



Trends and drivers of change in the EU textiles and leather sector: Mapping report

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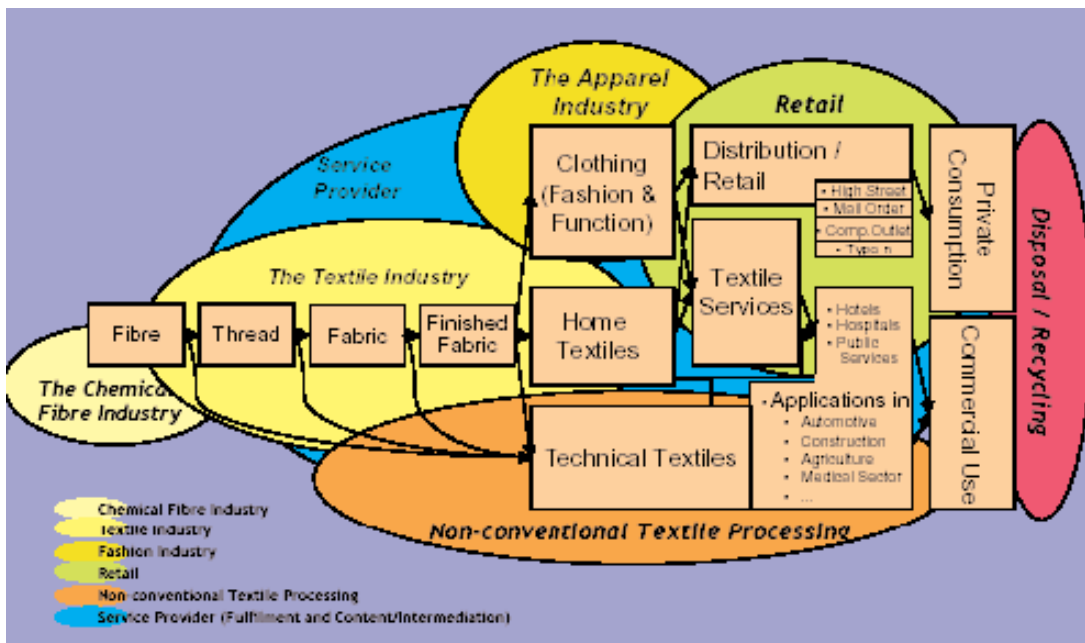
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Textiles, leather, and clothing represents a significant sector in world trade, and also within the European Union. Currently, the sector is becoming subject to the pressures of globalisation. Some segments are responding to this by focusing on niche production with a high degree of value added. Much rationalisation is taking place in the hopes of re-designing the European textiles sector so that it remains viable in new economic realities.

Introduction

The textiles industry

Figure 1: *The world of textiles: the value-adding network of production and application of textiles*



Source: *Tex-Map* (<http://www.atc.gr/Tex-Map>)

In 2002, the textiles and clothing sector generated flows of about €350 billion, amounting to almost 6% of total world exports. The clothing sector accounts for the lion's share with some €200 billion. The sector is particularly important to developing countries which account for 50% of the world's textile exports and 70% of its clothing exports. For many of these countries, textiles are the main source of export revenue and manufacturing employment.

Consistent investment, emphasis on upmarket products and world leadership in the fashion industry have all made Europe the world's biggest exporter of textiles and the second biggest exporter of clothing. The sector directly employs two million people in the EU out of a total population of 15 million, and represents over 110,000 enterprises – or about 10% of industrial companies in the EU, 90% of which are small and medium-sized enterprises (SMEs) (European Apparel and Textile Organisation – Euratex, 2002). The leather industry consists of about 3,000 SMEs and employs around 55,000 people, and is therefore much smaller than the textiles industry. However, leather is also a sector where the EU has an important position, being the largest supplier of (treated) leather to the international market (European Commission, 2001b).

The textiles industry in Europe is highly scattered. A first group consists of countries such as Italy, Portugal, and Spain which still have an extensive textiles activity. However, many of these textiles activities are becoming more and more subject to pressure due to globalisation of the industry. A second group comprises small countries such as Belgium, Finland and the Netherlands; these have a healthy industrial outlook due to their focus on niche products with a high added value. A third group includes countries like France and the United Kingdom (UK), positioned midway between the first two groups.

The leather industry

The leather and tanning industry includes the processing of raw materials into leather for use in the manufacture of a wide range of products across several sectors, from automotives to furniture to fashion and footwear. The different applications require different types of leather, for example, raw to finished for furniture upholstery and raw to crust for sole leather. Footwear remains the most important outlet for the EU tanning production with a share of 50% of the EU tanning production output, followed by the clothing industry (20%), furniture and upholstery (17%), and the leather goods sector (13%).

Employment situation

Intense global competition in clothing and textiles has affected employment levels and has led to a decrease in the overall number of companies in the 1990s. Between 1995 and 2001, the number of companies decreased by 13.9%. The greatest decline has been in the clothing sector.

Table 1: *Number of companies across EU in the different textile subsectors, 1995-2001 (% change)*

Sector	Number of companies	% change
Textiles	33,829	-7.9%
Knitting	30,601	-15,8%
Clothing	48,538	-17.0%

Source: *Totterdill (et al), 2002.*

Table 2: *EU employment levels in the different textile subsectors*

Textiles	656,100
Knitting	499,500
Clothing	961,500
Total	2,117,200

Source: *Totterdill (et al), 2002.*

Employment in the sector has been steadily declining. According to figures from a Leonardo da Vinci study of the sector, the overall number of jobs has fallen by 16.9% since 1995 (Totterdill *et al*, 2002).

The leather industry is evolving in a similar way. According to figures from DG Employment (2002), based on compiled statistics from 2000, the EU has a total of 3,043 companies in the industry employing 57,723 workers. Since 1990, the production capacity has fallen by 25% while employment has been reduced by a third. For the European industry as a whole, developments are not homogenous. In Italy, which represents 55% of total EU production, employment has risen between 1990 and 2000 by 4.5% according to figures from DG Employment. In Spain, which represents 16% of EU leather sector production, employment has fallen by 31%.

Trade patterns

Imports

The bulk of EU textile and clothing imports¹ came from Asian countries (€22.6 billion), Euro-Mediterranean countries and others with whom the EU has free trade agreements (€18 bn), and China (€9.8 bn). The remaining (€11.7 bn) came from the United States (US) and other non-European industrialised countries (€4.1 bn), other European countries (€2.3 bn), African-Caribbean-Pacific (ACP) countries (€1.9 bn), and the rest of the world (€1.9 bn). The most significant increases of imports since 1999 relate to China (+ €1.8 bn), Turkey (€1 bn), Bangladesh (€0.8 bn), India and Romania (€0.6 bn), Indonesia (€0.5 bn), and South Korea (€0.4 bn). The main supplier is Asia including China (€46.6% of the total) followed by preferential² Euro-Mediterranean³ countries including Turkey (36.7%).

As regards clothing, the main suppliers to the EU are in Asia (China, Hong Kong, Bangladesh, India, Indonesia and Pakistan), Turkey, and countries in the Euro-Mediterranean zone (Romania, Tunisia, Morocco, Poland, and Hungary). The share of Asia including China is very high (49.8% of the total), followed by the preferential Euro-Mediterranean countries including Turkey (40.9%).

For all textile products, the volumes are considerably smaller, the main supplier countries being in Asia (China, India, South Korea and Japan), and the US, Turkey, and Switzerland. Grouped by countries, the shares are more evenly divided among Asia including China (34.7%), the preferential Euro-Mediterranean countries including Turkey (25.7%), and industrialised countries outside Europe (20.9%).

