarios a stronger service orientation will become more important. In the global scenarios the social and language skills will gain importance.

In the *customisation* scenarios, a close co-operation with the customers will become necessary to establish a workable concept that takes into account individual freedom and the translation into doable products.

In both *mass production* scenario's the necessity for industrial and commercial designers to have creative skills to design distinctive and unique furniture will become more important in order to create a distinctive competence for furniture manufacturers.

E-skills will also become a growing necessity since much of the design work will be computer-based. The introduction of new materials calls for increasing technical knowledge to assess new design opportunities with new materials.

5.5 Production planners

Table 5.5 summarizes the emerging skills and competencies that production planners in the furniture industry will need under the different scenarios. Those skills and competences coloured black or grey are the ones that are clearly emerging under a particular scenario and may require attention in terms of additional training and adjustments in the curricula of educational establishments. Those skills and competencies coloured black are the ones that are the most critical, followed by those coloured grey.

For the *global mass production* scenarios as well as for both *customisation* scenarios this function will become more challenging in the future. In all scenarios the shift from handicraft to machine and robot manufacturing will ask for a different input from the production planner, who needs to understand the characteristics of the manufacturing process in order to make a detailed work plan based on the design from the commercial designer. Since the production planner needs to communicate well with designers and production employees (machine operators and skilled handicraft people), this person needs to have communication, networking and team working skills. For production planners the planning of suppliers and the understanding of customers is of growing importance. Also the e-skills will become very relevant in each scenario since production planner will increasingly use computer-based systems to execute their planning.

For the *customisation* scenarios the production planner will face more criteria that a furniture design has to fulfil in order to be adaptable for customisation by customers.

Table 5.5 Emerging skills and competences of production planners in the European furniture sector under different scenarios

Skill category	Skills	Mass production		Customisation	
		Local	Global	Local	Global
Social skills	Team working skills				
	Social perceptiveness				
	Communication				
	Networking				
	Language				
	Intercultural				
Problem solving skills	Analytical skills				
	Interdisciplinary				
	Initiative				
	Multi-skilling				
	Creativity				
Self management	Planning				
	Stress & time management				
	Flexibility				
	Multi-tasking				
Entrepreneurship	Understanding supplier & customers				
	Business development				
	Marketing skills				
	Trend setting / spotting				
Management skills	Strategic & visionary				
	Coaching & team building				
	Collegial management style				
	Change management				
	Project management				
	Process optimizing				
	Quality management				
Knowledge	Legislative & regulatory knowledge				
	e-skills				
	Technical knowledge				
Total emerging skills and competences		Count: 10	Count: 24	Count: 21	Count: 24

5.6 Accounting and finance professionals

Table 5.6 summarizes the emerging skills and competencies that accounting and finance professionals in the furniture industry will need under the different scenarios. Those skills and competences coloured black or grey are the ones that are clearly emerging under a particular scenario and may require attention in terms of additional training and adjustments in the curricula of educational establishments. Those skills and competencies coloured black are the ones that are the most critical, followed by those coloured grey.

Small companies often outsource the accounting and finance jobs, while medium-sized and large companies usually have their accounting and finance staff. In the larger firms the accounting and finance professionals may have to deal with a more complex flow of contracts and payments, considering the increase in the use of different materials and therefore different suppliers. For the global scenario's the accounting and finance professionals have to deal with clients, retailers and suppliers from many different

countries, which require additional communication, language and intercultural skills as well as an understanding of different legal and regulatory systems. Furthermore, the use of more sophisticated software and the integration and standardisation of Enterprise Resource Planning-software (ERP) with electronic administration, invoicing into standardised software will require additional e-skills under all scenarios. Also in the *customisation* scenarios the communication with customers will grow in importance, which will increase the importance of soft skills and understanding customer's skills for accounting and finance professionals. In all scenarios the communication with suppliers and customers will become more important due to an increase in the diversification of resource materials. Also the use of e-skills and the understanding of relevant laws and regulations of other countries will become more important, not only in the global scenarios but also in the local scenarios in which the buying of raw materials will become more a global issue.

Table 5.6 Emerging skills and competences of accounting and finance professionals in the European furniture sector under different scenarios

Skill category	Skills	Mass production		Customisation	
		Local	Global	Local	Global
Social Skills	Team working skills				
	Social perceptiveness				
	Communication				
	Networking				
	Language				
	Intercultural				
Problem solving skills	Analytical skills				
	Interdisciplinary				
	Initiative				
	Multi-skilling				
	Creativity				
Self management	Planning				
	Stress & time management				
	Flexibility				
	Multi-tasking				
Entrepreneurship	Understanding supplier & customers				
	Business development				
	Marketing skills				
	Trend setting / spotting				
Management skills	Strategic & visionary				
	Coaching & team building				
	Collegial management style				
	Change management				
	Project management				
	Process optimizing				
	Quality management				
Knowledge	Legislative & regulatory knowledge				
	e-skills				
	Technical knowledge				
Total emerging skills and competences:		Count:5	Count:10	Count: 6	Count: 10

5.7 Sales and marketing professionals

Table 5.7 summarizes the emerging skills and competencies that sales and marketing professionals in the furniture industry will need under the different scenarios. Those skills and competences coloured black or grey are the ones that are clearly emerging under a particular scenario and may require attention in terms of additional training and adjustments in the curricula of educational establishments. Those skills and competencies coloured black are the ones that are the most critical, followed by those coloured grey.

Table 5.7 Emerging skills and competences of sales and marketing professionals in the European furniture sector under different scenarios

Skill category	Skills	Mass production		Customisation	
		Local	Global	Local	Global
Social Skills	Team working skills				
	Social perceptiveness		Grey	Grey	Grey
	Communication		Grey	Grey	Grey
	Networking		Grey		Grey
	Language				
	Intercultural		Grey		Grey
Problem solving skills	Analytical skills				
	Interdisciplinary				
	Initiative	Grey	Grey	Grey	Grey
	Multi-skilling				
	Creativity	Grey	Grey	Grey	Grey
Self management	Planning		Grey		
	Stress & time management				
	Flexibility	Grey	Grey	Black	Grey
	Multi-tasking				
Entrepreneurship	Understanding supplier & customers	Grey	Grey	Grey	Grey
	Business development				
	Marketing skills	Grey	Grey	Grey	Grey
	Trend setting / spotting				
Management skills	Strategic & visionary		Grey		
	Coaching & team building				
	Collegial management style				
	Change management				
	Project management				
	Process optimizing				
	Quality management				
Knowledge	Legislative & regulatory knowledge		Grey		Grey
	e-skills	Grey	Grey	Grey	Grey
	Technical knowledge	Grey	Grey	Grey	Grey
Total emerging skills and competences		Count: 7	Count: 16	Count: 11	Count: 14

The sales and marketing staff are responsible for managing customer relations, marketing the products and managing sales activities. In the globalisation scenarios the sales and marketing professionals require strong language and intercultural skills. In addition, sales and marketing work requires high level social skills to engage in extensive contacts with external parties such as customers or service providers. These social skills are part of the set of soft skills that are required in most professional jobs such as team working,

communication, networking, language and intercultural skills in addition to flexibility, creativity, multi-tasking and project management skills. Especially in the mass-customisation scenarios the understanding customers is very important for marketing and sales to offer the right conditions for customers to customise and design their own product. For the mass-production scenarios it is important for the sales and marketing professionals to understand the customer wishes in order to know what kind of mass-produced furniture is wanted and what the new consumer trends are. With increasing market segmentation and niche markets emerging in the scenarios, entrepreneurial skills such as spotting of market trends and opportunities become increasingly important. Moreover, it will be very important to be able to translate market requirements into product specifications.

While sales and marketing is not a science but an art, it is mostly learned through learning on the job. Specific knowledge requirements relate to:

- Product knowledge, especially the technical understanding of products, in order to be able to serve clients.
- E-skills and particularly e-business skills as for most professional jobs are crucial and need to be up-to-date. Sales and marketing staff frequently works with specific IT programmes to manage client relationships / communication.
- With national differences in regulation of the sector, sales staff that sells products in international markets needs to be aware of differences in environmental and health and safety regulation to perform its tasks.

In general, creativity and the taking of initiative will be of relevance due to a general up-scaling of marketing innovations by all competitors. Internet-based sales, advertising and marketing will become standard, providing more opportunities for original concepts and strategies. Especially the Internet as a commercial platform necessitates creative marketing concepts due to fierce global competition in the global scenarios. Although some experts doubt whether consumers will in the future buy furniture online, some new furniture manufacturers have already set up an online sales websites that sells furniture products, including seats and sofa's globally and online. Especially for the lower value added markets this might in the future become an important way for gaining sales and asks different skills of sales and marketing professionals in furniture manufacturing firms. Until now the manufacturing firms primarily focus on retailers for the sales of their products.

Technical knowledge may also become more important for marketing because of the development of new materials, new concepts and innovations whose advantages have to be explained to the customers.

5.8 Strategic buyers

Table 5.8 summarizes the emerging skills and competencies that strategic buyers in the furniture industry will need under the different scenarios. Those skills and competences coloured black or grey are the ones that are clearly emerging under a particular scenario and may require attention in terms of additional training and adjustments in the curricula of educational establishments. Those skills and competencies coloured black are the ones that are the most critical, followed by those coloured grey.

