

# FWC Sector Competitiveness Studies - Competitiveness of the EU Metalworking and Metal Articles Industries

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ECORYS SCS Group  
P.O. Box 4175  
3006 AD Rotterdam  
Watermanweg 44  
3067 GG Rotterdam  
The Netherlands

T +31 (0)10 453 88 16  
F +31 (0)10 453 07 68  
E [fwc-scs@ecorys.com](mailto:fwc-scs@ecorys.com)  
W [www.ecorys.com](http://www.ecorys.com)  
Registration no. 24316726



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## Abbreviations and conventions

BCP	Boilers, containers and packaging (a sub-sector of metalworking and metal articles)
CE	Cambridge Econometrics, Cambridge, UK
IDEA	IDEA Consult, Brussels, Belgium
DTI	Danish Technological Institute, Aarhus, Denmark
ECORYS	ECORYS Holding BV, Rotterdam, Netherlands
EC	European Commission
ETS	Emissions Trading Scheme
EU	The European Union as it was in the year of reference, e.g. EU in 2003 would be the EU15; EU in 2005 would be the EU25
EU5	The five member bloc of France, Germany, Italy, Spain and the UK
EU10	The ten Member States that acceded to the EU on 1st May 2004
EU12	The 12 Member States that have acceded to the EU since 1st May 2004
EU15	The bloc of 15 Member States that made up the EU prior to 1st May 2004
EU25	The bloc made up of the EU10 and the EU15
EU27	The bloc made up of the EU25 plus Bulgaria and Romania
IFO	CESifo, Munich, Germany
IPPC	Integrated pollution prevention and control
IPR	Intellectual property rights
ORGALIME	The representative body for the MMA sector at an EU level
MMA	Metalworking and metal articles
SME	Small and medium-sized enterprises (typically defined as a firms with less than 250 employees)
SWOT	Marketing/ strategic analysis technique highlighting <u>S</u> trengths, <u>W</u> eaknesses, <u>O</u> pportunities and <u>T</u> hreats
bn	billion
m	million
mt	million tonnes
pa	per annum
pp	percentage point

# Executive Summary

## Introduction

The Mid-term Review of Industrial Policy in 2007 concluded that the approach adopted in 2005 (integrated horizontal and vertical initiatives) had been successful and should be continued. In order to do so, an up-to-date understanding of sectors and the conditions affecting their competitiveness is required.

The purpose of the study is to provide the EC with a clear and up-to-date understanding of the competitiveness of the EU Metalworking and Metal Articles (MMA) sector, to allow the EC to knowledgeably engage with the sector in the development of horizontal and vertical policy, in such areas as those mentioned in the previous paragraph. This study should, therefore, allow the EC to develop policy for the Metalworking industry that maximises opportunities at home and abroad.

The information presented in this report is based on data and literature collected from desk-based research; a questionnaire issued to national associations (to which we received responses from Member State National Associations, representing just over 60% of output and just over 50% of employment); and interviews with Metalworking firms, supplier firms and customer firms. Findings from the questionnaire and interviews have been used to support existing commentary and analysis, but are also presented in boxes throughout the report to shed more light on the topic of interest. The commentary and analysis throughout the report are also supported by case studies of Metalworking clusters in located around the EU. A more elaborated example of the Silesia region in Poland can be found in Appendix 2.

There are six chapters to this report. Chapter two looks at key aspects of the MMA sector by presenting some stylised facts on the way the sector operates. Chapter three analyses the competitive position of the sector. Chapter four presents an assessment of the horizontal aspects (regulatory and non-regulatory conditions) that influence the competitiveness of the Metalworking sector. Chapter five presents a strategic outlook for the EU MMA sector in the medium to long term, accompanied by regional cluster studies. Chapter six provides conclusions on the competitiveness of the EU MMA sector. The findings and messages from these chapters are summarised below.

## Overview

### *MMA sector within EU industry and distribution of activity*

The metalworking and metal articles (MMA or Metalworking) sector is a very large sector which provides technologies, services and equipments to all other industrial sectors

and also finished products. It incorporates a vast range of heterogeneous activities which include: steelwork fabrication; manufacture of vessels, containers and steam-generating boilers; and the production of a wide variety of metal articles such as cutlery, wire and springs.

In 2006, the Metalworking sector accounted for 7.4% of manufacturing output and 10% of the total manufacturing value added in the EU27. It might seem that compared with other manufacturing sectors, these shares appear relatively small. Chemicals and the motor vehicles accounting for roughly for 14% and 11% of manufacturing output respectively. However, basic metals, a sector closely linked to the MMA sector, accounted for around 5% of manufacturing output. Of the total MMA output produced in 2006, France, Germany, Italy, Spain and the UK accounted for just over 75% combined. The rest of the EU15 accounted for around 16% of total output, while the new Member States for roughly 8%. Germany is the single largest producer of MMA goods, followed by Italy and France. Among the new Member States Poland and the Czech Republic appear to be the largest producers.

The key strengths of, and opportunities for, the Metalworking sector were identified as follows:

#### *Strengths*

- Geographical proximity of supply chain and close relationships with customers
- High degree of specialisation and functional flexibility
- High quality output and strong position in high-end markets
- Technology intensity and a strategic focus on innovation
- Efficient use of input materials and high degree of recycling

#### *Opportunities*

- Increased consolidation
- Improved market surveillance to support enforcement of regulation
- Increased competitiveness through a modern IPR system
- Higher energy efficiency solutions
- Better products/services through enabling technologies
- Innovation networks and collaborations

The sector employed around 12.5% of the EU27 total manufacturing workforce and consisted of nearly a fifth (406,000) of the total number of the manufacturing enterprises operating in the EU27. As such, the Metalworking sector accounts for a much larger share of the number of enterprises operating in the manufacturing sector compared to other important industries. The sector not only employs more Europeans than most other manufacturing sectors, but it also enjoyed robust growth in employment over the last decade and this serves to highlight the resilience and adaptability of the sector.

The vast bulk of the MMA sector employment is concentrated in France, Germany, Italy, Spain and the UK, which together accounted for two-thirds of employment in the sector in the EU27 in 2006. The new Member States accounted for 20% of the sector's



employment, highlighting a relatively more labour-intensive process compared to the EU15. Looking at the sub-sectoral breakdown, we see that 44% of the total number of persons employed in the Metalworking sector was in metal processing, while constructional metalwork accounted for 29% of the MMA sector employment.

Trade in Metalworking goods in the EU is dominated by between five and eight producers. The EU5 typically accounts for just over 50% of export and import flows (with Germany and Italy as the major players). If Austria, Belgium and the Netherlands are added in, this share increases to around 70%. Germany and Italy are the largest exporters to EU and non-EU countries, although Germany accounts for nearly twice as much as Italy. Behind them, a half dozen or so Member States account for 4-8% of EU total MMA exports each.

The Metalworking industry does, of course, have some distinct activities. For the purposes of this study we have identified four sub-sectors: Metal Processing; Constructional Metalwork; Boilers, Containers & Packaging; and Metal Products. More information on the structure of these sub-sectors can be found in the report.

### *Recent Developments*

Comprehensive and comparable data are available from Eurostat only up to 2006. Since then, the onset of the global financial crisis and the ensuing deep recession have impacted upon the MMA sector. The effects have varied between the defined product groups but in general:

Output has been reduced below the levels reached in the middle of the present decade.

Employment cut-backs, although substantial, have not been enough to prevent productivity declining as output levels have fallen.

Enterprises are continuing to suffer a price-cost squeeze. On the one hand, energy, materials and other input costs have increased while, on the other hand, end-users have put downward pressure on selling prices.

Reduced liquidity and restricted access to credit and capital markets are particularly severe problems for SMEs, which make up the greater part of the enterprises in this sector.

With regard to the specific product groups:

Demand for metal processing has fallen as the demand for steel and other metal products has declined sharply from the record levels reached in 2007.

Demand for structural products for the construction sector has fallen as industrial and commercial construction and residential housing demand has collapsed. Some support is coming from public infrastructure investment, the magnitude of which is intended in part to boost macroeconomic activity.

Demand for fabricated products, in particular boilers, tanks and other vessels, is being supported by continuing investment in energy generation and supply.

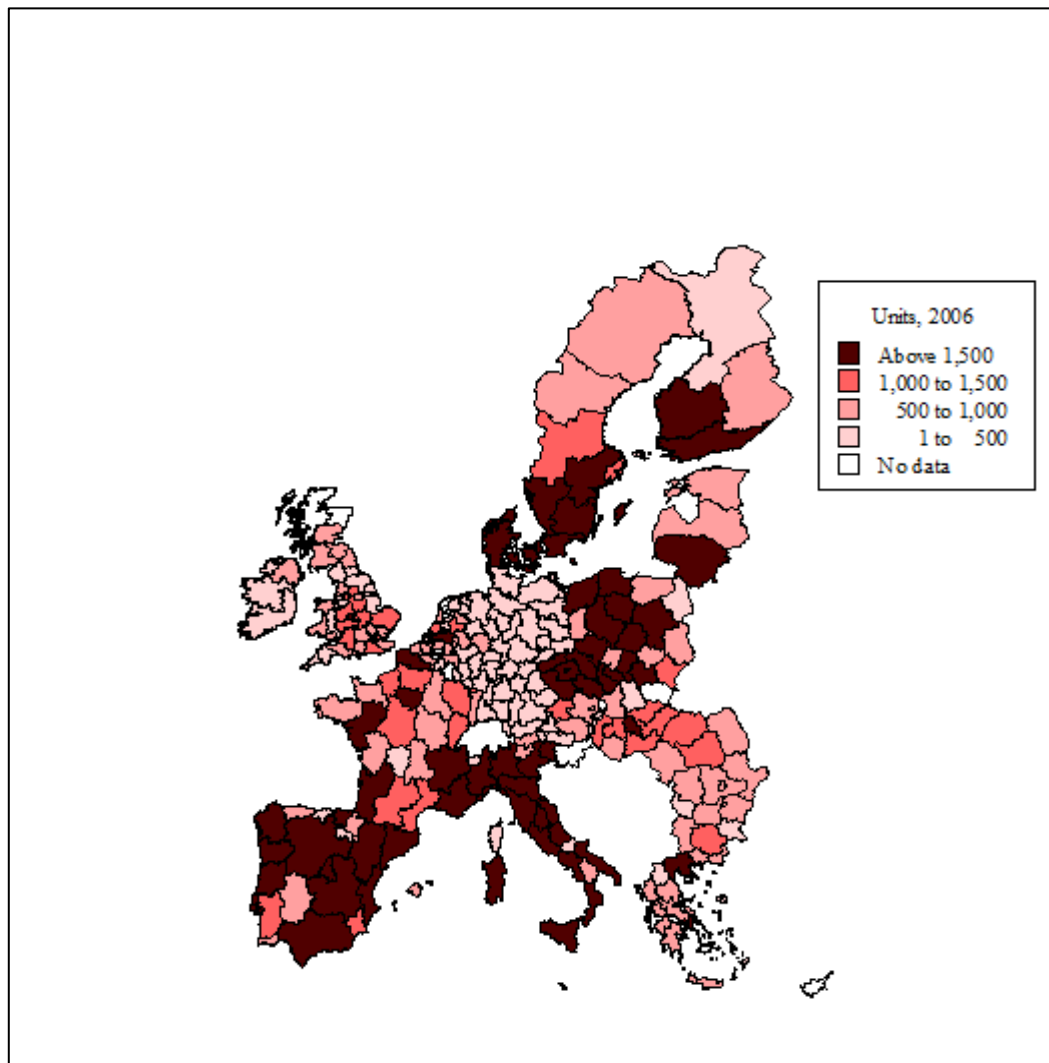
Metal products' output reflects both the general fall in manufacturing activity that the recession has brought about and the movement of production to low-cost centres.

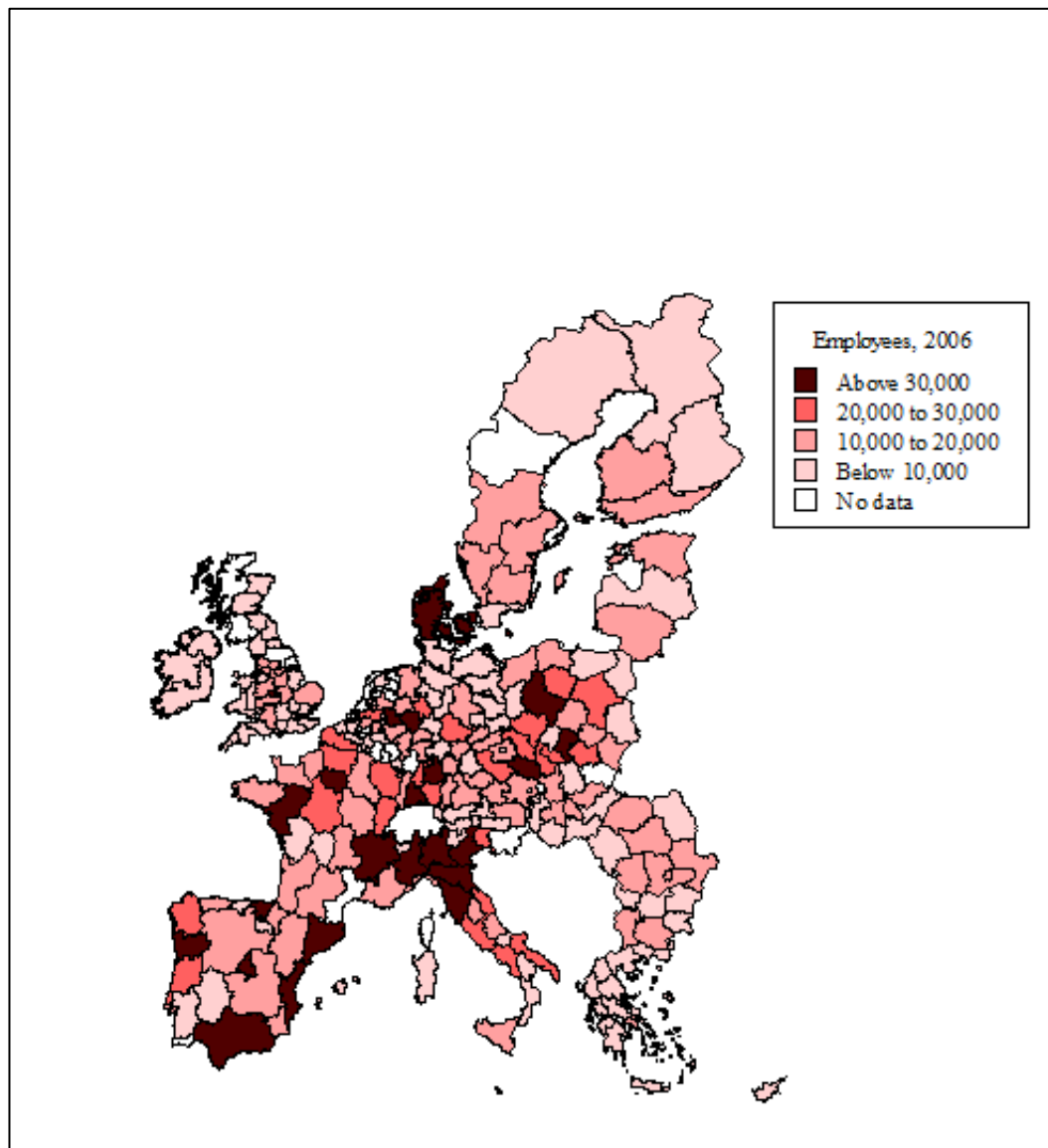
### *Regional dimension*

#### **Distribution of activity**

The chart below shows the regional distribution of the absolute number of firms (units) for 2006. To some extent the distribution of units runs along national lines, with Spain, Italy, Denmark, and some of the new Member States easily identified by the high number of firms in their regions. However, some heterogeneity within countries can be seen, particularly in France, and Finland and Sweden although the latter two are not surprising given the geography of these countries. The total employment chart shows a more mixed picture, with the majority of jobs concentrated in northern Italy, Denmark, parts of Spain and France. What both charts also show is that the MMA sector has a vast geographic reach, with a presence in nearly every NUTS2 region.

Number of enterprises by NUTS2 region





Findings from our cluster studies showed that although the geography, the industrial history of the regions and the policy framework may differ across regions, MMA sector enterprises appear to share some commonalities:

#### **The invisible sector**

The sector is dominated by SMEs, mostly sub-suppliers to other sectors such as the automotive sector and the construction and food sectors. In many regions the small size of the companies makes the sector “invisible” *Commercially, Financially, Politically, To end users, and To the workforce*. This invisibility of the MMA sector is somewhat of a paradox given that the sector is also an important employer in the regions studied, delivering essential products and parts to other sectors.

### **Networks, cooperation and innovation**

In several of the studied regions, sector aggregation is a key word for the MMA sector through mergers and acquisitions or cooperation between companies. Local technical colleges and institutes are their prime sources of innovation and knowledge renewal for many SMEs. Most of the regions studied facilitate cooperation between companies, universities and education and training institutions in Triple-Helix-like models. Networks such as NEMAS in South Westphalia and the Katowice Special Economic Zone in Poland have all been created to accumulate and disseminate knowledge in different ways.

The cluster studies show that, micro-companies and small companies regard the large scale research projects as irrelevant. In several cases, large-scale EU funded research projects are not perceived as tailored to the needs of the MMA sector, and only a limited number of companies have benefited from the EU Research programmes.

### **Demography and education**

In most countries, because the sector does not have a visible profile and a strong brand, particularly among young school leavers, demographic change threatens to undermine the long-term sustainability of the workforce. This was highlighted by the cluster studies, which indicated that it is critical that the MMA sector, in collaboration with vocational colleges and tertiary institutions, takes actions to show case career pathways and employment opportunities in the sector to attract an adequate supply of well-trained professionals in the medium to long term. Interesting examples of where the sector has tried to boost its profile and open itself up include South Westphalia, where the employers' organisation has developed projects to spur children's interest in technical matters and cooperates with universities and educational institutions. Similar initiatives have been taken in the Austrian Vorarlberg region, and in the UK.

### Key regulatory and framework challenges

Different sub-sectors are affected differently by the framework conditions according to who their customers and suppliers are and their relative importance; while the geographic distribution and concentration of the Metalworking sector and its sub-sectors means that the effects of these conditions (and their intensity) varies between regions or Member States. Nevertheless, outside the Metalworking industry the main horizontal aspects that affect, or are likely to affect, its competitiveness are:

#### *Environmental regulations*

The direct effect comes through regulations covering: waste prevention and control; the integrated product policy (e.g. eco-design requirements for energy-using products); and specific product standards or regulations (boilers, constructional products, electrical and electronic equipment). This can become a substantial burden on Metalworking firms in the form of compliance measures, adaptation of the production process, and implementation of new technologies. However, where such regulations also apply to imports this can give EU MMA firms an advantage over non-EU producers exporting to the EU.

The indirect effect comes from when the some of these regulations are applied to customer or supplier industries and they pass the burden onto the Metalworking sector (by virtue of a stronger bargaining position).

### *Skills and training*

Increased automation of production and the accompanying increased need for engineers instead of manual workers has shifted the skills profile of the MMA workforce and altered the skills required. This has been reinforced by the growing need to engage in R&D. The key challenge is the insufficient supply of many of these newly required skills, some which are in great demand across the manufacturing sector (and Member States), with strong competition and wage pressures the result. The historical perception of the Metalworking sector as heavy industry remains an obstacle to attracting skilled workers, even though it does not accord with the modern reality of the MMA sector. Consequently, stakeholders report skills shortages as having a major negative impact on the competitiveness of the sector, and are an important factor in deciding where to locate. The perceived erosion of the EU's historically strong knowledge base threatens to undermine the attractiveness of the EU to MMA firms (EU and non-EU) as place to locate production and R&D. Stakeholders also recognised the role of employers in skilling workers and to this extent the current economic downturn creates an opportunity to do so.

### *Innovation, R&D and protection of intellectual property rights*

We conclude that the relatively weak bargaining position of the Metalworking sector in relation to larger upstream and downstream firms does not prevent firms from innovating and conducting research, and instead acts as an incentive to innovate as a means to survive. However, a key element in supporting and stimulating R&D is the enforcement of intellectual property rights. Here the issue for the Metalworking sector is not just to protect intellectual property from non-EU MMA competitors, but also from customers who wish to integrate MMA inventions and innovations into their own areas of work. A second issue is the process of protecting inventions, whereby firms are put off applying for patents because it involves detailed descriptions of the invention being published for others to see and appropriate.

### Key features and challenges for the Metalworking industry

The MMA sector is an important part of EU manufacturing, accounting for 10% of value added.

The Metalworking sector is the largest employer in EU manufacturing.

It does have many more enterprises than other manufacturing sectors, and is thus far more fragmented and much less concentrated than some customer/supplier industries.

Labour productivity in the Metalworking sector is below the level for manufacturing as a whole, reflecting the relatively more labour-intensive nature of the MMA sector.

Investment per worker is comparatively low (around 27% below the manufacturing average).

SMEs dominate the sector, accounting for 75-80% of both output and employment.

Interview responses indicate that bank finance is the most important source of funds for Metalworking companies, but there is significant variation across Member States and firm size.

#### *Impact of size on bargaining position*

The relatively large size of supply partners compared to the MMA sector as a whole puts pressure on SMEs. The relatively small size of Metalworking producers makes it difficult for SMEs to earn economies of scale from their inputs or engage in effective bargaining. Not only are the upstream supply chain partners of the MMA sector large and powerful, but many of the firms that the Metalworking industry sells to are powerful (more powerful than Metalworking firms). This creates competitiveness challenges for small independent MMA manufacturers, who consequently have little influence on prices. This should be of concern to all sectors as the industry is a feeder for many key supply chains, and so the efficiency of the Metalworking sector has the potential to influence the competitiveness of EU manufacturing as a whole. To some extent, these pressures are exacerbated by the increasing use of metal substitutes by supply chain clients. The metalworking sector has, however, reacted to these pressures by developing its own products with more advanced physical and technical properties.

#### *Impact of size on R&D activity*

Whilst SMEs appear to be well suited to the MMA sector their small size does hinder their competitiveness due to the limited investment that can be made in Research and Development and product and process design. For SMEs the cost of investing in R&D to add value to their products and processes is too high and due to being relatively labour intensive, ongoing R&D is a challenge. Those firms that do have the financial and human resources to be able to undertake effective R&D are often not rewarded for their innovation in the form of increased sales, due to the unlawful counterfeiting of its products or techniques.

The competitiveness challenges that face supply chain partners in both directions has emphasised the need for the Metalworking sector to increasingly compete on the basis of high value product differentiation as opposed to just cost alone. The existence of comparable new low-cost competition from non-EU countries has forced supply chain partners to adapt their strategies in order to survive. The changing strategies of supply-chain clients inevitably have consequences for the Metalworking sector, and it increases the need for innovative products and processes. While this can create opportunities for the MMA sector that it would have otherwise not had, the practicalities of developing and marketing new products present a challenge for many Metalwork SMEs.

#### *Competitiveness on world markets*

A factor of concern to all MMA manufacturers is the impact that emerging economies are having on their businesses, especially countries that are able to supply the EU with comparable products at lower cost, such as China. Imports from China have increased



overwhelmingly over the past decade, making it one of the most significant competitiveness threats to the Metalworking industry. Its ability to produce manufactured metal products at lower cost than most EU producers inevitably has direct implications for the demand of finished goods produced in the Metalworking industry.

#### *Labour costs and productivity*

The analysis of labour productivity and costs found evidence of overall productivity gains in the Metalworking industry in the EU27, and of convergence in productivity levels among the leading producer Member States. But notwithstanding the single market, there is wide divergence in employment costs among the Member States, more than offsetting any convergence of productivity levels. The result is that variations among the Member States in unit labour costs are wide and show no signs of convergence. Hence significant differences in cost competitiveness in MMA production persist across the EU.

#### Strategic responses

In bringing together the intra-industry issues & challenges and the extra-industry challenges we identified the following **possible strategic responses** for consideration by stakeholders.

##### *Consolidation and strategic partnerships*

We contend that there is significant scope for increased consolidation through mergers and acquisitions. This would support the competitiveness of the Metalworking sector through increased economies of scale and access to new markets; a stronger bargaining position of Metalworking firms to help them to achieve lower input costs and higher product prices; and better opportunities for accessing the required skills and human capital. We identify the MMA sector as the key stakeholder for leading the response.

##### *Improve dissemination of information and knowledge sharing, taking into account the characteristics of SME's within the sector*

Here, the importance of information and knowledge sharing (and knowledge platforms) to support innovation and strategic capacity is emphasised. Investment in sector research programmes and institutions are necessary instruments to achieve this, but are not always sufficient to deliver a benefit, particularly where the evidence or findings are not related/transferred to the reality of the SME. That aside, another key issue, particularly with respect to the MMA sector, is that such information is used mainly by large companies; SMEs are rare users. Hence, dissemination activities with a greater focus on SMEs are recommended. We suggest that the response is led at all levels: sector, Member State and EU level.

*Take policy measures and stimulate awareness among SMEs about the competitive opportunities of increased enterprise engagement in research collaboration and networks, whilst improving framework conditions for innovation for SMEs in the Metalworking sector*

Many MMA firms, because of their small size, face resource constraints (e.g. skills, finance) with regard to organising and carrying out R&D. As a result, significant innovation activities and involvement in research projects are often absent. More initiatives to increase SME engagement in these activities are required. This would require greater co-ordination between Member States and the EU, and greater involvement of SME representatives in the design of such programmes. Support should also be available through the Small Business Act which aims to improve the operating and R&D environment for SMEs. Another possible option to help support R&D activities and the exchange of knowledge is to promote greater collaboration between universities and SMEs. Member States need to take the lead here, with support from the sector and the EU.

*Labour for the future – improve the image and attractiveness of the sector to ensure a qualified workforce in the medium term*

A significant challenge for the Metalworking sector is attracting and retaining the necessary skilled people, which is essential for maintaining and developing the competitive position of the EU Metalworking sector. Engineering, design, and managerial skills are especially important. This should be a priority policy/action area, and the EU has a key role to play here through its open method of co-ordination and various initiatives to develop lifelong learning opportunities. Beyond this, more needs to be done to improve the image of the MMA sector and its sub-sectors, to help it attract people with the required skills. Some MMA sub-sectors are more hi-tech and high skilled than others, and so this action will probably be required at a sub-sectoral level. More programmes and mechanisms need to be adopted to bring in and educate a younger workforce. Partnerships between training programmes and industry can help to achieve this, and stimulate management awareness about business opportunities stemming from a creative behaviour and demonstrate to young outsiders that the sector does produce high value-added, sophisticated products that are solutions to customers' problems. Branding and advertising initiatives can support this by highlighting the modern, highly innovative and diverse nature of the Metalworking sector. Economic reforms at the Member State level are very important in this respect, through the importance they attach to active labour market and lifelong learning policies in supporting industrial competitiveness. The challenge is to balance the needs of firms with the interests or rights of the individual.

*Access to finance*

Many of the micro and small-sized companies that dominate the MMA sector struggle with access to external finance. Many rely on banks for finance. This hampers firms'



ability to invest in capital or R&D. This access problem has been exacerbated by the financial crisis and threatens the survival of some companies. This highlights the importance of efficient capital flows in ensuring the survival of companies, and good relationships with suppliers and customers. However, further investigation into the obstacles to efficient capital flows is required. One of the guiding principles of the Small Business Act is the facilitation of SMEs' access to finance, and there are initiatives devoted to improving SMEs access to finance, and helping SMEs identify and navigate funding programmes. But a lack of internal resources and awareness means many small firms do not take advantage of these. Companies need more advice and help on the possibilities offered by various funding sources/mechanisms. While this suggests a key role for representative organisations, it also relies on MMA firms making the most of these services and opportunities.

#### *Engaging in the climate change challenge*

The EU MMA sector is relatively more energy efficient than competitors outside the EU and more attuned to the environmental requirements of its products and processes. The increased global focus on climate change should, therefore, be seen as a major opportunity for the EU MMA sector, which is in a strong position to benefit from the climate change challenge by applying a pro-active strategy. To that extent, the Small Business Act should be used to support the MMA sector, by helping it to exploit opportunities in new environment-related markets. At the same time, policy needs to review how the administrative burden of environmental legislation can be lessened for SMEs, which dominate the Metalworking sector.

In addition, energy is an important input factor for the MMA sector. Its availability and price is of strategic importance. It is vital, therefore, for policymakers to continue with the further development of EU energy markets to promote lower prices, stability and increased security as means to support the competitiveness of the Metalworking sector.

Furthermore, for the MMA sector and the EU as whole, it is vital to get international co-ordination on environmental regulations, such as those related to CO<sub>2</sub> emissions. If not, offsetting measures need to be considered to help those producers placed at the greatest disadvantage. Trade policy might be one avenue for pursuing this.

In light of the systemic importance of the sector in the EU supply chain and the dominance of SMEs, additional responses that might also be worth further exploration (although not discussed in great detail in the study), particularly for policy-makers, are responses that: 1) consider the **whole supply chain** and the importance of the MMA sector in it; and 2) recognise and support the role played by and the importance of SMEs – a **'Think Small First'** approach. Our suggestion here is that when writing new or revised legislation, policy-makers should give serious consideration to the impact of any rules or regulations on SMEs, and the capacity of SMEs to adapt to or deal with any such legislation. In short, legislation should be kept simple and cost-effective to make it easy for SMEs to comply with. At the same time, it is also very important for policy-makers and enforcement agencies not to look at the MMA sector, or other sectors, in isolation,

but to take a whole supply-chain view of any new policies and their potential or actual impact on all sectors. Here, it is also important for authorities to differentiate between those sectors that receive support (or some protection) for political or strategic reasons, and those that do not. Beyond that, and in light of the dominance of SMEs in the Metalworking sector, competition authorities need to be firm in monitoring and dealing with abuses of power that arise from differences in size of the firm/sector, especially suppliers (interview responses suggest MMA firms have no or little bargaining power in relation to raw material and energy suppliers).

## Conclusions

We conclude by noting that in some sense, the Metalworking sector punches above its weight. It is an important sector that should not be overlooked. Its engagement in R&D to meet the environmental challenge of climate change and sustainability mean it is a 'smart' sector. Its Achilles heel appears to be its structure, with the very high proportion of SMEs creating a fragmented and less co-ordinated sector vis-a-vis its suppliers and customers. Interview and questionnaire evidence provide support for the hypothesis that Metalworking SMEs are squeezed. Access to finance can be a challenge for Metalworking SMEs. Improved access to finance would help more firms engage in mergers & acquisitions, which most interviewees believed would help improve the competitiveness of the sector. At the same time, protection of inventions and innovations remain a key issue and initiatives need to focus on restricting third party access to patenting documentation and providing an inexpensive and administratively simple system to allow MMA firms to protect their inventions and enforce their intellectual property rights. The correct and consistent application of the Small Business Act across all EU Member States, could go some way to mitigating these issues.

Of course, there are regional and sub-sectoral variations across the Metalworking sector, while the relative importance of the sub-sectors is not equal. This very varied, fragmented and disparate nature of the MMA sector makes it hard to imagine that any single or simple policy aimed at the MMA sector with a one size fits all approach could be effective or easily estimated. This suggests that policy initiatives to help the Metalworking sector need to be taken at various levels, especially local level, and need to take into consideration the effect of other policy initiatives (possibly unrelated to the MMA sector) implemented at other levels.

Labour productivity in the sector as a whole can be expected to go on improving in the medium term, with increasing convergence, while the scope for boosting productivity depends on a combination of market forces and policy initiatives. Overall, there is wide divergence in employment costs (labour costs per employee) among the Member States, more than offsetting any convergence of productivity levels. The result is that variations among the Member States in unit labour costs are wide and show no signs of convergence. Hence significant differences in cost competitiveness in MMA production persist across the EU.

With regard to suppliers, the basic metals industry is frequently the biggest input supplier to the MMA sector, accounting for between 15-20% of total inputs to the Metalworking

sector. Steel is a major input to the MMA sector and the relatively large size of steel input suppliers compared to the relatively small size of Metalworking producers makes it difficult for Metalworking SMEs to earn economies of scale from their inputs and engage in effective bargaining. This is seen as very restrictive and a major threat to its competitiveness. The importance of the whole MMA sector as a customer varies, accounting for anywhere between 10-70% of steel suppliers output, depending on the sub-sector or specialisation. This limits the bargaining power of the Metalworking sector in some areas and as a whole. However, the high percentage for some sub-sectors or specialisations suggests that some MMA firms or sub-sectors should be able to enjoy greater bargaining power. Other industries that are responsible for large shares of input across regions also include distribution and mechanical engineering. On the demand side, the mechanical engineering industry is the largest consumer of the sector's output. The construction and the motor vehicles industries are also large consumers, but less so than mechanical engineering. It is also worth noting that the MMA sector is often the largest or second largest customer of the basic metals sector. This suggests that weak bargaining positions are a reflection of the dominance of SMEs in the Metalworking sector, and that consolidation within the MMA sector would strengthen its position in relation to basic metals suppliers.

A final conclusion, aimed more at policy-makers than stakeholders, is the need to recognise the dominance of SMEs in the MMA sector and the systemic importance of the sector in the overall EU supply chain. The latter underlines the Metalworking sector's sensitivity to SME policy (or lack of SME consideration in other policy), while the latter is a key influence on the decision of customer sectors, such as the motor vehicle industry, on where to locate production. Without a healthy, innovative and competitive MMA sector, some customer firms or sectors will be attracted to relocating outside the EU (e.g. motor vehicles), or sourcing outside the EU (e.g. construction), or both (e.g. mechanical engineering), and the EU industrial base will be undermined. Conversely, the recent success of several car scrappage schemes around the EU in boosting demand for new cars also boosted demand for products from some MMA sub-sectors. Thus, a whole supply-chain (and inter-sector linkages/impacts) point of view needs to be adopted when writing legislation and assessing the impact.

This is especially important given the sector is present in virtually every corner of the EU. In most regions the Metalworking sector accounts for at least 10% of total manufacturing employment, and in many other cases it is over 15%. This makes the MMA sector an important generator of regional wealth and prosperity, and an important contributor to innovation programmes. Nevertheless, much more can be done by policy-makers, governing authorities and support organisations to match the services offered in support of R&D activity, SMEs and the MMA sector to the needs of the MMA sector, other (customer & supplier) sectors, and market conditions.