In the leather sector, the EU is economically a net importer of raw material (raw hide and skins) with an import worth €621 million and an export of €239 million. The main suppliers of raw material to the EU in terms of volume are Russia (23%), Australia (12%) and the US (11%).

When looking at leather (treated raw material) however, the EU is economically a net exporter, with exports worth €2.8 bn in 1999 and imports worth €1.7 bn. The primary suppliers when looking at the amount of materials are Brazil (28%), Australia (13%) and New Zealand, Argentina, South Africa, and the US (5% each) (1999 figures, European Commission, 2001b).

Exports

The main destination for exports are the preferential countries in the Euro-Mediterranean zone, which account for 39.5% of total textile and clothing exports, the non-preferential industrialised countries (21.7%), followed at some distance by Asia (8.9%) and Turkey (4.2%). The main individual destinations remain the US (€5.6 bn) followed by Switzerland, the Euro-Mediterranean countries, Japan, Turkey, Hong Kong, Norway, and Russia.

¹ The following figures are from DG Trade, *Background notes*, Sectoral issues, Textiles, 12 June 2000, available at: http://trade-info.cec.eu.int/textiles/legis_texts.cfm. The notes include key figures from the EU textiles and clothing industry, a report on market access and comparison of tariffs applied and bound in the WTO by the EU and its main trading partners.

² 'Preferential' origin rules normally relate to a preferential tariff treatment accorded by the EU to a specific trading partner or group of partners.

³ All EU candidate countries and Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine Authority, and Tunisia.

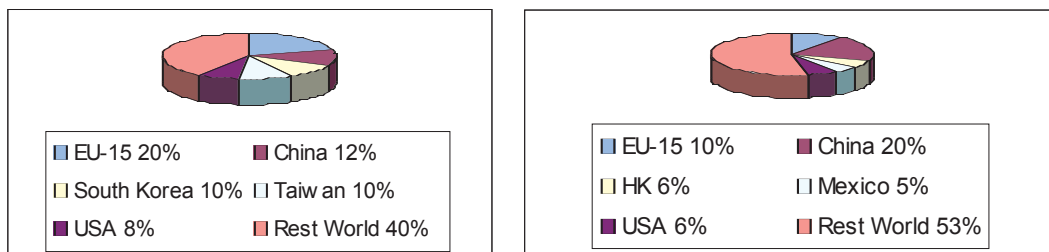
The only countries that are at the moment a significant destination for EU clothing exports (exports over €0.5 bn) are the US, Switzerland, Japan, Norway, Russia, Romania, and Hong Kong. The balance for clothing trade is negative in almost all countries, the only exceptions being the US, Switzerland, Japan, Norway, and Saudi Arabia (surplus of over €300 m).

As for textile exports, preferential Euro-Mediterranean countries including Turkey account for 52.9% of EU exports, the other main destination markets being the US, Switzerland, Japan, and Hong Kong (accounting for 21.3%). Exports to Asia and China apart from Hong Kong represent only 8%.

Outward processing trade

International trade has been characterised by a growth in outward processing trade (OPT). Under OPT regulations, duty is only payable on the value added to the fabrics, i.e. value added during manufacture and not the material cost, before they are re-imported to the EU. Initially, OPT was adopted by companies in high labour-cost zones such as Germany and Benelux, but since then other countries such as the UK have followed similar strategies to gain competitive advantage (Totterdill, 2002, p. 29). One pattern of regional trade is the flow with central and eastern European countries (CEECs) and Maghreb⁴. These areas are very significant for processing clothes using EU intermediate products. Although a view of the overall textiles and clothing trade situation seems almost balanced (EU exports to that region in 2000 were €13.6 bn and imports €16.6 bn), the situation is very different when viewing textiles and clothing separately. The EU exports a lot of textiles to that region (€10.1 bn) and imports little (€2.1 bn), but it exports little clothing (€3.5 bn) while importing €14.5 bn of clothing. This phenomenon is extreme in the cases of Morocco, Tunisia, Poland and Romania. In 2000, they together exported less than €0.6 bn worth of textiles to the EU while they imported €6.3 bn. At the same time, they exported clothing worth €9.7 bn to the EU, the four countries being among the largest 10 EU clothing suppliers.

Figure 2: Main players in world exports of textiles (left) and clothing (right)



Source: Euratex, 2002

In the leather sector, the export of raw materials from the EU had a value of €239 million in 1999, the material going primarily to Turkey (15%), Hong Kong (11%), Poland (10%), and China (8%). Concerning leather, the EU exported €2.8 bn in 1999. Exports primarily go to Hong Kong (42%), the US (7%), Romania (6%), China (5%), and Poland (4%) (European Commission, 2001b).

Structure of the industry

The basis of the leather sector consists of tanning companies, treating the raw hides and skins and turning them into leather. In the last 10 years, the sector has lost a quarter of its industrial capacity and one third of its workforce due to restructuring and modernisation. North European business in particular has moved to developing countries. The sector is very diverse in the sense that some companies perform only a few steps of the process of turning hides into leather,

⁴ Algeria, Morocco and Tunisia.

while others perform the whole process within the same company (OECD, 2003). Tanneries in the EU are typically family-owned SMEs. The industry often plays a key role in the local economy. The industry is globally oriented and dependent on access to raw materials as well as on export markets. Leather processing is based on highly technological processes and is capital intensive (European Commission, 2001b).

The textiles industry in Europe is structured into three main sectors: man-made fibres, textiles, and clothing, representing 6%, 55% and 39% respectively.

The textiles part of the industry is composed of five major subsectors:

1. The *interior textiles* subsector includes carpets (woven squares and bathroom rugs, tufted, needle felt, etc), furnishing fabrics (flat weaves, pile fabrics, plain, jacquard, printed, etc), upholstery fabrics (curtain fabrics, wall coverings, etc), household linen (kitchen linen, table linen, bed linen, bath linen) and mattress ticking.
2. The *clothing textiles* subsector includes woven fabrics and knitted fabrics for: sportswear, leisure wear, rainwear, nightwear, workwear, underwear, fashion articles as well as for ready wear or knitted wear such as: babies' wear and children's wear, sweaters and other outerwear, tights, stockings, socks, gloves, berets, etc.
3. The *technical textiles* subsector includes the following textile products: geotextiles and textiles for building, textiles for agriculture, gardening and fisheries, textiles for defence, protection and safety, textiles for vehicles, textiles for medical purposes, textiles for transport and packing, textiles for industrial applications (means of filtration, etc).
4. The *textile finishing* subsector includes washes, bleaches, prints and coats for many textile products (yarns, woven fabrics, carpets, knitted fabrics, non-woven fabrics, ready-to-wear articles, etc); making them soil repellent, shrink resistant or flame retardant, etc; it includes commission finishing as well as integrated textile companies.
5. The *spinning and preparation* subsector includes the preparation and the production of filaments (mainly PA), fibres (PA, PES, PP, etc.), and yarns (pure and blend) of cotton, wool, linen, etc.

The network of production and application of textiles reveals a trend which is not only of horizontal integration, but rather a combination of both horizontal and vertical integration. Diversified companies that are specialised in many disciplines tend to disappear, tending to focus on one discipline or product. Within this one specialty area, however, they do diversify to a great extent.