Table 5.8 Emerging skills and competences of strategic buyers in the European furniture sector under different scenarios

Skill category	Skills	Mass production		Customisation	
		Local	Global	Local	Global
Social Skills	Team working skills				
	Social perceptiveness				
	Communication				
	Networking				
	Language				
	Intercultural				
Problem solving skills	Analytical skills				
	Interdisciplinary				
	Initiative				
	Multi-skilling				
	Creativity				
Self management	Planning				
	Stress & time management				
	Flexibility				
	Multi-tasking				
Entrepreneurship	Understanding supplier & customers				
	Business development				
	Marketing skills				
	Trend setting / spotting				
Management skills	Strategic & visionary				
	Coaching & team building				
	Collegial management style				
	Change management				
	Project management				
	Process optimizing				
	Quality management				
Knowledge	Legislative & regulatory knowledge				
	e-skills				
	Technical knowledge				
Total emerging skills and competences		Count: 11	Count: 16	Count: 11	Count: 16

5.9 Administrative support staff

Table 5.9 summarizes the emerging skills and competencies that administrative support staff in the furniture industry will need under the different scenarios. Those skills and competences coloured black or grey are the ones that are clearly emerging under a particular scenario and may require attention in terms of additional training and adjustments in the curricula of educational establishments. Those skills and competencies coloured black are the ones that are the most critical, followed by those coloured grey.

Support staff should be understood here as being in support of all other job functions and to improve work effectiveness. The category of support staff is defined here to include all other support job functions than the ones that have already been described and not requiring tertiary education. Most support staff functions are administrative related jobs. Key knowledge required for these activities are up-to-date e-skills to function effectively

in an administrative environment (basic Internet skills; spreadsheet and word processing skills; e-monitoring skills).

In addition, a number of social skills is crucial to perform support functions in an organisation well, especially team working skills and communication skills. Both will become increasingly important in project driven environments. Project driven environments require self-initiative to work independently, good planning, multi-tasking and stress & time management. In international organisations also for support functions language and intercultural skills become increasingly important.

Table 5.9 Emerging skills and competences of administrative support staff in the European furniture sector under different scenarios

Skill category	Skills	Mass production		Customisation	
		Local	Global	Local	Global
Social Skills	Team working skills				
	Social perceptiveness				
	Communication				
	Networking				
	Language				
	Intercultural				
Problem solving skills	Analytical skills				
	Interdisciplinary				
	Initiative				
	Multi-skilling				
	Creativity				
Self management	Planning				
	Stress & time management				
	Flexibility				
	Multi-tasking				
Entrepreneurship	Understanding supplier & customers				
	Business development				
	Marketing skills				
	Trend setting / spotting				
Management skills	Strategic & visionary				
	Coaching & team building				
	Collegial management style				
	Change management				
	Project management				
	Process optimizing				
	Quality management				
Knowledge	Legislative & regulatory knowledge				
	e-skills				
	Technical knowledge				
Total emerging skills and competences		Count: 4	Count: 9	Count: 4	Count: 9

While there is little difference in skills needs between the sub-sectors as support staff comprises tasks generic to the sector, nevertheless a basic technical understanding of the products is beneficial for people seeking employment in the sector. Furthermore, there is a change that much of administrative work may become outsourced or will be automated due to the application of advanced and sophisticated software.

Especially in global scenarios, language and communication skills as well as flexibility will become more important for administrative support staff. Due to expected increases in safety and environmental regulations, improved legal knowledge will add as an upcoming skill for administrators.

Especially in global settings the function of (strategic) buyers will generally get more important. Independent of the scenarios, the manufacturing of furniture is not a local, but a global process where materials and production are organised internationally, depending on the optimisation of prices and material availability. In the future more and more different materials will be used and applied in the furniture industry, including the application of high-tech materials as well as the addition of intelligence to furniture (sensors and ICT). This will require more technical knowledge of the strategic buyers, as well as communication, networking, language and intercultural skills.

The understanding of customers and suppliers is of much relevance and especially global scenarios require a high degree of flexibility.

Knowledge about legal issues and regulations will generally become more important due to new and stricter rules, e.g. in regard to environmental and safety aspects. The same applies for a certain degree of technical knowledge when it comes to innovations and the use of new materials and product components.

In the local scenarios the higher use of local materials is expected, to give products a more local (and sometimes also an eco-friendly) image. Still in this scenario also the use of many different non-local materials is foreseen to serve the many different wishes of a wide variety of local customers.

5.10 Plant and machinery maintenance and repair workers

Table 5.10 summarizes the emerging skills and competencies that plant and machinery maintenance and repair workers in the furniture industry will need under the different scenarios. Those skills and competencies coloured black or grey are the ones that are clearly emerging under a particular scenario and may require attention in terms of additional training and adjustments in the curricula of educational establishments. Those skills and competencies coloured black are the ones that are the most critical, followed by those coloured grey.

Many of the tasks of plant and machinery maintenance and repair workers will be performed by the builder of the machinery or will be outsourced to service providers. The large furniture manufacturer will employ maintenance and repair workers who will be responsible for the daily routine and small repair and maintenance functions, where the large repair and maintenance functions will be outsourced to service providers.

In the future more sophisticated machines and autonomous robots will be used in the furniture industry, which will be more operated based on advanced software. This requires from the maintenance and repair workers more advanced e-skills and ICT knowledge. In general, machinery will become more multifunctional and complex, necessitating higher technical and analytical skills in general.

For the mass production or mass-customisation a good planning of maintenance and repair of machines will become more important. Since a less labour intensive manufacturing process will likely to be a continuous process, day and night, the maintenance and repair of machines has to be time efficient and keep the interference with production process at a minimum.

Table 5.10 Emerging skills and competences of plant and machinery maintenance and repair workers in the European furniture sector under different scenarios

Skill category	Skills	Mass production		Customisation	
		Local	Global	Local	Global
Social Skills	Team working skills				
	Social perceptiveness				
	Communication				
	Networking				
	Language				
	Intercultural				
Problem solving skills	Analytical skills				
	Interdisciplinary				
	Initiative				
	Multi-skilling				
	Creativity				
Self management	Planning				
	Stress & time management				
	Flexibility				
	Multi-tasking				
Entrepreneurship	Understanding supplier & customers				
	Business development				
	Marketing skills				
	Trend setting / spotting				
Management skills	Strategic & visionary				
	Coaching & team building				
	Collegial management style				
	Change management				
	Project management				
	Process optimizing				
	Quality management				
Knowledge	Legislative & regulatory knowledge				
	e-skills				
	Technical knowledge				
Total emerging skills and competences		Count: 7	Count: 10	Count: 7	Count: 10

5.11 Skilled handicraft workers

Table 5.11 summarizes the emerging skills and competencies that skilled handicraft workers in the furniture industry will need under the different scenarios. Those skills and competences coloured black or grey are the ones that are clearly emerging under a particular scenario and may require attention in terms of additional training and adjustments in the curricula of educational establishments. Those skills and competencies coloured black are the ones that are the most critical, followed by those coloured grey.

In all scenarios the number of skilled handicraft workers will decrease, due to the increase of automation and robotisation. For skilled handicraft workers, the use of more sophisticated and automated tools to facilitate their handicraft will increase, asking for more different technical skills in operating these tools. In the future, the borders between handicraft workers and machine operators may blur, requiring from the handicraft workers multi-skilling capabilities. Due to a further expected increase in the use of

different materials, handicraft workers need to broaden their knowledge about materials to many new materials. In small traditional furniture manufacturing organisations many skilled handicraft workers have extensive knowledge about the treatment of wood and the manufacturing of furniture out of different types of wood. With the use of plastics, bamboo, concrete, glass and many different materials new knowledge and skills in how to treat these materials is necessary.

In the customisation scenarios it will be important to translate the customer wishes into the desired product, which necessitates flexibility and creativity from a more analytical perspective.

Table 5.11 Emerging skills and competences of skilled handicraft workers in the European furniture sector under different scenarios

Skill category	Skills	Mass production		Customisation	
		Local	Global	Local	Global
Social Skills	Team working skills				
	Social perceptiveness				
	Communication				
	Networking				
	Language				
	Intercultural				
Problem solving skills	Analytical skills				
	Interdisciplinary				
	Initiative				
	Multi-skilling				
	Creativity				
Self management	Planning				
	Stress & time management				
	Flexibility				
	Multi-tasking				
Entrepreneurship	Understanding supplier & customers				
	Business development				
	Marketing skills				
	Trend setting / spotting				
Management skills	Strategic & visionary				
	Coaching & team building				
	Collegial management style				
	Change management				
	Project management				
	Process optimizing				
	Quality management				
Knowledge	Legislative & regulatory knowledge				
	e-skills				
	Technical knowledge				
Total emerging skills and competences		Count: 10	Count: 13	Count: 14	Count: 15

5.12 Machine operators

Table 5.12 summarizes the emerging skills and competencies that machine operators in the furniture industry will need under the different scenarios. Those skills and competences coloured black or grey are the ones that are clearly emerging under a particular scenario and may require attention in terms of additional training and adjustments in the curricula of educational establishments. Those skills and competencies coloured black are the ones that are the most critical, followed by those coloured grey.