In particular, a key issue is the large number of SMEs in the sector and the impact this has on R&D given the difficulty SMEs have in obtaining finance, especially for riskier (as perceived by financiers) activities such as R&D. Better advertising and co-ordination of several existing EU support schemes is required, particularly at the local/regional level. The support for R&D activity in Metalworking SMEs seems especially important as the sector has carried out, and continues to, extensive R&D activity related to environmental technologies, and innovation in producing greener products and processes: for example, the use of thermal imaging of furnaces has been used by metals processing firms to

highlight maintenance needs and process improvements to help raise productivity and reduce energy consumption. To that extent it could be called a ‘smart’ industry and is worthy of further support in the development of new eco-technologies and the necessary skills required to develop them. The importance of R&D activity to the MMA sector to remain competitive and, in turn, support: the competitiveness of the wider EU industrial base; regional development & prosperity; and the transition to a post-carbon society, stresses the importance of well coordinated policy responses to all of these areas.

# 1 Introduction

## 1.1 Background

In 2005 the EC set out for the first time an integrated approach to industrial policy with horizontal and vertical initiatives, to provide the right framework conditions for enterprise and innovation to succeed, and to drive the economy forward. The Mid-term Review of

Industrial Policy in 2007 concluded that this approach has been successful and should be continued, with a focus on how best to respond to globalisation and climate change. And in highlighting the importance of productivity as a driver of long-term growth, the European Competitiveness Report 2007 reinforced the importance of industrial policy in helping to deliver the framework conditions that allow firms and employees to raise their productivity.

In order to sustain the progress made under the integrated approach an up-to-date understanding of sectors and the conditions affecting their competitiveness is required, and this prompted DG Enterprise and Industry to set up a Framework Agreement analysing the competitiveness of sectors and industries. Under this Agreement, this study on the competitiveness of the metalworking and metal article (MMA) sector commissioned towards in October 2008.

This final report presents the work undertaken on the competitiveness of the EU MMA sector.

## 1.2 Purpose

The purpose of the study is to provide the EC with a clear and up-to-date understanding of the competitiveness of the EU MMA sector (as it is now and how it might develop), which will then allow the EC to knowledgeably engage with the sector in the development of horizontal and vertical policy.

This includes:

- Identifying the key aspects of the sector (performance, structure, processes and inputs) that can be described by reliable data sources or other available documentation;
- Identifying the competitive position of the sector in relation to main competitors;
- Identifying which horizontal aspects (eg regulation, labour force skills, infrastructure, energy supply, etc) are key issues for the sector;
- Presenting the strategic outlook for the sector, identifying threats, opportunities and policy challenges/issues.

## 1.3 Remaining sections

The Terms of Reference identified five key requirements:

- The collection and presentation of data
- A synthetic literature review
- Assessment of the industry's competitive position on EU and global markets
- Analysis of regulatory and other framework conditions which have an impact on the competitiveness of the EU MMA sector
- A strategic outlook

In relation to these requirements the remaining sections of this final report are organised as follows:

The collection and presentation of data is not confined to a single section or chapter. Collected data are used in chart and table form to illustrate and support points throughout the report where deemed necessary. However, most of the collected data that are presented in this report are used in chapters two and three.

Similarly, the synthetic literature review is not confined or relevant to just one part of the report, rather it is used to support and inform all sections of the report.

Chapter Two looks at key aspects of the MMA sector by presenting some stylised facts on the way the sector operates. This includes a review of structure, including the distribution of production and employment, including regional (NUTS2) activity; the importance and nature of trade; processes and inputs.

Chapter Three analyses the competitive position by looking at a similar range of factors, but focusing more on how they contribute to varying performance levels within sub-sectors and for individual firms.

Chapter Four presents work on any horizontal aspects relating to competitiveness of the MMA sector, including an assessment of the impact of issues such as regulatory conditions (labour markets, competition policy, industry standards and health and safety, IPR, environmental regulation, etc), framework conditions (including geographical cohesion, labour force skills, trade access and firm structure) and exogenous conditions (eg global competition, energy supply, and the effects of the current global financial crisis).

Chapter Five presents a strategic outlook for the EU MMA sector industry in the medium to long term based on an in-depth assessment of underlying trends, future competitiveness drivers, and challenges for the sector and its sub-sectors. This is complemented by regional cluster studies.

Conclusions are presented in chapter six.

This study is supported by a series of *Cluster Studies* for eight MMA clusters spread out across the EU. These are presented throughout the report and serve as a contextualisation to the general evidence and figures provided in the report and give a richer and nuanced description of some of the challenges facing the MMA sector. The eight regions are:

- Basque country, Spain
- Brescia, Italy
- Flanders, Belgium
- Lithuania
- Pays de la Loire, France
- Silesia, Poland
- South Westphalia, Germany
- Vorarlberg, Austria

In addition to the above mentioned examples the Valencian metalworking association *Femeval* has delivered an example from Valencia, Spain. A more elaborated example of the Silesia region in Poland can be found in Appendix 2.

The regions have been selected for this study in cooperation with Orgalime. Each of the short examples introduces the MMA sector in the region with a few statistics and a short presentation of some of the regions' main or typical companies. After the introduction, central challenges of the regions' MMA sector are presented. The section concludes with a discussion on industry need and possible policy actions. The 2-3 page examples are intended to present the variations in challenges and solutions in the MMA sector across the regions selected. In addition, Femeval has contributed to the study with a presentation of experiences from Valencia. This example has been added to the study without any involvement of the consultants.

The examples are generally a result of one interview with a key person from the region in question – usually a representative of the industry. The consultants have carried out supplementary desk research. However, the reader should keep in mind that the examples are largely a presentation of the region from the point of view of the industry in that region.

The geography, the industrial history of the regions and the policy framework may differ, but in all regions the MMA sector enterprises appear to have more in common than differences.

## 1.4 Acknowledgement

This report was written by Cambridge Econometrics, Danish Technological Institute and IDEA Consult. Several people within each of these organisations contributed to this report. This team was assisted by Professor Tony Cockerill, in his capacity as sector expert. Professor Cockerill's contribution to this study has been supported in part by Leverhulme Trust Research Award EM/20239.



## 2 Key aspects of the sector

### 2.1 Introduction

The metalworking and metal articles (MMA) sector incorporates a range of heterogeneous activities which include: steelwork fabrication; manufacture of vessels, containers and steam-generating boilers; and the production of a wide variety of metal articles such as cutlery, wire and springs. This chapter presents an overview of the MMA sector as a whole and by sub-sector to provide an understanding of the sector in terms of the distribution of production and employment, and the importance and nature of trade. We also try to identify the role of SMEs in the MMA sector.

For the purposes of this study the MMA sector was defined statistically as shown in Table 2.1 below:



Table 2.1 Sub-sectors of the MMA sector and their NACE classifications

Terms of Reference	NACE Rev. 1.1 code	NACE Rev. 2 code	NACE Rev. 1.1 Description
Casting of metals (including ferrous and non-ferrous metal castings)	27.5	24.5	Casting of metals. Includes: 27.51 - Casting of iron; 27.52 - Casting of steel; 27.53 - Casting of light metals; 27.54 - Casting of other non-ferrous metals
Structural metal products (including the manufacture of metal structures and parts of structures, metal building and construction products and railway tracks)	28.11	24.33 25.11	Manufacture of structural metal products: 28.11 - Manufacture of metal structures and parts of structures; 28.12 - Manufacture of builders carpentry and joinery of metal
Tanks, reservoirs, boilers, metal containers and steam generators	28.12 28.21 28.22	25.12 25.29 25.21	Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers: 28.21 - Manufacture of tanks, reservoirs and containers of metal; 28.22 - Manufacture of central heating radiators and boilers
	28.30	25.30	Manufacture of steam generators, except central heating hot water boilers
Forging (including drop forging, close die forging, pressing, stamping and roll forming)	28.40	25.50	Forging, pressing, stamping and roll forming of metal; powder metallurgy
Treatment and coating of metals (including the manufacture of articles on turning machines and chains, the treatment of metals and general mechanical engineering on a subcontract basis)	28.51 28.52	25.61 25.62	Treatment and coating of metals; general mechanical engineering: 28.51 - Treatment and coating of metals; 28.52 - General mechanical engineering
Tools and finished metal goods (including the manufacture of durable and consumer goods for use in offices, gardening and household, etc) and,	28.61 28.62	25.71 25.73 28.41 28.49 28.92	Manufacture of cutlery, tools and general hardware: 28.61 - Manufacture of cutlery; 28.62 - Manufacture of tools; 28.63 - Manufacture of locks and hinges
	28.63	25.72	
Metal packaging and general hardware items	28.71 28.72 28.73 28.74 28.75	25.91 25.92 25.93 25.93 25.94 25.71 25.72 25.99 32.99	Manufacture of other fabricated metal products: 28.71 - Manufacture of steel drums and similar containers; 28.72 - Manufacture of light metal packaging; 28.73 - Manufacture of wire products; 28.74 - Manufacture of fasteners, screw machine products, chain and springs; 28.75 - Manufacture of other fabricated metal products n.e.c.

## 2.2 Categorisation of sub-sectors for this study

However, the Terms of Reference requested a re-grouping of these definitions into product groupings to facilitate the economic analysis. The metalworking and metal articles industry is heterogeneous in terms of both organizational structure and outputs. The relevant NACE 2 classification for the sector as defined for this study comprises 24 4-digit sub-sectors and one 3-digit sector. In order to focus and to an extent generalise the analysis, the sub-sectors have been arranged into four product groups. These groups have been defined in terms of product, process and markets and typical enterprise characteristics:

Primary metal processing: casting, forging and coating of metals. Typically small-scale and fragmented enterprise structure, widely distributed throughout EU-27.

End-user market: constructional metalwork. Spatial distribution of building and construction activity is a strong localising factor.

Fabrication: boilers, metal containers and packaging. Larger enterprise size on the basis of presence of scale economies.

Final manufacturing: metal products. Manufacturing processes in a wide variety of enterprise types and sizes.

Therefore, where possible we have reorganised the data and analysis throughout this report to match the groupings presented in Table 2.2.

Table 2.2 Grouping the MMA sector by product groups

Product group	NACE Rev. 1.1 code	NACE Rev. 2 code	Sector defined in ToR
Metal processing: castings, forgings and coating of metals	27.50	24.50	Casting of metals ( <i>including ferrous and non-ferrous metal castings</i> )
	28.40	25.50	Forging ( <i>including drop forging, close die forging, pressing, stamping and roll forming</i> )
	28.51	25.61	Treatment and coating of metals ( <i>including the manufacture of articles on turning machines and chains, the treatment of metals and general mechanical engineering on a subcontract basis</i> )
	28.52	25.62	
Constructional metalwork	28.11	24.33	Structural metal products ( <i>including the manufacture of metal structures and parts of structures, metal building and construction products and railway tracks</i> )
	28.12	25.11 25.12	
Boilers, metal containers and packaging	28.21	25.29	Tanks, reservoirs, boilers, metal containers and steam generators
	28.22	25.21	
	28.30	25.30	
	28.71	25.91	Metal packaging (and general hardware items)
	28.72	25.92	
Manufacture of metal products	28.61	25.71	Tools and finished metal goods ( <i>including the manufacture of durable and consumer goods for use in offices, gardening and household, etc</i> )
	28.62	25.73	
		28.41	
		28.49	
		28.92	
	28.63	25.72	General hardware items
	28.73	25.93	
	28.74	25.94	
	28.75	25.71	
		25.72	
		25.99	

## 2.3 The metalworking and metal articles sector in context

In 2006 (most recent year for which data are available) the MMA sector in the EU27 employed around 4.2m people and produced around €506bn worth of output<sup>1</sup>.

### 2.3.1 The MMA sector compared to manufacturing

In the wider context, the MMA sector accounted for 7.4% of manufacturing output in the EU27 in 2006. At the same time, however, the sector accounted for just over 10% (€177bn) of total manufacturing value added. The 4.2m people employed by the MMA sector in the EU27 in 2006 were spread across roughly 407,000 enterprises. These 4.2m people employed by the sector represent almost 12½% of the total number employed by manufacturing, while the 407,000 enterprises account for almost a fifth of all manufacturing enterprises. The personnel costs associated with those 4.2m employed by the MMA sector totalled close to €117bn (11% of total manufacturing personnel costs). As a result the gross operating surplus for the MMA sector in the EU27 in 2006 was €60bn, equivalent to 9½% of the gross operating surplus for manufacturing as a whole.

The data collected also show that MMA enterprises tend to be smaller relative to others in manufacturing in terms of output and employment. In 2006, turnover per enterprise in the MMA sector was around €1.2m, compared to just under €3m in manufacturing. In terms of employment, enterprises in the MMA sector employed roughly 10 people in 2006, compared to roughly 15 in manufacturing.

While the MMA sector appears to outperform other manufacturing sectors, in the sense that its shares of manufacturing value added and gross operating surplus are larger than its share of manufacturing turnover, it performs less well on labour productivity. Apparent labour productivity (value added/persons employed) in the MMA sector in 2006 was around €42,000, or just 83% of apparent labour productivity in manufacturing as a whole. Even when adjusted for wages, labour productivity was still only around 91% of that in manufacturing as a whole in 2006. Nevertheless, the whole MMA sector performs well on profitability, with the gross operating rate 27% above that for manufacturing in 2006.

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<sup>1</sup> Although we refer to the EU27, data were unavailable for Malta. However, given that Malta would have accounted for less than 0.1% of total manufacturing output in the EU25 in 2002, we are confident that the difference between the MMA sector in the EU26 (EU27 minus Malta) and the EU27 would be negligible, such that EU27 can be used here without any significant loss of meaning or emphasis.

Table 2.3 The MMA sector in relation to the manufacturing sector (EU27)

<b><u>THE MMA SECTOR IN RELATION TO THE MANUFACTURING SECTOR (EU27)</u></b>		
<b><u>Indicator</u></b>	<b><u>Value</u></b>	<b><u>Share of manufacturing sector (%)</u></b>
<b><u>Total MMA sector</u></b>		
Number of enterprises	406,842	17.6
Gross output (€bn)	505.8	7.4
Production value (€bn)	492.9	7.8
Total purchases of goods and services (€bn)	336.8	6.7
Value added at factor cost (€bn)	176.7	10.3
Gross operating surplus (€bn)	59.9	9.4
Personnel costs (€bn)	116.6	10.8
Gross investment in tangible goods (€bn)	21.5	9.0
Number of persons employed (m)	4.24	12.4
Number of employees (m)		12.0
<b><u>Relative to value for manufacturing (%)</u></b>		
Apparent labour productivity (€'000)	41.7	83.2
Wage-adjusted productivity (€'000)		
<i>NACE 27.5 (Castings)</i>		89.7*
<i>NACE 28</i>		91.6*
Gross operating rate (%)	11.9	127
Note(s) : All figures are for 2006 except *, which is for 2005; apparent labour productivity = value added/number of persons employed; gross operating rate = (gross operating surplus/ turnover)*100.		
Source(s) : Eurostat; CE calculations.		

### 2.3.2 The MMA sector benchmarked against other sectors

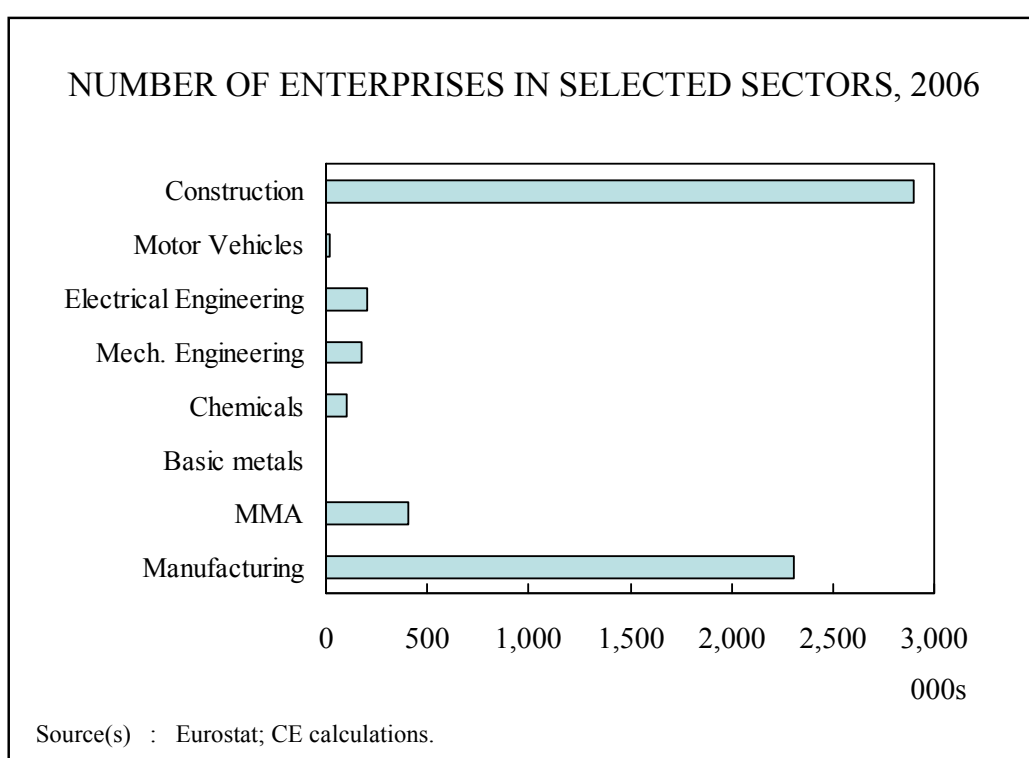
This section analyses the main economic indicators for the MMA sector by making comparisons against other manufacturing sectors. This enables us to gain an understanding of how the metals sector compares in terms of recent growth and shares of key indicators such as output, employment and investment.

#### *Number of enterprises*

In 2006 there were around 407,000 enterprises within the MMA sector, a decrease of just over 1,000 since 2005. Yet this is not part of a long-run decreasing trend, as the number of enterprises increased between 2004 and 2005 by 0.2%, or 894 enterprises. Most of the other sectors shown in Chart 2.1 follow a similar pattern, with an increase in the number of enterprises in 2004 and 2005, but a decrease in 2006. However, the changes in some sectors such as mechanical engineering and electrical engineering are much higher than the changes in the MMA sector.

In 2006, the MMA sector was fairly large in terms of the number of enterprises when considered against other engineering and manufacturing sectors. The chart below demonstrates how, with the exception of construction, the MMA sector has a larger number of enterprises than any of the other sectors shown. The MMA sector accounts for around 18% of all enterprises in the manufacturing sector. This has in fact remained fairly constant since 2001, before which the MMA sector accounted for a slightly smaller share of enterprises in the manufacturing sector. The MMA sector accounts for a much larger share of the manufacturing sector than other industries shown in Chart 2.1. For instance, electrical engineering accounts for just 9% of all manufacturing enterprises. Basic Metals accounts for just ½% of all enterprises in the EU manufacturing sector.

Chart 2.1 Number of enterprises in selected sectors, 2006



### Output

The MMA sector does account for quite a sizeable proportion of output in the manufacturing sector as a whole, with a share of 7½%. When compared to the chemicals and the motor vehicles industries, this appears relatively small with chemicals and the motor vehicles accounting for roughly for 14% and 11% of manufacturing output respectively. At the same time, however, Basic Metals accounts for roughly 5% of manufacturing output, slightly less than the MMA sector.

In spite of the fact that the MMA sector has more enterprises, the output of the sector is not as large as some of the other sectors compared here. In 2006 the MMA sector had an output of €506bn; in comparison Chemicals had an output of €975bn. Even so, output in the MMA sector grew every year between 2000 and 2006, aside from a small dip in 2002 of -0.1%, and growth has been more robust and consistent than in other sectors. Out of all the industries shown in Table 2.4, only construction and the chemicals industry saw positive output growth across the whole 1999-2006 period.

Table 2.4 Output growth: MMA sector compared to other manufacturing sectors (%)

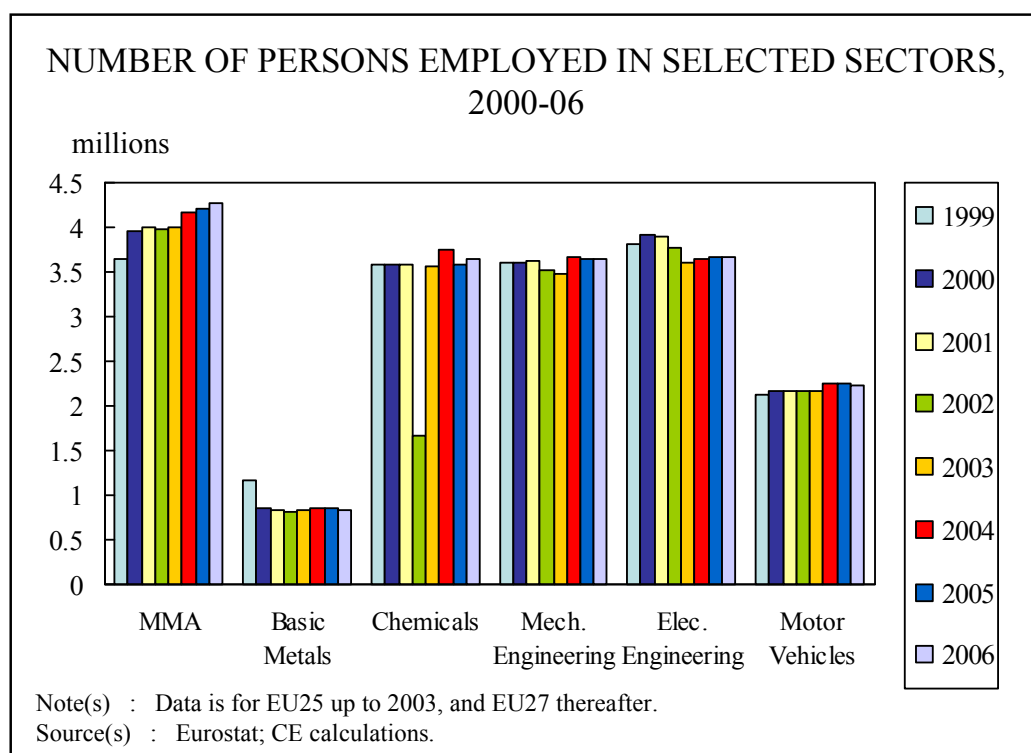
<b>OUTPUT GROWTH: MMA SECTOR COMPARED TO OTHER MANUFACTURING SECTORS (%)</b>							
<b>Sector</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
Manufacturing	9.1	1.9	0.5	-0.6	5.5	4.0	7.8
MMA	12.4	2.1	-0.1	1.5	9.0	5.6	9.7
Basic Metals	4.6	-2.0	-0.4	1.7	26.0	9.6	23.2
Chemicals	12.1	2.2	2.0	0.4	5.2	4.7	6.6
Mechanical Engineering	6.5	3.7	-0.6	-0.5	6.6	5.7	10.4
Electrical Engineering & Instruments	16.4	-3.0	-6.5	-4.8	3.0	4.0	8.2
Motor Vehicles	0.2	4.1	12.0	2.6	-4.7	3.4	7.1
Construction	7.9	6.1	6.7	1.4	8.0	7.3	12.3

Source(s): SBS, Eurostat.  
Note(s): Data is for EU25 up to 2003 and EU27 from 2004 onwards.

### Employment

The chart below illustrates how employment has changed over some of the key manufacturing sectors in the EU. It can be observed that for most of the sectors there is no obvious trend in employment, apart from the increasing numbers of employees in the MMA sector.

Chart 2.2 Number of persons employed in selected sectors, 2000-06



In 2006, the number of employees in the MMA sector stood at 4.3m across the EU27 countries, or around 12% of total manufacturing employment. This is more than any of the other sectors shown, particularly the basic metals and the motor vehicles sectors. The basic metals and the motor vehicles sectors were responsible for just 2% and 7% of employment in manufacturing respectively. The other three sectors looked at here (chemicals, mechanical engineering and electrical engineering) do have quite sizeable shares, each with a share of around 11%. This number of employees in the MMA sector is, however, over three times smaller than the amount of individuals who are employed in the construction industry.

The number of employees within the MMA sector increased by around 300,000 over 2000-06, or 8% overall. In general, the broad manufacturing sector saw diminishing numbers of employees over this period, so the MMA sector went against the general trend in this respect. During this period employment growth in the other sectors varied immensely, but the MMA sector saw increases in employment in all but one year (2002). It is for this reason that the growth rate across the whole period is the highest out of all the sectors considered here. Employment in basic metals fell by 3½% over 2000-06, while in Electrical Engineering it fell by 6% over the same period.

#### *Investment*

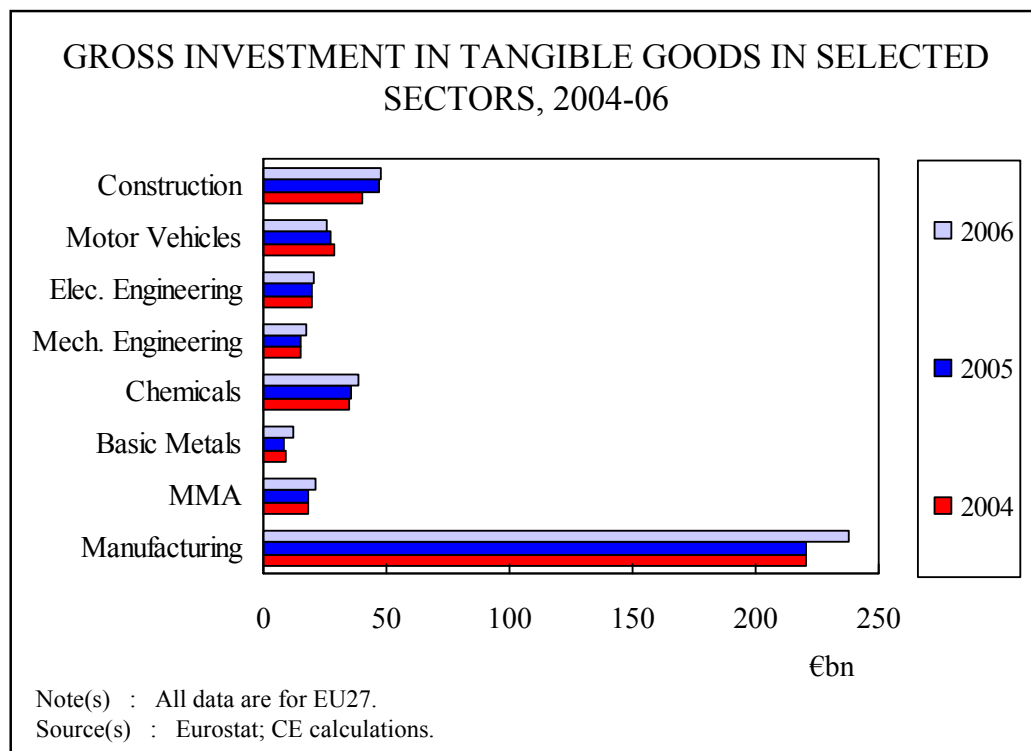
In 2006, the gross investment in tangible goods, which includes investment in new and existing tangible capital goods, was just over €21bn in the MMA sector. Chart 2.3 shows that this level of investment is larger than gross investment in tangible goods in the mechanical engineering and electrical engineering industries and almost twice as large as investment in the basic metals industry. However, investment was larger in the chemicals and motor vehicles sectors, and almost four times greater in the construction industry.

The chart demonstrates how the levels of investment in tangible goods remained fairly constant over the period 2004-06, with the MMA sector usually investing one of the lower amounts each year out of the industries shown. Investment growth in the MMA sector in 2006 was very high, at 15.8%. The only sector to report a growth rate higher than this was the basic metals sector, with an exceptionally sizeable growth rate of over 38%. In Construction, meanwhile, investment grew by just over 1%, while in the motor vehicles industry investment fell by almost 6% in 2005 and 2006.

When considering gross investment in tangible goods as a share of the total, all of the manufacturing industries shown in the chart account for at least 57% of all investment in the manufacturing sector. And gross investment in tangible goods in the MMA sector accounts for 9% of total investment across the manufacturing sector. This figure is considerably high in general, but is also high in comparison to the shares of total investment that certain other sectors are accountable for. Only the chemicals industry takes a larger share of total gross investment in tangible goods, with a share of over 16%. A final point to note is that these shares of the total gross investment in tangible goods remained fairly consistent over the time period 2004-06.



Chart 2.3 Gross investment in tangible goods in selected sectors, 2004-06



#### *Investment per person employed*

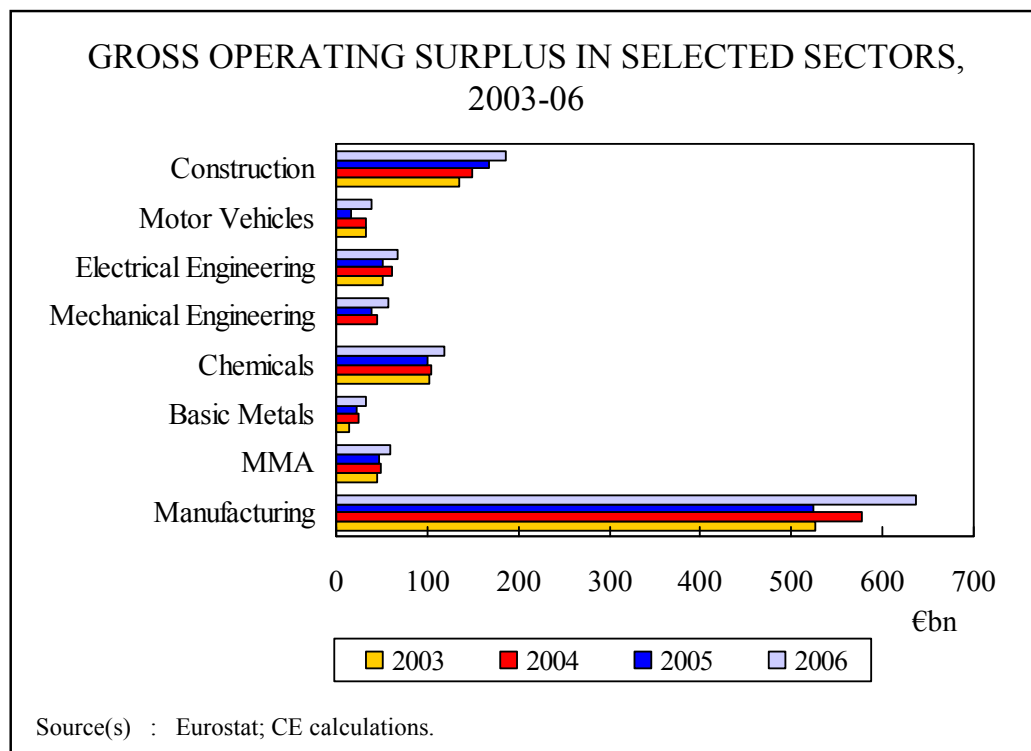
The investment per person employed in the MMA sector is quite low in comparison to some other sectors and is lower than the average investment per person employed across the broad manufacturing sector. In 2006, the investment per person employed in the MMA sector was around €5,030, whereas in the manufacturing industry as a whole the figure was slightly more, at €6,915. Some industries invested considerably more per person employed, for example the motor vehicles industry invested around €11,500, the chemicals industry invested €10,636, and finally the basic metals industry invested the largest amount: €14,250 per person employed. The MMA sector does, however, still invest a higher amount than the mechanical engineering and the construction sectors.

The growth in investment per person employed was high across all sectors in 2006, with the exception of the motor vehicles and construction sectors, which both reported negative growth rates. Growth in investment in the MMA sector was relatively high at around 14%, an improvement on the ¼% growth in 2005, but nonetheless dwarfed by the huge growth of 42% in the basic metals sector in 2006. Despite this, the MMA sector still had the second largest growth rate in investment per person employed in 2006, and was higher than the average growth rate of 9% across the manufacturing sector as a whole.

#### *Profit levels*

The chart below shows both the levels of gross operating surplus over 2003-06. The level of gross operating surplus in the MMA sector in 2006 was €60bn, which is quite high in comparison to sectors such as basic metals, motor vehicles and mechanical engineering. These levels are high considering the fact that both the motor vehicles industry and

Chart 2.4 Gross operating surplus in selected sectors, 2003-06



mechanical engineering both had greater turnover than the MMA sector in 2006. The level of gross operating surplus in the MMA sector is nevertheless dwarfed by the levels in sectors such as construction or chemicals.

In 2006, gross operating surplus grew by approximately 30% on the previous year, which at first glance seems very high but is in fact similar to growth rates in other sectors. All sectors shown here, except for construction, suffered a decrease in gross operating surplus in 2005, which is perhaps why there was relatively high growth recorded in 2006, as sectors recovered. The motor vehicles industry had an extremely high rate of growth in particular, of over 135%.

As a fraction of the manufacturing industry as a whole, the MMA sector again accounts for quite a large share of gross operating surplus, with a proportion equal to 9½% (this is around 1½ pp higher than in 2000). Nevertheless, this compares to rather sizable shares for both the chemicals sector, with a share of almost 19% (up by around 1 pp on its 2000 share), and the electrical engineering sector, with share worth almost 11% (down by around 2 pp on its 2000 share). The basic metals, mechanical engineering and motor vehicles sectors' gross operating surplus shares are, however, smaller in comparison to the MMA sector (in the region of 5-9%).