As to company categorisation, one observes large groups in the textiles industry that focus on vertical integration, processing everything from fibre to finished fabric, but also large groups which are more horizontally structured and specialise only in one discipline such as spinning, weaving, etc. The majority of companies range from medium-sized to small companies. Small companies with fewer than 50 employees have the advantage of being more flexible.

For apparel manufacturers, the key to success is the ability to introduce sophisticated information links, forecasting capabilities, and management systems: in other words, supply chain management (Hammond, 1999).

Factors that currently influence supply chain practices are product proliferation and short product life cycles leading to forecasting uncertainty and inventory risk. At present, it is extremely difficult to predict the demand at stock level. This results in huge expenses for mismatched supply and demand (e.g. stockouts, markdowns and inventory carrying costs). The fundamental challenge consists in matching supply with demand. When production precedes demand, this often leads to inventory holding costs, increased risk of product obsolescence, and retail markdowns.

Conversely, demand preceding production often results in lost sales or dissatisfied customers. It is observed that forecasting uncertainty increases when product variety rises and when lead times rise. On the other hand, forecasting uncertainty decreases with replenishment capability. Major contributors to mismatched supply and demand are uncertainties regarding lead-time, production, transportation, and customs. Innovative textile companies are therefore looking for new strategies for planning, sourcing and inventory control – lean retailing as the key to success. Retailers and manufacturers will also be looking to streamline their interfaces, and generally there is a need for cooperation, coordination and capability among all partners of the supply chain. In the following section, this issue will be expanded.

Main drivers of change

The previous section described the potential impact of information technologies on the work organisation within the sector, but there are a range of other important drivers of change to be observed and analysed.

Liberalisation of markets

The textiles industry is heading for a complete liberalisation. By 1 January 2005, all quotas for textiles trade will have disappeared under the Agreement on Textiles and Clothing (ATC). The ATC is a transition agreement under the World Trade Organisation (WTO) covering the transition from the Multi-Fibre Agreement (MFA, which meant very high tariffs and strict quotas on export from the developing countries) to the non-discrimination rules of the GATT. The transition period is 1995–2005.

At the moment, conditions for access to the world's leather, textile, and clothing markets are highly disparate. While EU customs duties average 9%, a number of countries charge customs duties of 30% or more. In addition, there can be quite considerable non-tariff barriers. For the leather sector, the barriers are twofold: hindrance of exports of finished leather, and restricted access to raw materials. The aim is to have all countries, with the exception of the least developed countries, cut their customs duties to the lowest possible common level and to eliminate all non-tariff barriers.

If the EU makes further reductions in its already fairly low customs duties without obtaining greater access to external markets, this would unbalance the world market and lead to increased competition in the industrialised countries' already sluggish markets. Removing the quotas will undoubtedly lead to increased imports, particularly in the apparel sector. This will result in a short-term loss of production and employment in the EU. Foreseeing this situation was part of the reason these countries initiated the MFA arrangement in the first place, and its removal was supported primarily by developing rather than developed countries. However, most studies of the consequences of the ATC reform predict that the EU and US will experience an overall welfare gain from this reform in the long run. Consequently, an analysis of the positive and negative aspects of the reform must be balanced according to the time perspective.

China plays an important role for Europe in this liberalisation. Its becoming a member of WTO in 2001 removed the export quotas industrialised countries had placed on it until then. This is expected to affect the textiles trade considerably, as China is the main exporter of textiles to Europe. This is also the case for the leather sector, as China has very high tariffs on shoes, which are one of the main outlets for the leather sector. On the other hand, the Chinese textiles market is low on the value-added chain, whereas Europe has a more high-technology and high-quality textiles industry (OECD, 2001). Thus, the focus of the European industry must be on strengthening research in the sector so as to produce textiles that can compete on 'intelligence' and quality, rather than on price and quantity.

Overall, as mentioned, most reports expect the result of the ATC and Chinese membership of the WTO to be one of general welfare gain. However, the division of this overall gain, which will also include lost incomes and jobs as well

as new ones, is more debated. In the long term, all studies expect the EU, US and Canada to gain from it – it is the short-term consequences that are uncertain for Europe (OECD, 2003).

Globalisation

Many emerging countries see textiles as an entry industry, as a lever to industrialise the country. The effect of this on Europe is one of increasing pressure on the production of commodity clothing. Few European countries will be able to compete on wage levels, and the European legislative framework related to production is stricter.

During the past 20 years, trade liberalisation and communication innovations have increased the opportunities for retailers and brands to buy their products from producers worldwide. The result is a new business model for major retailers, such as hypermarkets, supermarkets, and department stores, and brand owners, such as leading clothing companies. According to a recent study from Oxfam, UK (2004), these retailers and brands have become ‘global sourcing companies’, outsourcing the production of the goods they sell to tiers of competing suppliers and producers through complex international networks, or global supply chains. These supply chains are:

- *driven by the big brands and retailers* – as gatekeepers to consumers, retailers and brands have tremendous power in determining price, quality, delivery, and labour conditions for suppliers and producers down the chain;
- *segmented into high and low profit steps* – high-profit steps in the process, such as innovation, marketing, and retailing, are tightly guarded by retailers and brands. In contrast, the low-profit steps, such as sourcing raw materials, production and assembly, finishing and packaging, are outsourced to mid-chain suppliers and low-cost producers worldwide;
- *widely dispersed but tightly integrated* – spanning continents, a supply chain can draw dozens of firms into the process of making and delivering a single product. Quality, technical standards, and logistics are closely controlled and coordinated. Li & Fung is a Hong Kong-based leading mid-chain garment supplier to major European and US retailers and brands. It may, for example, source fibre from Korea, dye and weave it in Taiwan, buy zips from China, and send it all to Thailand for assembly.

Global supply chains have created labour-intensive exports from low-cost locations. The result is a dramatic growth in the number of producers, heightening competition among the world’s factories at the bottom of the chain. In China’s Guandong province, one of the world’s fastest growing industrial areas, young women face 150 hours overtime each month in the garment factories. 60% have no written contracts and 90% have no access to social insurance, according to the Oxfam report in 2004.

Such an imbalance between intensely competing producers and relatively few buyers in the global marketplace gives retailers and brands the upper hand over their supply chains.

The report from Oxfam states that the World Bank recognises this danger. It warns that competition among suppliers may drive prices down, and the benefits of local firms’ productivity improvements will accrue to the multinational. There are no conclusive studies of the effect of this, but experts from the University of Ghent expect that, over the next 10 years, up to 90% of the European commodity products will be replaced by much cheaper imports from, for example, Asia and Africa. Although the quality of these materials is not their most important feature, they are good enough as standard products to be bought by a large share of the European population.

Some countries (and companies) already focus on specialty materials, technically advanced and research-driven engineered products. By doing so, they enter niche markets, exploring markets where other materials were previously used and where quality and functionality at a reasonable cost are of utmost importance. This focus drives the companies

to eliminate all avoidable losses in the whole production chain and to achieve cost effectiveness. Managing cost complexity is crucial. All this requires more automation, computerisation, and information. Companies will also have to be more aggressive in their search for markets abroad, particularly in the emerging countries, where consumer demand will develop substantially both in volume and in trade.

To sum up, several globalisation strategies are emerging:

1. Global sourcing companies that function as brand gatekeepers, outsourcing the production of the goods they sell to tiers of competing suppliers and producers through complex international networks.
2. Successful retailers expecting to utilise winning strategies worldwide. Examples include entry into the EU of retailers such as GAP, as well as expansion from the EU of retailers such as Zara, Hennes & Mauritz (H&M), and Benetton.
3. Relaxation of import restriction in emerging markets, which could open opportunities for EU value-added exporters, for example, to China and India.
4. Development of new, innovative, non-clothing markets in technical textiles such as medical, automotive, defence, and geotextiles, building on research across generic technologies such as materials science, pervasive computing, and nano- and biotechnology.