Table 5.12 Emerging skills and competences of machine operators in the European furniture sector under different scenarios

Skill category	Skills	Mass production		Customisation	
		Local	Global	Local	Global
Social Skills	Team working skills				
	Social perceptiveness				
	Communication				
	Networking				
	Language				
	Intercultural				
Problem solving skills	Analytical skills				
	Interdisciplinary				
	Initiative				
	Multi-skilling				
	Creativity				
Self management	Planning				
	Stress & time management				
	Flexibility				
	Multi-tasking				
Entrepreneurship	Understanding supplier & customers				
	Business development				
	Marketing skills				
	Trend setting / spotting				
Management skills	Strategic & visionary				
	Coaching & team building				
	Collegial management style				
	Change management				
	Project management				
	Process optimizing				
	Quality management				
Knowledge	Legislative & regulatory knowledge				
	e-skills				
	Technical knowledge				
Total emerging skills and competences		Count: 6	Count: 8	Count: 8	Count: 10

Automation and robotisation will also increasingly enter the furniture manufacturing industry. This applies to large companies, but until 2020 also a growing number of SMEs will increase the application of automation and robotisation. With the increase of competition from Asia (mainly China) and possibly European countries east of the EU (e.g. Ukraine and Belarus) a further cost reduction for low-added-value furniture is

possible with the replacement of expensive labour with low-cost machines. Also the countries in Central and Eastern Europe inside the EU that now have a competitive advantage due to low labour cost, will face increases in wages. For mass customisation scenarios the use of software controlled machines that can make unique designed furniture at mass-production is necessary. In these scenarios the machine operators will need team working skills and communication skills to communicate with handicraft workers and the production planner for the successful customisation of each product (in case this is not fully automated).

Since machines will get more ICT-based and more complex. This will necessitate more information-based than manual skills. E-skills and technical knowledge will grow in importance. It is also likely that fewer people will control a growing number of machines and that programming skills will become central.

For all scenarios the borders between ICT professionals, handicraft workers and machine operators may blur, necessitating more multi-skilling.

5.13 Labourers

Low-educated workers still make up a significant part of the workforce in the sector; they have been, however, the biggest loser in terms of employment in the recent past. The number of production labourers in this sector is diminishing in Europe, as most of the simple production activities have moved outside Europe or have been replaced by machines. Future employment opportunities for this type of workers will be in up-skilling towards future skill requirements of metal and machinery workers as well as skilled handicraft workers and machine maintenance and repairers. Labourers active in cleaning and maintenance will increasingly see their job outsourced to third party service providers; therefore, this type of job function will shift to the service sector.

5.14 Summary

Both the quantitative and qualitative implications for jobs and skills for each of the scenarios are summarised in Table 5.13. The volume changes have been taken from Table 4.1 and the skills and competences changes from the last row of Tables 5.2-5.12. Table 5.13 shows that the largest change in volume and skills and competences occurs under the *global customisation* scenario followed by the *local customisation* scenario. The *traditional (local) mass production* scenario will result in a stagnation/decline for most jobs categories and less demand for new skills and competences than under the other scenarios.

Table 5.3 Summary of quantitative and qualitative changes per job category under different scenarios

Job category	Scenarios							
	Local mass production		Global mass production		Local customisation		Global customisation	
	Volume change	Change in skills	Volume change	Change in skills	Volume change	Change in skills	Volume change	Change in skills
Managers	M	1	M/I	16	I	7	I	10
ICT professionals	M/I	5	I	10	M	11	I	14
Commercial and industrial designers	M	5	M/I	12	I	11	I	14
Production planners	M	10	I	24	M	21	I	24
Accounting and finance professionals	M	5	M/I	10	M	6	M	10
Sales and marketing professionals	M/I	7	I	16	I	11	I	14
Strategic buyers	I	11	I	16	M/I	11	I	16
Administrative support staff	M	4	M	9	M	4	M	9
Plant and machinery maintenance and repair workers	M/I	7	I	10	M/I	7	I	10
Skilled handicraft workers	D	10	D	8	M/D	8	M/D	10
Machine operators	M	6	M	13	M/I	14	M/I	15
Labourers	D	NA	D	NA	D	NA	D	NA

Notes: D =decrease, I=increase, M=maintain. In total 29 different skills and competences were identified in this study.

6 Strategic choices to meet emerging competence needs

6.1 Introduction

The objective of this section is to identify the main strategic choices to meet the skills and knowledge needs identified for the three non-traditional scenarios: *global mass production*, *local customisation* and *global customisation* (step 8 of the methodology). This section provides a framework to pick and select the most relevant strategic choices available (i.e., solutions to meet skill and competence needs). In section 7 some of the more specific implications relating to education and training will be described (step 9 of the methodology). Strategic choices refer and relate to the medium- and longer-term, even though skills needs may also apply to the present and immediate future. Essential in seeking appropriate solutions is to keep this time perspective in mind. Rather than focusing on one single solution, a set of linked strategic choices will in most cases be the best strategy to follow. Prioritising both in time (what first, where to follow up) and in allocation of resources (budgetary focus) as well as further fine-tuning is a clear necessity to guarantee that skills needs are targeted and satisfied. Skills needs can be identified at various levels, ranging from assessments at the national or even European sector level to regional and company level. The former are by nature rather general, while the latter can be more precise and resulting in a more differentiated picture. 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 employment strategy. Some solutions will be found within the company itself, for instance by reorganising functions within or between plants, by offering training trajectories and by active global sourcing of personnel. For SMEs and especially for micro-enterprises² such longer-term, more strategic human resource management often is more difficult to organise. It should be emphasized that at all levels identified different players need to act to address skills needs and offer solutions. These can be individual firms, organised interests at the sector level (employers and employees), as well as local, regional and national governments. This section offers first of all a better insight in the ‘menu’ of possible strategic choices (section 6.2). 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 (section 6.3). This framework is subsequently applied to the furniture sector (section 6.5 and following).

6.2 Possible strategic choices

The possible strategic choices discussed in this section include strategic choices proposed in the common methodology (Rodrigues, 2007: 42) as well as a number of other options. Whereas *strategic* choices mostly refer to the medium and longer term, most of the options mentioned can also be implemented in the short run, to ‘mend’ existing skills shortages and/or skills gaps (see section 5). Each of the solutions at hand differs in whether or not they 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

² Defined as firms with less than 10 employees.

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.

Strategic choices to meet skills needs have to be taken by a number of actors and at different levels (firm, sectoral, local, regional, national, EU). 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 gaps in skills and competences. Companies avail of a number of options to meet their skill and competence 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); and
- H. Outsourcing and off-shoring.

Companies themselves are the prime actor for pursuing these options, even though for some options co-operation is needed from other actors. Examples include measures to enable recruiting workers from abroad or support from sector organisations in re-training.

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

- I. Changing vocational education;
- J. Designing and offering new courses (continuing vocational education and training);
- K. Providing information about jobs and (emerging) skills: career guidance; updating job profiles regularly;
- L. Improve the image of the sector (joint action of companies together); and
- M. Stronger cooperation with the industry (internships, company visits for participants in education, image improvement).³

Whether the 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 (job functions) and in qualitative terms (knowledge and skills). An important question that needs to be addressed first is at what level and to whom the skills needs question actually applies. Obviously for an individual firm different

³ A more detailed description of these options can be found in annex I.

information is needed when identifying future skills needs than for a ministry at the national level.

This step would in principle require extensive and detailed future analysis at Member State and preferably even regional level of demand and supply patterns of skills and competences by each sub-sector, in a similar way and along the steps provided by the methodology of this study so far. In principle this methodology is also applicable at the national and regional level of analysis. Ideally, these results should subsequently be complemented by the results of labour market model forecasts to corroborate the results. Such an analysis would also need to include an assessment of the numbers (cohorts) and composition as regards skills training of those currently being educated. In other words, an estimate should be made of all cohorts of primary, secondary and tertiary pupils and students (and their skills potential) who currently are in the educational system and will arrive at the labour market in the oncoming years. Furthermore, a thorough overall assessment of the current educational and training system itself would be needed, including the already decided changes herein for the oncoming years, to assess whether the system as it is now in place is able to satisfy the prevailing and future new skills demands.

Key questions for identifying skills needs are:

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)
 - a. If decreasing, there is probably less need for recruiting workers from other sectors and (non-) Member States and less need for recruiting unemployed.
 - b. 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. See Table 4.1 for estimated volume effects per scenario.
2. *Are the required qualitative skills expected to be rather stable between now and 2020?*
 - a. If there are not many changes in required competences, there is probably no need to apply many strategic options. Please focus on the options that are most effective.
 - b. If many competences are changing, there is probably a need to apply many strategic options. Create a package of strategic options to meet skills needs. See Tables 5.1 and following for the number of competences changing per job function per scenario.
3. *Do SMEs and especially small companies (including micro enterprises) play a large role in the sector?*
 - a. 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.

4. *Are companies in general active on Member State level, EU level or global level?*
 - a. 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 off-shoring.
5. *Are workers in a job function in general low-educated?*
 - a. 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.
6. *Are workers in a job function in general old (i.e. older than the average age in the sub-sector and compared to other sectors)?*
 - a. 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.

6.3 Mapping and framing future skills needs at the local level and firm level

For firms and local governments an elaborate readily operational foresight tool to assess and judge job and skills needs in the longer term will normally not be available. What is needed here is an appropriate targeted short-cut strategic decision tool to enable the management or the HRM department of a firm and local decision makers to pick and choose the best strategic option(s). In this section this tool is described.

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

6.4 Meeting skills needs by choosing the right strategic options

In a subsequent next step, the list of available strategic options is confronted 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 the prime actor to change the current situation into a more favourable direction. If the strategic option is considered relevant, a “yes” is included in the Table, otherwise a “no”. If the strategic option is dependent on the characteristics of the sector or components thereof, this will be included in the Table. For example, if recruiting workers from other Member States is only an option for large companies a “Yes, but only for large companies” will be

included. Characteristics that are dealt with in the following Tables are based on the six question analysis, representing:

- The change in volume (the scenario with the largest increase is taken as a reference, i.e. the transformation scenarios);
- The change in skills (as a reference we use the scenario with the largest change in competences, i.e. the transformation scenarios);
- Education level;
- Age of the workforce; and
- Markets and location characteristics of the company.