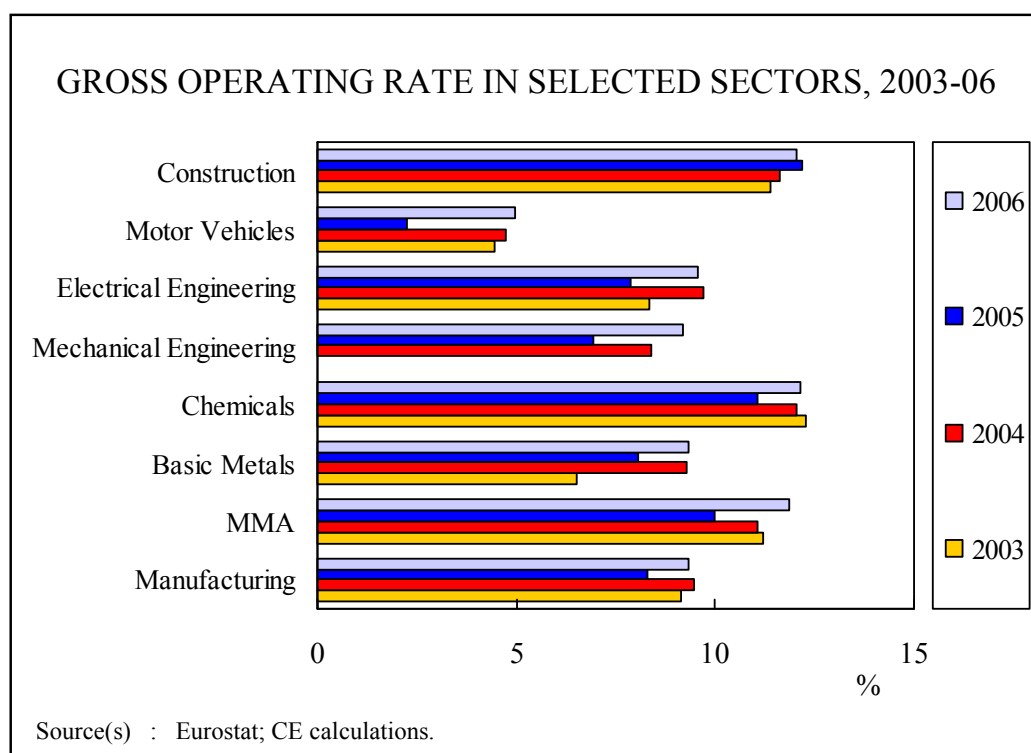
### *Profitability*

Chart 2.5 shows the gross operating rate for each sector over 2003-06. Except for Construction, there is no clear trend in any sector. The MMA sector performs well on profitability, even though the gross operating rate of around 12% appears to be quite low. However, the broad manufacturing sector has an even lower gross operating rate of just over 9%, so the MMA sector fares better in comparison. Other sectors such as the chemicals or the construction sectors have similar gross operating rates of between 10-

12%. On the other hand, the motor vehicles industry has a particularly low gross operating rate of around just 5%.

In 2006 the gross operating rate for the MMA industry improved by around 19%, having previously shrunk in 2004 and 2005. Chemicals and Basic Metals saw the gross operating rate improve by less. In mechanical engineering and motor vehicles sectors the improvement was very large, with the gross operating rate for the motor vehicles sector more than doubling.

Chart 2.5 Gross operating rate in selected sectors, 2003-06



### 2.3.3 General findings from cluster studies<sup>2</sup>

#### *The invisible sector*

The sector is dominated by SMEs, mostly sub-suppliers to other sectors such as the automotive sector and the construction and food sectors. In many regions the small size of the companies makes the sector “invisible” in several ways:

*Commercially.* SMEs in the MMA sector are in a bargaining squeeze between large clients and large suppliers.

*Financially.* SMEs that do not have access to capital markets have to engage with banks for capital, and in the present financial climate it is difficult for small players.

<sup>2</sup> A more elaborated example of the Silesia region in Poland can be found in Appendix 2.

*Politically.* In the example from Flanders in Belgium the MMA sector and its needs are sometimes invisible to national decision makers likely because of the many SMEs which are more difficult to organise or convene than large companies, and the sector therefore is politically weak.

*To end users.* The products of the sector are invisible to the end user. In many cases the products are embedded invisibly in the end product as parts in cars, buildings or production facilities.

*To the workforce.* In many cases the sector has to promote its workplaces to young people to spur an interest in a technical career.

The invisibility of the MMA sector is a paradox since the sector is also an important employer in the regions delivering essential products and parts to other sectors.

### *Networks, cooperation and innovation*

In Brescia and elsewhere sector aggregation is a key word for the MMA sector through mergers and acquisitions or cooperation between companies – but it is not a straightforward task for small, traditional and family-owned companies. Cooperation and brand creation through high-quality products are important strategies in the regions.

Most regions facilitate cooperation between companies, universities and education and training institutions in Triple-Helix-like models. Networks such as NEMAS in South Westphalia, EMC2 in Pays de la Loire, the Katowice Special Economic Zone in Poland or the work done by Linpra in Lithuania have all been created to accumulate and disseminate knowledge in different ways.

The local and national governments can stimulate the innovative capacity and internationalisation of the sector through demonstration projects in partnerships with relevant knowledge institutions. Technical, hands-on and application-oriented knowledge as well as dissemination of knowledge into value-adding applied solutions in the sector are also enabling features.

As discussed in the Flanders case, large-scale EU funded research projects are not perceived as tailored to the needs of the MMA sector, and only a limited number of companies have benefitted from the EU Research programmes. Micro-companies and small companies regard the large scale research projects as irrelevant, according to sector representatives.

Local technical colleges and institutes are their prime sources of innovation and knowledge renewal for many SMEs. This is for instance seen in Flanders with the Sirris and the Welding institute, the IHM<sup>2</sup> in the Basque Country, the Fachhochschule in South Westphalia or the AQM and C.S.M.T in Brescia.

### *Demography and education*

In most countries, changing demographics will reduce the workforce, especially if active labour market policies do not ensure changes in current retirement patterns in the EU in the years to come. Because the sector does not have a visible profile and a strong brand particularly among young school leavers, it is critical that the MMA sector in

collaboration with vocational colleges and tertiary institutions take actions to show case career pathways and employment opportunities in the sector to attract an adequate supply of well-trained professionals in the medium to long term.

One way forward for the sector could be to identify and map best practices to attract and retain well trained professionals starting already in compulsory school. Innovative lessons could also likely be found among some of the major OECD economies.

The sector could also take measures to stimulate more young females to choose a technical education relevant to the sector. As the companies in the sector in the EU move up the value chain, factors such as functional design and product services transformation become more important to the value creation of the sector- and as such also offer new branding opportunities as well as new employment possibilities.

An interesting example with regard to opening up the sector was initiated in South Westphalia. The employers' organisation has developed projects to spur children's interest in technical matters and cooperates with universities and educational institutions. Similar initiatives have been taken in the Austrian Vorarlberg region. In the UK a large scale exercise to engage youth in futures thinking about products of tomorrow has engaged students in activities with involvement of manufacturing companies- and relevant to the metal sector.<sup>3</sup>

## 2.4 Distribution of production and employment within the EU

### 2.4.1 Distribution of the MMA sector by region

Of the €506bn worth of output produced in 2006, France, Germany, Italy, Spain and the UK accounted for just over 75% combined. With the EU15 (the bloc of 15 Member States that made up the EU prior to 1st May 2004) accounting for around 92% overall, this means the remaining ten Member States of the EU15 accounted for just 17% of output, with the Benelux countries accounting for 6.3% of total output. The EU12 (the 12 Member States that have acceded to the EU since 1st May 2004) accounted for just over 8% of output<sup>5</sup>.

The single biggest producer was Germany, accounting for around a quarter of all EU27 MMA output in 2006. This was followed by Italy (19.7%) and France (13%), with Spain (9.4%) and the UK (8.8%) a little further behind. Among the newer Member States, Poland and the Czech Republic were the largest producers, accounting for 3% and 2% of EU27 MMA output in 2006.

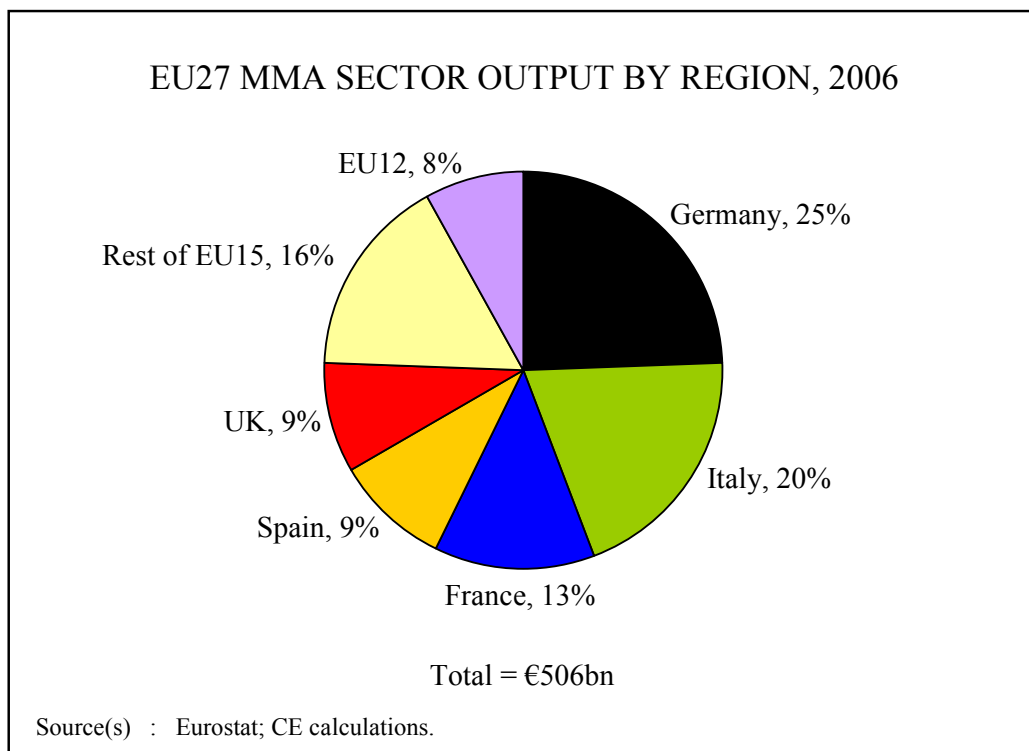
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<sup>3</sup> <http://www.youngforesight.org/>

<sup>4</sup> Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia.

<sup>5</sup> Data for Malta were unavailable.

Chart 2.6 EU27 MMA sector output by region, 2006



Similarly, 77% of MMA value added in the EU27 in 2006 was accounted for by France, Germany, Italy, Spain and the UK combined. The remaining ten Member States of the EU15 accounted for just over 16% of MMA value added in the EU27 in 2006, while the EU12 accounted for close to 7%. Germany accounted for the largest share of value added (27%), followed by Italy (18%). Spain, France and the UK each accounted for 9-13% of MMA value added in the EU27 in 2006. Together, the Benelux countries accounted for 5.7%.

#### 2.4.2 Cluster study: South Westphalia (Germany)

##### Facts

Number of MMA companies: 600  
 Size of companies : 72.5% of the companies have less than 250 employees  
 Number of employees: 140,000 employees

##### Typical MMA companies in South Westphalia are:

**Muhr und Bender KG (Mubea)**, is a family-run company located in 30 offices, production sites and partnerships worldwide. Mubea supplies products to all automobile manufacturers worldwide. The Mubea product range encompasses heavy-duty technical springs and other lightweight components.

Employees: 5,000  
 Turnover: €790m

<http://www.mubea.com>

**KIRCHHOFF Gruppe**. Kirchhoff is a family-owned company through four generations. The company makes metal structures, vehicle recreation and hand tools with the world's automotive industry as its primary client. Kirchhoff has 31 plants in 12 countries with its headquarters based in Iserlohn in the South Westphalia region.

Employees: 4,000  
 Turnover: €637m (expected 2009)

[www.kirchhoff-gruppe.de](http://www.kirchhoff-gruppe.de)

<p><b>C.D. Wälzholz KG</b> produces cold rolled and tempered steel strip and profiles in no less than 29,000 variations. Steel products optimised for application purposes are the specialty of the company with only very few of the products being standard or basic versions. C.D. Wälzholz customises products and materials in close cooperation with customers and suppliers.</p> <p><a href="http://www.cdw.de/Products/1_313.html">http://www.cdw.de/Products/1_313.html</a></p>	<p><b>MAHLE Brockhaus GmbH</b> is the world's leading supplier of forged steel connecting rods. MAHLE Brockhaus is among the top 30 automotive suppliers globally. With a delivery capacity of 55 million connecting rods per year, the company is the world's largest supplier of forged steel rods.</p> <p>Employees: approx. 600 people at the Plettenberg plant and 75 at the Roßwein plant Turnover: €137m (1997)</p> <p><a href="http://www.mahlebrockhaus.com/">http://www.mahlebrockhaus.com/</a></p>
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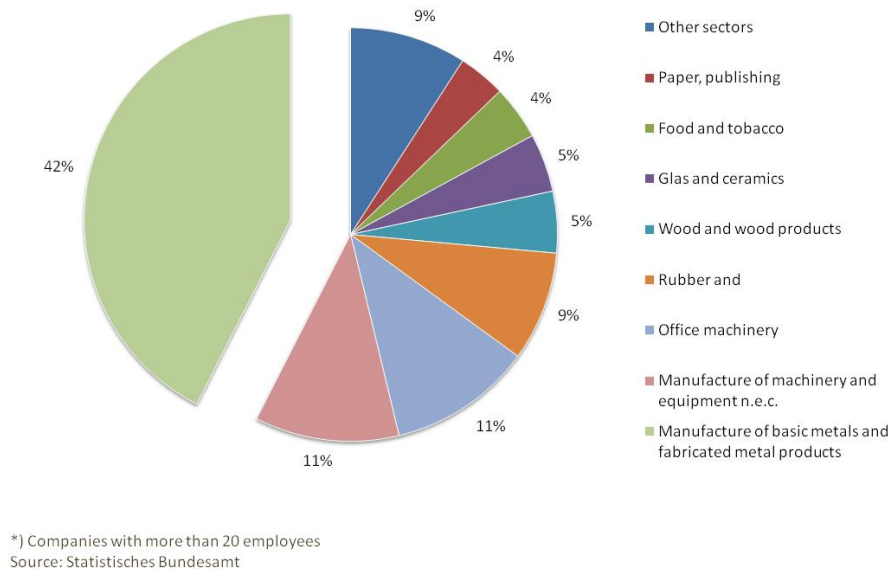
South Westphalia is situated in the south-west corner of Nordrhein-Westfalen and consists of the districts Hochsauerlandkreis, Märkischer Kreis, Olpe, Siegen-Wittgenstein, and Soest. Its population is about 1.5 million. South-Westphalia has a long industrial history.

The region was one of the earliest industrialised regions in Germany because of its immediate access to raw materials (iron ore, metal ore). Most MMA sector enterprises in the region are family-owned SMEs and medium-sized companies, in contrast to the nearby Ruhr district that is dominated by large enterprises.

In many cases, the small company scale has proved to be a competitive advantage for the South Westphalia companies. Thus, at the turn of the new millennium the region had more industrial workers than the Ruhr district. The advantage of being an SME is close contact to customers and suppliers as well as flexibility and innovation in production processes. The disadvantage is reduced bargaining power, and the companies often find themselves being squeezed between the huge steel suppliers and their huge customer companies in the automotive industry.

MMA South Westphalia companies are primarily suppliers to the automotive and tool making industries and the construction sector. Many of the companies export their products.

Manufacturing sectors in South Westphalia



The long industrial tradition in the region and the many companies and workplaces in the MMA sector have helped to develop a strong skills and competences base in the South Westphalia workforce. The *Fachhochschulen* or Vocational education Institutions colleges are the centres for training and educating young people as well as continuous lifelong learning. The *Fachhochschulen* are responsible for vocational training, tertiary professional education, and applied research and development. The South Westphalia University of Applied Sciences (Fachhochschule Südwestfalen, <http://www3.fh-swf.de/foreign/english.htm>) has 7500 students enrolled at campuses in Hagen, Iserlohn, Meschede and Soest. The South Westphalia University of Applied Sciences is involved in finding solutions to the current problems of the region and thus gain experience for application-oriented studying. Companies can get advice on technology and innovation and joint projects with the university and the local industry have led to developments in products and processes.

An example of industry collaboration is the Network of Machine-building industries in South Westphalia– NEMAS (<http://www.nemas-sw.de/>). NEMAS is a platform for cooperation and promotes partnerships, joint trade fair participation, purchasing cooperation and collaboration with colleges, universities and research institutions. Another example is the automotive network of South Westphalia (Automotive Netzwerk Südwestfalen, [www.automotive-sw.de](http://www.automotive-sw.de)).

The South Westphalia region depends on the MMA sector. This is mirrored in the economics of the region, in the many workplaces within the MMA sector and in the social capital and the regional characteristics of this. The metal construction and mechanical engineering areas belong to the defining economic sectors of South Westphalia. 53.8% of the companies in the region with more than 20 employees belong to the MMA sector. South Westphalia is the leading German region in the field of mechanical engineering (Zukunftatlas, Prognosis). Approximately one fourth of the region's employees are employed in the metal products manufacturing and mechanical



engineering areas, and every sixth industrial worker draws his wages from one of the 500 manufacturers of parts and components for the automobile, rail, or aerospace industries or shipbuilding.

Nevertheless, the MMA sector in South Westphalia faces several challenges:

Globalisation I. More than 50% of the sector's industrial output is exported, and the industry is vulnerable to changes in international competition such as competition from low-cost countries, infringement of IPR rights, and imitations.

Globalisation II. If the industries of the sector's customers offshore activities to Asia, the SME structure will be put under pressure since proximity to clients and customers is necessary and difficult to maintain for SMEs.

Demography and competences. All technical occupations are challenged to attract enough young people to the industry to maintain the workforce at the present level.

Living conditions in South Westphalia must be attractive to the workforce; social capital and cultural activities are important parameters in this context.

In the current economic crisis, banks appear to be critical of the business opportunities of the MMA sector and do not seem to appreciate the value of the sector as a supply sector to most other sectors.

The German Association for the Steel and Metal Working Industry (Wirtschaftsverband Stahl-und Metallverarbeitung - WSM) observes several key areas where the South Westphalia region needs to meet the challenges.

The first key area is networking. According to WSM, an appropriate policy measure is to provide an enhanced knowledge infrastructure. This involves networks of educational institutions and dissemination of information and knowledge – all actions to improve the overall framework for doing business without interfering directly with the price mechanisms. Investments in high-level R&D are important as well, since most SMEs do mostly not have the necessary R&D resources. However, the competitive edge is gained through soft side innovations in which lifelong learning is a central means. Vocational education institutions and training institutions are in a central position for maintaining the competitiveness of South Westphalia, because they can collaborate with the sector in a strategic partnership to ensure the ability of the sector to maintain continuous innovation through both formal and non-formal learning measures. In areas with a high concentration of companies sharing the same technologies and characteristics inter-sector mobility of a skilled workforce also constitutes a key feature in innovation. A task for local governments could be to support the building of networks and collaboration and exchange between schools, colleges, universities, and companies.

The second key area is the service sector. Industry dominates in South Westphalia, but many industries are extending their business with services. According to WSM, services have a huge growth potential. One study from the German Federal Statistical Office shows that about 40% the total industry budget is allocated to purchasing services such as research and development of personnel services, marketing, sales, reorganisation of work processes, and transport and logistics. It would be easy to transpose these findings to the South Westphalia metal industry.

The third key area is an ample long-term supply of well-trained professionals. This requires initiatives right from the kindergarten years. To promote the industry, the South Westphalia employers' organisations have developed the project "Miniphänomena" with

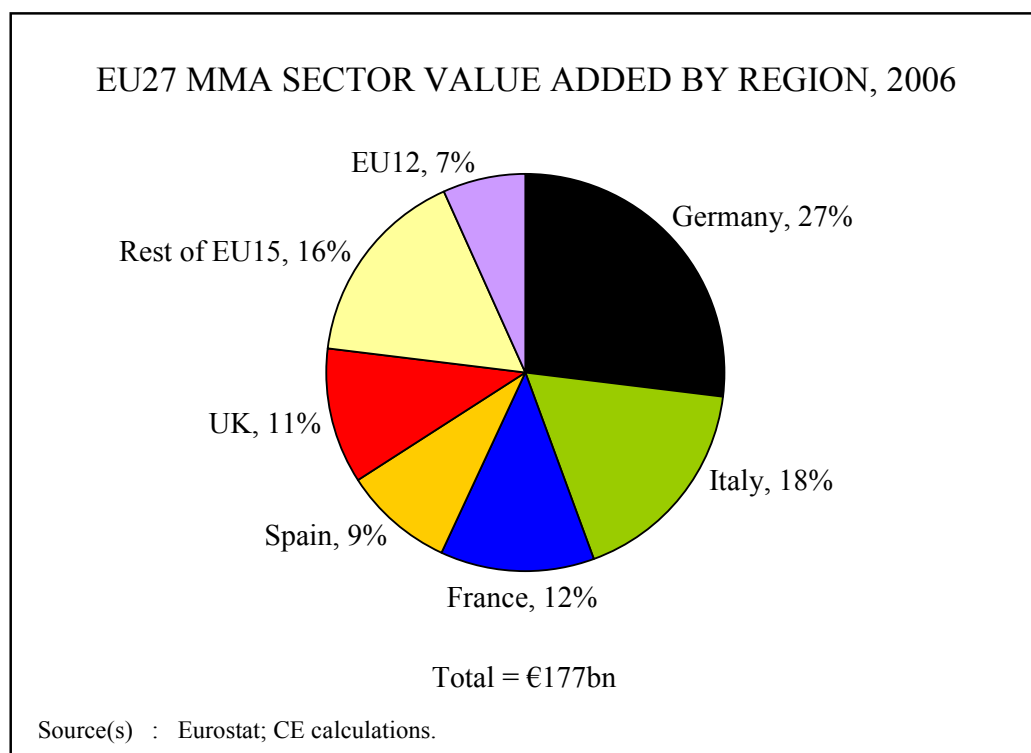
experiments to spur children's interest in science and math. The sector collaborates with several tertiary education institutions which play a central role in providing the sector with a well-trained workforce. This collaboration involves the University of Applied Sciences South Westphalia in Hagen, Meschede and Soest, the new University Lippstadt-Hamm, which offers courses in "Mechatronics" and "Energy and Resource Optimization", and the University of Siegen with its economic and scientific fields as well as BiTS, Business and Information Technology School. Additionally, the employers' associations have a training institution financed entirely by their customers in the medium-sized industry.

The fourth key area is the existing collective bargaining system between the labour unions and the employers' organisation. The collective bargaining process allows the unions and the organisations to negotiate wages, holidays, hours, and working conditions in the MMA sector. The government's influence in these areas is minimal.

Finally, the policy strategy at regional, national or EU level should be to provide a strong framework. According to the WSM, policy makers must work to provide an even playing field with non-EU competitors.

#### Distribution of the MMA sector by region

Chart 2.7 EU27 MMA sector value added by region, 2006

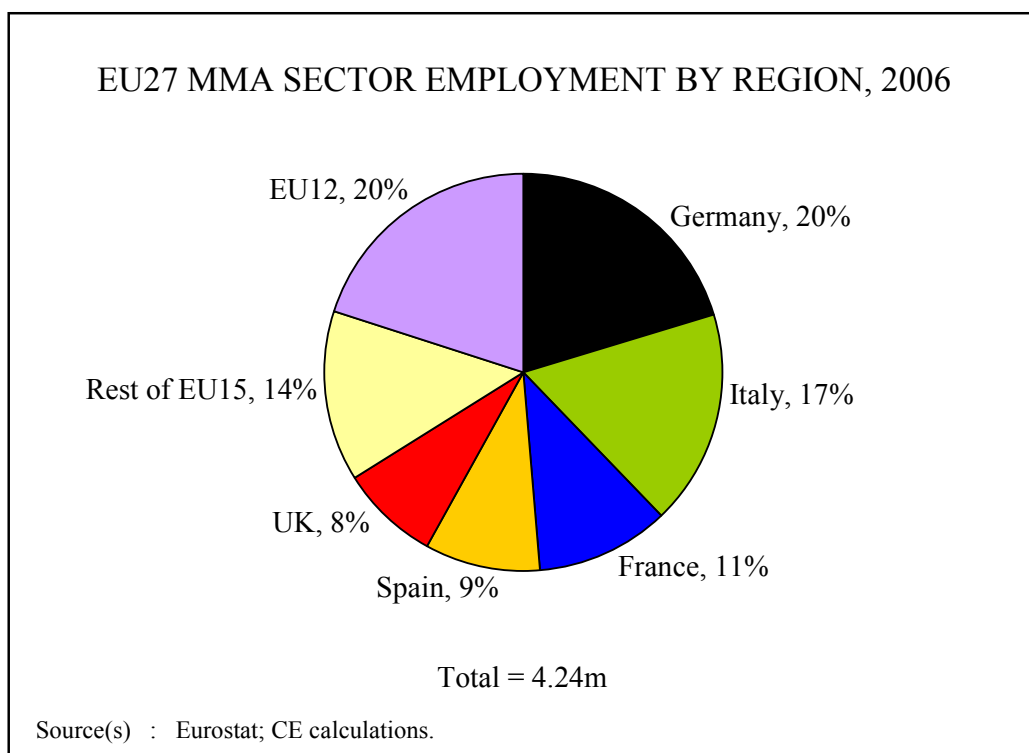


There are some similarities between the distribution of employment and output across the EU27. The vast bulk of employment is concentrated in France, Germany, Italy, Spain and the UK, which together accounted for two-thirds of employment in the MMA sector

in the EU27 in 2006. However, a key difference is that the newer Member States that make up the EU12 accounted for a larger share of employment in the MMA sector: 20%, indicating a relatively more labour-intensive process in the EU12. As a result, the remaining ten Member States of the EU15 accounted for 14% of employment in 2006.

With around 860,000 people employed in its MMA sector in 2006, Germany accounts for the largest share of employment (20%), followed by Italy on 17%. France, the UK and Spain all have 8-11% each, while the Benelux countries account for around 4¼% of those employed by the EU MMA sector. Among the EU12, Poland and the Czech Republic employ the most, and in fact employ more than the Benelux countries. The MMA sector employed around 302,000 in Poland and 186,000 in the Czech Republic in 2006. This means Poland and the Czech Republic accounted for roughly 7% and 4½% of total employment in the EU27 respectively in 2006.

Chart 2.8 EU27 MMA sector employment by region, 2006



The distribution of output and employment in the MMA sector across the EU27 is given in more detail in Table 2.4 below, which picks up on the variations and differences across and between countries.

It shows, for example, that the EU12 countries are more labour intensive than their EU15 counterparts. Romania, for example, accounted for just ½% of MMA output in the EU27 in 2006, but accounted for just over 2½% of employment. Indeed, for all the newer Member States of the EU12, the share of employment in the MMA sector was larger than the share of output in 2006. In contrast, in the EU15 the share of employment in the

MMA sector was smaller than the share of output in 2006 (except for Greece and Portugal). Furthermore, it is also the case for most of the EU12 Member States that given their share of MMA output, they account for a smaller share of value added and a larger share of the number of enterprises. It suggests that there is scope for further consolidation and rationalisation in MMA sector in the EU12 (compared to the MMA sector in the EU15).

Despite this, the table also shows that the MMA sector in some Member States of the EU12 is sizeable and compares to the MMA sector in other Member States of the EU15. Poland, for example, was responsible for 3% of output and 7% of employment in 2006, while the Czech Republic was responsible for 2% and 4½% respectively. Hungary accounted for 2% of total MMA employment in 2006. This compares to a 2½-2¾% share of output and a 1¾% share of employment in both Belgium and Austria in 2006, and a 3½% share of output and 2½% share of employment in the Netherlands.

The table also indicates some differences between countries in the EU15. In Germany, France and the UK, for example, the shares of employment and the number of enterprises in the whole MMA sector were smaller than the shares of output or value added. In contrast, Spain, Italy and Portugal all saw shares of employment and the number of enterprises in the whole MMA sector exceed the shares of output or value added. While some of these variations between regions are likely to be explained by differences in the composition of the MMA sector, they do also suggest some scope to raise efficiency and productivity in some regions, and narrow the variations in performance.

Table 2.5 Detailed geographic overview of the MMA sector in 2006

<b><u>DETAILED GEOGRAPHIC OVERVIEW OF THE MMA SECTOR IN 2006</u></b>	
	<b><u>% share of EU27 MMA sector</u></b>

	<u>Number of enterprises</u>	<u>Output</u>	<u>Value added</u>	<u>Employment</u>	<u>Persons per enterprise</u>	<u>Labour productivity (€000)</u>
Belgium	1.6	2.5	2.2	1.7	11	55.9
Bulgaria	0.9	0.2	0.1	1.1	12	4.6
Czech Rep.	8.5	2.1	1.7	4.4	5	16.5
Denmark	1.1	1.3	1.5	1.2	11	55.0
Germany	9.5	24.6	26.9	20.3	22	55.3
Estonia	0.2	0.2	0.1	0.3	16	15.7
Ireland	0.1	0.4	0.4	0.3	23	50.2
Greece	3.6	0.9	0.9	1.0	3	38.2
Spain	10.8	9.4	8.9	9.4	9	39.6
France	7.5	13.0	12.5	10.8	15	48.1
Italy	24.1	19.7	17.6	17.5	8	41.8
Cyprus	0.3	0.1	0.1	0.1	4	29.6
Latvia	0.2	0.1	0.1	0.2	15	10.4
Lithuania	0.4	0.1	0.1	0.5	13	9.1
Luxembourg	0.0	0.2	0.2	0.1	22	71.4
Hungary	2.4	0.8	0.6	1.9	8	13.2
Netherlands	2.0	3.6	3.3	2.4	13	56.7
Austria	1.1	2.6	2.8	1.8	18	64.5
Poland	7.5	3.0	2.6	7.1	10	15.2
Portugal	4.4	1.0	1.0	2.1	5	19.0
Romania	1.6	0.6	0.4	2.6	17	6.7
Slovenia	1.1	0.6	0.6	0.9	8	25.4
Slovakia	0.3	0.4	0.3	0.9	27	14.3
Finland	1.2	1.4	1.5	1.2	10	54.2
Sweden	2.9	2.5	2.6	2.1	8	52.4
UK	6.9	8.8	11.0	8.2	12	55.7

Note(s) : Data for Malta were unavailable.  
Source(s) : Eurostat; CE calculations.

### 2.4.3 Cluster study: Basque country (Spain)

#### Typical MMA companies in the Spanish Basque Country:

<p><b>CIE Automotive Group</b> was found in 1997 (Egana). It has grown through mergers and acquisitions and is now represented in 13 countries with 13,000 employees and 51 plants, the majority in Bilbao. The group specialises in managing high-value added processes. Their main business is being a supplier of components and subassemblies to the global automotive industry, working with complementary technologies (aluminium, forging, metal, plastics and steel) and a number of associated processes (machining, welding and assembly).</p> <p><a href="http://www.cieautomotive.com/">http://www.cieautomotive.com/</a></p>	<p><b>Tecnichapa</b> was founded in 1982 as part of the <b>Ormazabal Group</b>. Its main goal is to provide solutions to its customers with products related to sheet metal precision parts. The company manufactures articles for industries such as aeronautics, IT and telecommunications for which precision is the most important requirement. Tecnichapa designs and manufactures high-end demanding metallic components for avant-garde markets.</p> <p><a href="http://www.tecnichapa.com/en/index.php">http://www.tecnichapa.com/en/index.php</a></p>
<p><b>Construcciones y Auxiliar de Ferrocarriles (CAF), S.A.</b> dates back to 1860. It is now one of the international market leaders in the design, manufacture, maintenance and supply of equipment and components for railway systems, including</p>	<p><b>F. y A. 2000, S.L.</b> was formed in 1993 and is specialised and consolidated in sheet metal forming and fabrication, complete industrial assembly and all kind of piping in carbon steel, stainless steel and iron. Their clients are mainly in the north of Spain</p>

railroad cars and locomotives, as well as variable gauge axles that can be fitted on existing trucks or bogies. The client base is global.  Employees: approx. 2,000 (2005) Turnover: €680,000m (2005)  <a href="http://www.caf.net/ingles/home/index.php">http://www.caf.net/ingles/home/index.php</a>	and mainly local.  Employees: App. 40 Turnover: €1.5m – 3.0m  <a href="http://www.fya2000.es/">http://www.fya2000.es/</a>
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### Backbone of the Basque manufacturing industry

The metal sector has always been the backbone of the Basque manufacturing industry through supply to the rail and shipbuilding industries. Today the metal sector is important for the primary and territory sectors as well as being a supplier of goods and services to the entire manufacturing and construction industries. Basque MMA companies depend on sectors such as transport (aviation, rail, shipbuilding, automotive), but also energy, agribusiness, and chemicals. It comprises a large number of associated sub-sectors, including:

- Machine tools
- Steel
- Metallurgy
- Mechanical industry
- Casting
- Plumbing
- Recycling of mechanical equipment

Like in many other regions, a market characteristic of the MMA sector is its tendency to locate products in market niches with high added value as labour intensive production to a large extent has been off shored to countries with lower labour costs.

One of the reasons for the success of the Basque MMA sector has been the long and focused support from the public authorities.

### Policy commitment to the MMA sector in the 1980s

Industrial activities were traditionally centred on steel and shipbuilding, mainly due to the rich iron ore resources found during the 19th century around Bilbao. The Estuary of Bilbao was the centre of the Basque industrial revolution during the 19th and the first half of the 20th century. These activities declined during the economic recession of the 1970s and 1980s, giving rise to the development of the service sectors and new technologies.

The situation in the Basque Country has changed dramatically since the 1980s when the infrastructure was outdated, unemployment levels were sky high at 25%, and the economy was based on the declining iron and steel sectors. The major policy challenge in the 1980s was whether to leave the traditional declining industries to the free market or intervene through public funding. The Basque Country decided to support the traditional industries through a ‘3-R-model’ (rescue, restructuring, and strategic reorientation of enterprises).

The Basque Country hired the cluster expert Michael Porter to identify a number of strategic clusters in 1988, and in 1992 the machine tool cluster emerged. The cluster

approach has been of great importance to the machine sector (and other identified clusters), not least because of the government's commitment. The cluster approach has created a strong network and trust between the machine tool companies and related industries. The latter is seen as the acknowledgement of all the advantages that make Spanish machine tools sector a highly competitive product supplier. Major flexibility in adapting to the specific requirements of each customer, sector and application as well as an excellent ratio between productivity and the return on investment is seen as a main competitive advantage.

The MMA sector also has an excellent network of technology centres and continues to enjoy the support of the regional public authorities.

Foreign-owned companies have a relatively large presence in the region. Previously foreign-owned companies located in the region due to costs advantages, local government support and subsidies to the MMA sector also played a role, and finally the progressive concentration of industry groups that could deliver complete products (especially within the auxiliary automotive industry, aeronautics and energy) was a factor.

#### The machine tool sector

The Basque region is the third largest producer of machine tools in the European Union. The region plays a key role in the economy's most important manufacturing sectors such as the automotive industry, aeronautics and aerospace, power generation, railways, capital goods, moulds and dies, etc., with 60% of production destined for international markets.