EU environmental legislation

In the framework of European environment policy, the Commission has launched the White Paper on the *Strategy for a future chemicals policy* (2001a). The White Paper's objectives consist of simplifying and updating existing legislation, ensuring a high level of protection for human health and the environment, and promoting a consistent and transparent framework for business. A central component of the White Paper is REACH (Registration, Evaluation and Authorisation of Chemicals), which proposes a mechanism for registration, evaluation and controlling the use of chemicals.

The textiles and clothing industry is an important downstream user of chemical products (according to Euratex statement on the White Paper, April 2002). It requires a wide variety of dyestuffs and pigments, lubricating agents and oils, solvents, and other substances. Under the current notification system, substances used as constituents of products (e.g. textiles) other than preparations are exempted. However, according to the White Paper, substances cannot be neglected if they can be released from products in significant amounts during use and disposal, thus causing human and environmental exposure.

In particular, the textiles finishing industry is largely dependent on the use of special chemical products that are predominantly marketed by European manufacturers. These products can be divided into the following main groups:

1. organic dyes and pigments;
2. optical bleaches (fluorescent whitening agents);
3. textiles auxiliaries i.e. pre-treatment, dyeing, printing, finishing, laminating.

Apart from the necessary base chemicals such as salts, organic and inorganic acids, or alkaline solutions, all other processing materials for textiles finishing are, in the broadest sense, preparations that consist of two or more components. This means that the individual active substances of a preparation are subject to an extensive process in defining environmental relevance, as are auxiliary products which have become a constituent part of the preparation. For these reasons, a large number of tests may be necessary in order to achieve approval or registration of a preparation for an actual application.

As a consequence, the European textiles industry might see this as an unwarranted expenditure, which could result in specific finishing processes being given up, and specific services no longer being provided or only provided to a limited extent. If testing procedures that cannot be paid for endanger the market for special chemical products, manufacturers of such products will have to cease production in Europe. This applies equally to organic dyes, pigments, and the large number of application products. It would also affect companies in the middle-of-the-range chemical industry that purchase base and intermediate products from all over Europe as a basis for preparing special products.

If suppliers were to cease production, this would lead to a large restriction in the available choice of products for the European textiles industry. This would in turn have an impact on the competitiveness of the textiles and clothing industry in general, by raising prices for the remaining used substances and preparations (cost for compliance in addition to supply and demand).

At present, bringing a new chemical to the EU market takes three times longer and costs 10 times as much as in the US. Substance innovation with new chemicals is therefore mainly taking place outside the EU. The situation is clearly inconsistent with the commitment made by the European Council to make the EU the most competitive and dynamic knowledge-driven economy in the world by 2010. The formation of producer-consortia for product testing can enhance this effect; agreements could lead to the creation of a monopolistic situation.

Such a situation would be detrimental to downstream users, and particularly detrimental to sectors dominated by SMEs. Given that the textiles and clothing industry is largely dominated by SMEs (95%), which by their nature are less equipped to face such burdens, it would lead to some closures. For the remaining larger companies, emerging markets may seem like a better and economically viable environment. Needless to say, there would be social consequences as well as a cost effect on the price of the final products and an impact on competitiveness in the world markets. Increased costs would significantly reduce the competitiveness of EU companies, forcing some to relocate certain production lines outside the EU. Naturally, such a development would have a negative impact on employment.

As has been noted, the current system effectively excludes substances used and placed on the market as constituents of products (e.g. textiles) other than preparations. So far, the task of monitoring these products has been left to other legislative instruments, such as the directives on general product safety, and marketing and use. Moreover, in the EU, a large percentage of substances included in textiles are covered since they are marketed either as such, or as components of preparations before being included into articles (notification requirements). However, articles where the manufacturing process has been undertaken outside the EU contain to a large extent untested and unregistered substances. Although the General Product Safety Directives' (GPSD) primary objectives are to ban and/or restrict the placing on the market of products containing harmful substances, whether they are imported or produced within the Community, these instruments arguably reveal their limits in addressing the safety of imports.

Ideally, and consistent with the broader aims of the Commission, one would expect to see effective burden-sharing agreements including non-European producers in order to minimise the impact on European producers.

Overcapacity

The entire industrial world – not just the textiles industry – is confronted daily by global overcapacity. This has been built up over the long term, not least through the development of new, highly productive machinery. Machinery manufacturers will have to sell fewer but better and more flexible machines. Industry will have to tread new paths together with the machinery manufacturers.

Changing consumer behaviour

The change in end-consumer buying behaviour is another challenge for the future: little brand loyalty, but quick changes from one trend to the next. The textiles industry must therefore put at least 7-8% of turnover into new and more flexible machinery and into new personnel and services.

As to consumer behaviour, the industry will face several important trends in coming years:

- change in the age structure in mature markets with an ageing population and rising income levels;
- growth of single-person households versus the classical family households in mature markets;
- rapid improvements in living standards for a new middle class in the most advanced of the developing countries;
- growing importance of the ‘intangible sphere’ in consumer behaviour that will favour ethical consumption in a world dominated by urban life.

As to market development, one can make a distinction between the developed, the emerging, and the developing countries:

- in developed, high income countries, consumer demand is likely to grow, albeit at lower rates than before, and growth in value will be stronger than growth in volume. On the whole, EU consumption is unlikely to increase significantly overall, although there will be areas of substantial growth such as technical and ‘intelligent’ textiles;
- in emerging, middle income countries, consumer demand will develop substantially both in volume and value, especially in the middle class range of the market;
- in developing, low income countries, consumption growth will be small, and informal forms of distribution will prevail.

Environmental change

The textiles industry used to be regarded as a polluting industry mainly because of the use of dyes that polluted the wastewater. In the future, more stringent requirements in terms of emissions to air, soil and water will be imposed. As was noted above, the European Commission is proposing new legislation on regulating the use of chemicals. This will affect the textiles industry, as chemicals are a part of the production process and there is a possibility of placing the responsibility for proper chemicals use on the producer as well as the retailer. It is planned that the legislation will also include products that contain chemicals even in small quantities, as textiles and clothes do. This increases the administrative burden on the industry (Erler *et al*, 2003). However, responsibility for implementing this legislation has recently been moved from the domain of the EU ministries of environment to the EU ministries of business affairs. While this does not change the context of the proposed legislation, it might change the focus in its implementation to make sure that companies do not suffer under too strict rules.

Manufacturing companies operating in Europe, compared to competitors in other parts of the world, are faced with higher costs for the use of natural resources such as energy in all forms, water, or air, and higher costs for health and safety provisions for the textiles workers in the production process. In addition, final products have to comply with high environmental and health standards that are imposed both by EU legislation and consumer demand. Finally, total life cycle considerations are gaining more ground in Europe. They are also part of the new EU legislation, making companies responsible for their products during their entire life span from production through use to disposal, recycling, or reuse. The industry has therefore to come up with innovative solutions to make up for these competitive disadvantages and

thereby preserve production in Europe. This can be supported by EU initiatives to promote safe eco-products by, for example, lowering the cost of their patents.