6.5 Managers

Table 6.1 presents viable strategic options for emerging skills and competences of managers in the *global mass production* scenario and both *customisation* scenarios for the furniture sector.⁴ While there is an increase in the number of managers expected under both customisation scenarios, also skill and competence shortages are expected in this occupational function (see chapter 5). What have been detected are current skill and competence gaps.

In principle, all listed strategic options are viable to meet the emerging skills needs of managers. Some are more probable than others, however. Viability depends on firm size and identified skills needs. Recruiting managers from other sectors for instance is a more viable option for larger companies than for SMEs. For SMEs operating locally, more company- and region-specific skills are needed. For larger companies operating globally more generic managerial skills are needed as well as intercultural skills, making recruitment from other sectors (in different ‘cultures’) a more viable option.

Some experts in the sector consider recruiting managers from other sectors a viable option in order to gain fresh ideas and new strategic visions for the companies in a fast changing business environment. However, in most small businesses that produce for the local market the owner is also the manager. For these reasons, the recruitment of workers from other sectors, other member states or other non-Member States are viable strategic options only for the larger companies, but not for SMEs in the furnishing sector. Recruiting unemployed presents an option for all companies, but is expected to be less relevant for this occupational function.

The recruitment of young people from the education system and training or re-training of the existing workforce presents viable strategic options for all companies. Training and re-training is an adequate method to cope with the emerging skill gaps provided that the overall workforce in the occupational function ‘managers’ is expected to level off or to decrease. The training content differs slightly due to the emerging needs in the different sectors and size of companies. Social skills like communication and networking skills are highly needed. This also holds for language and intercultural skills, mainly in the global customisation scenario (see section 5.2.). Training for an ageing group of managers is an important strategic choice.

⁴ Where significant differences are expected in strategic choices between the sub-sectors these will be included in the text and accompanying Table.

Table 6.1 Strategic options managers

Questions	Answers	
1. What is the maximum volume effect? 2. What is the maximum change in skills? 3. Do SMEs play a large role? 4. Is the sector national/EU/global? 5. Is the workforce old? 6. Is the workforce low educated?	Increase (longer term maintain in GMP) 16 Yes (especially in LMC) Global (except LMC) Yes (in EU-15); younger in EU-12 Yes	
Options	Is this option viable?	Actors*
A. Recruiting workers from other sectors	Yes, mainly for generic managerial skills (GMP and GC), Less viable for LC (more specific managerial skills needed)	C, S, I
B. Recruiting workers from other Member States	Yes, mainly in GMP and GC, less viable in LC; often language barrier	C, E, G, I
C. Recruiting workers from non-Member States	Yes, mainly in GMP and GC, less viable in LC; often language barrier	C, E, G, I
D. Recruiting unemployed with or without re-training	Only in rare cases	C, I
E. Recruiting young people from the education system	Yes, e.g. through apprenticeships	C, S, E
F. Training and re-training employed workers	Yes, in-house promotion and further training in the firm	C, S, E
G. Changing work organisation	Yes, GC mainly ICT & logistics driven (Supply Chain Management)	C
H. Outsourcing and off-shoring	Yes, only for large companies in GMP and GC.	C
I. Changing vocational education	Yes, networking, communication, language and intercultural management	S, E
J. Designing and offering new courses	Yes, networking, communication, language, intercultural management, also e-skills and logistics (SCM). In GMP and GC knowledge regarding foreign regulation and legislation.	C, S, E
K. Providing information about emerging skills	Not necessary	
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	Not necessary	

* C = company; S = sector organisations and chambers of commerce; E =education & training; G =governments; I = intermediary organisation, public or private.

Changing the work organisation, e.g. inter-disciplinary team work, is a viable option for meeting the emerging skills demands in global customisation. Outsourcing and off-shoring is a plausible option for larger companies in the globalisation scenarios GMP and GMC.

Designing and offering new courses is a necessary and viable option to meet the demand for skills and competences for managers in the future. On the one hand the availability of

courses, especially for SMEs, has to be improved; on the other hand courses should refer strongly to the needs of the furniture industry.

Due to the good reputation of managers and the furniture industry and due to the availability of managers on the labour market, improving the image of this occupational function is not necessary.

6.6 ICT professionals

Table 6.2 shows the strategic options for emerging competences of ICT professionals. In the three 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. In the mass production scenario, the role of ICT professionals will be less different than today, whereas the global character of the situation will call for more intercultural and language skills.

The recruitment of workers from other sectors is a viable option since also generic ICT skills are required for ICT networks, ICT support, maintenance and service. Professionals specialised in programming and data processing are less likely to be recruited from other sectors due to the sector-specific 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.

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 ICT professionals and engineers. Recruiting young people from the education system is another viable option to meet the skill gaps and shortages for ICT 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. In order to overcome existing and emerging skill gaps within this occupational function continuous or life long training is necessary.

Table 6.2 Strategic options ICT professionals

Questions	Answers	
1. What is the maximum volume effect?	Increase	
2. What is the maximum change in skills?	14	
3. Do SMEs play a large role?	Yes (especially in LC)	
4. Is the sector national/EU/global?	Global (except LC)	
5. Is the workforce old?	No	
6. Is the workforce low educated?	No	
Options	Is this option viable?	Actors*
A. Recruiting workers from other sectors	Yes (mainly from industrial sectors).	C, S, I
B. Recruiting workers from other Member States	Yes, mainly in GMP and GC in order to obtain intercultural skills. Less viable in LC.	C, S, E, G, I
C. Recruiting workers from non-Member States	Yes, mainly in GMP and GC in order to obtain intercultural skills. Less viable in LC.	C, S, E, G, I
D. Recruiting unemployed with or without retraining	Yes, but only with retraining. Operating systems and programming languages change fast, especially GC and LC.	C, E, I
E. Recruiting young people from the education system	Yes, ICT skills (knowledge) readily available. Competition is fierce.	C, E
F. Training and re-training employed workers	Yes, but difficult for older workers (lacking ICT based education/affinity).	C, S, E
G. Changing work organisation	Yes, extending corporation in supply chain, especially GMP and GC.	C, I
H. Outsourcing and off-shoring	Yes, in house ICT support can be outsourced mainly in LC and GMP, off-shoring mainly in GC.	C
I. Changing vocational education	Yes, integrating ICT skills and intercultural and language skills (e.g., understanding international suppliers and customers). LC and GC web-based, customer-driven development/ production and logistics.	C, S, E
J. Designing and offering new courses	Yes, intercultural and web-based, customer-driven development/ production and logistics	C, S, E
K. Providing information about emerging skills	Not necessary	
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	Not necessary	

* C = company; S = sector organisations and chambers of commerce; E = education & training; G = governments; I = intermediary organisation, public or private.

6.7 Commercial and industrial designers

Especially in smaller companies, designers are rather external employees or have project-based contracts. Larger companies can have their own design departments. Creativity and service orientation will become more important skills for the commercial and industrial designer, but also social and language skills will become more important, especially in both the globalization scenarios.

In the *customisation* scenarios, a close co-operation with the customers will become necessary to establish a workable concept that takes into account individual freedom and the translation into doable products. E-skills will also become a growing necessity since much of design work will be computer-based. The introduction of new materials calls for increasing technical knowledge to assess new design opportunities with new materials.

Table 6.3 shows the strategic options for the furniture sector to provide oneself with these needed skills. Recruiting designers from other sectors is not a viable option, since sector-specific knowledge and skills are essential. Only with the proper education or experience in the furniture sector one can function as a commercial furniture designer. Recruiting designers from other Member or non-Member States certainly is a viable option, as is recruiting unemployed and young people from the education system. As long as people are educated in furniture design, they can be recruited. However, one has to reckon with language as well as cultural barriers when recruiting designers from other countries.

Training and retraining employed workers is also considered a viable option. However, this only applies to employees that have already a background in designing. Training these workers should mainly be focused on e-skills (designing furniture on the web) and on new materials, concepts and products. Changing vocational education is not necessary, although some more attention should be given to e-skills in the relevant vocational/educational programs.

In both *customisation* scenarios contact with the customer will be of great importance since a customer could very well become a co-designer. Closer business-to-customer (B2C) interaction will require additional social and e-skills from the commercial or industrial designer. These aspects should be paid attention to in training courses as well as in vocational education programs.

Table 6.3 Strategic options commercial and industrial designers

Questions	Answers	
1. What is the maximum volume effect?	Increase (except LC)	
2. What is the maximum change in skills?	14	
3. Do SMEs play a large role?	No	
4. Is the sector national/EU/global?	Global (except LC)	
5. Is the workforce old?	No	
6. Is the workforce low educated?	No	
Options	Is this option viable?	Actors*
A. Recruiting workers from other sectors	No	C
B. Recruiting workers from other Member States	Yes	C, S, E, I
C. Recruiting workers from non-Member States	Yes	C, S, E, I
D. Recruiting unemployed with or without re-training	Yes, but rarely available	C
E. Recruiting young people from the education system	Yes	C, E
F. Training and re-training employed workers	Yes, but mainly e-skills and new materials, concept and product	C, E
G. Changing work organisation	Yes, in LC and GC closer B2C interaction,	C, I
H. Outsourcing and off-shoring	Yes, outsourcing mainly SME	C
I. Changing vocational education	Not necessary	
J. Designing and offering new courses	Not necessary	
K. Providing information about emerging skills	Yes	S, I
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	Not necessary	

* C = company; S = sector organisations and chambers of commerce; E =education & training; G =governments; I = intermediary organisation, public or private.

6.8 Production planners

This function describes the activity of developing the most appropriate method and sequence of operations for a particular project. It is a rather organisational function that accompanies the whole furniture production process. For globalisation as well as for customisation scenarios this function will become more challenging in the future.