The need to compete in foreign markets has been a decisive factor in encouraging local enterprises to work towards developing their own technologies and creating a broad range of products with embedded flexibility and adaptability make them highly competitive in the face of changing demand. A large number of customers of the Basque machine tool sector are multinationals and other large companies from highly demanding sectors such as the aerospace and automotive industries.

One of the fundamental reasons for the success of the Basque machine tools sector is its commitment to innovation and technological development of the involved companies. According to the manufacturers' association AFM (with headquarters in the Basque technology park in Miramón in San Sebastian) the manufacturers channel 5% of their turnover into these activities. This is the key to their competitiveness.

The efforts of companies are reinforced by schemes such as the Machine Tool Industrial Research Foundation (Invema) which encourages development, offers technological services and promotes inter-company and auxiliary management programmes. Basque manufacturers are assisted by a series of specialised technology centres so to meet the challenges and opportunities posed through continuing innovation. One example of this initiative is the Fatronik System<sup>6</sup> a group formed by 14 manufacturers for joint work in technology, training and promotion.

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<sup>6</sup> <http://www.fatronik.com/>

Training is a fundamental aspect of the competitiveness of Basque companies in the machine tool sector. The IHM<sup>7</sup> (Machine Tool Institute) plays an important role. AFM chairs the institute board, and public institutions, manufacturing and user companies, trade unions, etc., also participate. The IMH promotes technological training and the dissemination of technological knowledge. In the beginning it focused its activities exclusively in the Basque Country, but other Spanish autonomous communities have gradually shown interest in its services and training programmes. For the last few years technicians from South East Asia have been welcomed by the Institute and projects are carried out in collaboration with Latin American countries. Thanks to its technical training courses for the metal and mechanics industries, the IMH is today a frontrunner in the professional training network in the Basque Country.

#### *Sub-contracting*

In 2005, Eusko Ganberak, the Basque chamber of commerce, carried out an in-depth study of the sub-contractors in the Basque Country.<sup>8</sup> The main activities of the Basque subcontracting sector are related to the MMA sector. According to the study, in 2005 casting involved 156 companies employing 8,643 workers (these companies have made great efforts to invest in an attempt to counteract fierce competition from countries with low labour costs) involving:

343 companies and 8,005 employees that offer services including drop-forging, stamping and deep-drawing of metals and powder metallurgy, consisting of (these companies found themselves in a situation of great uncertainty);

2,003 companies and 14,240 employees engaged in metal treatment and coatings and general mechanical engineering (in the case of metal treatment and coatings, the situation was unfavourable, while general mechanical engineering was in a stable situation, although with a lack of specialised labour);

The coating subsector, an activity that requires some proximity to clients, with 1,148 companies and 12,715 workers, which has benefited from a more favourable situation;

The metal construction subsector which expected a slight growth.

The sub-contracting 'sector' study shows that the MMA sector is facing challenges but also that the sector has a strong presence in the region.

#### SWOT analysis and possible scenarios

The table below shows the current situation of the MMA sector in the Basque Country.

**SWOT table for the MMA sector in the Basque Country**

Strengths	Weaknesses
High level of expertise	Upstream and downstream
Good competitive position	squeeze (not final producers)
High degree of flexibility and	Generally small businesses and

<sup>7</sup> <http://www.imh.es/>

<sup>8</sup> <http://www.camaradealava.com/subcontratacion/estudiopaisvasco03.pdf>



<p>adaptability to change</p> <p>Strong network of technology centres</p> <p>Strong support from public authorities</p>	<p>lack of large companies</p> <p>Weak tradition of business cooperation</p> <p>Weak financial position</p>
<b>Opportunities</b>	<b>Threats</b>
<p>Growing market in large countries like Brazil, India, China</p> <p>Further internationalisation of local companies</p> <p>Reach of higher niche markets through higher technological input (higher margins)</p> <p>Explore a strategic partnership with the Innobasque organisation<sup>9</sup></p>	<p>Competition from low-cost countries might lead to loss if labour intensive production</p> <p>Reduction in consumption in leading European products (household, automotive, appliances, etc.)</p> <p>Entry into EU-countries (New Member States) with similar industrial traditions, but lower wages.</p>

Given the conditions mentioned above, the best and worst case scenarios are presented below.

#### *Best case scenario*

A strategic partnering with Innobasque accelerates the adaption to production of metal goods whose final destination is the consumer with their own brands located in the high technology market.

#### *Worst case scenario*

Large companies (clients) move their investments and purchases from the Basque Country to Eastern European countries, Northern Africa, and Asia.

#### *Policy recommendations*

In order to support the Basque MMA sector, the sector needs:

Heavy investment in R&D - machinery and training is needed;  
 Support to participation in R&D and workforce development;  
 Funding and increased access including knowledge about existing financing regimes;  
 International relations (network);  
 Capacity-building and technical assistance to target new international markets and deployment of new technologies

The Innobasque Initiative<sup>10</sup>, with a broad involvement of partners relevant to driving innovation in the region and launched in 2008, could be the lever needed for the MMA sector transformation in the region. In support of such a process, it is central that the MMA sector at a regional level together with leading partners in the Basqueinno organisation, which type of actions and forms of collaboration can be formed in partnership with the Basqueinno organisation to realise the overall vision of the basque

<sup>9</sup> <http://www.innobasque.com/home.aspx?tabid=476>

<sup>10</sup> <http://www.innobasque.com/home.aspx?tabid=476>

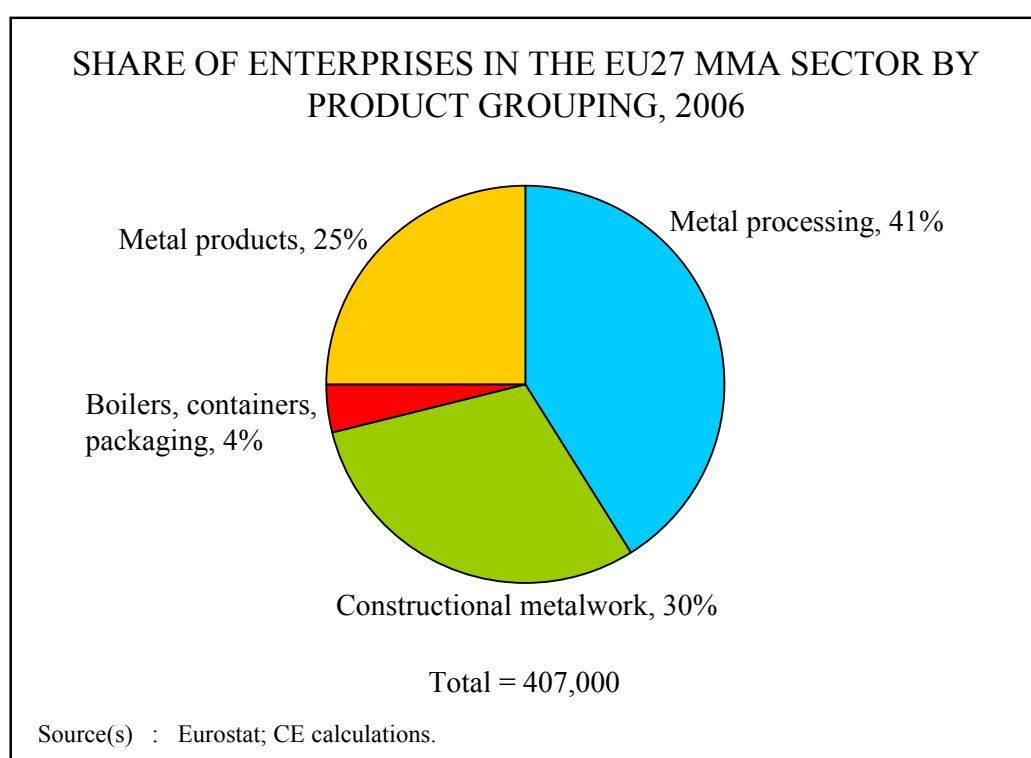
region bearing a leading edge innovative region in 2030. At the same time it will be important to identify concrete indicators of progress to track progress.

#### 2.4.4 Distribution of the MMA sector by product grouping

An analysis of the MMA sector by the product groups presented in section 2.1 provides the following understanding of the distribution of output and employment.

Of the roughly 407,000 enterprises operating in the MMA sector in the EU27 in 2006, just over 40% were engaged in metal processing activities (castings; forgings; treatment of metals). Metal products (tools, finished metal goods and general hardware) (104,000 enterprises) and constructional metalwork (122,000) accounted for 25% and 30% respectively, the sub-sector engaged in the production of boilers, containers and packaging (BCP) was home to just 4% of all enterprises in the MMA sector.

Chart 2.9 Share of enterprises in the EU27 MMA sector by product grouping, 2006



The distribution of output across the product groups follows a similar pattern. Metal processing accounted for 40% of all MMA output in the EU27 in 2006. Metal products and constructional metalwork each accounted for 24%, while around 12% of output was attributable to the boilers, containers and packaging (BCP) sub-sector. The chart for value added shows a virtually identical breakdown.

Chart 2.10 EU27 MMA sector output by product grouping, 2006

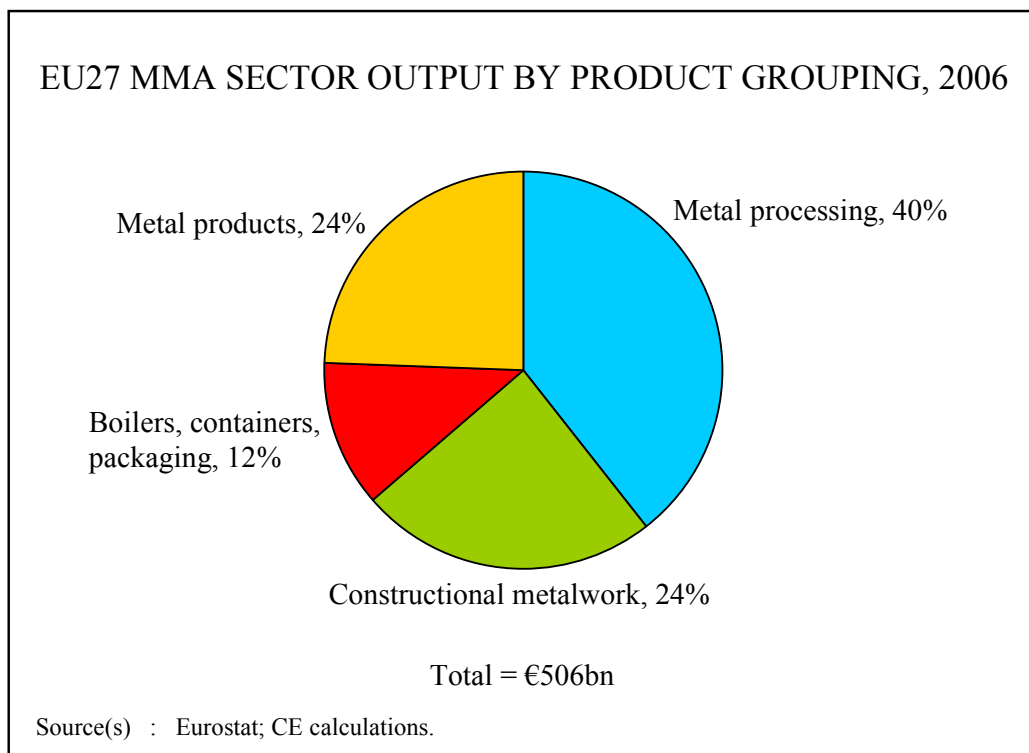
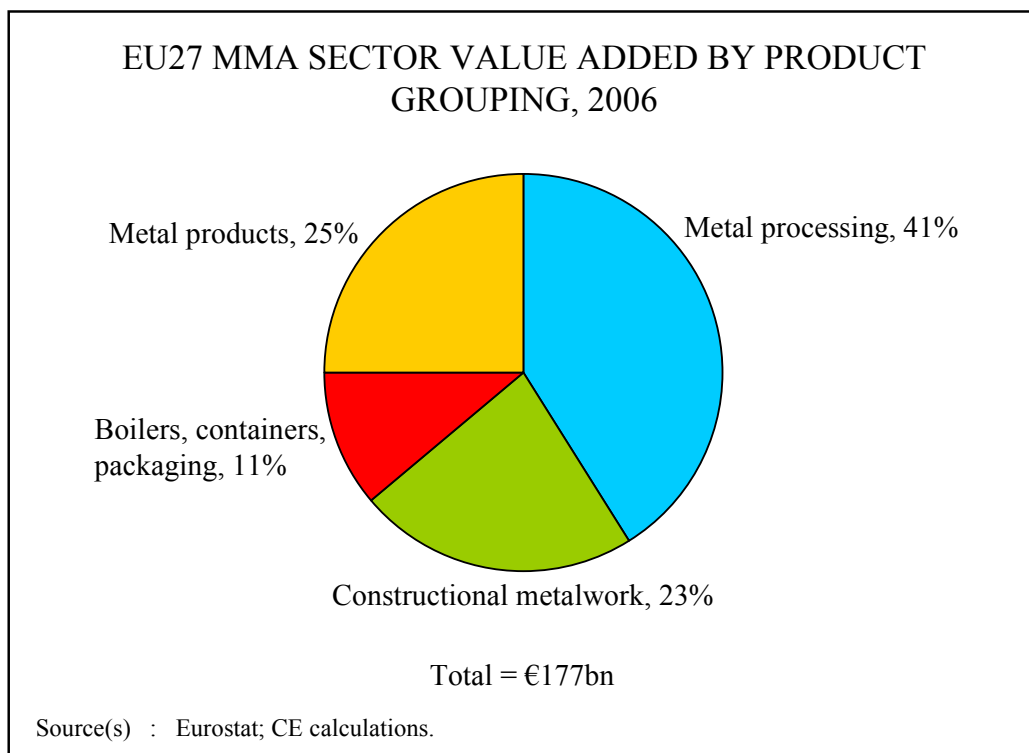
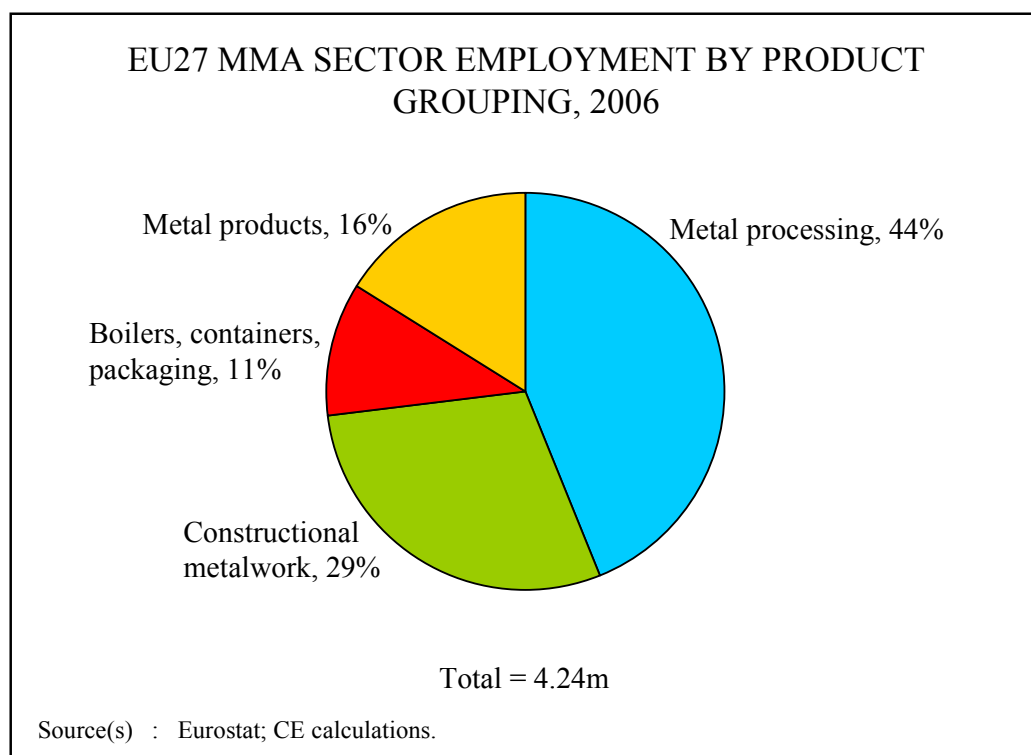


Chart 2.11 EU27 MMA sector value added by product grouping, 2006



The distribution of employment deviates more noticeably from the distribution of output, although the ordering of the product sub-sectors does not change. Metal processing remains the dominant sub-sector, accounting for 44% of employment in the MMA sector in 2006, while the boilers, containers and packaging sub-sector continues to have the smallest share, 11%. Metal products and constructional metalwork are in-between, on 16% and 29% of employment in the MMA sector respectively.

Chart 2.12 EU27 MMA sector employment by product grouping, 2006



These findings on output and employment highlight the dominance of metal processing in the MMA sector. Metal processing accounts for roughly two-fifths of the MMA sector, by whatever measure. They also indicate the relatively smaller contribution of the sub-sector producing boilers, containers and packaging, which accounts for just 11-12% of output, value added or employment. Metal products and constructional metalwork lie in-between these other two sub-sectors and their importance (or weighting) is equal with regard to output or value added. However, a slighter greater proportion of enterprises are engaged in constructional metalwork. At the same time, constructional metalwork also employs a far greater number of people than metal products, almost double.

At this early stage, these findings indicate differences in the performances of each sub-sector and scope for potential improvement in some. The metal processing sub-sector accounts for around two-fifths of output with a similar share of the number of enterprises and a slightly larger share of employment. Similarly, constructional metalwork generates just under a quarter of output but accounts for 30% of the MMA workforce and all MMA enterprises. In contrast, the BCP sub-sector generates 12% of output with a similar share of employment and a much smaller share of the number of enterprises (4%). The metal products sub-sector, meanwhile, appears to make good use of its labour with its share of

output noticeably larger than its share of employment. The BCP and metal products sub-sectors, therefore, appear relatively more efficient compared to metal processing or constructional metalwork. This suggests some scope for consolidation in the metal processing and constructional metalwork sub-sectors through reducing the number of enterprises and employees, or scope for increased investment to raise labour productivity.

Interview responses from MMA firms revealed:

*Production reallocation outside the EU*

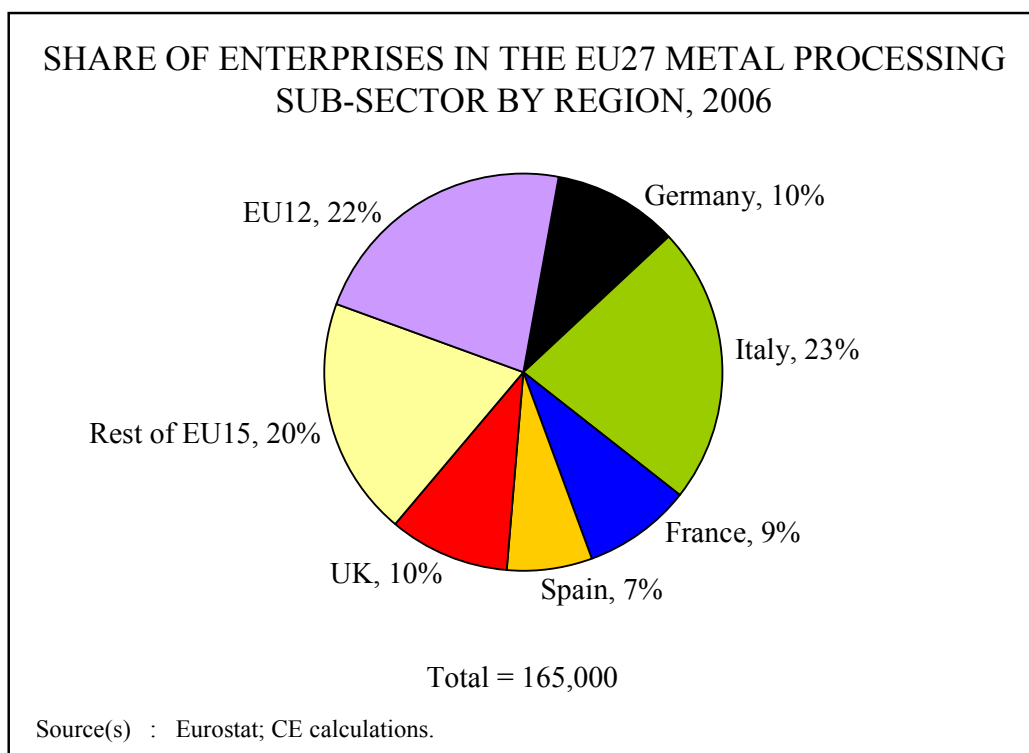
*Of the five companies who responded on this, only two have not transferred any of the production outside the EU. China appears to be the country of choice when transferring production, but Turkey, India, Brazil and the US have also been named. The reallocation of production, however, has led to little or no transfer of R&D activities.*

#### 2.4.5 Distribution of product groups by region

*Metal processing*

Of the roughly 165,000 enterprises engaged in metal processing across the EU27 in 2006, just under a quarter were located in Italy.

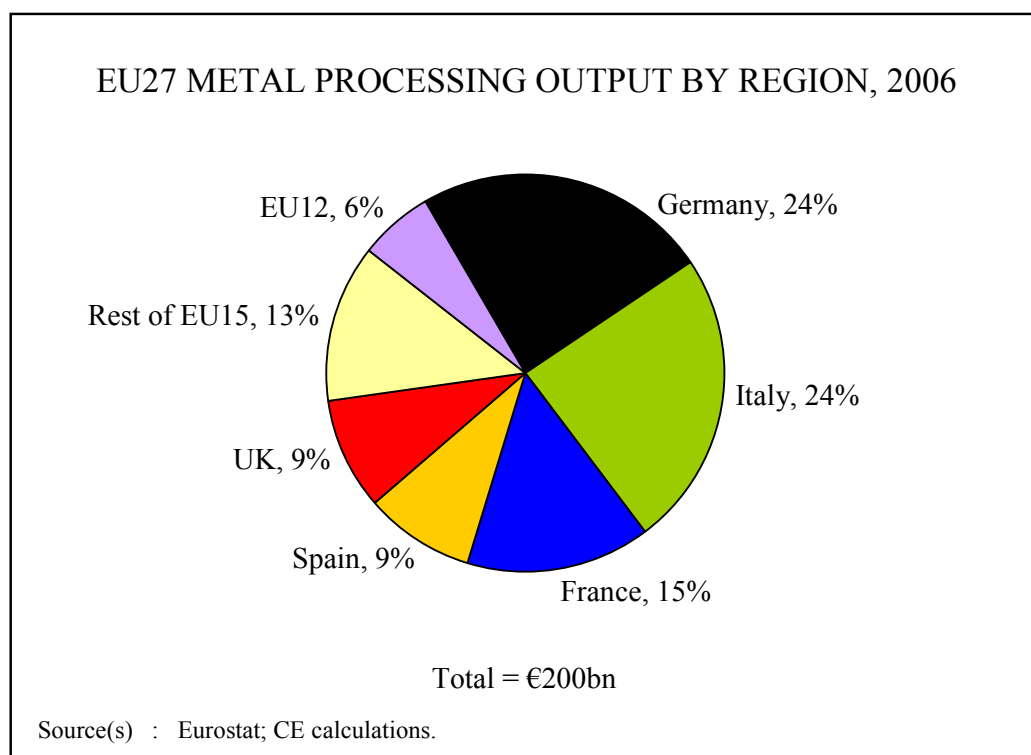
Chart 2.13 Share of enterprises in the EU27 metal processing sub-sector by region, 2006



Germany, France, Spain and the UK all accounted for 7-10% each. The rest of the EU15 accounted for 20% of all metal processing enterprises in the EU27, with the Benelux countries accounting for just under 5% combined. Among the Member States of the EU12, Poland and the Czech Republic had the largest shares, with 10% and 6% of all metal processing enterprises. While, for some regions, these shares translated into similar shares of output and employment, this was not the case for all. For example, although the EU12 was home to 22% of all metal processing enterprises, it accounted for just 6% of all metal processing output in the EU27 in 2006.

Italy and Germany accounted for the largest share of metal processing output in 2006 (€200bn), with around 24% each. With France accounting for 15% and Spain and the UK generating 9% of output each, the EU5 (France, Germany, Italy, Spain, the UK) accounted for over 80% of EU27 metal processing output in 2006.

Chart 2.14 EU27 metal processing output by region, 2006



The regional distribution of value added was very similar, with regions' shares varying from output shares by just 1-3 pp. Germany accounted for the largest share of value added (26%), while Spain accounted for just 8%; France, Italy and the UK lay in-between. Of the 5% generated by the EU12, Poland and the Czech Republic were responsible for 70% of it.

Likewise for the distribution of gross operating surplus; except in the case of France, which generated just 8% of the gross operating surplus in metal processing in 2006, compared to 15% of output or value added.

Chart 2.15 EU27 metal processing value added by region, 2006

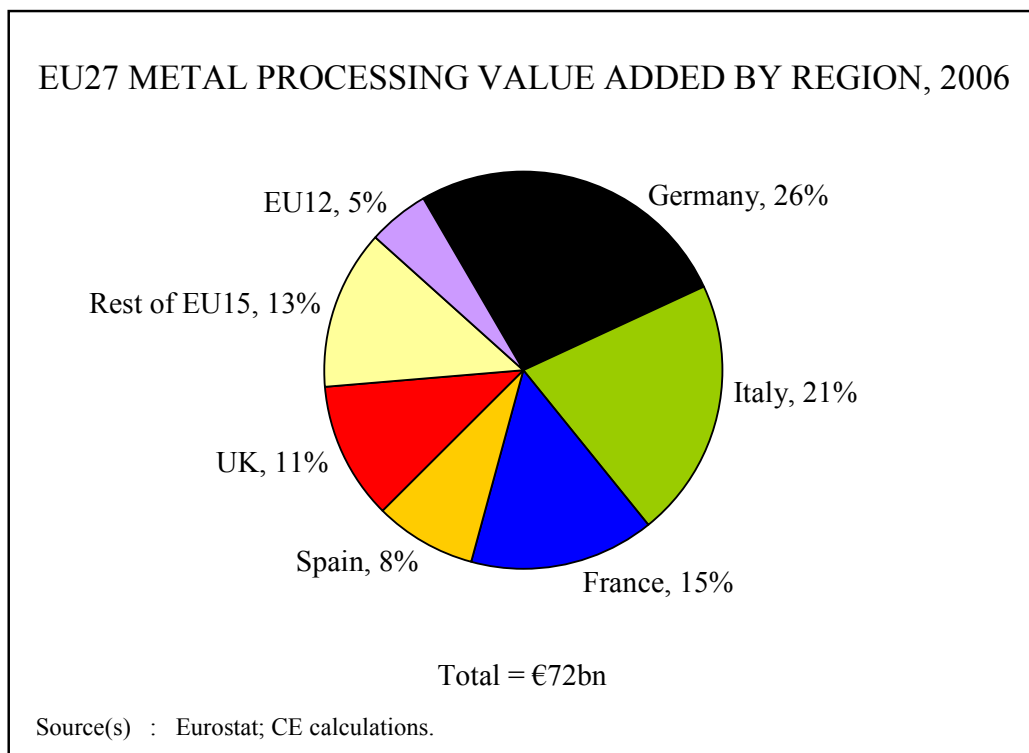


Chart 2.16 EU27 metal processing gross operating surplus by region, 2006

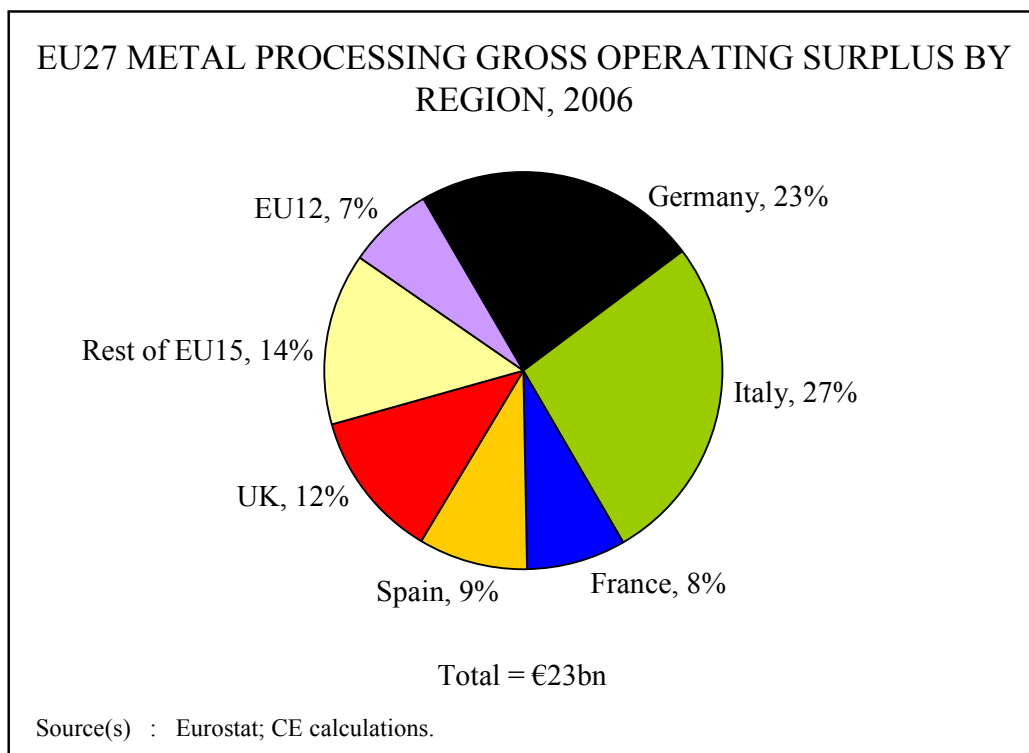
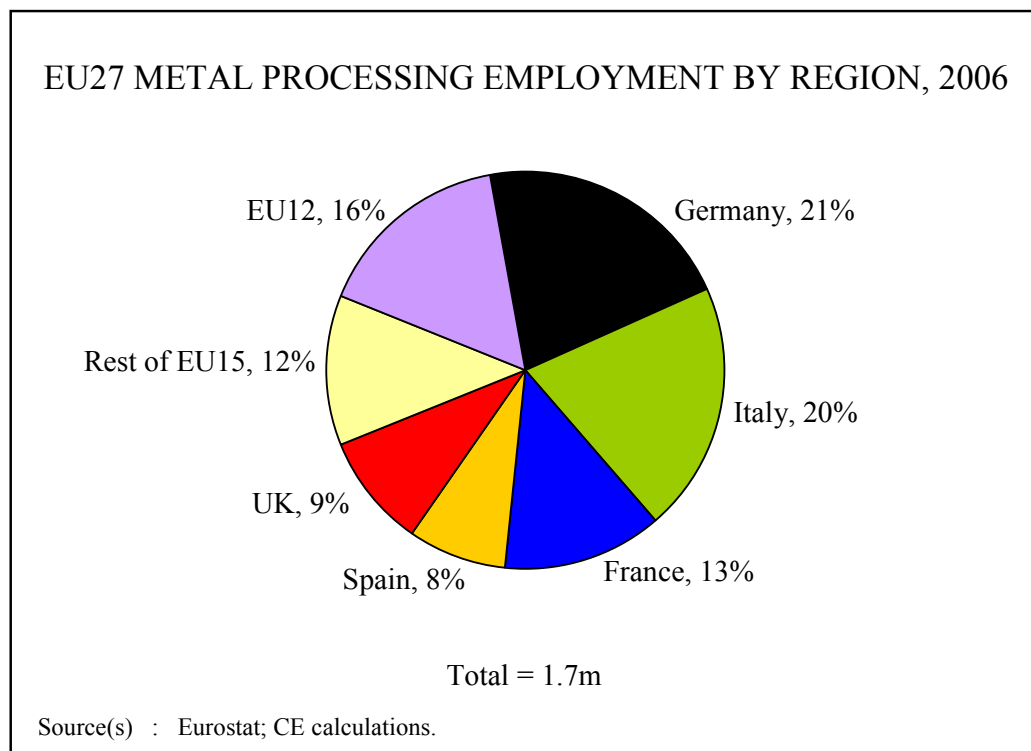


Chart 2.17 EU27 metal processing employment by region, 2006



The production of €200bn of output and €72bn worth of value added in the metal processing sub-sector in the EU27 in 2006 was supported by a workforce of 1.7m. This workforce was distributed along similar lines to output or value added. Germany and Italy were the dominant regions, with 20-21% of total employment each. With Spain and the UK each employing 8-9% of the metal processing workforce, and France employing 13%, the dominance of the EU5 in the metal processing sub-sector is underlined. It accounts for around 80% of output or value added and over 70% of employment.

Within the EU5, Germany and Italy are the dominant Member States. Both of these account for similar shares of output and employment, and although Germany accounts for a higher share of value added, it is Italy that generates the largest share of gross operating surplus, indicative of higher labour costs (and possibly higher skills) in Germany. Furthermore, underpinning these shares of output and employment is the fact that Italy is home to more than twice as many enterprises. Given their virtually identical employment shares, this would suggest that Italian firms in the metal processing are smaller (in terms of number of workers employed) than their German counterparts. But given that the Italian metal processing sub-sector accounts for the same share of output and a slightly larger share of gross operating surplus, there seems to be no suggestion that Italian producers suffer from the disadvantages associated with being smaller (less efficient, smaller economies of scale, higher average costs). A similar comparison can be made between France and Italy: based on their shares of output, enterprises, employment etc, the metal processing firms in France appear to be larger, but although the French metal processing sector generates 15% of output or value added, it accounts for just 8% of the gross operating surplus.



In the EU12, although a 7% share of the gross operating surplus based on a 5-6% of output/value added suggests an advantageous wage differential, there still appears to be a less efficient allocation of resources. The metal processing sub-sector in the EU12 accounts for 22% of enterprises and 16% of employment but generates just 6% of output. In contrast, both Italy and Germany account for around 20% of employment and generate 24% of output; and the metal processing sub-sector in Germany does this with just 10% of all metal processing enterprises in the EU27.

#### *Constructional metalwork*

As with metal processing, Italy is the dominant region with regard to the number of firms in operation. Italy was home to 29% (around 35,000) of the 122,000 firms in the constructional metalwork sub-sector in the EU27 in 2006. Spain was home to the next largest population of constructional metalwork firms, with around 24,000 or 20%. The UK and France both accounted for 4% of all enterprises, while 10% operated in Germany. In total, the EU12 accounted for 15% of all enterprises in the constructional metalwork sub-sector in the EU27, with Poland accounting for 4½%, Hungary 2½% and Romania 2¼%. Together, the Benelux countries were home to 3½% of all enterprises.