One possible focus for the industry lies within the area of renewable and biodegradable materials. Naturally produced materials are experiencing a revival as they are both renewable and biodegradable, which is not always the case with artificial materials. Another area is environmentally friendly and resource efficient processes, recycling, and reuse. This means using fewer and 'greener' products while obtaining an end product of higher quality. Both of these areas are of increasing interest to consumers, thereby making it possible to include these benefits in marketing.

The health and safety of workers in the production process represents a high industry priority. Exposure to noise, heat, dust, etc, must be minimised. General research in this area can help the individual company as well as society as a whole, avoiding the costs of parallel research and of injured workers.

In Europe, voluntary and obligatory labelling is imposed on the industry in order to guarantee environmentally friendly and safe products and production methods. Some industries within the textiles sector, such as the protective clothing industry, have already implemented obligatory quality controls. This will soon be the case in the geotextiles subsector. However, these relatively new labels will require some adaptation efforts from the industries concerned. The new technical standards (for example, fireproofing) are costly, requiring tests to be carried out. Examples are the European Ecolabel and the Öko-Tex standards that evaluate harmful substances in textile products after production.

New and improved fibres, textiles, and composite materials

Property improvements at fibre level have an influence on the processing options of the material as well as on the final product. Fibres that respond in a 'smart' way to external influences, such as temperature changes, humidity, chemicals and bacteria, light and radiation, fire, electric discharge, or mechanical use, will enable the production of functional or smart clothing for sports and leisure wear as well as work wear and protective clothing. All of these represent growing markets.

Fibres and textiles that conduct electric current or light, accumulate energy, store information, or receive and transfer radio waves, will open up a whole new market for intelligent garments. These could contain sensors and actuators, and advance the vision of wearable technology that can control, alert, inform, relax, or entertain the wearer. Fibres and textiles with improved characteristics in strength, weight, chemical resistance, flame retardance, isolation, filtering or noise reduction properties, as well as biodegradability will find wide use in a variety of industrial sectors – for example, construction and interiors, automotive, aeronautics and machinery, environmental and geo-technologies, and agriculture. High value-added products that draw from traditional European strengths in engineering and industrial design skills can give the industry tremendous opportunities to compete in worldwide markets.

Last but not least, textiles with medical and hygienic properties will find a multitude of applications in the healthcare sector, be it in the form of biocompatible implants and tissues, antibacterial wound treatment material, anti-allergenic clothing, or home textiles for infants, children or skin-sensitive persons.

The enormous diversity of textile applications makes it obvious that research has to be multidisciplinary. It also has to be carried out by research teams that combine scientific backgrounds as diverse as physics and material sciences, biology and (bio)chemistry, informatics, medicine, and social sciences.

Information and communication technologies

The following is an overview of concepts and technologies for greater efficiency in product development, manufacturing, and distribution throughout the textiles/clothing/retail chain, based on Euratex's common strategy paper (2002).

All products and product services that may result from innovations can only be successful on the market if they are produced exactly to customer specification, at competitive cost, and delivered at the right time to the right place. In order to achieve this, a multitude of factors need to be kept under control. This constitutes a great challenge to individual companies, especially to the many specialised small and medium-sized enterprises in the textiles clothing chain. Continued business acceleration and globalisation will increase the interdependence of suppliers, customers, technology providers, designers, testing and research centres, and all kinds of business intermediaries, often widely spread across Europe and the world. This makes efficient communication and information management indispensable for all enterprise functions from procurement, production, planning, and organisation to marketing, sales, and research and product development.

Examining the different business functions, the following information technologies-related trends can be identified.

Procurement and industrial sales (Business-to-business (B2B) eCommerce)

Various tools and concepts have been developed and are now beginning to be used, ranging from company websites and eCatalogues to supplier-customer extranets and virtual marketplaces. Real value can be created through systems that: facilitate the identification of suppliers and customers; make crucial procurement/sales information available in real time to all parties concerned; automate standard transaction functions; and allow all enterprise functions to focus on fulfilling customer demands, without compromising on cost and profitability parameters. However, there is a need for intelligent concepts and technologies based on sector expertise. These could permit both highly integrated, personalised systems for crucial supplies and key customers (via Extranets, EDI systems etc.) as well as non-strategic activities such as the procurement of standard goods or the sale of overcapacity, seconds, or waste (via Internet marketplaces or auctions).

Distribution and retail sales (Business-to-consumer (B2C) eCommerce)

Take-up of B2C eCommerce in the textiles and clothing sectors has been much slower than in other, more standardised consumer goods sectors (such as books, music, and software). This is basically due to problems of product property description (notably fit, feel and touch, as well as colour) and to logistic and technological problems (economies of inventory and delivery, capacity, and cost of consumer Internet connections). More sophisticated solutions to overcome such problems are under development and may help growth in B2C eCommerce in the sector. Greater technological development, integration, and standardisation are necessary in order to implement full 3D visualisation of garments or home textiles, realistic virtual fitting, and system independent colour rendering technologies. These technologies must become applicable and affordable to a wide range of companies if they are to capture consumer interest and raise confidence in online shopping for apparel and home textiles.

Production and resource planning, flexible manufacturing systems

Intelligent and highly flexible production planning and manufacturing systems based on affordable, user-friendly and compatible IT solutions allowing integration with business management systems (internal and external) are still not sufficiently available to the industry. Trends towards highly specialised industrial products as well as personalised consumer goods increase the need for systems that can efficiently handle small orders and production batches, reduce lead times, or quickly control changing product parameters.

Enterprise resource management systems that fully cater to the *multi-step-processing* orientation of the industry rather than to the *assembly-of-parts* system of other sectors need to be further developed if they are to achieve a wider deployment in companies of all sizes. Online inspection and quality control systems must be further advanced in terms of functionality and user friendliness in order to enhance the reliability of production and planning, and to save costly resources by reducing waste and erroneous production.

Research, product development, engineering, and design functions

The complex and sophisticated nature of textile products, combined with a higher frequency of product changes and shortened product life cycles, calls for an ability to put specialised, multidisciplinary expertise to work in a quick and efficient way. This requires knowledge-based concurrent enterprising. Relevant knowledge has to be sourced and exchanged in expert networks. This can be done efficiently if the right IT tools and organisation concepts are used and made available to the industry. Product development and design processes can be speeded up enormously by keeping as many steps as possible (e.g. design, sampling, testing, etc) on a virtual level. Similarly, new technologies to support technical textiles innovations, such as wearable technologies and the introduction of ‘sewing machines’ with the ability to sew complex 3D structures, could pave the way for new opportunities for the sector. One of the major advances could be the convergence of textiles and information and communication technologies (ICT) for medical non-invasive usage such as health monitoring and diagnosis⁵. To achieve this, sophisticated but easy-to-use systems are needed to realistically and reliably simulate optical, mechanical, or chemical properties of the product as well as parameters of further processability.

Security aspects play a prominent role in research and product development supporting IT systems, since the future competitive advantage of the company relies directly on confidentiality.

Innovation in processing technology

New textile and composite materials will require adapted or entirely new machinery and processing methods. Existing materials, however, can also yield new properties and functions if processed and engineered in innovative ways. Recent breakthroughs in biochemistry and biotechnology, as well as in plasma, laser, and nanotechnologies, will enable novel yarn forming, coating, or laminating processes. These will give new and traditional fibrous and textile materials highly desirable properties both in terms of subsequent processability and final product characteristics.

Even traditional textile processes can offer enormous scope for potential innovative solutions that improve manufacturing speed, quality, automation, or flexibility.