In almost every skill category, the demands will rise. Especially e-skills will become very relevant in every scenario since the activities are going to be increasingly 'e' and knowledge-based. Organisation and coordination will be key elements for efficient and successful activities.

Table 6.4 presents the viable strategic options for emerging competences of production planners in the furniture sector. Many strategic options mentioned in the table are considered more-or-less viable. For this job function recruiting workers from other sectors is, however, not a viable option since specific knowledge is required. Recruitment from other states, especially Member States, is a viable option, mainly for larger companies. Recruiting from non-Member States may be more difficult since cultural differences and language barriers are often more substantial. An intercultural workforce might open up new possibilities in terms of market access. In globalisation scenarios recruiting from other countries is therefore a viable option. Recruiting unemployed people is a viable option also, but only with some additional training, since the unemployed often lack the contemporary competences required to work as an engineer.

Recruitment of young people through well developed technical traineeships (or courses) is also a viable option. A focus in these training courses should also be on e-skills, especially in the customisation scenarios. These latter training packages should also be made available for older workers to retrain them or for unemployed to introduce them to working in the furniture sector. The offering and designing of new courses as well as changes in the vocational education courses should focus on these aspects.

Table 6.4 Strategic options production planners

Questions	Answers	
1. What is the maximum volume effect?	Increase (GMP and GC), maintain (LC)	
2. What is the maximum change in skills?	24	
3. Do SMEs play a large role?	Yes in LC, No in GC and GMP	
4. Is the sector national/EU/global?	Global (except LC)	
5. Is the workforce old?	Yes	
6. Is the workforce low educated?	Yes	
Option	Is this option viable?	Actors*
A. Recruiting workers from other sectors	No, specific knowledge required	C
B. Recruiting workers from other Member States	Yes, less viable for SMEs	C, S, E, I
C. Recruiting workers from non-Member States	Yes, but difficult for SMEs and often language barrier.	C, S, E, I
D. Recruiting unemployed with or without re-training	Yes, specific (re)training required	C
E. Recruiting young people from the education system	Yes, apprenticeships. Training on the job.	C, E
F. Training and re-training employed workers	Yes, Training on the job.	C, E
G. Changing work organisation	No	
H. Outsourcing and off-shoring	No	
I. Changing vocational education	Yes, e-skills	S, E, G
J. Designing and offering new courses	Yes, e-skills	C, S, E
K. Providing information about emerging skills	Yes	C, S, E, G
L. Improve the image of the sector	No	
M. Stronger cooperation between stakeholders	No	

* C = company; S = sector organisations and chambers of commerce; E =education & training; G =governments; I = intermediary organisation, public or private.

6.9 Accounting & finance professionals

This job category is in particular relevant for the large(r) companies in the furniture industry. Most SMEs, however, tend to outsource the accounting and finance function. As globalisation and customisation are expected to grow, communicative skills are generally getting more important, also for accounting & finance professionals. Also, in the global scenarios, complexity and time-zone issues will increase, necessitating more flexibility and analytical skills. Working in many different countries also requires knowledge on more different regional and local rules and regulations. The least challenging scenario for accounting would be local customisation, since language skills, requiring new knowledge on local and regional rules and regulations and flexibility will not be that important. The number of accounting staff will only slightly increase in the *global mass production*

scenario, due to growing outsourcing and off-shoring tendencies of accounting and finance (A&F).

Table 6.5 presents strategic options for emerging skills and competences related to the accounting and finance professionals in the furniture sector. Some A&F emerging skills, such as legal and regulatory knowledge of an international, national or even regional nature, are considered generic skills that can easily be recruited from other sectors. The same goes for e-skills.

Table 6.5 Strategic options accounting & finance professionals

Questions	Answers	
1. What is the maximum volume effect?	Limited increase (GMP), maintain (LC and GC)	
2. What is the maximum change in skills?	10	
3. Do SMEs play a large role?	Yes in LC, No in GC and GMP	
4. Is the sector national/EU/global?	Global (except LC)	
5. Is the workforce old?	No	
6. Is the workforce low educated?	No	
Options	Is this option viable?	Actors*
A. Recruiting workers from other sectors	Yes, mainly generic skills involved (business, finance, law)	C
B. Recruiting workers from other Member States	Yes, in GMP	C, S, E, I
C. Recruiting workers from non-Member States	Yes, in GMP	C
D. Recruiting unemployed with or without re-training	No	
E. Recruiting young people from the education system	No	
F. Training and re-training employed workers	Yes, GMP and GC training in regulations in 'new' markets	C, E
G. Changing work organisation	No	
H. Outsourcing and off-shoring	Yes	C
I. Changing vocational education	No	
J. Designing and offering new courses	Yes, aiming at: (a) improving e-skills in using new programmes; and (b) improving knowledge about international law in case of the GMP and GC scenarios	C, S, E
K. Providing information about emerging skills	Not necessary	
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	Not necessary	

* C = company; S = sector organisations and chambers of commerce; E = education & training; G = governments; I = intermediary organisation, public or private.

These generic e-skills can also be recruited from other countries (Member States as well as non-Member States). Also emerging accounting and finance skills can be recruited

from other countries. This is mainly a viable option in the GMP scenario in which it is important to recruit A&F personnel with knowledge of local, regional or national laws and regulations in new markets. Recruiting accounting and finance skills from other states within or outside the EU can pose difficulties however, since regulatory and legislative knowledge are often country-specific. Recruiting these skills from other member states is a viable option only for operations from the home state of recruits. Recruiting skills for other countries or markets than the home market of the recruit would be a less viable option.

Recruiting young people as well as recruiting the unemployed is not really a viable option, since a lot of specific training would be required, either in country-specific skills and knowledge or in sector-specific skills and knowledge.

Although the need for accounting and finance professionals is expected to be modest in the furniture sub-sector, replacing employees that leave the labour market will be necessary and recruiting these skills from other sectors is a viable option.

To make recruitment activities in other states more viable training programs can be developed that provide recruits with an international set of skills and knowledge of international laws and rules. The EU could help in standardizing international rules and laws, potentially improving labour mobility. For furniture an extra effort should be on training personnel in acquiring e-skills needed to function well in GC or LC scenarios.

6.10 Sales & marketing professionals

Sales and marketing activities will become more important for the furniture industry in all three scenarios. Especially in the global scenarios, social and language skills will become more important. In general, creativity and taking initiative will be of relevance due to a general up-scaling of marketing innovations by all competitors. Internet-based sales, advertising and marketing will become standard, providing more opportunities for original concepts and strategies. Especially the Internet as a commercial platform necessitates creative marketing concepts due to huge competition. Technical knowledge may also become more important for marketing because of the development of new materials, new concepts and innovations whose advantages have to be explained to the customers.

Table 6.6 presents strategic options for emerging skills and competences related to sales and marketing professionals in the furniture sector. Recruitment of workers from other sectors is a viable strategic option for the furniture sector, although product and material knowledge will become more and more important in this job function. New recruits from other sectors will therefore often need to be trained on the job in order to gain a more profound understanding of consumer and supplier needs, materials used and products made. Also e-commerce will become a main issue.

In formulating a recruitment strategy aimed at pulling in workers from other countries (inside or outside the EU), as well as for pulling in young people and unemployed people, firms should broaden their recruitment horizon and also aim at for instance female workers. The furniture sector is still very much a 'white males' sector. A characterization that does not appeal to the female workforce that offers sales and marketing potential. In addition to broadening the recruitment horizon, however, improving education and training opportunities and content is also in order. New courses need to be developed and vocational education needs to be updated. The main focus should be on technical product specifications and translating these for clients in different markets and countries as well

as on using the Internet and websites in customizing products and on helping customers to choose materials and products via electronic portals. The latter is mainly in order in the GC and LC scenarios. Also some basic knowledge on regional rules and regulations on materials use and product specifications is in order.

Table 6.6 Strategic options sales & marketing professionals

Questions	Answers	
1. What is the maximum volume effect?	Increase (GMP, LC and GC)	
2. What is the maximum change in skills?	16	
3. Do SMEs play a large role?	Yes in LC, No in GC and GMP	
4. Is the sector national/EU/global?	Global (except LC)	
5. Is the workforce old?	No	
6. Is the workforce low educated?	No	
Options	Is this option viable?	Actors*
A. Recruiting workers from other sectors	Yes	C
B. Recruiting workers from other Member States	Yes	C, S, E, I
C. Recruiting workers from non-Member States	Yes	C, S, E, I
D. Recruiting unemployed with or without re-training	Yes, but with retraining in product and materials knowledge and ICT skills	C
E. Recruiting young people from the education system	Yes	C, E
F. Training and re-training employed workers	Yes, e-skills need updating (electronic sales portals) as well as knowledge on new materials, concepts and innovations.	C, E, S
G. Changing work organisation	Yes, introduce teleworking	C, I
H. Outsourcing and off-shoring	Yes, outsourcing market research/ B2B and B2C via electronic portals	C
I. Changing vocational education	Yes, marketing and sales via electronic portals B2C and B2B, working and communicating in full product life cycle	S, E
J. Designing and offering new courses	Yes, mainly sector specific modules in product knowledge (technical understanding), e-skills and laws and regulations in emerging markets (in GC and GMP)	C, E, S
K. Providing information about emerging skills	Yes	C, S, I
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	Yes	C, S, E, G, I

* C = company; S = sector organisations and chambers of commerce; E = education & training; G = governments; I = intermediary organisation, public or private.

Recruiting young people is a further viable option especially related to up-to-date e-skills. Young people are used to work with ICT and will be able to learn these skills more quickly than older workers. Also, young people often possess more intercultural and language skills as they grew up in a more mixed society/ school environment.