Chart 2.18 Share of enterprises in the EU27 constructional metalwork sub-sector by region, 2006

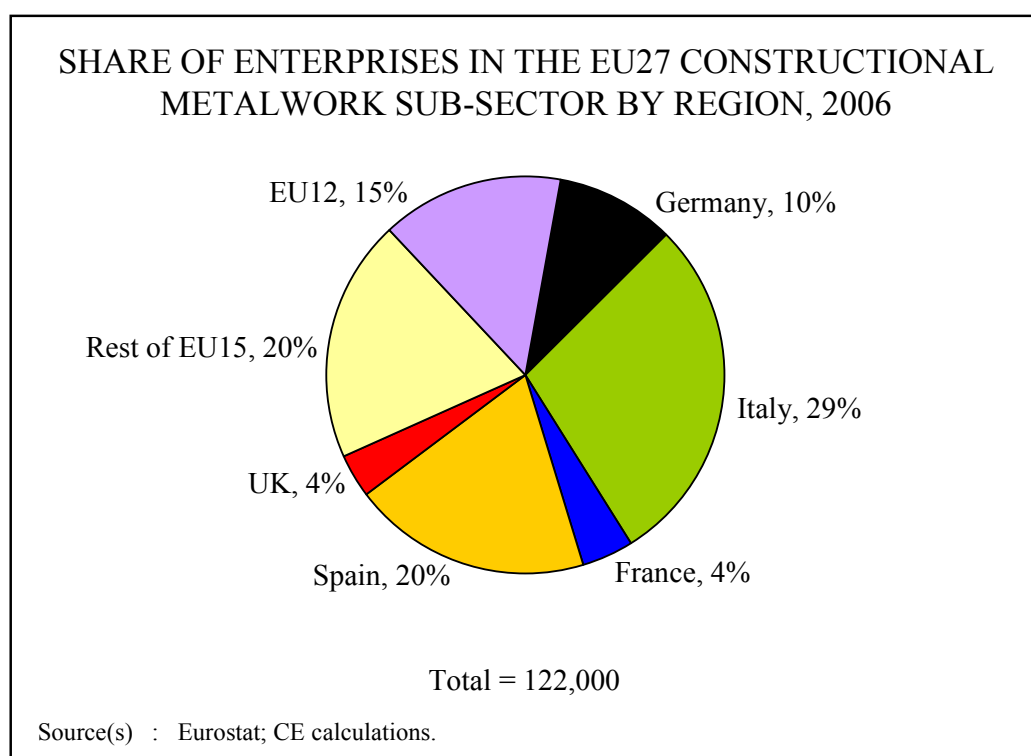
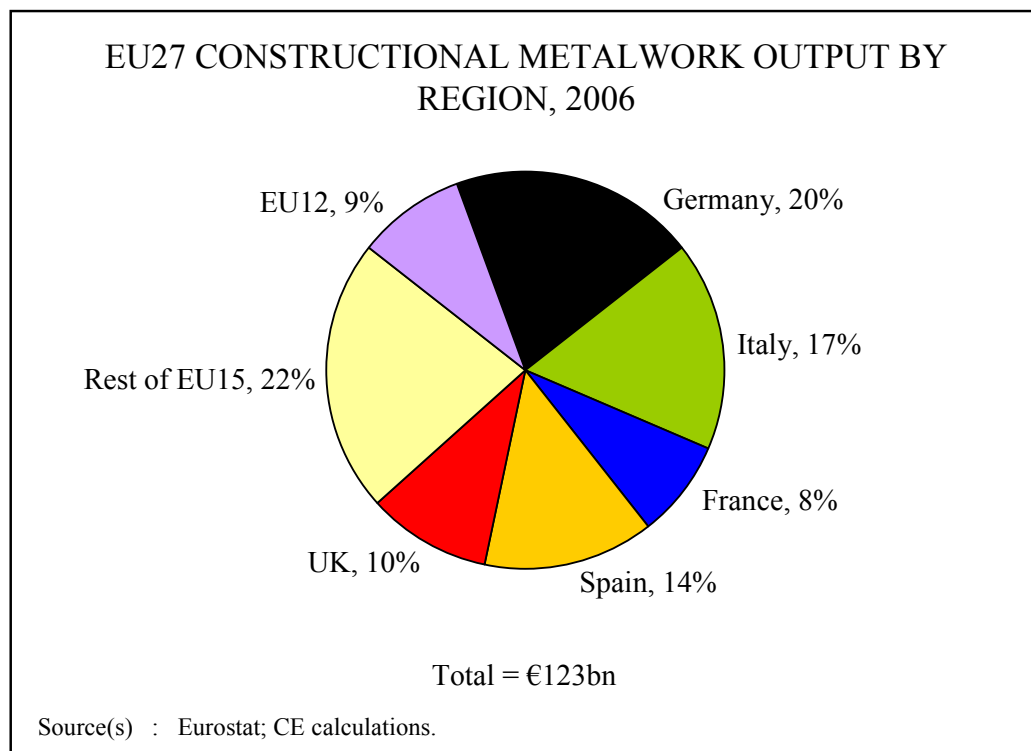


Chart 2.19 EU27 constructional metalwork output by region, 2006



The single biggest producer of constructional metalwork is Germany, which accounted for 20% of all output in 2006. The next largest producers were Italy and Spain on 17% and 14% respectively, with France (8%) and the UK (10%) a little further behind. Consequently, the EU5 accounted for close to 70% of all constructional metalwork output in the EU27. The other Member States of the EU15 were responsible for 22% of output, with the Benelux countries accounting for over 9%. The EU12 accounted for 9% of output. Poland was the main contributor, with 3½% of total output, while Hungary, Romania and the Czech Republic were each responsible for 1-1½% of EU27 output.

The distribution of the value added generated in constructional metalwork is virtually identical, with regions' shares varying by just 1-2 pp from their output shares. Of the €41bn created, the largest share came from Germany (22%). Among the other Member States of the EU15, the Netherlands was responsible for 5¼% of value added, while Belgium and Austria were each responsible for just over 3%. Exactly 3% of all value added generated in the EU27 came from Poland, which remained the main contributor from the EU12; the Czech Republic, Hungary and Romania each created ¾-1% of value added.

Chart 2.20 EU27 constructional metalwork value added by region, 2006

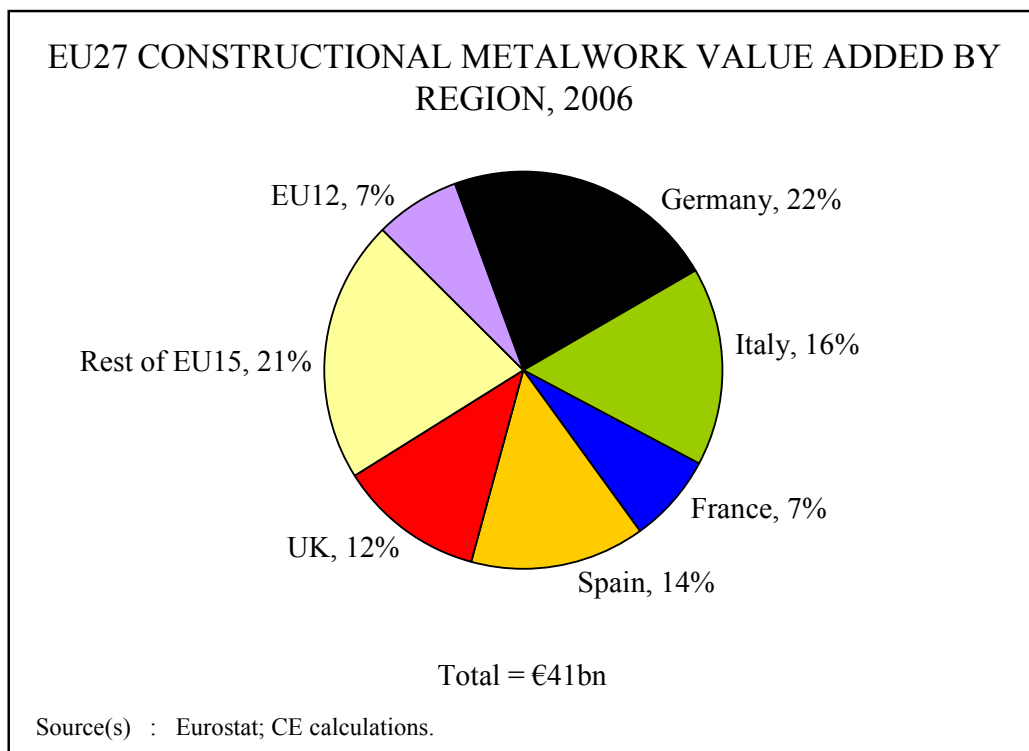
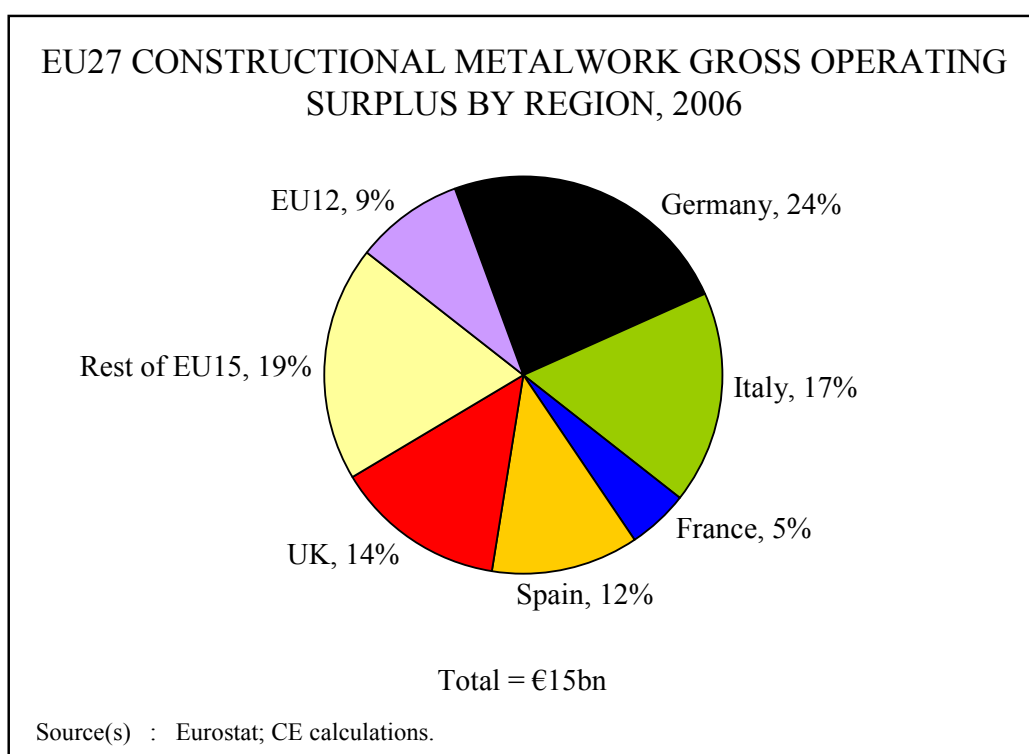
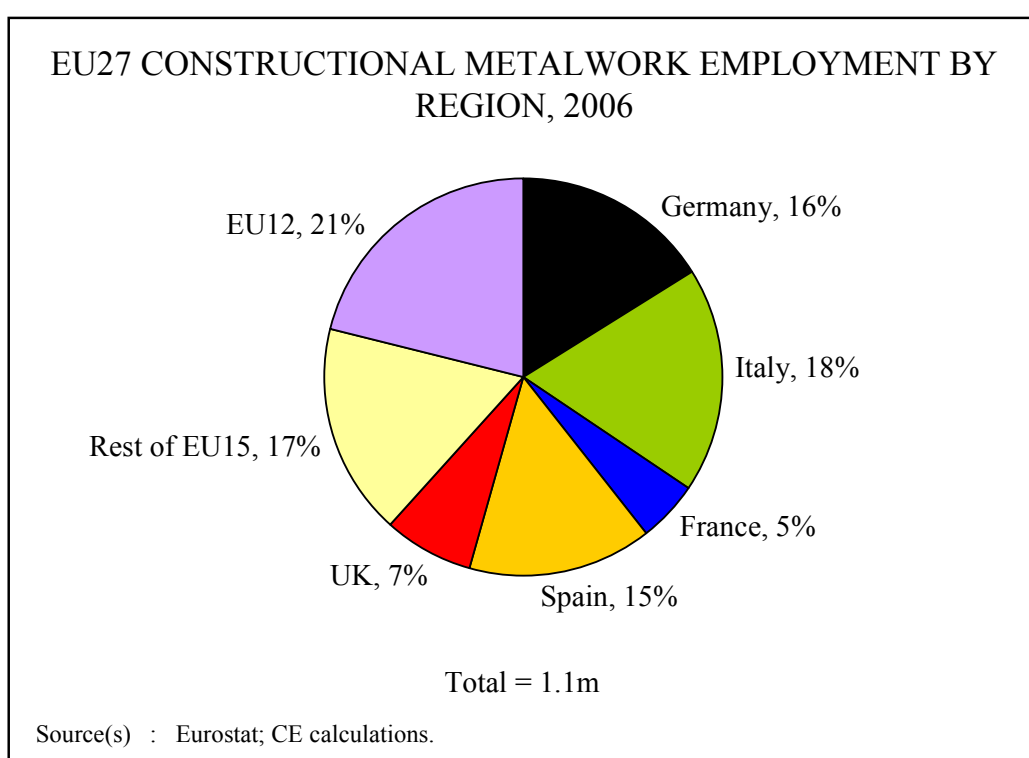


Chart 2.21 EU27 constructional metalwork gross operating surplus by region, 2006



Once labour costs had been paid, a gross operating surplus of €15bn remained. The distribution of this across the regions was similar to the distribution of value added. The shares of Germany and the UK were a little higher (compared to their shares of value added), while those of the French and Spanish constructional metalwork sub-sectors fell a little. The EU12's share of gross operating surplus was also greater than its share of value added. Given its share of employment, this is likely to reflect advantageous wage differentials. In Germany and the UK, however, it is likely to be due to the relatively small size (share) of the workforces compared to the (share of) output/value added created.

Chart 2.22 EU27 constructional metalwork employment by region, 2006



The constructional metalwork sector employed around 1.1m people in 2006, with the largest proportion of these (18%) employed in the Italian constructional metalwork sub-sector. Germany (16%) and Spain (15%) accounted for slightly smaller shares of the workforce. France and the UK employed even smaller shares of the EU27 workforce, just 5-7% each. Among the other Member States that make up the rest of the EU15 the Netherlands and Portugal were each home to 3¼-3½% of the constructional metalwork workforce, while Austria and Belgium were both home to just over 2%. Around 21% of the workforce was employed in the EU12, indicating yet again the comparatively labour intensive nature of production in the EU12; the EU12 accounted for just 9% of output in 2006. Half the workforce in the EU12 was located in just two countries: Poland accounted for 7¼% of the EU27 workforce, while Romania was home to 4½%.

As with metal processing, the data serve to emphasise the dominance of the EU5, which accounts for around 70% of output, value added or gross operating surplus, and around 60% of employment. With the Netherlands, Belgium and Austria added to the EU5, these shares increase to around 80% and 70% respectively. In terms of output/ value added, Germany has the dominant constructional metalwork sub-sector. Italy comes next, with Spain and the UK just behind on roughly equal terms, followed by France with the smallest contribution of the EU5. Within the EU12 Poland and the Czech Republic are the dominant producers, with Hungary and Romania a little behind.

Germany is not only the major producer in this sub-sector, it also appears to make relatively better use of its resources. With just 10% of firms and 16% of the workforce, it accounts for 22% of value added and 24% of gross operating surplus. Similarly, with just 7% of the workforce and 4% of enterprises, the constructional metalwork sub-sector in the UK creates 12% of all value added and 14% of gross operating surplus. In contrast, Italy accounts for 29% of all firms and 18% of the workforce but generates just 16-17% of value added or gross operating surplus. Meanwhile, the constructional metalwork sub-sector in Spain has 20% of all enterprises and employs 15% of the workforce but also creates just 12-14% of all value added or gross operating surplus.

Given each country's share of output, enterprises, employment etc, it appears as if German and British constructional metalwork firms are larger (in terms of numbers employed) than Spanish or Italian firms, such that on this occasion Spanish and Italian firms do suffer from the disadvantages of being smaller (compared to their German or British counterparts). Although firms in the sub-sector in the EU12 also appear to be larger than those in Italy or Spain, they look to be nowhere near as efficient as German or British producers, with just 7-9% of value added or gross operating surplus.

#### 2.4.6 Cluster study: Flanders (Belgium)

##### Facts

Number of MMA companies: 700 (230 members of the industry organisation Agoria) Size of companies: SMEs dominated by very small companies or companies with fewer than 10 - 50 employees Number of employees: 21,000 (status 2008) MMA sector turnover: € 3.7bn (status 2008)
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##### Typical MMA companies in Flanders are:

<b>Galva Power Group.</b> The main activity of the Galva Power Group is hot dip galvanising and colour coating of steel constructions. The group has nine sites in the Benelux area.  Employees: 295 <a href="http://www.zinq.com/">http://www.zinq.com/</a>	<b>Parts &amp; Components (P&amp;C).</b> P&C is a leading first tier supplier of custom-made sheet metal components and assembled modules. The company mainly supplies to truck companies (Daf, Renault/Volvo) and off-road equipment companies (Caterpillar, Mitsubishi, Toyota).  Employees: 171 <a href="http://www.parts-components.be">http://www.parts-components.be</a>
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<p><b>N.V. stewal S.A.</b> is a Belgian tool manufacturing company specialised in the development and manufacture of custom-made tools for mass production. The company is a subcontractor to the automotive, aerospace, nuclear energy, electronics, medicine, mechanical engineering, textile, packaging industry, robotics</p> <p>Employees: 30  <a href="http://www.stewal.com/">http://www.stewal.com/</a></p>	<p><b>Constructiebedrijf Ivens</b> specialises in the design, prefabrication, assembly and transport of storage tanks, pressure vessels, piping and special steel constructions.</p> <p>Employees: 54  <a href="http://www.iven-cb.be/">http://www.iven-cb.be/</a></p>
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SMEs dominate the Flemish MMA sector. More than 80% of the MMA companies have fewer than 50 employees. Most of them supply production capacity (turning, milling, sheet metal work, surface treatment, thermal and chemical treatment, assembly, etc.) to other industries in the region, and only a few companies have their own product (cooking gear, cans, etc.). The majority of the companies supply industries within a 300-kilometre radius including exports to neighbouring Germany, Netherlands and France. The Flemish MMA sector exports nearly 50% of their production.

The two most important client markets for the MMA sector are the automotive industry and mechatronics. The automotive industry is important in Flanders, and several of the leading automotive enterprises – such as Audi, Volvo, Ford and GM - have assembly plants there. The presence of the automotive industry has led to a large number of sub-contracting companies in the MMA sector specialising in welding, cutting, coating, and heat treatment. The mechatronics sector with its manufacturers of agricultural machines (e.g., Case New Holland), machines for the construction industry (e.g., Caterpillar), textile machinery (e.g., Picanol, Van de Wiele), compressors (e.g., Atlas Copco), gears and transmissions (e.g., Hansen Transmissions International, Spicer Off-Highway) is the MMA sector's second biggest client market.

Most of the SME industries employ fewer than 50 people, and many even fewer. The size of the companies has resulted in weak bargaining power vis-à-vis their suppliers (e.g., steel producers) and customers (e.g., Caterpillar, Atlas Copco). The companies are highly skilled, but only an estimated 5% of MMA companies are involved in development and design with their clients.

In Flanders, some 209,000 people are employed in technological industries and 21,000 are employed in the MMA sector. In 2008, the turnover from the technological industries was about €60.1bn and the turnover in the approx. 700 MMA companies was €3.7bn. Many of the smallest companies are family-owned, whereas the medium-sized or large companies are owned as groups of companies since many owners tend to merge their companies.

Knowledge, competences, and innovation are important to companies. However, EU R&D funding is not tailored towards the needs of the MMA sector, according to sector representatives. The result is that only a limited number of the medium-sized companies or large companies have benefitted from EU funds in the past, and most of the very small companies have not benefitted at all. With less than 10 people in a company focusing on day-to-day operational issues, there is often not the internal capacity to target medium-term strategic opportunities such as participating in EU-funded research projects. Most small companies perceive contact with research projects as irrelevant, and their prime knowledge sources are instead local technical colleges. Sirris, the collective research centre for the technological industry ([www.sirris.be](http://www.sirris.be)), plays a role for medium-sized companies as a knowledge broker and as access point to research and consulting in

materials and production technologies. The Belgium Welding Institute ([www.bil-ibs.be](http://www.bil-ibs.be)) is also an important hub of information for Flemish MMA companies.

The sector's strength lies in its flexibility towards its customers, highly skilled workforce, use of new technology and location close to the central European transport system and industrial areas.

The immediate threat to the Flemish MMA sector companies is the current financial crisis, which is affecting the MMA sector companies in several ways:

**Demand is dropping.** According to statistics from the employers' organisation Agoria, the order books in June 2009 were down to 25% of the 2008 level. In the MMA sector subcontractors delivering to the automotive industry and machine tools have seen the sharpest drop in demand.

**Material prices have dropped.** Material prices have dropped 30% – 40% over the past year and large customers are demanding to see this reduction reflected in their suppliers' prices, even though in many cases they bought the raw material at higher prices.

**Access to capital is difficult.** The financial crisis forces banks to ask for guarantees and small family-owned companies take out mortgages in their private homes to obtain capital for their companies.

**Loss of competences.** Blue-collar workers can be “technically unemployed”, i.e., they work for two days a week and receive wage compensation for the remaining three days. This means that the workforce remains available to the company for a period. . Until 1 July, this was not possible for white-collar workers, and companies with no orders had to choose between keeping on an expensive workforce without earnings or firing them and losing their competences.

In the medium to long term, a deficit of a technically skilled individuals and a shrinking workforce may be barriers to sector development. A decreased interest in technical training and education among young people is one factor in play; another is due to demographic changes.

The MMA sector has an image problem in common with other technology-related industries. The general perception is that the MMA sector offers heavy work and unattractive workplaces – where in fact most companies offer more “brainwork” than “handwork” in a technological and challenging environment. Thus, the MMA sector can be regarded as a somewhat invisible sector. Across the technological sectors, sector bodies and businesses at the national level must take action to create a shared vision about the MMA sector of the future, which could subsequently be used to brand the sector with possibilities of attractive jobs and career pathways. As stated previously in this section- the European Metal sector could take lead for mapping of best practice initiatives to open up the metal sector to a future workforce in collaboration with relevant educational providers.

According to Agoria, national decision-makers have a tendency to focus on large companies such as Caterpillar or Case New Holland when discussing the sector, and SMEs easily remain invisible. One reason may be that many of the companies with fewer than 10 employees are difficult to organise and thus the sector does not have a strong voice in policy matters.

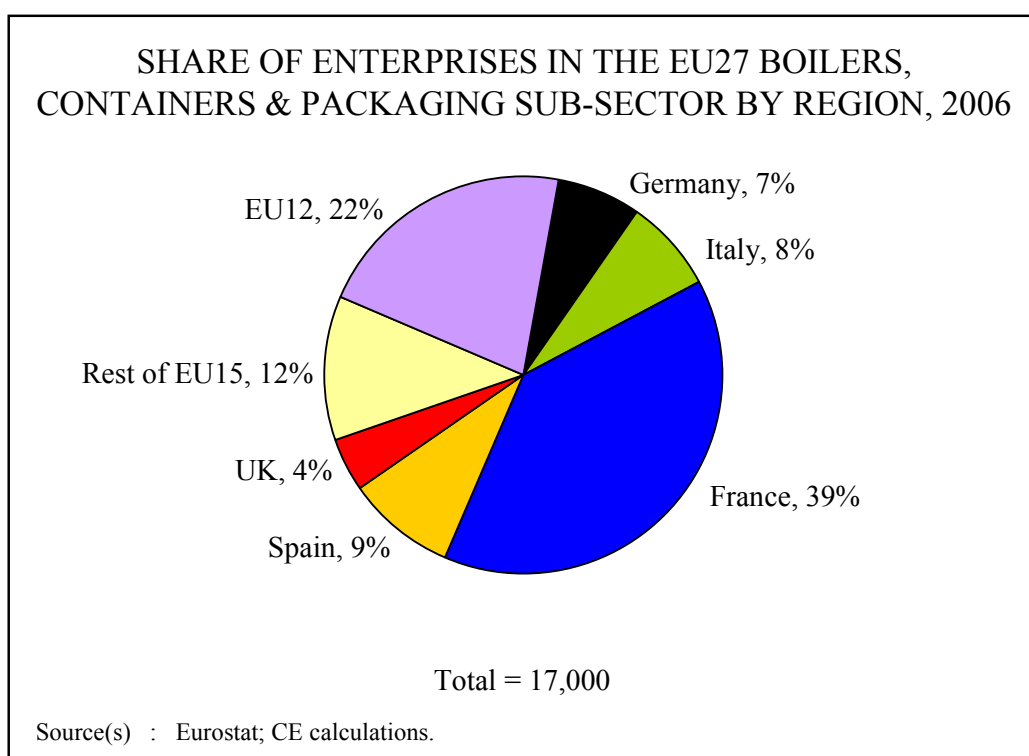
According to Agoria, the administrative burdens are also high for the SMEs, and national and regional policy makers should take measures to reduce administrative burdens as the principles in the Small Businesses Act endorse.<sup>11</sup>

## Distribution of product groups by region

### *Boilers, containers & packaging*

In contrast to its small share of enterprises in the metal processing and constructional metalwork sub-sectors, France has the largest population of enterprises in the boilers, containers and packing (BCP) sub-sector. Of the 17,000 enterprises operating the BCP sub-sector in 2006, France accounted for 39%. Germany, Italy, Spain and the UK all account for 4-9% each. The rest of the EU15 was home to 12% of all BCP enterprises, with Belgium (2¼%), Greece (2¾%) and Portugal (2%) having the largest shares. The EU12 was home to 22% of all firms in the BCP sector in 2006. Poland and the Czech Republic had the largest populations, accounting for 8½% and 6¼% of all BCP enterprises in the EU27 respectively in 2006. In several cases, a region's share of the population of enterprises bore no resemblance to its share of output.

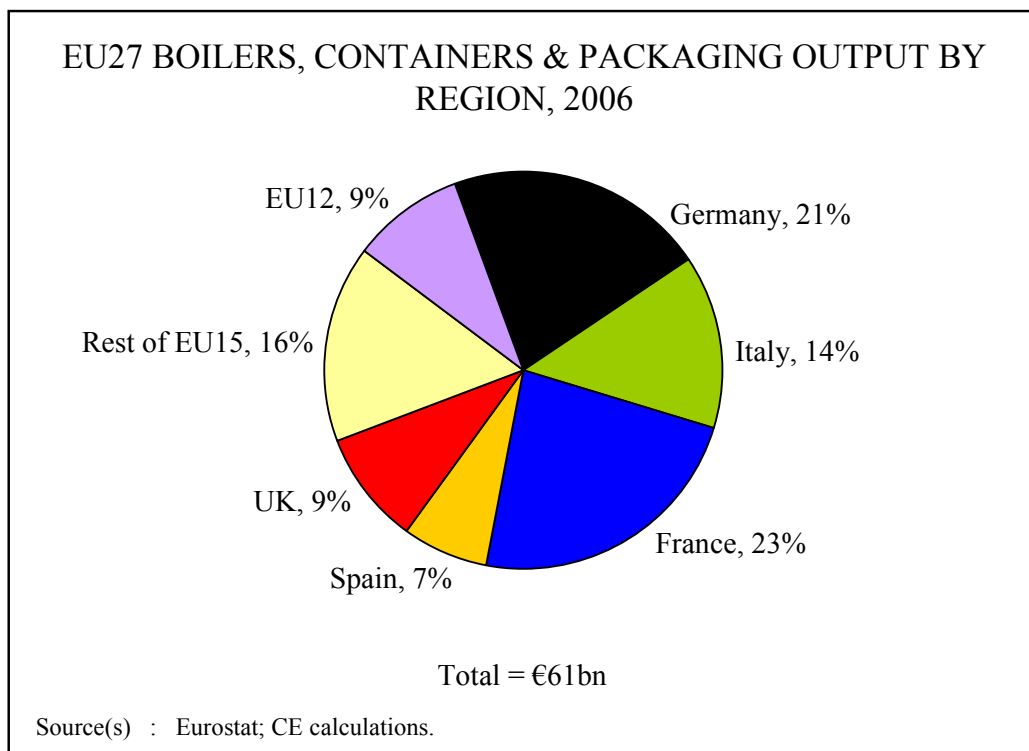
Chart 2.23 Share of enterprises in the EU27 boilers, containers & packaging sub-sector by region, 2006



<sup>11</sup> [http://ec.europa.eu/enterprise/entrepreneurship/docs/sba/com\\_2008\\_394\\_sba.pdf](http://ec.europa.eu/enterprise/entrepreneurship/docs/sba/com_2008_394_sba.pdf)



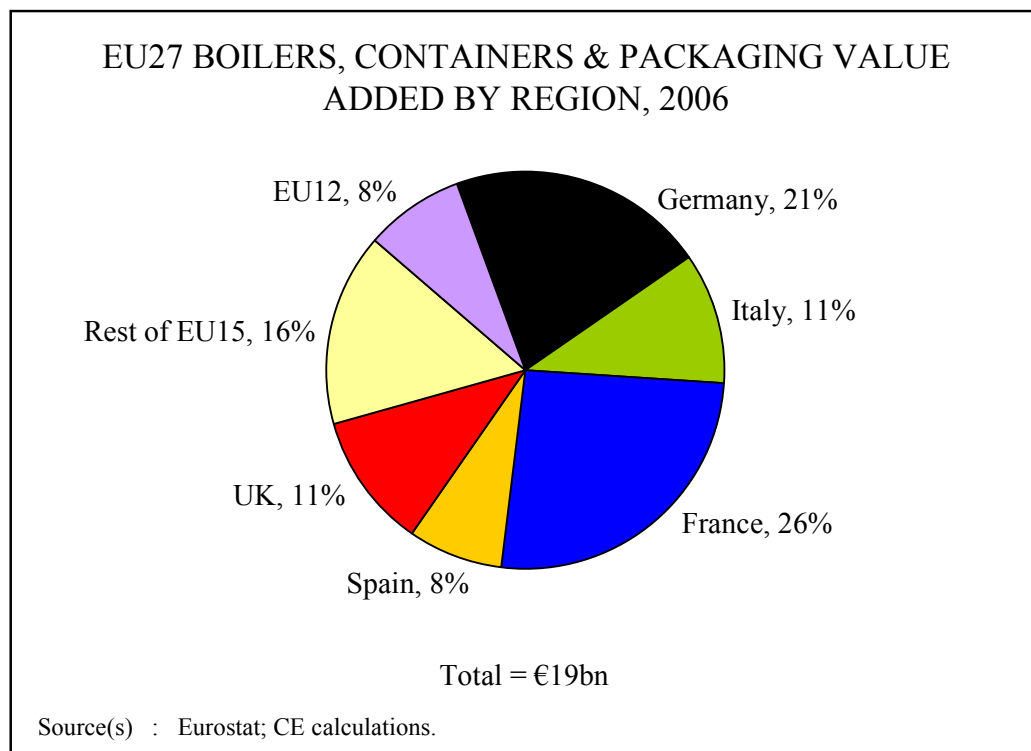
Chart 2.24 EU27 boilers, containers & packaging output by region, 2006



The BCP sector produced €61bn worth of output in 2006 and France produced the major share of output, 23%. Germany, with just 7% of enterprises, generated 21% of BCP output. In contrast, the EU12, with 22% of enterprises, was responsible for just 9% of output. Italy generated 14% of output in 2006, while the UK was responsible for 9%. In both cases, these shares were much larger than their share of enterprises. Overall, the EU5 accounted for 75% of all output in 2006. Of the 16% of output coming from the rest of the EU15, the Netherlands (4½%) and Belgium (3½%) were the main contributors, with Austria and Finland responsible for slightly smaller shares (2¼% each). The 9% from the EU12 was similar to its contribution in the previous two sub-sectors (metal processing (6%), constructional metalwork (9%)).

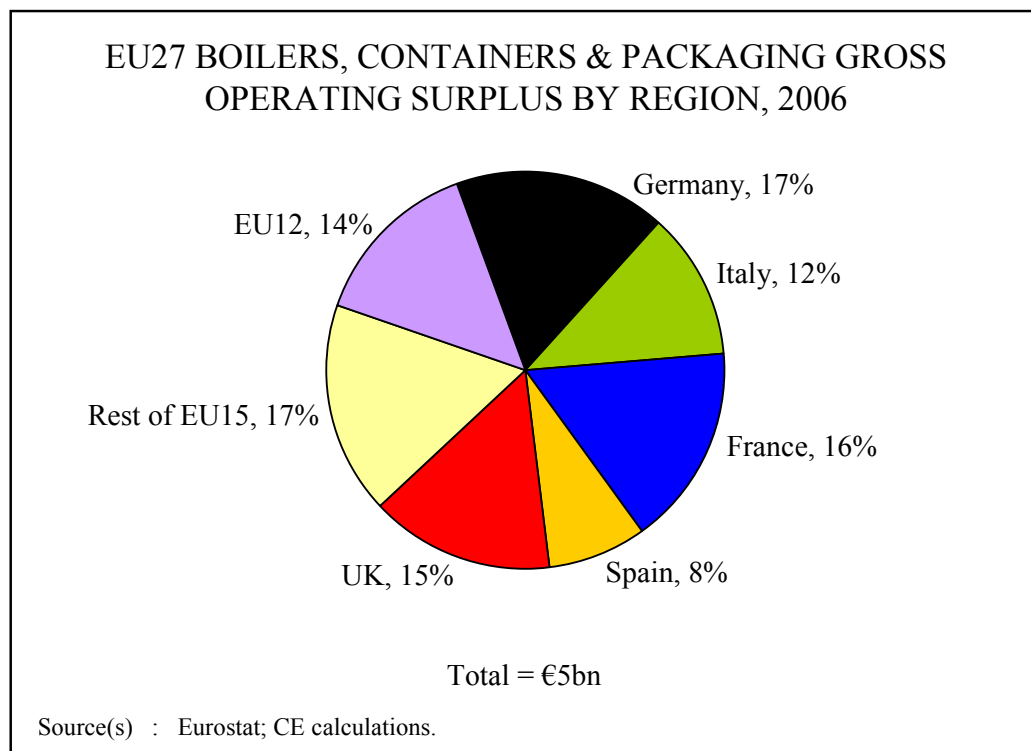
The distribution of value added in the BCP sub-sector was similar, with the share of each region identified in the pie charts varying by 1-3 pp. However, Poland did contribute 4¼%, which was more than the 3½% from both the Netherlands and Belgium, or the 3% from Austria.