Intensive design and product development functions for clothing will remain firmly rooted in Europe, while labour intensive manufacturing (i.e. the physical production of garments) increasingly moves to low-cost countries. This exemplifies the artificial separation of skills and technology, and highlights the difference that the existence or non-existence of fully automated processes can make. Other parts of the textile industry are already high-tech. A resolute effort is needed to tackle the problems that prevent the garment manufacturing industry from also becoming a truly high-tech industry. This effort will, if successful, not only reverse the relocation trend but also stop the erosion of the industrial skills base in Europe. It will provide the whole industry with a more modern image, which is sorely needed to attract high-potential young employees and to create a more favourable climate for local investment.

Strategies for managing change

Overall, value added within the textiles sector has increased by 16% since 1995 (Euratex, 2002). The bulk of this improvement has come from the clothing industry, where the index of value added has increased from 100 in 1995 to 123 in 1999 (companies with over 20 employees). This is the result of restructuring and continues to occur within the sector, using outward processing for labour-intensive manufacturing.

⁵ See Shapiro, H., and Iversen, J. S., ‘Teknologikonvergens og nye applikationsområder’, Background note for scenario report: *Industry location Denmark 2015*, Danish Technological Institute, 2002.

General strategic theory states that success can be achieved if flexibility is guided by market requirements and not by production preferences. Considering that it takes years to change a company's behaviour, it is necessary to anticipate changes and developments in order to stay in production. Companies that learn the fastest and show flexibility have a competitive advantage. However, the continuous implementation of new tools, techniques, methods, trends, and mechanisms over a short time span is often too great a task for textiles companies, having dealt too long with traditional methods of textiles manufacturing and business.

Textiles activities are particularly vulnerable to labour cost and technological development. In Europe, production costs and energy costs – in addition to labour costs – are very high. On the other hand, transportation costs are relatively low. When costs increase, the business is simply moved and taught to people in less developed low-wage countries. Textiles companies will have to manage efficiently cooperation and networking structures across company boundaries, including subcontracting, outsourcing of non-core tasks, or concurrent engineering. A clear enterprise strategy will be indispensable, supported by appropriate structures and extensive use of information and communication technologies (ICT).

However, textiles companies can be seen as vulnerable because of the rapid spread of ICT which are not always implemented adequately as a result of a lack of expert knowledge. One of the latest advancements in ICT is the increasing use of the Internet. This development generates new opportunities (such as eCommerce, as was highlighted above) but also risks. It could be just an expensive gadget for the textiles industry for some years to come due to lack of knowledge as to how to implement it fully. Electronic commerce is developing, but is only an extra channel through which business can be done and – due to investments and the knowledge that needs to be acquired – very likely will not give a substantial return for some years. Currently, it is just an alternative (but still risky) way to do business, requiring extra labour and actually not compensated for by a comparable volume of trade. Nevertheless, in order to avoid being called 'outdated', textiles companies might feel they have to get onboard if they are to secure their future.

However difficult it might be for European SMEs facing tough competition, brand development and brand image is and will be a growing asset for overseas export. This is particularly important in relation to emerging markets, where purchasing power is increasing rapidly and where the status symbol plays a central role among wealthier consumers.

Textiles companies are often small and medium enterprises that have difficulty with the introduction of new technology, innovative management, and a global business approach requiring lots of capital. They suffer from a lack of access to financial resources, and the existing profit margins of textiles companies do not allow for a well-developed research department. Moreover, direct public financial subsidy to the sector is coming to an end. Statistics reveal that less than 0.5% of the turnover in textiles is invested in research and development (R&D). This is the lowest figure for all industries. In order to overcome technological backwardness, more venture and research capital must be made available. Such venture capital must aim at developing a new industry based on value-added processing as a result of innovative research; it must not be used to balance accounts, pay for actual losses or buy simple technical support. For this value-added processing to work, it must be the result of a true research driven environment. This is crucial, as research is one of the most important tools for European companies to remain competitive in a global market.

Mass customisation and flexible production

The structure of the textiles industry is traditionally technology or production-oriented, catering for mass-produced goods. This is typical of a resource-based industry. During the last two decades, production has been moving to countries with cheap labour costs, and this change has had a tremendous impact on employment, with subsequent social problems. The more progressive enterprises have recognised the need for market orientation and reorganisation around products and market segments, taking into consideration the need for supply chain integration. However, the next stage of development will call for radical change as companies need to centre their reorganisation strategy on the customer in

order to cater for mass customisation. The industry and allied supply chains must develop into a business based on technical knowledge rather than on resources.

The term mass customisation means that clothing is made to order. Personalised production can be offered together with advantageous prices since there are no stocks. It is possible to make exactly what the customer wants, and flexible production technology can also be combined with a high level of product quality. Information systems make it possible to respond to and integrate customer preferences in production processes. Personalised details can be added to standard production, making every piece of textile unique.

The basic trend in the sector is that mass customisation represents the road through the 21st century. Its implementation will further the scientific and technical know-how. This will enable the development of a viable textiles and clothing sector that is customer centred. It will focus on eliminating the need for cutting and sewing; the 3D product will be developed at the fabric forming stage, thus eliminating parts of the supply chain which are labour and waste-intensive. It also aims at maximum flexibility and rapid response, fundamental for delivering products which are totally customised from fibre to selling in a timescale that is convenient to the customer. As a result, this century's textiles industry will be structured around networks of customer-centred complementary SMEs. Those will take customised orders for sophisticated advanced textile products, and design, manufacture, and deliver in a minimum amount of time, while still adhering to strict specifications.

The change described above will apply to textile products developed not only for apparel but also for the transportation, building, and other sectors. The necessary transition from a resource-based to a knowledge-based industry will entail moving from:

- passive low-functionality materials to active materials with a high degree of functionality;
- a largely low-skilled workforce to a highly qualified and professional workforce;
- products in a mature, static state to high-tech products in a dynamic state;
- mass-produced single-use products to manufactured-on-demand, multi-use, and upgradeable product services;
- material and tangible to intangible value-added products, processes and services.

Focus areas for industry action

Regional, national and international reports⁶ and actors consistently point to a paradigm of flexible production, mass customisation, research and development, and brand management to ensure a sustainable European industry. This is based upon the vision of a new textiles world, which aims at bringing manufacturing back into Europe by introducing innovative multifunctional textiles and implementing new retailing techniques. The intention is to drive job creation and

⁶ For example: at regional level from the Northwest development agency (2003); at national level from Skillfast-UK (2001); and at international level from Euratex (March 2002).

wealth in the EU through a radical change in the way the textiles supply chain works. More specifically, the common intention seems to be the development of a knowledge-based textiles business by integrating research, education, and dissemination activities in the following areas:

- a) The structure and management of the textile business that will require a much shorter supply-chain and be supported by networks of customer-centred complementary SMEs. Innovations will include:
 - shops with samples to try on and a customer-centred interface to propose alterations;
 - high-tech fabrication centres in urban or peripheral areas that manufacture customised products from fibre through 3D fabric forming and finishing without cutting or sewing, and without any production waste.
- b) The design, manufacture and delivery technologies that must be radically changed to cater for the mass customisation of intelligent 3D textile products, including:
 - user-friendly interactive setup of specifications by the customer;
 - specifications conversion software and interfaces for production and delivery;
 - customised automatic production;
 - customised product delivery.

In addition, B2B and B2C communication, 'just-in-time' (JIT) manufacturing and delivery, and other supporting technologies will be required for the fast flow of information and goods up and down the supply chain.