Since the future appears to be e-driven within the furniture industry, changing the work organisation is also a viable strategic option. The industry could for instance increase tele-working possibilities in order to appeal to specific groups of workers. Outsourcing and off-shoring are also viable options, especially in combination with the development of e-portals for business-to-customer (B2C) and business-to-business (B2B) communication. Also market research can be outsourced to specialized companies. The latter is mainly a viable option in the sense that market research in emerging markets may very well be performed by local agencies.

6.11 Strategic buyers

Especially in global settings the function of strategic buyers will generally get more important. Here the manufacturing of furniture is not a local, but a global process where materials and production are organised internationally, depending on the optimisation of prices and material availability. The understanding of customers and suppliers is of much relevance and especially global scenarios require a high degree of flexibility. Knowledge about legal issues and regulations will generally become more important due to new and stricter rules, e.g. in regard to environmental and safety aspects. The same applies for a certain degree of technical knowledge when it comes to innovations and the use of new materials and product components.

Table 6.7 presents the strategic options for emerging skills and competences related to strategic buyers. Recruiting workers from other sectors and countries are all viable options, as is the recruitment of unemployed people and young people from the education system. Some introductory training will be necessary for people who do not have a basic technical understanding, however. This goes especially for the long term unemployed. Mainly social, technical and E-skills are of growing importance and since these or not really sector or country specific, they can be recruited anywhere.

Since the job function of strategic buyers is a relatively new one training and retraining of employees is also a viable option, as is changing vocational education and designing new courses. Vocational education as well as training should then be aimed at communication skills, E-skills and some basic technical skills that mainly concerns knowledge of (new) materials and products. Also some basic knowledge of rules and regulations, either general or country specific is in order, depending on the market to be served.

Strategic buyers need to be in good contact with marketing and sales in order to be able to buy the right materials. This makes changing the work organisation in a way that this continuous contact is possible a viable as well as a necessary step.

Table 6.7 Strategic options strategic buyers

Questions	Answers	
1. What is the maximum volume effect?	Increase GMP and GC, limited increase LC	
2. What is the maximum change in skills?	16	
3. Do SMEs play a large role?	No	
4. Is the sector national/EU/global?	Global (except LC)	
5. Is the workforce old?	No	
6. Is the workforce low educated?	No	
Options	Is this option viable?	Actors*
A. Recruiting workers from other sectors	Yes, aim at technical sectors, since a basic technical understanding is useful.	C
B. Recruiting workers from other Member States	Yes, aim at social skills next to technical and e-skills	C, S, E, I
C. Recruiting workers from non-Member States	Yes, see above	C, S, E, I
D. Recruiting unemployed with or without re-training	Yes, training necessary in basic technical, social and e-skills	C, I
E. Recruiting young people from the education system	Yes, e-skills, language and intercultural skills readily available	C, I, E
F. Training and re-training employed workers	Yes, train communication skills, as well as e-skills and knowledge of laws and regulations. Knowledge of new products and materials.	C, E
G. Changing work organisation	Yes, teamwork and cooperation with marketing and sales.	C, I
H. Outsourcing and off-shoring	No	C
I. Changing vocational education	Yes, communication skills, e-skills, knowledge of laws and regulations, products and materials	S, E
J. Designing and offering new courses	Strategic Buying	S, E
K. Providing information about emerging skills	Yes	S, I
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	Yes	C, S, I

* C = company; S = sector organisations and chambers of commerce; E =education & training; G =governments; I = intermediary organisation, public or private.

6.12 Administrative support staff

Much of the administrative work may become outsourced or will be automated (e.g., with better software). Especially in global scenarios, language and communication skills as well as flexibility will become more important. Due to expected increases in regulations, improved legal knowledge will add as an upcoming skill for administrative support staff.

As a result of these developments recruiting activities can be limited to young people from the education system, as Table 6.8 shows. These new employees should be used to replace employees that leave the furniture sector and to ensure the import of new administrative concepts and methods into the organizations.

Since in GC and LC the furniture production process will become different, the administrative support staff job function can be expected to change as well. These changes require training and retraining of employed workers, as well as changing vocational education and developing new courses and training. These new educational programs should aim mainly on providing administrative support staff with up-to-date e-skills, planning skills and some basic knowledge on local or regional administrative rules and regulations

Table 6.8 Strategic options administrative support staff

Questions	Answers	
1. What is the maximum volume effect?	Maintain	
2. What is the maximum change in skills?	10	
3. Do SMEs play a large role?	No	
4. Is the sector national/EU/global?	Global (except LC)	
5. Is the workforce old?	Yes	
6. Is the workforce low educated?	Mainly	
Options	Is this option viable?	Actors*
A. Recruiting workers from other sectors	Not necessary	
B. Recruiting workers from other Member States	Not necessary	
C. Recruiting workers from non-Member States	Not necessary	
D. Recruiting unemployed with or without re-training	Not necessary	
E. Recruiting young people from the education system	Yes, in order to maintain	C, E
F. Training and re-training employed workers	Yes, mainly e-skills, planning, laws and regulatory knowledge	C, E
G. Changing work organisation	Yes, introducing teleworking and teamwork	C
H. Outsourcing and off-shoring	Yes, outsourcing and off-shoring	C
I. Changing vocational education	Yes, e-skills, GC and GMP communication and networking; laws and regulatory knowledge	S, E
J. Designing and offering new courses	Yes, e-skills, GC and GMP communication and networking; laws and regulatory knowledge	S, E
K. Providing information about emerging skills	Not necessary	
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	Yes, shared service centres	C, S, I

* C = company; S = sector organisations and chambers of commerce; E = education & training; G = governments; I = intermediary organisation, public or private.

6.13 Plant and machinery maintenance and repair workers

Much of these tasks will be performed by the builder of the machinery. Since new machines/technology will be more software-based, e-skills are getting very important for maintenance and repair workers. In general, machinery will become more multifunctional and complex, necessitating higher technical and analytical skills in general.

Table 6.9 presents strategic options for emerging competences related to plant and machinery repair and maintenance. Recruiting workers from other sectors as well as recruiting workers from other states, member as well as non-member, are considered viable options. Recruiting workers from other sectors is, however, limited to workers with generic skills. Specific skills needed to maintain or repair ‘furniture-specific’ machinery can only be recruited from the furniture sector in other states, not from other sectors.

Table 6.9 Strategic options plant and machinery maintenance and repair workers

Questions	Answers	
1. What is the maximum volume effect?	Maintain in GMP, slight increase LC and GC	
2. What is the maximum change in skills?	10	
3. Do SMEs play a large role?	No	
4. Is the sector national/EU/global?	Global (except LC)	
5. Is the workforce old?	Yes	
6. Is the workforce low educated?	Yes mainly	
Options	Is this option viable?	Actors*
A. Recruiting workers from other sectors	Yes, generic skills needed	C
B. Recruiting workers from other Member States	Yes	C, S, I
C. Recruiting workers from non-Member States	Yes	C, S, I
D. Recruiting unemployed with or without re-training	Yes, some training necessary in technical knowledge and e-skills	C, E
E. Recruiting young people from the education system	Yes	C, E
F. Training and re-training employed workers	Yes, mainly technical knowledge and e-skills (ICT and programming)	C, E
G. Changing work organisation	No	C, I
H. Outsourcing and off-shoring	Yes, both outsourcing (mainly in GMP) and off-shoring (GC)	C
I. Changing vocational education	Yes, related to technical knowledge and e-skills	E, S
J. Designing and offering new courses	Yes, related to technical knowledge and e-skills	E, S
K. Providing information about emerging skills	Yes	C, S, I
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	Yes	C, S, E, G, I

* C = company; S = sector organisations and chambers of commerce; E = education & training; G = governments; I = intermediary organisation, public or private.

Next to recruiting across national borders or sectoral borders, recruiting youngsters from the education system as well as recruiting the unemployed are viable options. In the case of the unemployed, however, some training is probably required, mainly in technical knowledge and E-skills. Also the provision of knowledge on new materials or products may be in order. Youngsters should mainly be recruited to replace employees that leave the labour market.

Training employed workers is also a viable option. In order to provide this training the development of new training programs or the alteration of existing programs may be in order. These new or altered training programs should put an emphasis on technical

knowledge was well as e-skills (ICT as well as programming). The sector could work together with educational institutions and sector organisations to develop a basic technical training for machinery maintenance and repair staff.

6.14 Skilled handicraft workers

Table 6.10 shows the strategic options that are viable for the furniture sector in providing oneself with the skills needed for Skilled Handicraft Workers in the longer term. Since in none of the four scenarios an increase in the number of skilled handicraft workers is expected, no recruiting is necessary, other than the recruitment of young people from the education system to replace workers that leave the labour market.

Table 6.10 Strategic options skilled handicraft workers

Questions	Answers	
1. What is the maximum volume effect?	Maintain in GC and LC, decrease in GMP	
2. What is the maximum change in skills?	15	
3. Do SMEs play a large role?	No	
4. Is the sector national/EU/global?	Global (except LC)	
5. Is the workforce old?	Yes	
6. Is the workforce low educated?	Yes, mainly	
Options	Is this option viable?	Actors*
A. Recruiting workers from other sectors	Not necessary	
B. Recruiting workers from other Member States	Not necessary	
C. Recruiting workers from non-Member States	Not necessary	
D. Recruiting unemployed with or without re-training	Not necessary	
E. Recruiting young people from the education system	Yes, but only replacement demand	C, S, E
F. Training and re-training employed workers	Yes, multi-skilling, mainly e-skills and social skills	C, S, E
G. Changing work organisation	Yes, combination with machine operators jobs. Job enlargement (multi-skilling)	C, I
H. Outsourcing and off-shoring	Yes, both outsourcing (mainly in GMP) and off-shoring (GC)	C
I. Changing vocational education	Yes, renew technical knowledge (new materials), e-skills, multi-skilling	C, S, E
J. Designing and offering new courses	Yes, on new materials, e-skills and social skills	C, S, E
K. Providing information about emerging skills	Yes	C, S, I
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	Yes	C, S, E, G, I

* C = company; S = sector organisations and chambers of commerce; E = education & training; G = governments; I = intermediary organisation, public or private.