Chart 2.25 EU27 boilers, containers & packaging value added by region, 2006



The distribution of gross operating surplus differed more from output shares. Germany accounted for just over 20% of output and value added, but generated just 17% of the gross operating surplus. Similarly, France was responsible for 23% of output and 26% of value added, but just 16% of the €5bn gross operating surplus in the BCP sub-sector in 2006. In contrast, the BCP sub-sector in the UK was responsible for just 9% of output and 11% of value added, but contributed 15% of the gross operating surplus. Likewise, the EU12 was responsible for 8-9% of output and value added, but 14% of the gross operating surplus. Poland alone was responsible for 8¼%. In contrast, the Netherlands and Austria contributed just 4-4½% each.

Chart 2.26 EU27 boilers, containers & packaging gross operating surplus by region, 2006

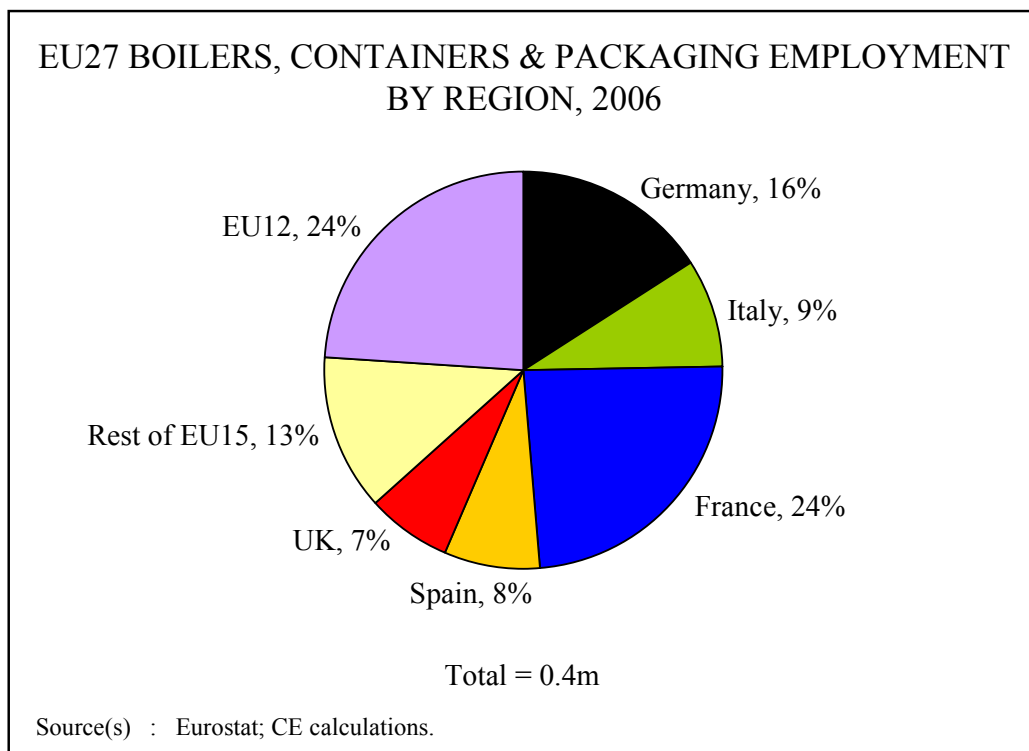


The BCP sub-sector employed just 0.4m people in 2006, making it the smallest of the MMA sub-sectors (in terms of employment). Around a quarter of those 400,000 workers worked in the French BCP sub-sector alone. This is the same proportion as in the whole of the EU12; Poland's share alone was over 9%. The next largest single employer was Germany, responsible for 16% of employment, while Italy, Spain and the UK all accounted for 7-9% of employment in the BCP sub-sector in 2006. The Netherlands and Belgium each employed around 2½% of the BCP workforce, while just 1¾% worked in the Austrian BCP sub-sector.

As with the previous MMA sub-sectors, activity in the BCP sub-sector is dominated by the EU5, who together accounted for around 75% of output and 70% of employment in 2006. These shares increase to around 85% and 77% if Austria, Belgium and the Netherlands are added. The EU12 continues to generate a relatively small share of output, overall and in comparison to its share of employment and the number of enterprises. However, Poland does emerge as a significant player in this sub-sector, with output, value added and employment shares as least as large as those for Austria, Belgium or the Netherlands.

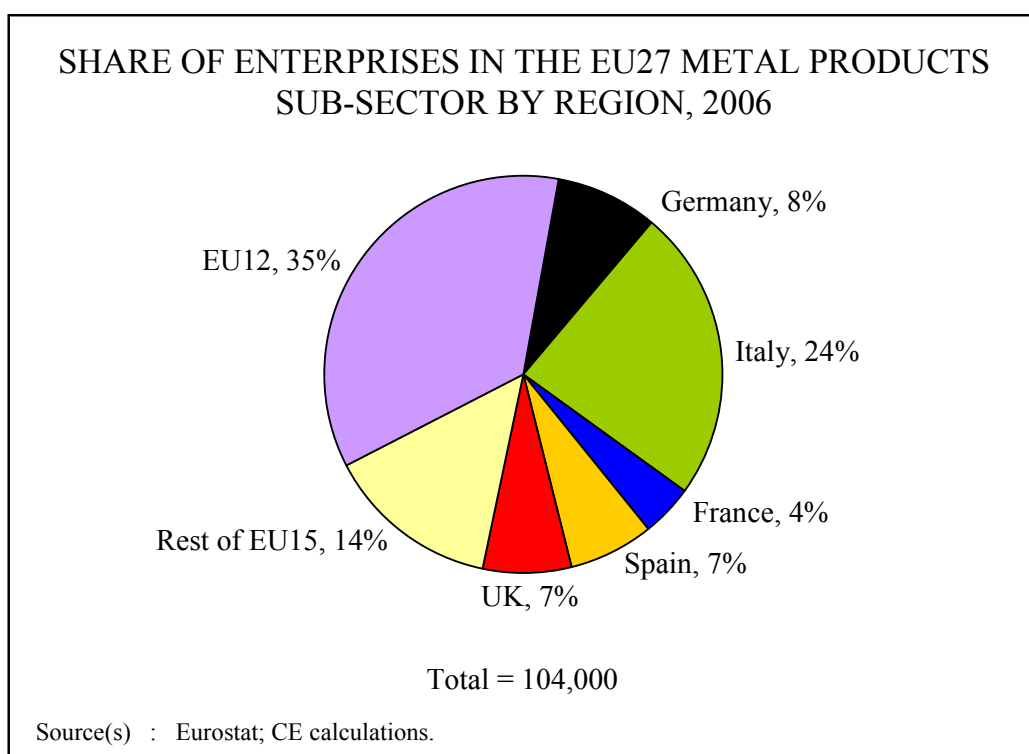
Looking across the shares of output, enterprises, employment etc, it looks as if the UK BCP sub-sector (and to a lesser extent the Italian BCP sub-sector) is one of the stronger performers. With just 4% of all enterprises and 7% of employment it manages to generate 15% of the total gross operating surplus. In contrast, with almost two-fifths of all enterprises and a quarter of the workforce, the BCP sub-sector in France generates just 16% of the gross operating surplus.

Chart 2.27 EU27 boilers, containers & packaging employment by region, 2006



### *Metal products*

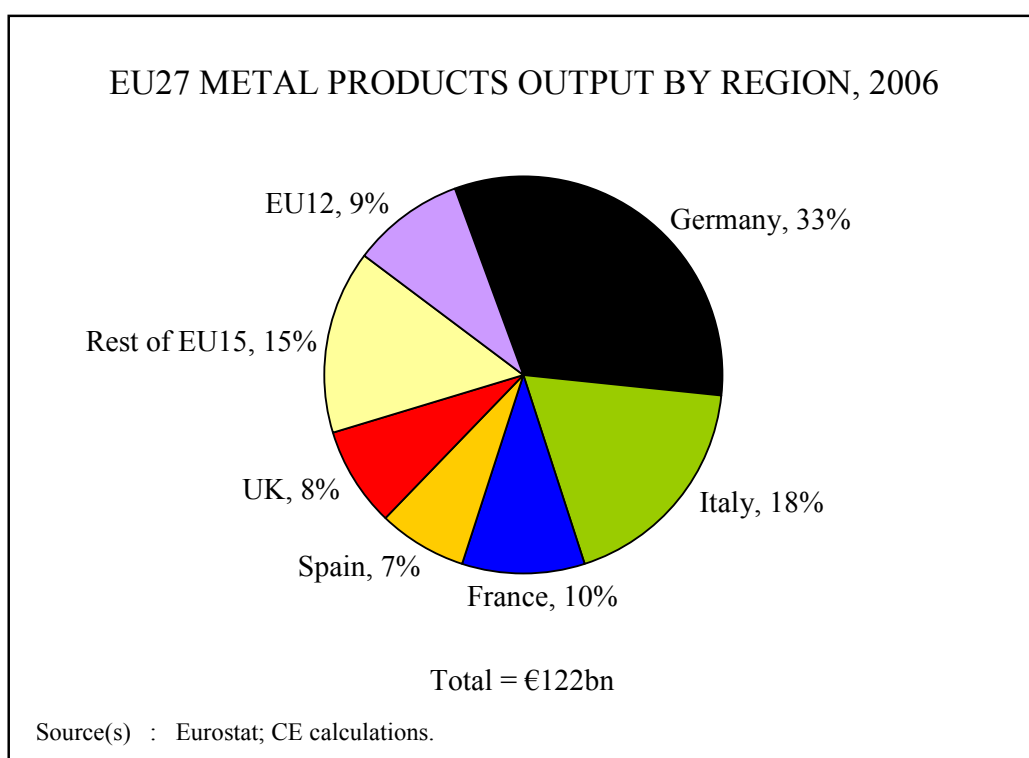
Chart 2.28 Share of enterprises in the EU27 metal products sub-sector by region, 2006



There were roughly 104,000 enterprises in the metal products sub-sector in 2006 and the EU12 was home to 35% of them. The country with the largest single share was Italy, with 24% (Italy also had the largest share of enterprises in metal processing and constructional metalwork). France, Germany, Spain and the UK all had relatively small shares (4-8%) of the population of metal products enterprises. The other Member States of the EU15 were home to 14% of enterprises, with 4¼% in Portugal and 2¼% in Greece and Sweden each. Among the Member States of the EU12, the Czech Republic accounted for the largest share, with 21% of all enterprises in the metal products sub-sector in the EU27 in 2006; this was followed by Poland on 7½%.

The output of the metal products sub-sector is dominated by Germany, which accounted for 33% of all metal products output in 2006. The next largest producer was Italy, which accounted for 18% of the €122bn worth of output produced in 2006. France, Spain and the UK each accounted for 7-10%, and so the EU5 was responsible for three-quarters of all output. The rest of the EU15 produced 15% of metal products output, with Sweden (4%), Austria (3½%) and the Netherlands (2¼%) the main producers, while the EU12 produced 9%. The key producers in the newer Member States were Poland and the Czech Republic, with 3-3¼% of EU27 output each.

Chart 2.29 EU27 metal products output by region, 2006



The distribution of value added across the regions is very similar, with regions' shares varying from output shares by just 1-2 pp. Germany remains the key producer, with a 35% share. Outside the EU5, the main contributors of value added are Sweden (4%), Austria (3¾%) and the Netherlands (2%) from the EU15, and Poland (2¾%) and the Czech Republic (2½%) from the EU12.

Chart 2.30 EU27 metal products value added by region, 2006

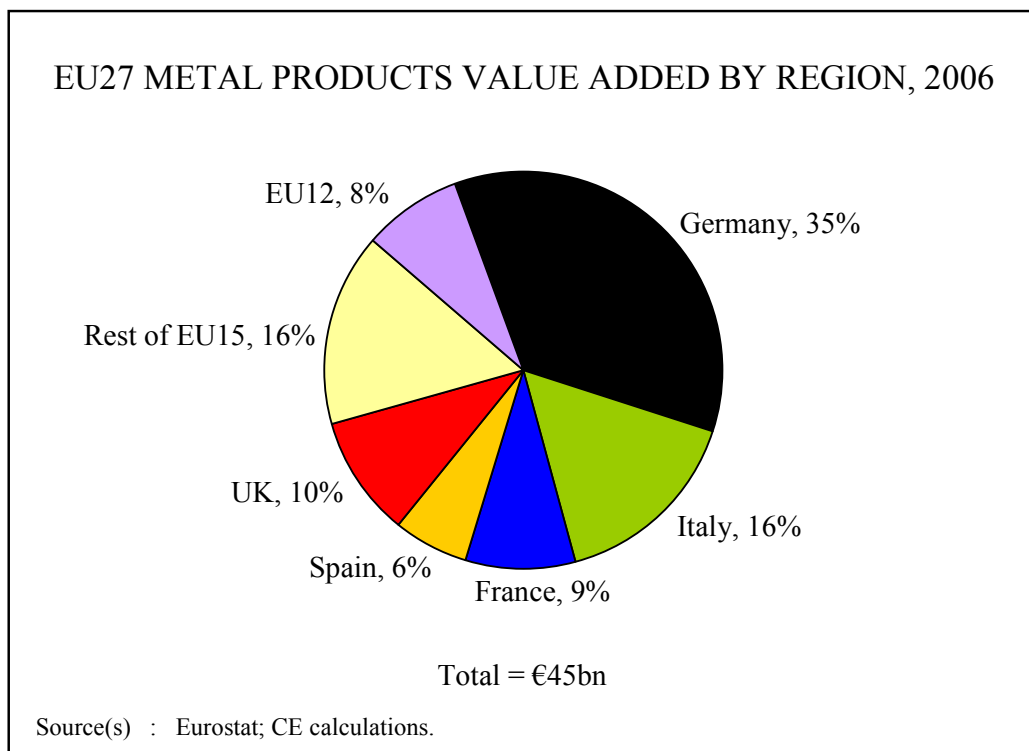
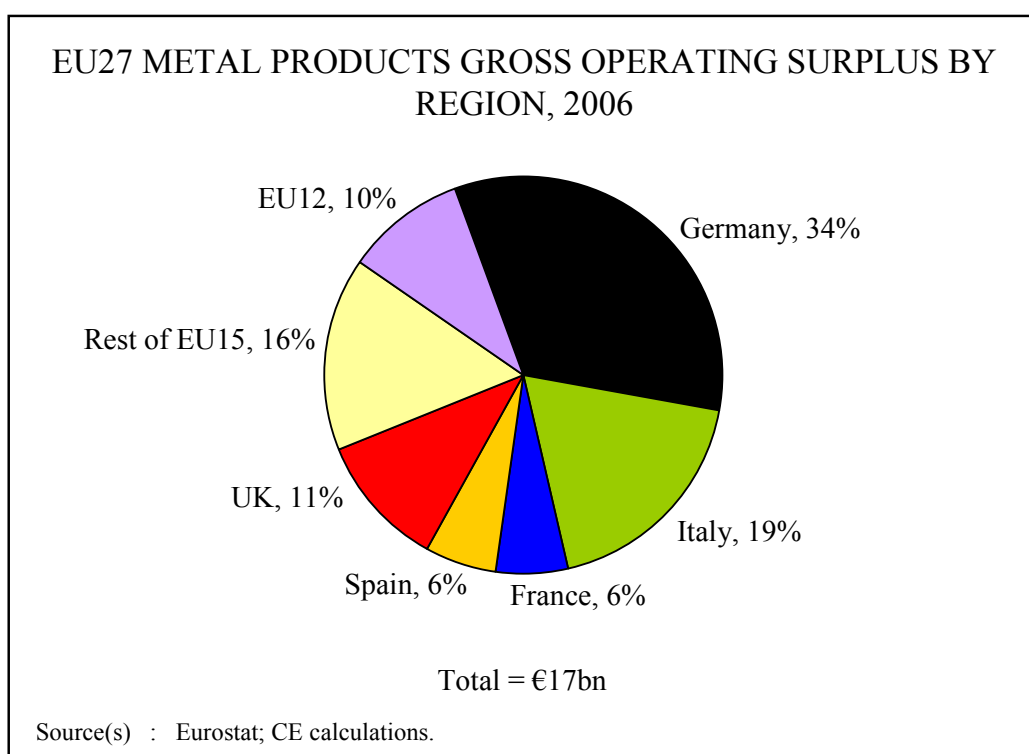


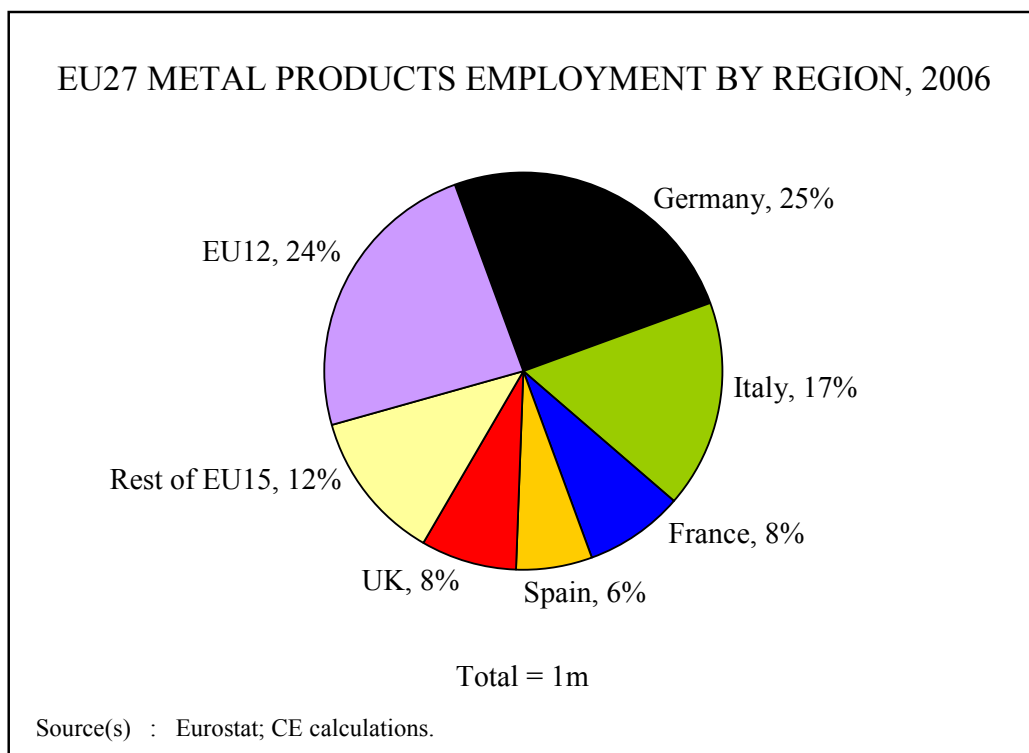
Chart 2.31 EU27 metal products gross operating surplus by region, 2006



The €17bn gross operating surplus generated in 2006 was similarly distributed. Germany contributed the largest share, 34%, with the next largest coming from Italy, 19% which was up slightly on its share of value added. The contributions of Spain, France and the UK to the gross operating surplus were largely unchanged from their contributions to value added. Again, the key contributors from the rest of the EU15 were Sweden, Austria and the Netherlands, and Poland and the Czech Republic from the EU12.

The dominance of Germany in the production of metal products maps over into employment. The metal products sub-sector in the EU27 employed around 1m people in 2006 and the German metal products sub-sector employed a quarter of those. Spain, France and the UK each employed 6-8% of the metal products workforce, while the Italian sub-sector employed 17%, making it the second largest employer. Of the other Member States in the EU15, Sweden and Austria were the main employers (2½-2¾% each); Belgium and the Netherlands each employed 1-1½%. The EU12 employed 24% of the metal products workforce in 2006, which seems disproportionately large compared to its share of output (and other countries shares of output and employment), but is more consistent with its share of enterprises. The main employers in the EU12 are Poland and the Czech Republic, which together accounted for 15% of the metal products workforce in EU27 in 2006.

Chart 2.32 EU27 metal products employment by region, 2006



The EU5 dominates the metal products sub-sector. In 2006 it accounted for around 75% of output, value added or gross operating surplus, and around two-thirds of employment. Breaking that down even further, the dominant metal products sub-sectors are in Germany and Italy: together they account for at least half of all output, value added or gross operating surplus, and two-fifths of all employment. However, Germany appears to

make better use of its labour resources. In 2006 Italy generated 16-18% of output or value added with 17% of the workforce; Germany generated 32-36% of output or value added with just 25% of the workforce. This could be a reflection of the fact that firms in the Italian metal products sub-sector appear to be smaller (in terms of employment) (the German metal products sub-sector employs just over 250,000 in 8,500 enterprises, while the Italian sub-sector employs just 167,000 over roughly 25,000 enterprises), and hence suffer from the disadvantages associated with being small or smaller. As in the other sub-sectors, the EU12 continues to account for a larger share of employment than output, value added or gross operating surplus.

Responses from the first questionnaire to national associations revealed:

*Geographical distribution, clusters and specialisation*

*In Lithuania, Belgium and France the geographical distribution of MMA sector is spread out across the country. In Belgium and Lithuania this result is to be expected, as they are small countries in term of land area. But for France, the extent of the distribution is surprising.*

*While the Rhône-Alpes region does account to 20% of the sector's overall production, the rest is split somewhat evenly across the existing regions. The distribution may be a result of the predominance of SMEs in the MMA sector. The French MMA production is non-specialised, the exception being Haute-Savoie region (specialisation in screw-cutting).*

*In Austria the MMA production is concentrated in the Eastern regions (Niederösterreich, Oberrösterreich and Styria) and the Western-most region (Vorarlberg).*

*In Italy, cutlery and house articles are located in Brescia and Novara, while the rest of the companies are generally spread out in across Italy, but with some concentration around Milan.*

*In Germany, MMA production is concentrated in the Western part of the country, in particularly in Westphalia and Baden-Württemberg. Companies tend to specialise in device assembly, EBM tools and cutlery.*



## 2.4.7 Cluster study: Brescia (Italy)

### Facts

Number of MMA companies: 5,861  
Size of companies: 99% SMEs  
Number of employees: 54,586

Source: AIB

### Typical MMA companies in Brescia are:

<p><b>Metra S.p.A.</b> is engaged in foundry, extrusion, surface finishing and mechanical machining of aluminium alloys. The company produces standard and customised extruded profiles, pneumatics systems. It supplies the construction sector with curtain wall systems, windows and doors, casement, sliding, shutters and systems for the completion of architectural shell. Metra is based in Brescia but has production capacity in Italy, Poland and Canada.</p> <p>Employees: 1,200 Annual turnover: €300m <a href="http://www.metra.it/">http://www.metra.it/</a></p>	<p><b>Bialetti Industrie S.p.A.</b> Alfonso Bialetti founded the company in 1919 in a workshop making semi-finished aluminium products. Today, the company controls a number of brands and manufactures and sells aluminium products for domestic appliances and, in particular, the market for cookware, coffee-makers and small electrical appliances for the mass retail market as well as the retail channel.</p> <p>Employees; approx. 9000 Annual turnover: €100m <a href="http://www.bialetti.it/">http://www.bialetti.it/</a></p>
<p><b>Industrie Pasotti S.p.A.</b> has two plants, one located in Sabbio Chiese, which produces pressure die-cast industrial components in light alloys, and the other located in Prevalle, which produces pressure die-cast aluminium alloy radiators for heating. The company has made specific investments in order to develop a research and technological innovation programme that has allowed the company to reach a high degree of mechanisation and high-quality products.</p> <p><a href="http://www.industrie-pasotti.com">http://www.industrie-pasotti.com</a></p>	<p><b>OMR S.p.A.</b> is a supplier of automotive steel products. OMR's main products are chassis, chassis components, support parts for driver's cabs, seat bearings, engine bearings, anti-intrusion bars, fixing iron bands for tanks, bonnet panels, articulated arms, buckets, loading forks for hand pallet truck, etc., OMR co-designs products with its customers.</p> <p><a href="http://www.omrspa.com/">http://www.omrspa.com/</a></p>

Brescia is internationally renowned for high productivity and knowhow in the MMA sector. Exports are reported to have continuously increased and reached €1.5bn in 2008. Historically, the local enterprises have focused on process innovation to produce high quality at the lowest price. Competition from emerging countries has led to a strategic change focusing on product innovation and brand-based marketing.

The Brescia industries are concerned with transformation and manufacture of metal products. Over time, the entire manufacturing cycle has been established in the province. From iron and steel plants, foundries, and forges, to the creation of a wide variety of metal products such as pots and pans, weapons, machine tools and a wide range of car and industrial vehicle components.

The non-ferrous metal sector produces semi-finished products in aluminium, copper and alloys thereof. The non-ferrous semi-finished products are sub-delivered to the construction sector, transport sector and others. The sectors that produce taps and valves, pots, pans and cutlery benefits directly from their proximity to the producers of raw material. Almost all the light arms produced in Italy come from the area around Gardone Val Trompia in Brescia.

### An MMA cluster with almost 6,000 internationally connected SMEs

The MMA sector in Brescia consists of almost six thousand companies employing 55,000 employees. The MMA sector is the most important industrial sector in the region with a share of about 20% of the local industrial sector. It is the most significant MMA cluster in Italy with a 7% – 10% share of enterprises and employees. The region produces 40% of the iron and steel in Italy - often in the form of “mini steelworks” with a multinational status. The accumulated knowhow in the cluster benefits the sectors further down the supply-chain such as automotive, mechanical and engineering. The cluster structure with SMEs provides high potential synergies and flexibility.

The cluster of MMA enterprises benefits from the presence of technical schools, an engineering university, and research and scientific centres such as AQM and C.S.M.T., which support the development and improvement of the companies. AQM (<http://www.aqm.it/english/>) is a non-profit service institution that supports companies in enhancing their competitiveness by offering a wide range of technical and organisational solutions. AQM was established in agreement with a group of companies, local institutions, and trade associations who acknowledged its validity in working for the common good. C.S.M.T. (<http://www.csmt.it/>) is a public/private consortium. It offers training activities, applied research, technological transfer, and technical services by promoting collaboration between the academic world and companies on a non-profit basis.

The MMA sector in Brescia is international. Foreign investments are concentrated in the automotive industry and less so in the MMA sector due to the small size of enterprises. However, local MMA enterprises have undergone a significant internationalisation process with NMS countries with direct green and brown field investments. Furthermore, the industries are in close contact with the biggest European MMA players, and many of the enterprises are in fact sub-suppliers to German MMA companies. Only a few of the companies benefit from EU funding due to their size and lack of expertise in managing EU projects.

### SWOT table for the MMA Sector in Brescia

<b>Strengths</b> High production flexibility Non-standard production and home-made engineering Significant percentage of innovative and internationalised medium-sized enterprises Widespread production knowhow Upstream and downstream integration Near to prominent transport infrastructure Presence of research and scientific services centres	<b>Weaknesses</b> Limitation of size Economies of scale insufficient to engage in important process and production innovation projects Too production capacity in low valued-added segment  High energy costs High transport costs Lack of skilled and unskilled workers in recent years
<b>Opportunities</b> Aggregation processes  Entry into new and technologically complex sectors Entry into new and high potential Mediterranean markets New application in construction and public works	<b>Threats</b> Low-scale economies in internationalisation and innovation processes Increasing competition from emerging countries  Lack of skilled and unskilled workers Sub-optimal logistics and transport facilities Environmental problems

Innovation and aggregation are key words in the business strategies and policy needs of the Brescia MMA sector. Without innovation and aggregation downsizing is a risk to not only the MMA sector but also to jobs and earnings in the Brescia region. Many

companies have already started a process of moving to a higher value market, and front-runners are already there.

### Innovation

The Brescia companies need to be part of the innovative trends in order to meet the competition from low-cost countries. According to AIB the local and national governments can help by creating fiscal incentives for the companies. Technical innovations are seen in the following areas:

### Metallurgy

- Production of corrosion resisting steel
- Automation over the complete ingot mould casting process for special steels production
- Energy recovery from melting process
- New high performance and more resistant metal alloys
- Nanotechnology applied to metals
- Research and optimisation in cutting and laser welding of steel and aluminium alloys plates
- Research into new applications for existing metals and alloys
- Logistics improvement

### Metal products

- New technologies development for metals surface treatments
- New technologies development for die-casting process
- Nanotechnology applied to metals
- Development of electronic applications to metal products and die-casting materials
- Technologies for heat recovery from production processes
- Industrial design for new products development

### Aggregation

Aggregation is the other key word for Brescia companies. Aggregation is needed to reach large-scale production or increase their bargaining power. Aggregation can be reached through mergers and acquisitions or cooperation between companies.

Between €1m to €5m EU funding has reached the sector. However, due to their size it is difficult for companies to participate in research projects funded by the EU. Often companies are required to invest in the projects, and lowering the threshold of these investments could attract more companies to the research programmes – especially if several companies could collaborate on projects, as seen in the Entrepreneurship and innovation programme (EIP). The EIP is a programme under the Competitiveness and Innovation Framework Programme (CIP).

## 2.5 Regional analysis

### 2.5.1 Data coverage

Data from Eurostat's Structural Business Statistics (SBS) database has allowed the identification of the metals sector at regional (NUTS2) level over the period 1995-2006.

The data cover a number of indicators, including the number of units, number of employees, investment, and wages and salaries. The coverage is surprisingly good, with around 70% of observations filled across the indicators, as shown in Table 2.6.

Table 2.6 Coverage of regional data on the European metals sector

COVERAGE OF REGIONAL DATA ON THE EUROPEAN METALS SECTOR			
Indicator	Units	Sector	Coverage (%)
Number of local units	Actual number	Manufacturing (d)	75.4
		Manufacture of fabricated metal products, except machinery and equipment (d28)	74.1
Wages and Salaries	€m	Manufacturing (d)	77.4
		Manufacture of fabricated metal products, except machinery and equipment (d28)	70.5
Gross Investment	€m	Manufacturing (d)	74.1
		Manufacture of fabricated metal products, except machinery and equipment (d28)	68.0
Number of persons employed	Actual number	Manufacturing (d)	77.3
		Manufacture of fabricated metal products, except machinery and equipment (d28)	71.6
Note: Potential maximum number of observations is 4236 (353 regions x 12 years).			

#### *Country coverage*

Across particular countries, the data are, in general, more sparse for the New Member States, but some old Member States, particularly Belgium, are also missing to a greater extent.

#### *Time coverage*

Across time, the years with most coverage are the more recent ones (2004-06) which typically have over 95% of observations available for total manufacturing and around 90% for metals. In this respect, 2006 is probably the best snapshot year to look at the structure of the sector. Growth rate calculations are possible, but the regional coverage tails off to below 50% if an attempt is made to use the whole period, so for this reason the period 1999-2006 is chosen for analysing performance.

#### *Sector coverage*

As shown in Table 2.6, the SBS data only cover industry 28 (Manufacture of fabricated metal products), which means that the industry 27.5 (Casting of metals) is missing. However, as 27.5 is a relatively small % of the overall industry for most Member States it is not considered a serious omission.

### *Units of measurement*

The SBS data for employment and number of units are volume measures, and so can be used directly for analysis. However, wages and investment are obtained in current prices, and so need to be converted to PPS measures for cross-section analysis, unless a ratio is chosen (eg share of metals wages in total manufacturing) in which case the untransformed data can be used.

### *Quality of data*

There are some doubts about the quality of the data, in particular some large jumps in series for numbers of units, and so an effort has been made to prevent any unrealistic observations from influencing the analysis.

## 2.5.2 Regional Structure

One of the main purposes of using the regional data is whether or not anything more can be gained from it. In other words, does the regional distribution of activity and other indicators differ sufficiently from what we already know along national lines? If not, then national patterns are probably sufficient to get a good picture of the metals sector, but if there are large within-country differences it becomes an interesting addition to the study.

With the data at hand, a number of questions can be asked along these lines:

- what is the regional distribution of metals activity, as measured by the number of firms and employment, across Europe and what is the picture like relative to manufacturing as a whole?

- how does the average size of metals firms (number of employees per firm) differ across the regions and are they higher or lower than the average for manufacturing as a whole?

- how do average wages and average investment (per employee) compare across the regions and are they higher or lower than the average for manufacturing as a whole?

### *Distribution of activity*

Figure 2.1 shows the regional distribution of the absolute number of units (firms) and as a % of manufacturing for 2006. To some extent the distribution of units runs along national lines, with Spain, Italy, Denmark, and some of the new Member States easily identified by the high number of firms in their regions. However, some heterogeneity within countries can be seen, particularly in France, and Finland and Sweden although the latter two are not surprising given the geography of these countries. When looked at as a % of manufacturing, the picture changes somewhat and the importance of France diminishes somewhat while that of the UK rises with most regions showing representation of over 15%.

The total employment levels show in Figure 2.2 provide a more mixed picture, with the majority of jobs concentrated in northern Italy, Denmark, parts of Spain and France. Relative to employment in manufacturing, a swathe of regions along the eastern side of France, and again in northern Italy, show the heaviest specialisation, as does parts of southern Italy and southern Spain, with less importance on the eastern side of Europe.

### *Average firm size*

Figure 2.3 looks at the number of employees per unit, and how this measure changes when made relative to the average for overall manufacturing (as an index of 1 meaning average there is no difference between metals and total manufacturing).

The number of employees per firm clearly moves along national lines, with Germany standing out as the Member State with the highest average employment among its companies, while Spain and Italy have the smallest firms. When made relative to manufacturing within the region, metals firms have among the highest employment in France and (some) Italian regions, otherwise the spread is fairly mixed although on average it seems that average firm size is smaller for metals when compared to manufacturing as a whole.

### *Wages and investment*

Average wages per employee, even adjusted to PPS exchange rates, offer few surprises as shown in Figure 2.4. The highest wages in metals can be located in (western) Germany and some UK regions, while the southern and eastern periphery have much lower wages (often a third less).