- c) New multifunctional active materials will have to be developed in order to:
 - improve performance, i.e. keep the human body at constant temperature and humidity in extreme conditions (thermo-physiological comfort);
 - monitor performance, i.e. evaluate vital signs such as arterial pressure, heart beat, breathing rate, body temperature, heart electrical activity, etc;
 - control performance, i.e. control glucose and cholesterol in the human body.
- d) The development of new customer-centred multifunctional products for a variety of applications, including concepts such as:
 - techno-fashion, i.e. the use of active materials, wearable computers, body enhancing materials, and other advanced artefacts and accessories as fashion elements in textiles and clothing;
 - information appliances (fibre based) designed to perform a specific activity such as measuring pressure, keeping temperature constant, keeping humidity constant, or changing colour. A distinguishing feature of fibrous information appliances is the ability to share information among themselves (i.e. various appliances may share information to perform multifunctional activities or tasks in a robust way).

Skills, training, and lifelong learning

There are a number of common challenges that affect the textiles and clothing sector as it has developed in different regions and countries.

There is still a predominance of female employment. Globalisation and the penetration of ICT may have a negative impact on their training and career prospects, as has been seen in other sectoral contexts (see Webster *et al*, December 2001).

A general decline of employment will mean the loss of low-skilled assembly-line jobs predominantly employing female workers.

A Leonardo da Vinci sector analysis within the Up-Skills project (Totterdill *et al*, 2002) reports that the future of the sector may be negatively affected by lack of training plans. Often, training is carried out on an ad hoc basis, for example when new equipment is purchased. This training is organised by the suppliers. Usually, such training is very specific in its technical focus and does not comprise generic skills linked to the reorganisation of work processes following the implementation of new technologies. This report also highlights inadequate managerial training and skills, and the fact that there appears to be a limited recognition of the future skills and resources needed to exploit technological innovations for strategic change.

Most sector training is on-the-job. The sector could benefit from a more flexible and accessible provision for internal training that also permits wider access by customers and supply chain partners, thus driving innovation. There are a number of examples of eLearning tools, notably developed with EU funding, but issues of scope, awareness, and easy accessibility remain problematic as they tend to be pilot initiatives only.

There are, however, examples of good practice. A multimedia course is offered by Temptex, development of a standard interactive template for innovative training in textiles. The Temptex project aims at studying how modern educational approaches and ICT can be integrated in standard training templates. Interactive training packages have been developed for two particular fields of textiles education: spinning and non-wovens. These training packages allow easy incorporation of all varieties of training materials in order to provide better, modern, and more efficient and flexible study methods and programmes.

Professional training is gaining in importance in some companies. For example, the weaving machine manufacturer Picanol has training centres in all major textiles areas in the world. Picanol organises specialised management courses, and courses about the electronics in its weaving machines. Before installing its weaving machines, experienced instructors give the customer's technicians a thorough foundation at one of the specially equipped Picanol training centres. Most training programmes consist of hands-on experience on machines identical to those of the customer (see the company's website for further information, <http://www.picanol.be/>⁷).

Vocational training for textiles workers is offered in Belgium, for example, by Cobot, the training centre for employees in the textiles sector, and by Cefret. In Denmark, the Danish vocational training college Teko has worked closely with the Danish high-end textiles sector to support innovations through a one-stop-shop approach, comprising vocational apprenticeship, tertiary level training, and continuing education.

As sectors and technologies converge, some of the competencies identified as relevant to the textiles industries of the future are ⁸:

- basic natural sciences skills, such as physics, chemistry, mathematics;
- materials science and engineering;
- electronics and informatics;

⁷ <http://www.picanol.be/>

⁸ Mario de Arújo, 'Trends in the textiles and clothing sector for 2008', Leonardo da Vinci Programme, Up-Skills Seminar, Portugal, 2002.

- nanotechnology;
- just-in-time philosophy, product, and process design;
- marketing textile technology;
- fibre science and engineering.

Softer personal and general skills include⁹:

- personal and organisational ambition, and ongoing vision and strategy;
- inter-organisational skills;
- recognition that standard finance measures, strategy, and planning tools, are insufficient to manage change.

The need for retraining and lifelong learning also applies to the textiles sector. However, since the industry structure consists of a large number of very small companies and SMEs, lifelong learning is not a particular concern of many sector companies. Several examples show national governments, representative organisations, and training organisations seeking to address lifelong learning through new qualifications and training courses in new forms of partnerships and with specific sector focus.

Examples include:

- *Autex*, the Association of Universities for Textiles, is an interdisciplinary organisation grouping together all major European universities with established international reputations in textiles education and research. Its aim is to promote collaboration in education and research. This is implemented in an exchange of materials, students and staff, and in the stimulation of growth, the organisation of symposia, and the realisation of an eJournal and projects.
- The *eTeam* programme, European masters programme in advanced textiles engineering, is a two-year programme incorporating the latest developments in the textiles field. The programme aims at stemming the continuous lack of interest for textiles education among young people. To this end, textiles education is provided in a multidisciplinary way, and the strengths of the most renowned education specialists in the domain of textiles in Europe are brought together. The programme helps meet the demands of an industry continuously striving for technological innovation, creativity, quality, and a high level of management performance. The *eTeam* programme favours mobility of students from all over Europe, hence propagating the European idea.
- *Textranet* is a non-profit organisation, having its headquarters in France, grouping non-academic textiles research centres. It provides a forum for the promotion of technical progress within the European textiles industry.
- *Euratex*, the European Apparel and Textile Organisation, promotes the interests of its members while taking into account the EU institutional framework and international obligations. Euratex also coordinated a project called Advottex, Investigating strategic needs for advanced vocational training in the European textiles industry. It concerned the analysis of training needs in the European textiles and clothing industry, more specifically concerning information and communication technologies.

⁹ Marcelo Bravo, 'The Boots Company plc', Leonardo da Vinci Programme, Up-Skills Dialogue Seminar, UK, 2002.

- The existence of a European marketplace network, the *Innovation Relay Centre* (IRC), is of key importance in providing for the transfer of innovative technologies or new technology solutions (<http://www.irc.cordis.lu/>). IRC addresses owners of innovative technology who are unsure how to market their innovation, and addresses those who are looking for new technologies to exploit or are searching for an innovative solution to a technology need.

Moreover, there are numerous instruments to support development and innovation in general, such as *Interreg*. This is an EU initiative that aims at strengthening economic and social cohesion by fostering balanced development through cross-border, transnational, and interregional cooperation. Special emphasis is placed on integrating remote regions and those that share external borders with the new Member States and candidate countries.

National initiatives are also taking place. For example, in Belgium, the government plans to provide training cheques for textiles workers (Euratex, 2002).

The tanning and leather industries are also confronted with a need for new skills in adopting ICT and developing international relations in consumer and environmental protection. Training is inadequate because it is not sufficiently perceived as an investment, according to findings from the European Commission (2001b). In the period 1994-1999, the EU initiatives Adapt, Emploi, and Leonardo provided a framework for new training schemes aimed at furthering adaptation and innovation in the sector through skills development. Similarly to the textiles sector, many of these projects seem to have remained limited in reach beyond the project period due to lack of awareness and accessibility among the target population.

The leather and tanning industries could attract more skilled workers, according to the European Commission, if sector image was improved. Apart from attractive salaries, the report *Promotion of competitiveness and employment in the European leather and tanning industry* (2001b) suggests promoting innovative work organisation, combined with the use of environmentally friendly technologies, as image enhancement strategies.