Skilled handicraft workers will be more important in the customisation scenarios, although an increase in automation is also expected in this area until 2020. The necessity of e-skills and technical skills is expected to grow, as well as knowledge about new materials. In the customisation scenarios it will be important to figure ways how to translate the customer wishes into the desired product, which necessitates flexibility and creativity from a more analytical perspective. The borders between handicraft workers and machine operators may blur, requiring multi-skilling.

Since the kind of work that skilled handicraft workers do will change, some training and retraining will be in order. First of all the job function of the skilled handicraft workers and the skilled non-handicraft worker will eventually become one and the same, requiring multi-skilling for both job functions. Next to that, mainly E-skills, knowledge of new materials and social skills are in order. Making these aspects central aspects in training courses as well as in vocational education is a viable as well as necessary option. Multi-skilling and closer teamwork between skilled and non-skilled handicraft workers implies changing the work organisation, for instance job enlargement as well as multi-skilling are in order. Some additional training may be required.

6.15 Machine operators and skilled non-handicraft workers

Automation will increasingly enter the furniture industry. This applies especially to large companies, but until 2020 also to a growing number of SMEs. Machines are getting more sophisticated, IT-based and complex, necessitating more information-based than manual skills. E-skills and technical knowledge grow in importance. It is also likely that fewer people will control a growing number of machines and that programming skills will become central. Not only technical and e-skills will become more important, but also social skills, especially in the global scenarios.

Table 6.11 presents the related strategic options. Recruiting technical knowledge from other sectors is possible, but only viable for generic skills. Similarly, recruiting people from other countries is a viable option. The EU could facilitate intersectoral and international labour mobility. However, this requires standardising of safety standards together with the furniture industry. Recruiting young people from the education system is also a viable option that deserves full attention. Recruiting unemployed is also considered a viable option, although some training or retraining in technical as well as e-skills will always be in order.

With technical as well as e-knowledge of key importance on the job, training courses are needed to keep technical skills up-to-date. These aspects should also stand at the core of possible alterations in the vocational education program, however.

Since we expect skilled non-handicraft workers/ machine operators and skilled handicraft workers to start working together ever closer, some organisational changes may also be in order. These two job functions may eventually very well become one job function, with the implication that every worker should be able to both handle new machinery as well as handicraft furniture him- or herself. Multi-skilling these groups of workers as well as organising working together are in order.

Table 6.11 Strategic options machine operators and skilled non-handicraft workers

Questions	Answers	
1. What is the maximum volume effect?	Maintain in GMP, slight increase LC and GC	
2. What is the maximum change in skills?	11	
3. Do SMEs play a large role?	No	
4. Is the sector national/EU/global?	Global (except LC)	
5. Is the workforce old?	Yes	
6. Is the workforce low educated?	Yes mainly	
Options	Is this option viable?	Actors ¹
A. Recruiting workers from other sectors	Yes, generic skills needed	C
B. Recruiting workers from other Member States	Yes	C, S, I
C. Recruiting workers from non-Member States	Yes	C, S, I
D. Recruiting unemployed with or without re-training	Yes, some training necessary in technical knowledge and e-skills	C, E
E. Recruiting young people from the education system	Yes	C, E
F. Training and re-training employed workers	Yes, mainly technical knowledge and e-skills (ICT and programming)	C, E
G. Changing work organisation	Yes, combination with skilled handicraft workers' jobs. Job enlargement (multi-skilling)	C, I
H. Outsourcing and off-shoring	Yes, both outsourcing (mainly in GMP) and off-shoring (GC)	C
I. Changing vocational education	Yes, related to technical knowledge and e-skills	E, S
J. Designing and offering new courses	Yes, related to technical knowledge and e-skills	E, S
K. Providing information about emerging skills	Yes	C, S, I
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	Yes	C, S, E, G, I

* C = company; S = sector organisations and chambers of commerce; E = education & training; G = governments; I = intermediary organisation, public or private.

6.16 Labourers

This category will be most threatened by automation processes. A general up-skilling is needed. Increasing technical and language skills will become more important. Also social skills will grow in relevance.

Table 6.12 presents the strategic options for emerging competences related to low skilled labourers. We expect a strong decline in the number of jobs within this job category. That is why only a few emerging competences were assessed. Current labourers need to be up-skilled/(re)trained with mainly technical and social qualifications to the level of plant and machinery maintenance and repair workers or even planning engineers. Labourers outside production are likely to be replaced by technology (security/-receptionists) or outsourced to the service sector (cleaning / maintenance).

Table 6.12 Strategic options labourers

Questions	Answers	
1. What is the maximum volume effect?	Decreasing	
2. What is the maximum change in skills?	6	
3. Do SMEs play a large role?	No	
4. Is the sector national/EU/global?	Global (except LC)	
5. Is the workforce old?	Yes	
6. Is the workforce low educated?	Yes	
Options	Is this option viable?	Actors*
A. Recruiting workers from other sectors	Not necessary	
B. Recruiting workers from other Member States	Not necessary	
C. Recruiting workers from non-Member States	Not necessary	
D. Recruiting unemployed with or without re-training	Not necessary	
E. Recruiting young people from the education system	Not necessary	
F. Training and re-training employed workers	Yes, up-skilling in technical qualifications and social skills (language)	C, S, E
G. Changing work organisation	No, automation of production processes	C
H. Outsourcing and off-shoring	No	
I. Changing vocational education	No	
J. Designing and offering new courses	Yes, general up-skilling in e-skills, technical knowledge and social skills	C, S, E
K. Providing information about emerging skills	Not necessary	
L. Improve the image of the sector	Not necessary	
M. Stronger cooperation between stakeholders	Not necessary	

* C = company; S = sector organisations and chambers of commerce; E =education & training; G =governments; I = intermediary organisation, public or private.

7 Specific implications for education and training

This section specifically discusses the implications for education and training. The results reported here are based on the conclusions of an internal workshop and expert judgement. They also include examples of initiatives from some of the larger EU Member States, in particular the UK, Germany, Italy and Spain, based on a literature review. The implications address the differences in education between Member States and education levels, ranging from schools, universities and colleges to initial vocational training institutions.

One of the key findings and an issue that should be urgently addressed is the following:

‘Challenges for education and training in the sector cannot be solved by education and training institutions on their own. A number of stakeholders needs to actively work together in order to provide joint answers and solutions to the range of challenges identified below.’

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 in general. Both become even more pressing in the oncoming future, especially so in the transformation scenarios.

There are four 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:

1. The degree of automation will increase throughout the industry, in all scenarios. In the *global mass production* scenario automation will play a bigger role than in the *local and global customisation* scenarios, but the application of machines/robots/prototypers will increase until 2020.
2. There will be more machines, but this does not imply a growing need for people to operate them – at least in the mass production scenarios. Production can be run by fewer people from central control boards.
3. The furniture industry lags behind in regard to the latest automation technology and it will probably remain a lagging sector until 2020. Hence machines capable of self-diagnosis and self-maintenance as well as maintenance-robots will probably not be deployed routinely in the furniture industry by 2020. This will lead to an increase in the need for machine maintenance and repair workers. However, they will more likely be provided by the producers of the machines rather than employed by the users of the machines (i.e., the furniture industry).
4. Ongoing technological change leads to profound changes in business strategies and job functions. The need for handicraft workers and labourers will decrease in general and the need for knowledge-based workers will most probably increase (managers, designers, strategic buyers).
5. *Mass customisation* leads to new niches in the sector and a stronger specialisation and differentiation; and
6. *Mass customisation* (both local and global) in combination with technological advancement will lead to a more customer-driven production process. Customers will probably be enabled to co-design their own furniture online, which will require the development of sophisticated and interactive websites. After completing the design,

the product will go into production, which could be fully automated. This way of selling products requires different technical skills and e-skills from practically every job function, from managers to marketing and sales and from commercial designers to labourers.

In the light of the importance of training it is necessary to prepare the education and training system to find adequate solutions. In the following, the implications for the education and training system of these challenges are described.

7.1 Implications for education

Introducing sector-specific skills at an early stage

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

To improve the matching of skills taught at schools and skills needed by the industry, the British Department for Children, Schools and Families (DCSF) has created a new education pathway for children from 14 to 19 years.⁵ The so-called 'Diploma' was jointly founded by education officials and the industry and tries to bridge general academic and vocational education.

Improving the image of the sector

The expected skill shortages in the two transformation scenarios, the expected increase of the ICT and engineering professionals, of business and finance professionals, as well as the replacement demand for production workers, makes it necessary to improve the image of the furniture sector in schools to attract more labour in these occupational functions.

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 who are threatened by unemployment. In the sector scenarios, it is expected that lower skilled occupations like production workers and support staff as well as managers 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.

⁵ <http://www.dcsf.gov.uk/14-19/index.cfm?go=site.home&sid=47> and <http://yp.direct.gov.uk/diplomas/> (both downloaded in October 2008).

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 Recognising, Validating and Certifying Prior Learning 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 furniture sector this could be a possibility to develop their human resource management.