A more interesting picture emerges when this measure is made relative to each region's own average wage for total manufacturing. The spread of higher wages being paid relative to the average for manufacturing is no longer along national lines, and individual regions within the Member States stand out, although it should be said that for the majority wages are typically below the manufacturing average.

Greece stands out when looking at investment in Figure 2.5, in both absolute terms per employee and relative to manufacturing. Otherwise there is no obvious pattern to mention other than the fact that only a small number of regions invest more per employee than their own manufacturing averages.

## **2.5.3 Regional Performance**

Employment growth has been fairly weak over the 1999-2006 period, with only peripheral regions in Spain, Greece and eastern Europe showing strong positive outcomes of over 5% pa, and most others showing weak or negative average performance. Growth of average employees per firm has been concentrated in Poland and southern Italy, which also happens to be where the smallest firm sizes are currently located.

Finally, looking at the change in metals employment shares in Figure 2.7, there seems to be a generally increasing trend relative to the average for manufacturing, although again the strongest changes are located in Greece, southern Spain and parts of Poland.

Figure 2.1: Number of units (absolute and as % of manufacturing)

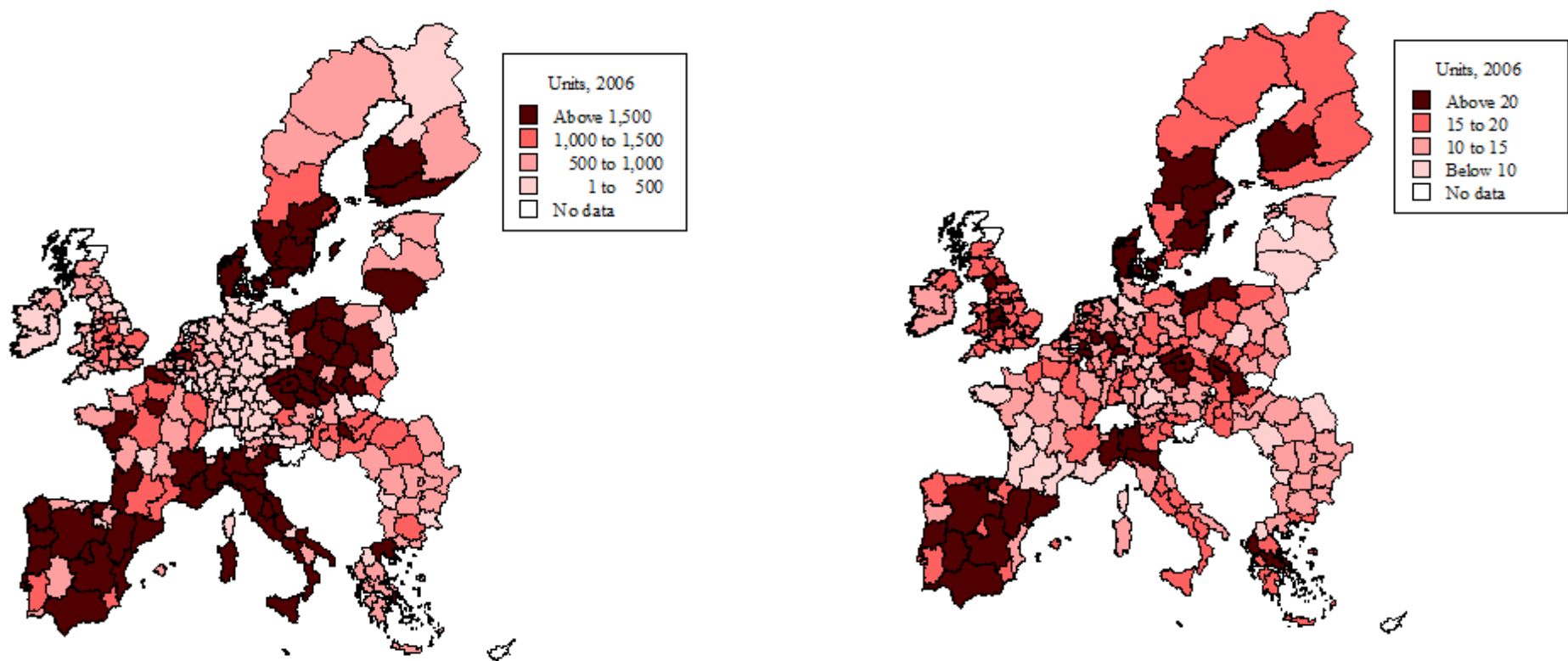




Figure 2.2: Number of employees (absolute and as % of manufacturing)

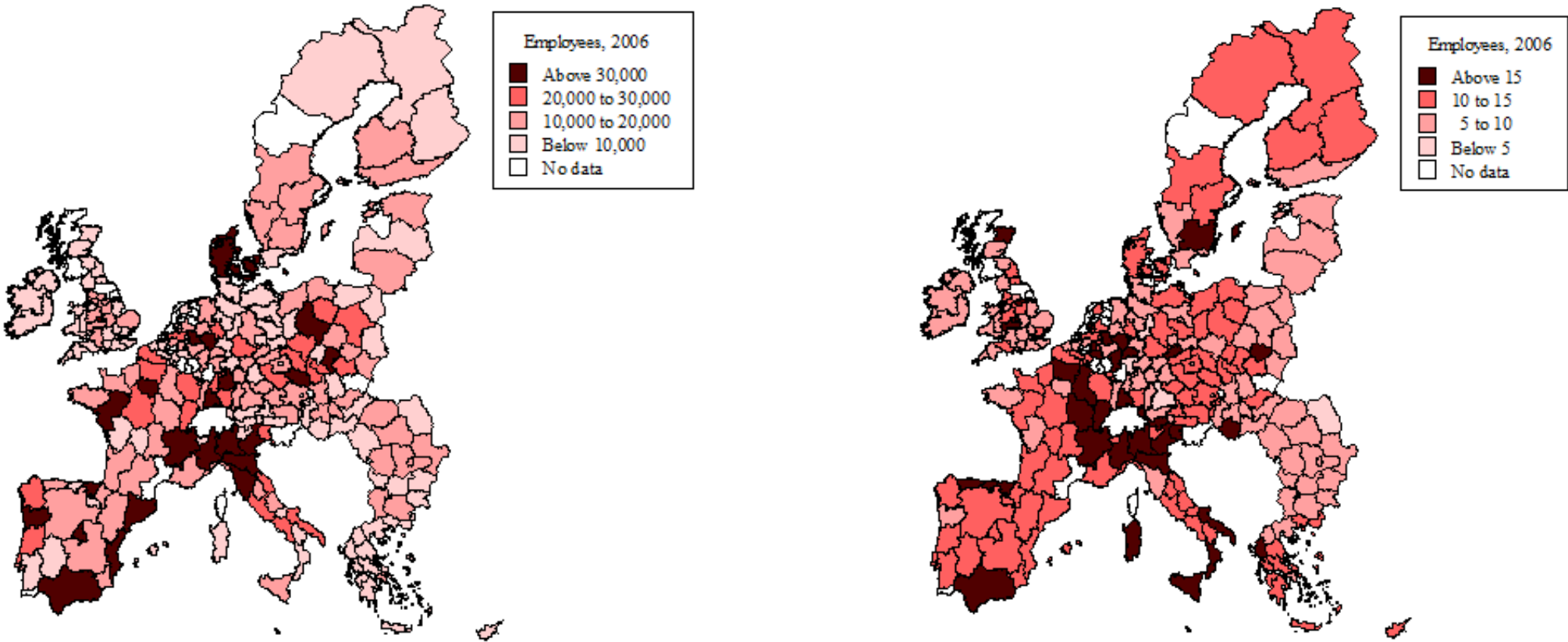




Figure 2.3: Employees per unit (absolute and relative to total manufacturing)

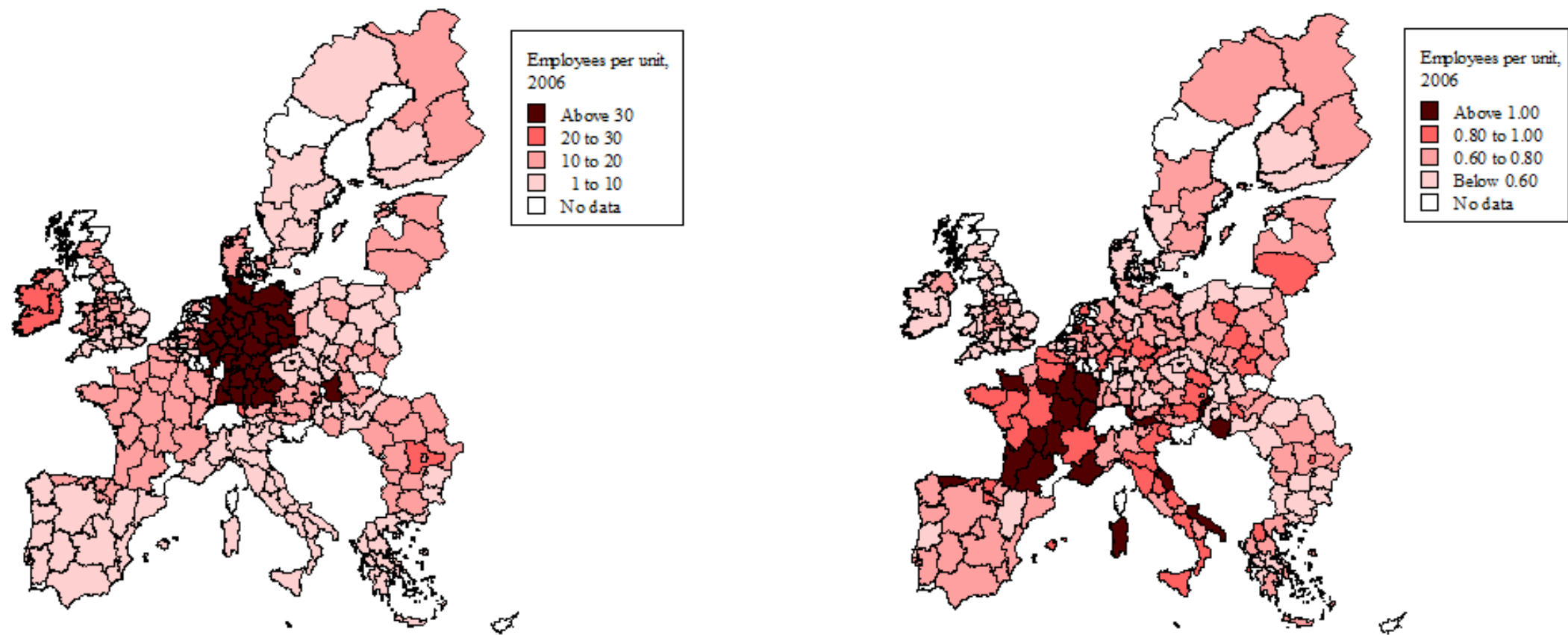


Figure 2.4: Wages per employee (absolute and relative to total manufacturing)

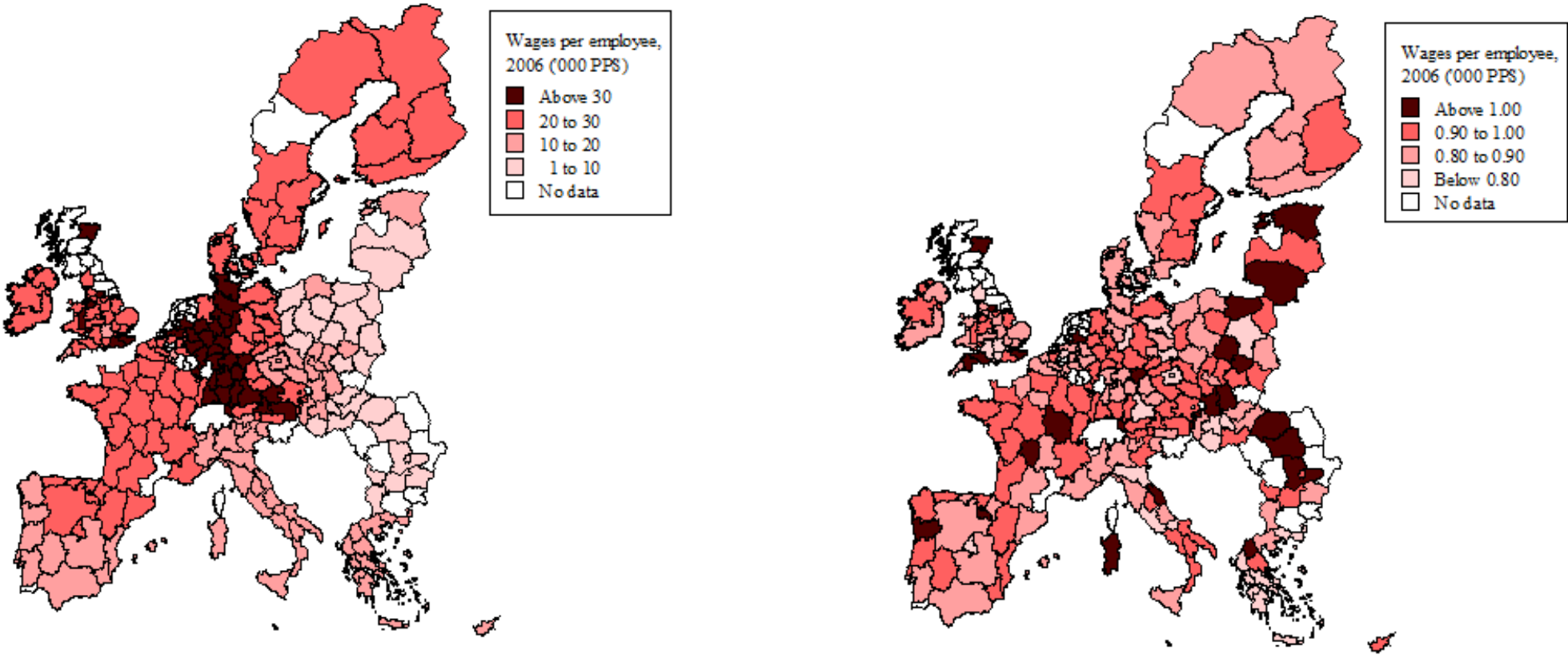


Figure 2.5: Investment per employee (absolute and relative to total manufacturing)

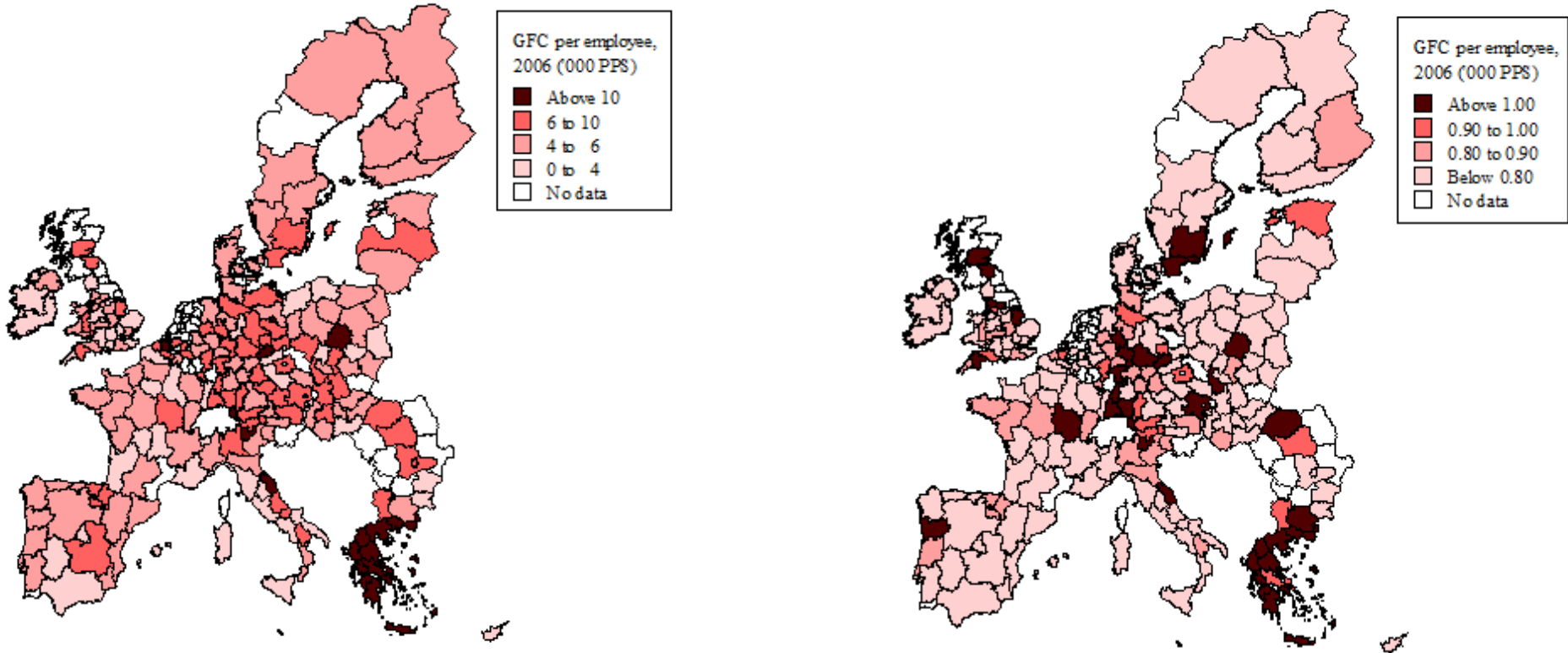


Figure 2.6: Employment growth (absolute and per unit)

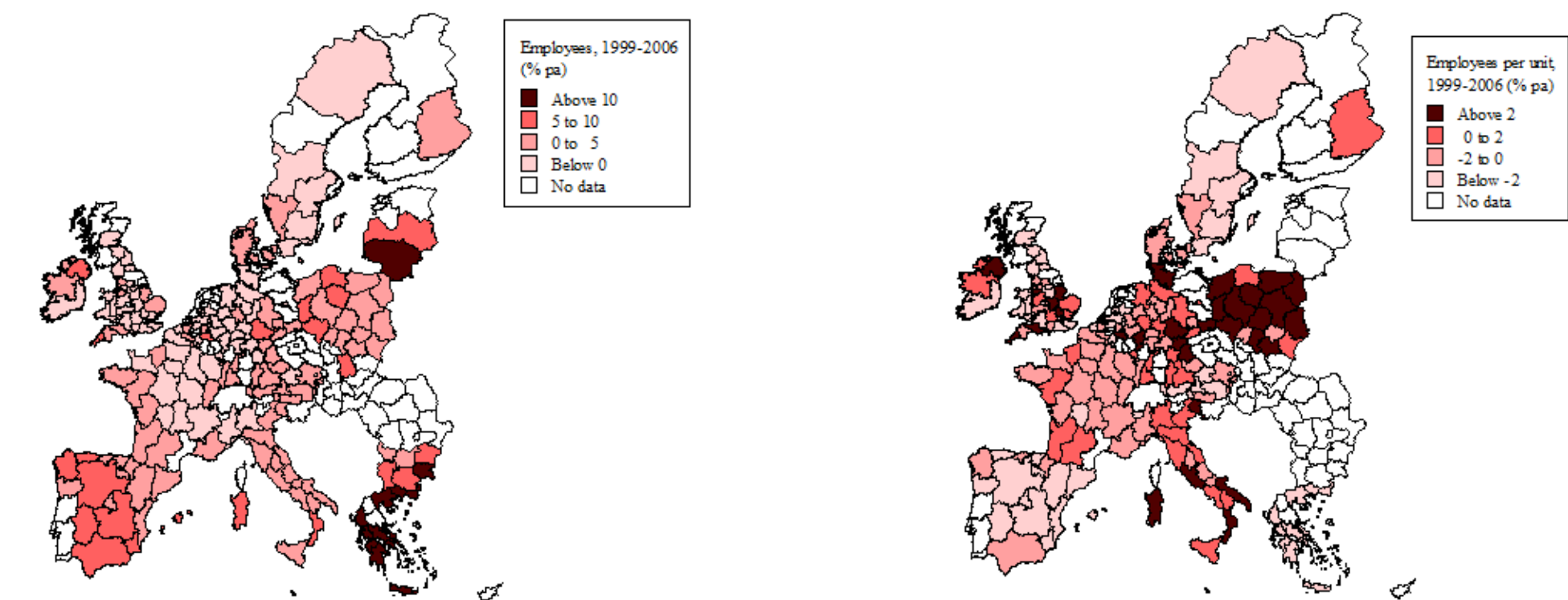
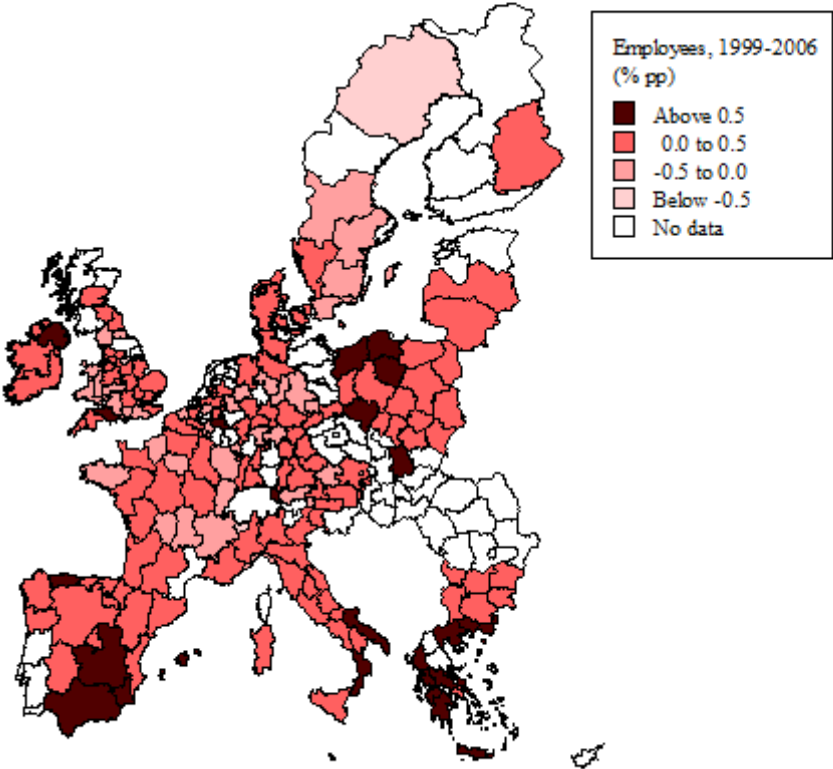


Figure 2.7: Change in employees share in total manufacturing





## 2.6 Productivity and profitability

In the EU27<sup>12</sup> as a whole the MMA sector had a gross operating rate of 12% in 2006, while labour productivity was around €41,700 (per person employed). This gross operating rate for the MMA sector was 27% higher than that for manufacturing as a whole, but labour productivity was just 83% of the value for manufacturing.

### 2.6.1 Productivity and profitability by region

In 2006, the MMA sector in Greece was the most profitable, with a gross operating rate of just over 20%. This was followed by the UK on around 17%, with Poland and Latvia each on around 15½%. The average gross operating rate across all countries in 2006 (excluding Malta due to unavailable data) was 12% (for manufacturing as a whole it was 9.4%). Other countries whose MMA sectors exceeded this were, in descending order: Luxembourg, Cyprus, Austria, the Czech Republic, Italy and Germany. The MMA sector in Spain averaged just under 11%, but with a rate of just 6¾% the MMA sector in France was the least profitable. The next lowest were Romania and Belgium with rates of around 9½%. The MMA sector in six of the 15 Member States (40%) of the EU15 had a gross operating rate above 12%. Of the eleven Member States of the EU12 for which data were available, four Member States (36%) had a gross operating rate above 12%.

The MMA sector with the highest labour productivity in 2006 was in Luxembourg (€71,400 per person employed). This was followed by Austria on €64,500, and then five countries on €55-56,000: the Netherlands, Belgium, the UK, Germany and Denmark (in descending order). The country average in 2006 (excluding Malta due to unavailable data) was around €35,300 (compared to just under €50,000 for manufacturing). Other countries whose MMA sector exceeded this were: Finland, Sweden, Ireland, France, Italy, Spain, Greece. This means that not only did all of the EU5 have an above average labour productivity, but also that all of the EU12 had below average labour productivity. The EU12 Member State with the highest labour productivity in 2006 was Slovenia, on just over €25,000.

Responses from the first questionnaire to national associations indicated:

#### *Operating efficiency*

*In order to improve operating efficiency German companies employ a slim structure of administration and focus on the efficiency of equipment and personnel productivity. Italian companies focus on R&D investments, networking and IT technology, particularly in small and medium size companies. The French MMA sector, on the other hand, focuses on capital expenditure and skilled manpower.*

<sup>12</sup> Excluding Malta – see footnote on page 12.

Chart 2.33 EU27 MMA sector gross operating rate by region, 2006

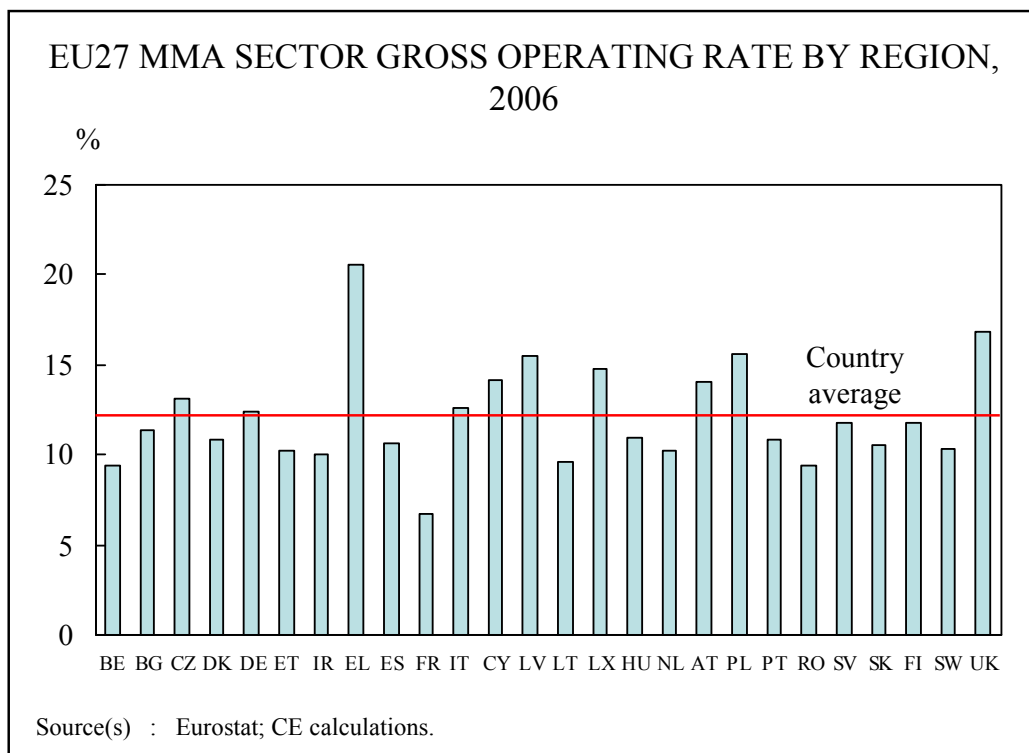
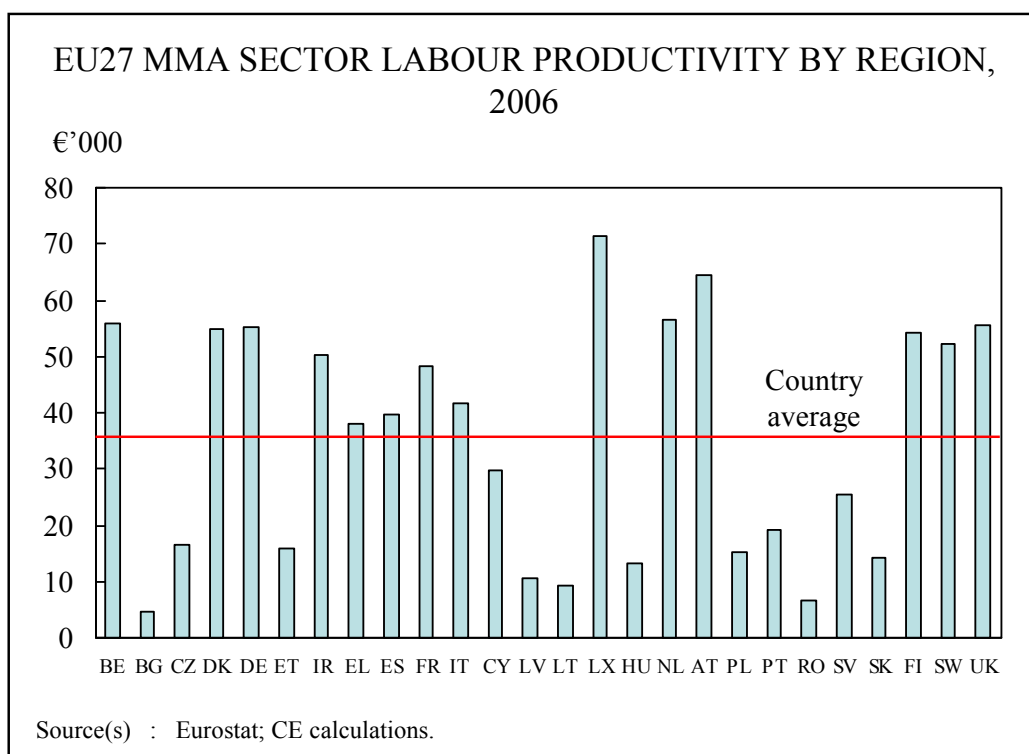


Chart 2.34 EU27 MMA sector labour productivity by region, 2006

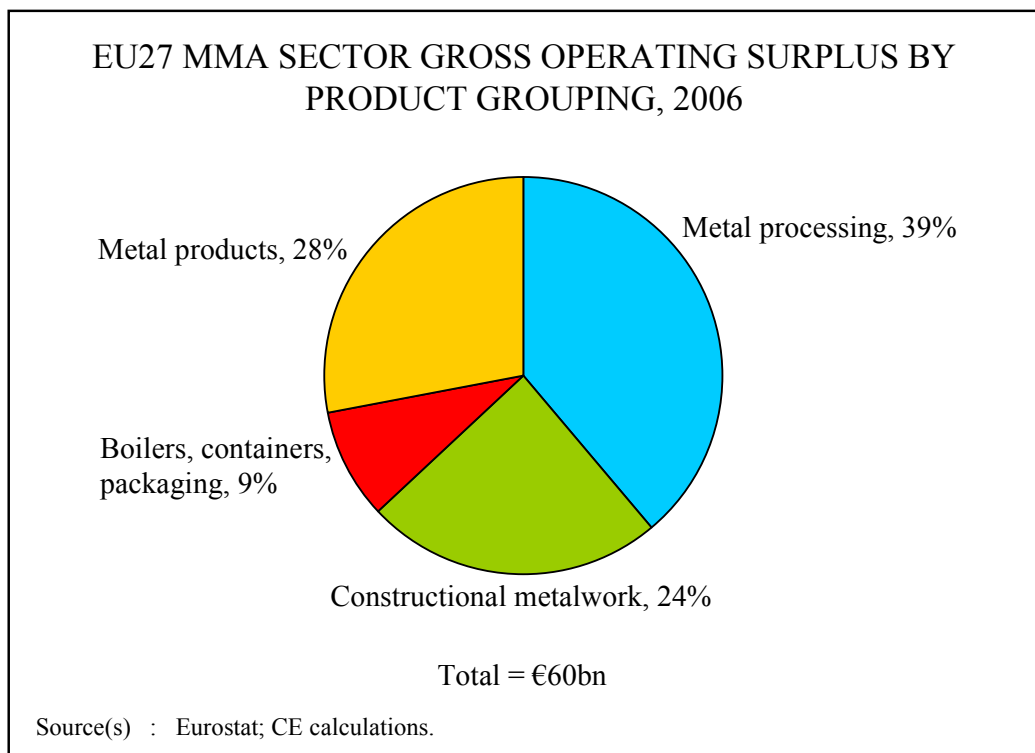




### 2.6.2 Productivity and profitability by product group

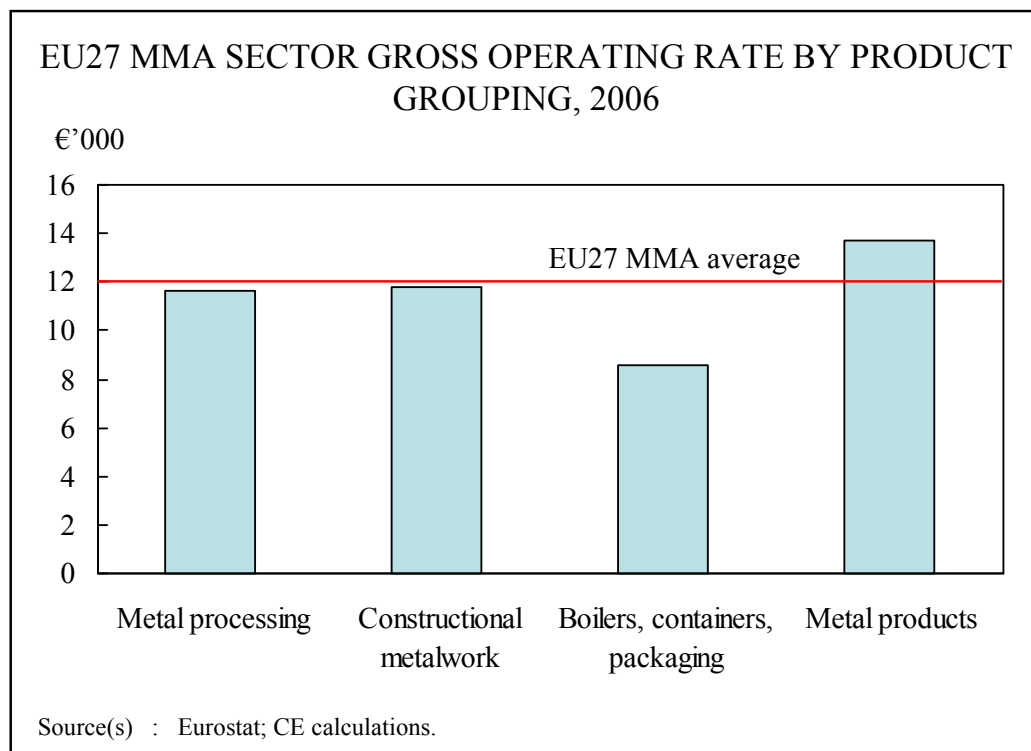
When analysing the gross operating surplus for the whole MMA sector in 2006, we see that the shares of metal processing and constructional metalwork are virtually identical to their shares of output or value added. However, the share of metal products is larger (28% of gross operating surplus compared to 24% of output) while the share of the BCP sub-sector is smaller (9% of gross operating surplus compared to 12% of output).