Work organisation

Even though there is a strong focus on individual competencies and job descriptions for managers and employees, the role of the company and organisational structures should not be neglected. Organisations need employees who can learn and be innovative. To do this, employees need work to be organised in a way that fosters innovation, learning, and personal development.

The Leonardo report (Totterdill *et al*, 2002) points to the increasing body of evidence linking the adoption of new forms of work organisation to sustainable competitiveness and innovation. Recent surveys indicate that introducing new forms of work organisation, such as direct employee participation and empowered teamworking, can have a positive impact on productivity and product quality (Gustavsen, 1996; European Foundation for the Improvement of Living and Working Conditions, 1997).

The Hi-Res project¹⁰ used case studies to identify a range of such initiatives in successful European organisations. Some of these initiatives are:

- Workplace partnerships between management, trade unions, and the workforce, to develop new modes of collaboration, dialogue, and trust between the parties.

¹⁰ *Defining the high road of work organisation as a resource for policymakers and social partners* (November 2002) was undertaken for the European Commission by a consortium of partners from six Member States led by the Work Institute at Nottingham Business School.

- Knowledge management technologies and systems in order to improve organisational and personnel knowledge and learning.
- Re-organisation so that structures match client and product, rather than traditional functional demarcations.
- Semi-autonomous groups and/or multi-skilled teams. This is often reflected in a reduction of job demarcations to ensure flexibility and opportunities for learning.
- Strengthening partnerships across organisational boundaries. New forms of work practice and cultures can enhance the potential for innovation and improvement by promoting multi-level collaboration between organisations. This can be achieved using a combination of planning tools such as virtual teamworking and inter-agency approaches to continual improvement.
- Rethinking performance measures to facilitate learning opportunities and encourage long-term thinking among employees.

However, the adoption of new work organisation practices building on a high skills strategy is constrained by a number of factors, according to the Leonardo da Vinci report (Totterdill *et al*, 2002). These constraints are:

- limited awareness and sector evidence of the benefits of emerging approaches in terms of adaptability, innovation, and competitiveness;
- few opportunities for shared learning between groups of firms and their employees;
- poor access to evidence-based approaches to change, and a general lack of internal capacity to exploit the benefits of sector-relevant research and innovation;
- limited adoption of cross-functional management teams in family-owned businesses to exploit fully the benefits of new technologies.

These characteristics should be seen in a context of an ageing workforce. Like other mature industries, the sector also suffers from an image problem tied to production methods and salary levels (except in the technical textiles and high-end fashion sectors), making it difficult to attract highly qualified labour.

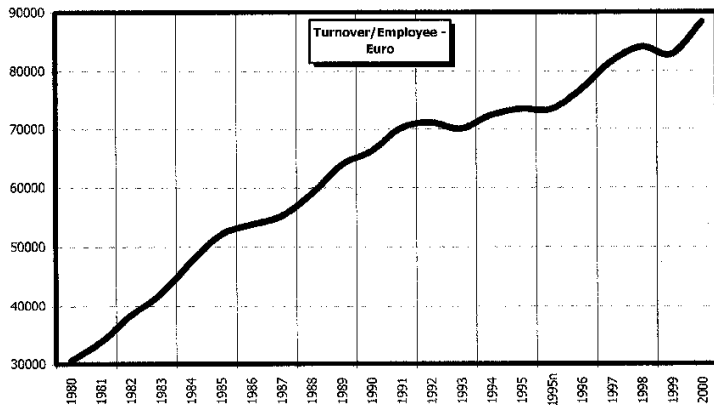
The Czech Republic seems to be an exception to this. Here, the sector has a strong technical skills base and a highly educated management staff profile (many are educated to BSc/MSc level). There is a sizeable pool of technical students: approximately 1,700 are currently studying for sector-relevant degrees, and there are 70 PhD students, according to the Leonardo da Vinci sector analysis.

However, in the Czech Republic as well as in other European countries, considerable weaknesses have been identified concerning the strategic management of business. This impedes the adoption of new work organisation practices and limits potential innovation benefits in terms of: responsiveness to market needs; use of the customer base as a source of innovation; internationalisation strategies; and exploiting ICT in new ways.

Employment and labour relations

The numbers employed in textiles have been falling over the last 20 years, although at the same time there has been a stable level of production.

Figure 3: *Productivity of the textiles industry*



Note: 1980-1994: EU12 (1980-1985: reconstructed data for Greece, Spain and Portugal); 1995-2000: EU15

Source: *Euratex on national data*

Employment has declined in western countries where workers have a good level of social protection and working conditions as jobs kept moving to low-wage countries. This trend has also depressed wages in the textiles industry.

However, the European textiles and clothing sector as well as the manufacturing industry as a whole could face a general shortage of qualified, high-tech personnel. This could be amplified by a deteriorating textiles knowledge base in Europe due to the decline in employment, and by the unattractiveness of the sector to high potential young people, due mainly to its traditional image and lower wages (Euratex, 2002).

So far, most textiles products are still much the same as they were 10 to 20 years ago. This is not optimal, as these kinds of products can be produced somewhere else at an extremely low cost. In the textiles industry, freelancers are not as omnipresent as they are in the clothing industry, where renowned fashion designers sell their collections to the large retail chains.

The role of the unions in the textiles sector is rather limited at present since most of the textiles companies are SMEs with little or no union membership. In times of bad economic perspectives, the impact of the unions decreases. In the past, unions have striven for better working conditions and safety at work, but now their main concerns are job maintenance and (if possible) higher wages.

At a European level, the European Trade Union Committee for textiles, clothing and leather of the European Trade Union Confederation (ETUC: TCL) is working on issues such as:

- globalisation and the urgency of adding a social dimension to world trade;
- the European integration and enlargement process, and the need to include the main values of the European social model;

- codes of conduct, framework agreements, and the obligation to better implement and verify them;
- the continuous deterioration of employment in the fashion sector and the need for better trade balance between the EU and the rest of the world in the framework of a ‘give and give’ relation;
- the need to develop human resources, to improve qualifications, and to implement genuine life-long learning.

At the end of 2000, about 57 organisations from 30 countries were part of ETUC: TLC, representing more than 1.5 million workers in the textiles, clothing, and leather and footwear sectors.

Trade agreements and labour laws

Forty-three out of the 177 members in the International Labour Organisation (ILO) have not yet ratified the conventions which assure workers the right to freedom of association, and the right to organise and bargain collectively. According to the Oxfam report on global supply chains (2004), many of those who have ratified, in practice, undermine workers’ organisations. It has been suggested that social clauses be incorporated in WTO agreements to oblige member governments to respect core labour rights, or risk a complaint that could lead to trade sanctions. However, according to the Oxfam report, governments in developing countries in particular have been opposing this, fearing that such an instrument could be misused for protectionism, given the current WTO membership imbalance.

The Swedish company Hennes & Mauritz provides, at company level, an example of best practice concerning global corporate social responsibility.¹¹ The company has approximately 950 stores in 18 countries. In January 2004, Hennes & Mauritz signed a collaborative agreement with Union Network International (UNI) – a global union network comprising 900 unions in 140 countries – to ensure the rights of all H&M employees around the world. This agreement is a further step in the implementation of Hennes & Mauritz’s code of conduct for global corporate social responsibility, which also covers issues relating to suppliers and child labour.

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¹¹ For further details see the EMCC case study on Hennes & Mauritz (European Foundation for the Improvement of Living and Working Conditions, 2004), available at: <http://www.emcc.eurofound.eu.int/content/source/eu04013a.html>.

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