7.2 Implications for initial vocational training: need for new contents and new approaches

Different vocational training systems in Europe

The expected technological change in the three 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 rather by a transition to flexible training (e.g., modularisation) than by offering new content. However, training institutions are unable to face this challenge on their own. To keep up pace with sector developments they need to provide the latest technology, the latest knowledge about emerging business possibilities and training for the skills of tomorrow. This challenge cannot be met by one actor alone. The half-life period of skills and knowledge is also getting shorter due to changes in customer demands and resulting changes in business models. This leads to several implications for education and training systems on the level of both, the nature and the content of the training provided.

Most of the employees in the furniture industry have low or medium educational qualifications. The majority of the occupational functions are either trained at schools, in apprenticeships, or on the job. Less than 50% of the managers in the furniture sector have higher education (Manshanden, et al. 2008, Table 3.16). Therefore, the initial vocational training system is important for most of the job functions. Before outlining several possibilities for improving Initial Vocational Education and Training (IVET), different Education and Training (VET) systems will be described and analysed. Different VET systems as well as a combination of Initial and Continuing VET systems (IVET and CVET) are implemented in the European Member States (see Clematide et al [2005] and 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.

Table 7.1 The three prevailing VET systems in Europe

	A. Liberal	B. State-controlled	C. Corporatist
Decision maker	Business (and individuals)	State	State and social partner organisations
Rational	Liberalistic competitive	Centralistic state-centred	Corporative – social consensus
Programmes	Business and individual	Education and citizen	Occupation
Content	Needs of business and individual, utility oriented, short term and specific	Politically determined, general knowledge, course-oriented, academic	Determined by social partners, occupation centred, strong 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 education with equal status to general education
Weaknesses	Under-investment in training and education	Weak linkage to the labour market	Inertia in the institutions
Representative examples	United Kingdom, Ireland	France	Germany, Austria, Denmark
Trends	Stronger state involvement in certification and quality	“Dual system” emerging and stronger orientation on business needs	Internal labour markets Marketing of VET

Source: Adapted from Clematide et al (2005).

In general, the VET systems can be grouped into three ‘ideal-typical’ systems, each of which have various characteristics, but are typified by the player(s) who decide(s) about the structure and content of the VET system. At the hand of this distinction, three main types of VET systems can be identified, namely: (a) Liberal; (b) State-controlled; and (c) Corporatist (see Table 7.1).

The three VET systems of Germany, France and the United Kingdom are of specific importance as they can be regarded as ‘ideal types’ representing many variations of the VET implementations 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 regulated at national level. Commercial certification systems are still competing with national ones. Thus, 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 social enterprises for long-term unemployed are present in several European Member States.

Besides those ideal types, several mixed forms exist in Europe. In Spain, for example, there are more informal forms of VET to be found. In Central and East European countries the VET system tends to move from a state-controlled model to a more corporatist model.

Enhanced flexibility and 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 the 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 skills 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 three 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. Modularisation and greater flexibility is one possibility to adequately react on emerging skills needs. An alternative option presents the building up of joint training systems.

Joint Training Networks to foster apprenticeships in the sector

Due to technological change and the development of different business niches, joint training networks between companies for job entrants (and also for mature workers) will become more important in the future. Regional based joint training networks between companies are one possibility to provide the comprehensive training job entrants need. The main purpose of joint training systems is that apprentices pass through all necessary stages of an apprenticeship, although the main training company can only provide some of these stages. Particular SMEs have continuing problems to dispense workers for 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 teaching facilities for all: keep vocational teaching up to date

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. To establish such training facilities the combined effort of sector organisations, component suppliers and public authorities is needed.

Development of e-learning and blended learning

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. The Dutch sectoral fund “Stichting Scholing en Werkgelegenheid Meubelindustrie” (Foundation for Schooling and Employment in the Furniture Industry) is another example where e-learning is going to be introduced. If they want, companies and schools have the possibility to use their platform to adjust and to 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.

7.3 Implications for continuing vocational training: further developing existing pathways

For practically all occupational functions in the sector the analysis suggests continuing changes in vocational education (for details see chapter 6). The overall implication of the scenarios for continuing vocational education is to keep the traditional skills needed in the sector up-to-date and to provide for new skills arising from technological developments and changes in business organisational models, especially “e-skills”. The requirements are best described by the term “multi-skills”. This development is boosted through the predominance of SMEs in the sector, where employees have more functions to fulfil than in large companies. Some occupations will be more affected by this trend than others. The scenarios and the already existing problems documented in the literature propose several urgent measures for certain job functions:

- Continuing vocational education: preparing for multi-skilling, re-training and up-skilling;
- Skills assessment, transparency and quality of training;
- Information campaign about utility of continuing vocational training in the sector;
- Joint continuing vocational training networks and special courses for older workers;
- Enhance flexibility in learning forms; and
- Cooperation to improve information regarding skills needs and job opportunities.

Continuing vocational training: multi-skilling, re-training and up-skilling

According to earlier analysis in this study the production workforce is low skilled, ageing and mostly employed in SMEs. Employment numbers are expected to decrease in the future but

also new skills are needed. This leads to several implications for the education and training system. Besides training the existing production workforce in emerging skills (and particularly in flexibility in applying new techniques, working with new materials and technologies and working with ICT and e-portals), and, due to a broader work scope, soft skills like communication, stress management, quality management and health and safety, there is also the necessity for up-skilling and even re-training in occupational functions like sales and marketing and business staff. For this reason certification of skills and knowledge obtained in the workplace should be recognized and skills assessments of skilled workers should be offered by training providers to optimize the re-placement of these workers (see also recognition of prior learning, section 7.1). To overcome skill shortages and gaps in the furniture 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.

Training, up-skilling and re-training support staff of the furniture 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 CNC machines, databank management, marketing, customer care and sales knowledge, full logistic services, etc.

Multi-skilling will become more important also for occupations in the furniture sector. Business skills and project management skills will become more important in the future. This will also be the case for designers because of their strong role as information hub and their position at the interface between customer and production. The main challenge for education and training will be to provide suitable courses.

Joint continuing vocational training networks and special courses for older workers

To minimise costs in off-the-job vocational training for SMEs joint vocational training networks can be established between firms. Companies of the sector jointly decide about training needs and send their staff to jointly organised trainings offered by external training providers. This could help reduce training costs. In some countries (e.g. Austria) these training networks are supported by the public employment service, but only when they are specifically targeted at certain groups, e.g. the older workforce. Thus, this could be a model to train the ageing workforce of furniture production workers.

Co-operation to improve information regarding skills needs and job opportunities

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 emerging 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 full-time, school-based VET systems that are state-driven (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).

8 Recommendations

8.1 General recommendations

A principal recommendation to meet emerging skills needs is to intensify cooperation between all relevant stakeholders in the sector. The challenge to overcome sectoral skill gaps will be met if industry, training providers, social partners, research and public authorities act in concert. This was demonstrated in section seven. A collaboration is not only required to meet skills needs, but also to support the development of sectoral learning strategies and the establishment of partnerships for innovation and job creation.

Enhanced investment in human capital is required. Cost sharing mechanisms between actors such as public authorities, companies and individuals need to be developed and life-long 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. In addition, the training and education systems in the Member States need to be improved to cope with more modular based needs for VET to cover knowledge shortages and up-skilling needs, as already stated in the above implications for education and training.

Life-long learning is the key to keep up with competitiveness and to prevent less favourable scenarios. Governments should further develop the legal framework for supporting life long learning at all ages. Social partners should develop joint programs of lifelong learning in cooperation with public authorities and other relevant stakeholders such as training organisations and universities in order to up-grade skills of the workforce in the sector. The programs should be tailored to the specific needs of SMEs in the sector. Life-long learning should encompass all skills levels aiming at raising basic social skills as well as technical sector skills. All available international, national and regional and local pathways should be used to finance lifelong learning.

8.2 Specific recommendations

Different strategic options by job function were laid out in sections 6 and 7. Additional specific recommendations relate to the following:

Facilitation of training co-operations between SMEs

The prevalence of SMEs in the furniture sector makes co-operation for initial and continuing vocational training necessary. These co-operations should be supported by national training bodies and sectoral social partner organisations and supported by public funding. Existing models should be made public and good practice examples should be disseminated. Joint training networks should be used for apprenticeships but also for the training of the employees of the sector. In regional centres of the sector provincial or regional authorities can support the establishment of training co-operations.

Up-skilling of low skilled technical production workers

To ensure employability of lower skilled technical production workers in furniture and to train them for other occupations in the sector, up-skilling and retraining is a necessary investment. Public authorities such as the public employment service or communities (as their responsibility for regional development) should engage and support companies and

individuals in their training efforts. For this reason an adult apprenticeship model could be developed and applied.

Keep older workers longer in employment and support vocational training for older employees

Like most industries, the furnishing sector is confronted with an ageing workforce. 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.

Build joint training facilities

Therefore, joint training facilities financed by sector organisations, companies (also engineering companies) and public authorities should be established for initial and continuing vocational training to keep the workforce up-to-date.

Strengthen cooperation in 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 demand for building up cooperation between companies, social partners, training providers and research institutions is obvious. 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, training should aim to make workers acquainted with emerging 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, sectoral funds and training providers are expected to play a major role in organising joint efforts.

Interdisciplinary and multidisciplinary studies

In vocational education and training more attention should be paid 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.

Enhance transparency of the quality of training as well as improving the trans-national recognition of vocational qualifications

Due to the fact that a common certification system is still missing in the EU, 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 programs (e.g. Leonardo da Vinci) and of support made available by the Structural Funds (e.g. ESF).

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