Chart 2.35 EU27 MMA sector gross operating surplus by product grouping, 2006



As a result of this, the BCP sub-sector exhibited a below-average gross operating rate (gross operating surplus/turnover), which acts as a measure of profitability; and this can be seen in the accompanying chart.

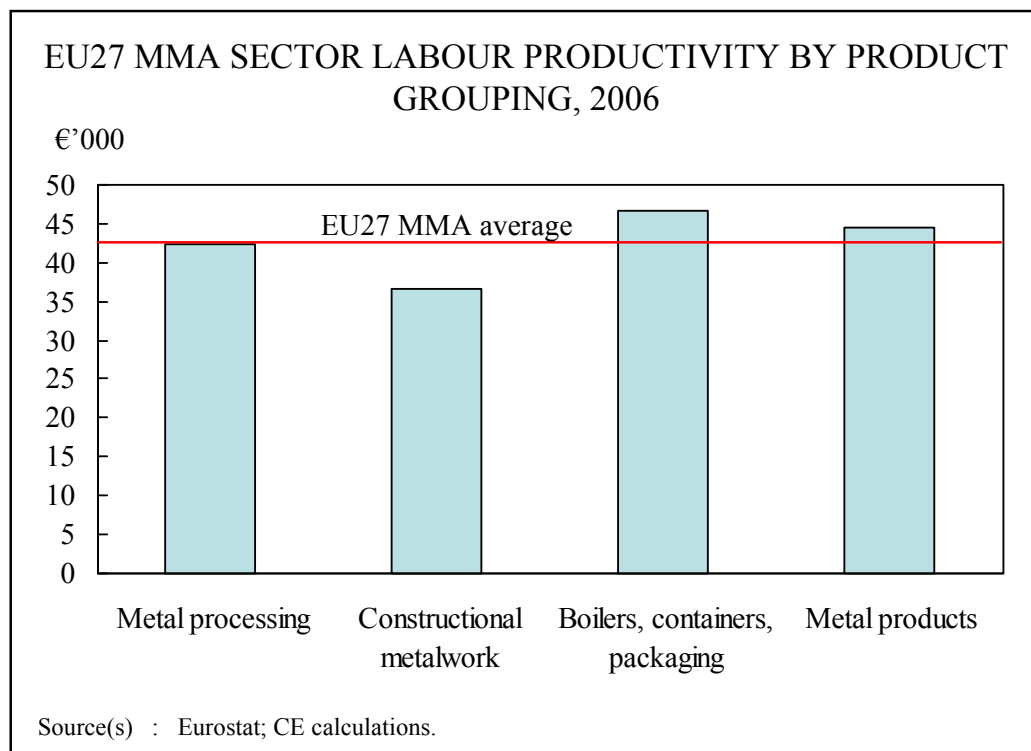
Chart 2.36 EU27 MMA sector gross operating rate by product grouping, 2006



The chart shows that the EU27 MMA sector as a whole enjoyed a gross operating rate of 12% in 2006, with metal processing and constructional metalwork on similar rates. However, it also highlights the relative under-performance of the BCP sub-sector, which recorded a rate of just 8.6% in 2006, while the metal products sub-sector registered an above-average rate of almost 14%. This is in part a reflection of the fact that personnel costs account for a larger share of value added in the BCP sub-sector, which in turn squeezes the gross operating surplus. Personnel costs in the BCP sub-sector accounted for 72% of value added in 2006 compared to 63-64% for metal products and constructional metalwork. In metal processing personnel costs account for around 67% of value added in 2006.

The story is somewhat different for labour productivity where, as the chart shows, the BCP sub-sector had the strongest outturn in 2006. The MMA sector as whole averaged just under €42,000 per person employed in 2006, with a similar value for labour productivity in the metal processing sub-sector. The highest labour productivity was in the BCP sub-sector, where it reached €46,700. Labour productivity in the metal products sub-sector was also above average, at €44,600, while the constructional metalwork displayed a much lower labour productivity with just €37,000 of value added created per person employed.

Chart 2.37 EU27 MMA sector labour productivity by product grouping, 2006



## 2.7 Industry structure and size distribution of companies

### 2.7.1 Extent and role of SMEs in the MMA sector

An analysis of the MMA sector by firm size (by employment) (see table below) shows that the sector is dominated by micro enterprises (less than 10 employees), which accounted for 80% of all enterprises in the MMA sector in 2006. At the same time, around 17% of all enterprises in the MMA sector could be classed as small in 2006 (10-49 employees). Thus, over 95% of all MMA enterprises employed less than 50 people in 2006; 3% could be classed as medium-sized (50-249 employees), while only around ½% of enterprises were large (250+ employees). The distribution of firms by size across the MMA sector is very similar to the distribution in manufacturing as a whole, where 81% of enterprises were micro-sized in 2006, and less than 1% was large. In both cases SMEs accounted for over 99% of all enterprises.

The similarities between the MMA sector and manufacturing tend to stop there. When looking at output (turnover) and value added, SMEs play a more significant role in the MMA sector, accounting for around 75% of each in 2006 compared to 40-45% in manufacturing. Compared to their share of enterprises, large firms (250+ employees) accounted for a large share of output or value added in the MMA sector in 2006, 23-25%. In manufacturing, large firms accounted for 55-60% of output or value added. Small and medium-sized firms in the MMA sector each accounted for around 30% of output or value added, much larger than their share of enterprises, especially in the case of

medium-sized enterprises. Only 13-15% of output or value added came from micro enterprises in 2006. In total, firms with less than 50 employees accounted for 42-45% of output or value added in the MMA sector in 2006, compared to 18-23% in manufacturing.

Table 2.7 Comparison of the MMA sector with manufacturing by firm size, 2006

<b>Comparison of MMA sector and sub-sectors with manufacturing by firm size, 2006</b>					
<b>No. employees</b>	<u>1-9</u>	<u>10-49</u>	<u>50-249</u>	<u>250+</u>	<u>SME share (%)</u>
<b>No. enterprises</b>					
Manufacturing	80.7	14.9	3.6	0.8	99.2
MMA	79.9	16.7	3.0	0.4	99.6
Metal Processing	79.1	17.7	2.9	0.4	99.6
Constructional Metalwork	79.3	17.9	2.6	0.2	99.8
Boilers, containers, packaging	69.6	24.6	5.0	0.8	99.2
Metal Products	83.9	12.9	2.7	0.5	99.5
<b>Turnover (€bn)</b>					
Manufacturing	5.6	12.6	21.2	60.6	39.4
MMA	13.2	29.0	32.7	25.0	75.0
Metal Processing	14.0	29.5	33.7	22.8	77.2
Constructional Metalwork	16.4	36.0	34.3	13.2	86.8
Boilers, containers, packaging	8.7	27.0	32.0	32.2	67.8
Metal Products	12.3	22.3	30.3	35.1	64.9
<b>Value added (€bn)</b>					
Manufacturing	7.3	15.5	22.5	54.6	45.4
MMA	15.0	32.1	29.4	23.5	76.5
Metal Processing	16.5	34.2	29.1	20.2	79.8
Constructional Metalwork	17.7	39.0	30.2	13.1	86.9
Boilers, containers, packaging	10.6	28.5	32.2	28.6	71.4
Metal Products	13.5	25.0	27.6	33.9	66.1
<b>Employment (m)</b>					
Manufacturing	13.9	20.4	25.1	40.6	59.4
MMA	20.8	32.5	27.9	18.8	81.2
Metal Processing	23.8	38.4	23.8	14.0	86.0
Constructional Metalwork	24.8	38.9	26.4	9.9	90.1
Boilers, containers, packaging	11.4	29.0	32.1	27.4	72.6
Metal Products	22.5	15.1	32.7	29.8	70.2
Source(s) : Eurostat; CE calculations.					

The importance of SMEs to output and value added in the MMA sector is mirrored in employment, where SMEs account for 81% of all those employed. This is a considerably greater share than for manufacturing, where SMEs employ roughly 60% of the workforce. Breaking it down further, firms with less than 50 employees account for over half of those employed in the MMA sector. Large firms account for just 19% of employment in the MMA sector; in manufacturing it is around 40%. In manufacturing and the MMA sector, medium-sized firms account for 25-28% of employment.

#### *MMA sub-sectors*

SMEs account for over 99% of all enterprises in the four MMA sub-sectors. While the distribution of firms by size in the metal processing and constructional metalwork sub-sectors is virtually identical to that for the MMA sector as a whole, the BCP and metal products sub-sectors deviate a little from the MMA average. A slightly higher proportion of firms in the BCP sub-sector are small or medium (30% compared to 20% for the whole MMA sector), while a smaller share are micro-sized (70% compared to 80% for the whole MMA sector). In contrast, the metal products sub-sector is more skewed towards micro-sized firms, with 84% classed as micro and just 13% classed as small (and 3% as medium).

While SMEs account for 75% of turnover in the MMA sector, there is some variation across the sub-sectors. At the top end, SMEs in Constructional Metalwork account for 87% of turnover, while, at the bottom end, SMEs in Metal Products account for just 65% of turnover.

In Metal Processing, medium-sized firms account for the largest share of turnover (34%), followed by small firms (30%), then large (23%) and lastly micro-sized firms (14%). That ranking and these shares are virtually identical to that for the MMA sector as a whole. This is not the case for the other sub-sectors.

In Constructional Metalwork large firms account for a much smaller share of turnover (13%), while the largest share is generated by small companies (36%), just ahead of medium-sized firms (34%).

Meanwhile, in the BCP and metal products sub-sectors, large firms are the dominant force, generating 32-35% of turnover, followed by medium-sized firms, which are responsible for 30-32% of turnover (although in the case of the BCP sector, the difference in the shares of large and medium-sized firms is very small). Micro-sized firms account for the smallest share of turnover, particularly in the BCP sub-sector where, at under 9%, it is noticeably lower than that for the whole MMA sector.

As with turnover, although SMEs account for 77% of value added in the MMA sector, there is some variation across the sub-sectors. SMEs in Constructional Metalwork account for 87% of value added, while SMEs in Metal Products account for just 66% of value added.

In the MMA sector as a whole, small and medium-sized companies generate most of the value added, accounting for 32% and 30% respectively. Large firms account for 24% while micro-sized firms generate just 15%. Looking at the sub-sectors, Metal Processing resembles this breakdown very closely. The other sub-sectors less so.

In the constructional metalwork sub-sector small and medium-sized firms account for the largest shares of value added, 39% and 30% respectively, as they do in the MMA sector as a whole. However, the noticeably higher share from small firms is at the expense of

large firms, which are responsible for just 13% of value added (compared to 23% for the whole MMA sector), less than that from micro-sized firms.

In the BCP and metal products sub-sectors, small firms account for smaller shares of value added (just 25-28% compared to 32% for the MMA sector as a whole), while large firms account for larger shares (29-34% compared to 24% across the whole MMA sector). In the BCP sub-sector, medium-sized firms account for the largest share of value added (32%) followed by large firms and then small firms. In Metal Products, large firms generate the largest share of value added, followed by medium and then small firms.

Across the MMA sector as a whole, small and medium-sized firms each account for close to 30% of employment while micro-sized and large firms each account for roughly 20% of employment. SMEs account for 81% of all employment; however, across the sub-sectors this is as high as 90% in Constructional Metalwork and as low as 70-73% in the BCP and metal products sub-sectors.

Small firms account for the largest share of employment in Metal Processing (38%). However, micro-sized firms account for 24% (compared to 21% for the MMA sector as a whole), the same-sized share as medium-sized firms (24% compared to 28% for the whole MMA sector). Large firms account for the smallest share of employment.

It is a similar picture for Constructional Metalwork, where the largest share of the workforce is employed by small firms (39%) and large firms account for the smallest share. Medium-sized firms account for a slightly larger share than micro-sized firms.

The pictures for the BCP and metal products sub-sectors are different, with medium and large-sized firms employing larger shares of the workforces. In both of these sub-sectors, medium-sized firms are responsible for 32% of employment, while large firms account for 27-30%. An additional point of interest is that micro-sized firms in the BCP sub-sector employ just 11% of the workforce (compared to 21% across the whole MMA sector), while in Metal Products, small firms employ just 15% of the workforce (compared to 32% for the MMA sector as a whole).

Responses from the first questionnaire to national associations revealed:

*In Germany, Italy and France 90% of MMA companies are privately owned SMEs. A very small percentage of companies operating in these countries are SMEs with venture capital/ private equity investments.*

*Financing*

*The questionnaire answers reveal a lot of variation between financing opportunities across countries and type of companies.*

*In Germany, 50% of the funds of SMEs used for operation and investment come from equity, while only 25% are derived from bank loans. Operating cash flows account to 25% of financing. Large firms, on the other hand rely on bank loans (50% of funds) to finance their operations and investment. Equity accounts for 30%, while the operating cash flow for 20%.*

*In Italy both SMEs and large firms rely on bank loans for financing. Around 63% of SMEs financing comes from bank loans. For large firms the percentage is around 76.7%. Equity accounts for around 23% of financing for both SMEs and large firms.*

*Austria has a more even distribution of financing opportunities for SMEs. Equity accounts for 33.5%, bank loans for around 27.5%. For large firms, however, equity appears to be the main source of financing, accounting for 42.5% of total funds.*

*Unfortunately, no questionnaire responses are available for France and Belgium.*

Interview responses from MMA firms revealed:

*Companies' source of funds*

*The main source of funds for companies in the MMA sector that were interviewed is bank finance. Some also rely on retained profits and only two (from seven) reported resorting to the owner's capital to finance operations and investment.*

*For the most part, the interviewed businesses believe that the growth of their business is not affected by difficulties obtaining finance.*

## 2.8 Trade

*Note*

*Trade data for the metal products, BCP and constructional metalwork sub-sectors were collected from Eurostat's COMEXT database. Data for the metal processing sub-sector were not available. The analysis of trade here, therefore, is on the three sub-sectors for which data were available. Analysis for the MMA sector, as the sum of these three sub-sectors, is also presented.*

In 2008, the EU27 exported roughly 32 million tonnes (mt) of MMA (Constructional Metalwork, BCP, and Metal Products) products. Of those 32 mt, just over 7 mt were exported to countries outside the EU, while 25 mt were intra-EU exports.

Meanwhile, the EU27 imported 33.5 mt of MMA products in 2008. Just over 9 mt were from outside the EU while around 24 mt were intra-EU imports. The difference between intra-EU exports and imports is due to measurement error and rounding.

Table 2.8 Member States' shares of MMA exports and imports (by volume), 2008

<b>MEMBER STATES' SHARES OF MMA EXPORTS AND IMPORTS (BY VOLUME), 2008</b>						
	<u>share of MMA exports</u>			<u>share of MMA imports</u>		
	<u>Total</u>	<u>Intra-EU</u>	<u>Extra-EU</u>	<u>Total</u>	<u>Intra-EU</u>	<u>Extra-EU</u>
Austria	4.9	4.7	5.4	4.3	5.0	2.4
Belgium	6.5	7.5	3.2	6.4	6.7	5.5
Bulgaria	0.4	0.4	0.5	0.7	0.6	1.2
Cyprus	0.0	0.0	0.0	0.2	0.2	0.4
Czech Republic	7.1	8.3	2.9	3.5	4.2	1.7
Germany	21.2	20.7	22.6	16.4	15.5	18.7
Denmark	2.0	1.8	2.5	2.8	3.1	2.1
Estonia	0.4	0.4	0.3	0.3	0.3	0.2
Spain	8.0	8.0	7.9	11.8	13.1	8.4
Finland	1.0	0.8	1.5	1.2	1.1	1.2
France	6.2	6.0	7.1	10.9	12.4	7.0
United Kingdom	4.1	3.5	6.0	8.3	5.7	15.2
Greece	0.5	0.4	0.7	1.7	1.6	1.8
Hungary	1.6	1.7	1.3	1.6	1.8	1.0
Ireland	0.3	0.3	0.1	1.4	1.4	1.3
Italy	13.0	11.7	17.5	5.4	3.3	10.9
Lithuania	0.5	0.4	0.6	0.7	0.7	0.6
Luxembourg	0.5	0.6	0.0	1.4	1.9	0.0
Latvia	0.3	0.3	0.5	0.3	0.4	0.3
Malta	0.0	0.0	0.0	0.1	0.1	0.1
Netherlands	6.0	6.6	4.1	6.3	6.1	6.8
Poland	7.4	8.0	5.5	5.0	5.2	4.2
Portugal	1.8	1.7	2.3	1.2	1.3	0.7
Romania	1.0	1.1	0.9	2.5	2.4	3.0
Sweden	2.1	1.7	3.5	2.6	2.4	3.2
Slovenia	1.2	1.0	1.7	0.9	0.9	0.8
Slovakia	2.0	2.2	1.2	2.3	2.7	1.2
<b>Total (mt)</b>	<b>32.2</b>	<b>25.0</b>	<b>7.2</b>	<b>33.5</b>	<b>24.3</b>	<b>9.2</b>
Note(s) : MMA sector is Constructional Metalwork, Metal Products and the BCP sub-sector, and excludes Metal Processing; trade data for Metal Processing were not available. Figures for intra-EU exports and imports are derived from sub-sector totals which are calculated from country values as given by Eurostat. Differences are due to measurement error and rounding. Source(s) : CE calculations from Eurostat (COMEXT) data.						



### 2.8.1 Exports

Germany and Italy were the largest exporters, accounting for 21% and 13% of all exports in 2008. The EU5 accounted for around 53% of all exports, with Spain responsible for 8%, France just over 6% and the UK just 4%. Austria, Belgium and the Netherlands each accounted for 5-6½%, and 17½% in total. With the exception of Poland and the Czech Republic, which each accounted for 7-7½%, all other countries accounted for 2% of total exports or less.

However, when comparing countries shares of intra-EU and extra-EU exports there are a few notable differences. The two most notable are Italy and the Czech Republic. Italy accounted for 12% of intra-EU exports but 18% of extra-EU exports in 2008. The Czech Republic accounted for over 8% of intra-EU exports but just 3% of extra-EU exports. Similarly, Belgium accounted for 7½% of intra-EU exports but 3¼% of extra-EU exports. The shares for Poland, the Netherlands and the UK all differed by 2½ pp. For all other Member States, the shares of intra-EU and extra-EU exports varied by less than 2 pp.

Focusing on just extra-EU exports, Germany and Italy are the largest exporters. In 2008 Germany and Italy were responsible for 23% and 18% of extra-EU MMA exports (by volume). Spain, France and the UK each accounted for 6-8% and so the EU5 accounted for 61% of total MMA exports to outside the EU27. Austria, Belgium and the Netherlands each accounted for 3-5½% and 13% combined. Poland was responsible for 5½% of MMA exports to outside the EU27, and in total the newer Member States of the EU12 accounted for 15½%.

Of the 25 mt of MMA goods exported within the EU, the EU5 are responsible for half, with Germany the largest intra-EU exporter (21%). The shares of France, Italy and the UK were all less than their shares of extra-EU exports. Collectively, Austria, Belgium and the Netherlands accounted for a larger share (19%) of intra-EU exports than extra-EU exports because of larger shares from Belgium and the Netherlands. Similarly, the newer Member States of the EU12 accounted for a larger share (24%) of intra-EU exports than extra-EU exports because of larger shares from Poland and the Czech Republic.



all MMA imports went to the EU5. Belgium and the Netherlands each took in around 6¼-6½% of total imports, and together with Austria (4¼%) they accounted for 17% of MMA imports in 2008. The newer Member States of the EU12 accounted for 18% of all MMA imports, with Poland (5%) and the Czech Republic (3½%) responsible for around half of that.

When comparing countries shares of intra-EU and extra-EU imports there are some notable differences. The two most notable are Italy and the UK. Italy accounted for 3¼% of intra-EU imports but 11% of extra-EU imports in 2008. The UK accounted for almost 6% of intra-EU imports but 15% of extra-EU imports. It was the same for Germany, albeit with a smaller difference. In contrast, Spain and France both took in 12-13% of intra-EU imports but just 7-8% of extra-EU imports.

Of the 9.2 mt of MMA goods imported from outside the EU, Germany (19%), the UK (15%) and Italy (11%) accounted for the largest shares. In total, the EU5 took in 60% of all extra-EU imports. Austria, Belgium and the Netherlands took in another 15% combined. The EU12 was also responsible for 15% of extra-EU imports, with Poland (4¼%) and Romania (3%) the main destinations.

Meanwhile, with regard to intra-EU imports, Germany (15½%), Spain (13%) and France (12%) accounted for the largest shares, and the EU5 as a whole accounted for exactly half. France's and Spain's shares of intra-EU exports were considerably larger than their shares of extra-EU imports. For Italy and the UK, the reverse was true. Meanwhile, Austria, Belgium and the Netherlands each accounted for 5-7% of intra-EU imports, and collectively took in just under 18%. The newer Member States of the EU12 accounted for just over 19% of intra-EU imports, with Poland taking in 5¼% of all extra-EU exports, and the Czech Republic 4¼%.

Responses from the first questionnaire to national associations revealed:

*Imports*

*Germany stands out as a major supplier of metals imports for the interviewed countries. In Austria, German MMA imports account for 49% of total imports. In France and Italy, imports from Germany account for 25% and 24% of total imports respectively. China is seen as an important supplier of imports only in Italy and France, while Turkey appears to be an important supplier to only the German market.*

Main import suppliers (as answered in questionnaire)



output and two-thirds of employment. Other key regions include Austria, Belgium and the Netherlands, which together account for another 8-9% of output and around 6% of employment. The key regions from the EU12 are Poland and the Czech Republic, whose individual shares of output are similar to those for Austria, Belgium or the Netherlands, while their employment shares are greater. Nevertheless, the MMA sector in the Member States of the EU12 accounts for a larger share of employment than output. Responses to the questionnaire suggest that the geographical distribution of the MMA sector within countries varies. In the case of Germany or Italy, for example, it tends to be centred around two or three clusters, while in Lithuania, Belgium and France it tends to be more spread out.

With regard to the four sub-sectors identified in this report, the MMA sector is dominated by the metal processing sub-sector, which accounts for around 40% of output and employment. The metal products and constructional metalwork each account for around 25% of output. However, constructional metalwork is far more labour intensive, employing around twice as many as metal products. Metal products is the star performer with regard to profitability and productivity: it was the only sub-sector to have above average rates for both. The BCP sub-sector appears considerably less profitable than the other sub-sectors, but it does appear to make the best use of its workforce, with the highest labour productivity of the four sub-sectors.

Germany, Italy and France are the dominant producers, particularly Germany and Italy. Around 50% of output in metal processing and metal products is attributable to Italy and Germany. In the other two sub-sectors they account for 35-40% of output. Across all the sub-sectors, the share of output produced by the French sub-sector varies from 10-23%. Similarly for employment, Germany and Italy are the major regions in metal processing and metal products, with just over 40% of the workforce in each sub-sector. The exceptions are constructional metalwork, where Germany and Italy account for just 34% of the workforce and have similar individual shares to Spain; and the BCP sub-sector, where France is the dominant sub-sector and employs the same number as Italy and Germany combined. The BCP sub-sector is the only one where France is the dominant region.

Almost all MMA enterprises can be classed as SMEs and they dominate the sector, with 75-80% of both output and employment. Thus, SMEs are important to the MMA sector, both in an absolute sense and in comparison to manufacturing as whole, where SMEs account for just 40-45% of output and 60% of employment. Interview responses indicate that bank finance is the most important source of funds for MMA companies. However, other sources (equity, retained profits) are used while questionnaire responses indicate significant variation across Member States and firm size. In Germany equity is the dominant source of finance for SMEs; in Italy it is bank loans. For the most part, interviewed businesses believe that the growth of their business is not impeded by funding constraints.

Trade in MMA goods in the EU is dominated by between five and eight producers. The EU5 typically accounts for just over 50% of export and import flows (with Germany and Italy the major players). If Austria, Belgium and the Netherlands are added in, this share increases to around 70%.

Germany and Italy are the largest exporters to EU and non-EU countries, although Germany accounts for nearly twice as much as Italy. Behind them, a half dozen or so Member States account for 4-8% of EU total MMA exports each. The destination of exports varies, however. Some Member States (Belgium, Czech Republic, Netherlands) account for noticeably larger shares of intra-EU exports than extra-EU exports, while the UK, for example, accounts for a much larger share of extra-EU exports than intra-EU exports. Questionnaire responses indicate that Germany is the most important export market; for Germany, the US is the most important export market.

Germany is the largest importer of MMA goods, from both EU and non-EU countries, followed by France and Spain. Behind them, a half dozen or so Member States account for 4-8% of EU total MMA imports each. Similar to exports, however, the source of imports varies. Some Member States (Austria, Spain, France) account for noticeably larger shares of intra-EU imports than extra-EU imports, while the UK and Italy, for example, account for a much larger share of extra-EU imports than intra-EU trade. Questionnaire responses indicate that Germany is the most important supplier of imported MMA goods; for Germany, Italy, Spain and Turkey are the most important sources of imports.

## 3 Competitive position of the sector

A detailed review is made of the performance and competitive makeup of the MMA sector using economic theory as appropriate. The business models of firms, and their main sources of competitiveness are identified and explored. Particular attention is given to how the competitiveness of the sector is influenced by its powerful large supply chain partners, including metal suppliers and end users. The productivity of the industry by subsector is assessed, relative to EU manufacturing as a whole, and other trends in the manufacturing process are identified. The impact that innovation and levels of Research and Development have on the prosperity of the sector is also considered. The chapter concludes by summarising the main competitiveness challenges and prospects that the sector faces.

### 3.1.1 The Competitive Makeup of the Industry

Before the competitive nature of the MMA sector can be explored it is important to outline some of its key characteristics.

The MMA sector manufactures products or inputs that are used in other engineering sectors, i.e. to a large extent it is a components industry with many suppliers of intermediate products (Orgalime, 2006).

The MMA sector links many industries and hence plays a key role in the infrastructure and competitiveness of EU manufacturing as a whole.

It is positioned between large supply chain partners at each end.

The sector is a heterogeneous, with a wide and differentiated product range (Orgalime, 2005).

The output of the sector is sensitive to overall manufacturing activity.

Most MMA manufacturers are relatively unknown due to their small size and large number.

### 3.1.2 Concentration in the MMA Sector

The MMA sector is made up predominantly of SMEs and there are very few large firms. The high number of SMEs in the MMA sector can be explained by their relative production flexibility and their ability to produce very specialised (and increasingly bespoke) metal products that industry requires. Although SMEs dominate the industry, a relatively small number (less than 1%) of large firms play a significant role in the sector, accounting for a quarter of MMA turnover. This suggests that large firms have

Table 3.1 Recent M&A activity in the MMA sector

Target Firm	Business Activity	Acquired by	Business Activity	Year
Galvex Services (Estonia)	Produces corrosion resistant pure zinc coated sheet steel.	ArcelorMittal (Luxemburg)	Steel producer and manufactures galvanized strip and coils.	2008
Norddeutsche Affinier AG (Germany)	Produces and markets copper cathodes, copper wire rod and copper formats as well as semi finished copper.	Salzgitter AG, (Germany)	Production and marketing of different steel products, including flat bar steel and pipes.	2008
<i>Luvata</i> (Luxemburg)	Metal and component fabrication.	<i>Eco</i> (Italy)	Manufacturer of heat exchange products such as coils.	2007
Stamptec (Germany)	Manufacture and sale of pressed metal parts and components.	Voestalpine (Austria)	Manufacture and sale of steel products.	2007
Teksid Aluminum S.r.l. (Italy)	Production of cast aluminum components for the automotive industry	Fiat, (Italy)	Manufacture and sale of automobiles, commercial vehicles, agricultural machinery, and metallurgical products;	2007
Danke Stanztechnik GmbH & Co.KG and Danke Werkzeugbau GmbH & Co.KG (Germany)	Manufacture and sale of pressed metal parts and components.	Voestalpine (Austria)	Manufacture and sale of steel products	2007
Corus Steel – Framing (Corus Steel, UK)	Manufacture and distribution of steel products, including coated and uncoated strip products, profiles and tubular products;	Redrow PLC* (UK)	Acquisition of land and development of and sale or let of residential and commercial property.	2002
Information acquired from EUR-Lex and CELEX databases.				
*To control 50% of Corus Framing.				



considerable market power and enjoy scale benefits, and this is one corner of the MMA sector where SMEs cannot compete.

Evidence suggests that the MMA sector, and its supply chain partners, have become more consolidated in the past decade. The table below shows a selection of the recent merger and acquisition activity that has occurred that was authorised by The Commission.

It can be seen that much of the activity involves horizontal and vertical integration. There is evidence of backward (vertical) integration such as large globalised car manufacturers acquiring smaller firms in the MMA sector, including cast aluminium suppliers or metal parts manufacturers. Motives for vertical integration include economies of scale and scope, cost reduction, feedback and greater control, but a significant incentive for this type of acquisition of MMA manufacturers is to allow the sellers of finished goods to have greater control over their supply chain. This is one reason why the firms that the MMA sector sells to are so powerful, and this creates competitiveness challenges for small independent MMA manufacturers. Similarly, another motive for backward integration of MMA manufacturers might be to prevent individual MMA producers from becoming too large and powerful and exerting too powerful an influence on their supplies – MMA producers have certainly tried to prevent this given the amount of horizontal integration that has occurred amongst MMA manufacturers. Integration by MMA suppliers, such as large steel producers acquiring metals coating firms, can also create problems and loss of power for smaller MMA manufacturers and potentially put them at a competitive disadvantage when they purchase their input materials. Redrow's (a large house builder) 50% vested interest in the framing division of Corus Steel (a large steel producer) is an example of how vertically integrated MMA manufactures are.

Evidence of integration within the MMA sector demonstrates that a degree of consolidation has already occurred, principally to attempt to earn economies of scale, to raise productivity, and to increase their size and power. However, as identified earlier, evidence from the MMA sector suggests that there is scope for further consolidation, especially in the EU12 given the high share of MMA firms and the relatively low share of value added. At a sub-sector level, the constructional metalwork sub-sector appears to have the greatest scope for consolidation given its relatively high proportion of labour use and its relatively low contribution to total MMA output, as identified in Chapter 2.

Interview responses revealed:

*Most interviewed companies believe that competitiveness in their sector would improve if the number of firms was reduced through merger and acquisition.*

*Few companies view merger and acquisition as unnecessary in their sector. However, family ownership and dependence on bank finance make such a process difficult. Some companies find it difficult to raise the external finance necessary for such a process.*

### 3.1.3 Sector Business Models

The business models and strategies of MMA manufacturers will clearly vary from firm to firm but there are a number of key trends in strategy that can be explained using economic theory on competitiveness. In the Resource Based View of the firm put forward by Barney (1991), firms base their competitive strategy on their available unique resources and competencies. According to Barney (1991), firms will achieve a competitive advantage if their resources are valuable, rare, imperfectly imitable and non-substitutable. The Resource Based View is used to help to understand the strategies of MMA manufacturers.

#### *SMEs*

SMEs represent nearly the whole of the MMA sector, 80 per cent of which have less than 10 employees per firm. In terms of output and value added, SMEs in the MMA sector play a much more significant role than they do in the in the EU manufacturing sector as a whole. This stresses the importance of SMEs in the MMA sector and emphasises the need to understand their business models and competitive environment, since their competitiveness has a major impact on the sector as a whole. The SMEs that make up nearly all of the MMA sector typically produce high value-added metal articles. They do so in a relatively labour intensive manner (more so than in manufacturing), but still nevertheless perform well at adding value compared to manufacturing as a whole.

Due to the small size of and focussed nature of SMEs it allows them to be flexible in their production methods and this enables them to manufacture differentiated products to specialised markets in a way that suits clients (such as Just-In-Time systems). Their relatively small size also allows them to develop good relationships with end users or purchasers. As The United Nations (2001, page 2) note, “increasingly the marketplace requires quality and a fast, flexible response to demand”, and SMEs are particularly suited to this. SMEs are also well suited to modifying existing products to the needs of customers (OECD, 2000, page 6). This is an especially important feature of SMEs that is relevant to the MMA sector, given that demand is becoming increasingly bespoke. The structure of the MMA sector allows it to involve clients more in the manufacturing process so that it can supply finished metal articles that are made to specification (Orgalime, 2005). The flexibility of SMEs in the MMA sector, and their close relationships with clients in the supply chain, allows them to adjust quickly to changes in consumer demands and thus appeal to niche markets.

Whilst SMEs appear to be well suited to the MMA sector (and to a large extent they are) their small size does hinder their competitiveness in a number of ways. Firstly, their relatively small size limits the investment they can make in Research and Development, and product and process design. The IEEF (2004) argues the importance of Research and Development and the value-added benefits it can bring to Engineering firms. The IEEF (2004) also notes that engaging in Research and Development allows manufacturers to move up the value chain and protect or enhance their competitive position. SMEs simply do not have the resources (and in some cases readily available expertise) to engage in high levels of innovation and this is a major competitiveness challenge in a sector where

innovation to improve end products and make manufacturing processes more efficient is growing in importance.

### *Large Integrated Firms*

As discussed above, integration of large firms is a trend that has affected the MMA sector over the past couple of decades. A lot of the consolidation that has occurred has meant that the supply chain partners of the MMA sector have become larger and more powerful. According to the (Orgalime, 2008a, page 3) increased consolidation has meant that:

“The Metalworking industry is (and increasingly so) in a sandwich position, which diminishes the range of possibilities to control its fate and influence its business environment...putting pressure on metalworking companies.”

The relatively large size of supply partners compared to the MMA sector as a whole puts pressure on SMEs in the sector in a number of ways (detailed later in section 3.4.1). Given that the consolidation of supply partners is likely to continue, large firms in the supply chain are likely to become more powerful and exert even greater influences over the functioning and competitiveness of the MMA sector.

## 3.2 Barriers to Entry

An entry barrier is anything that places a potential entrant at a competitive disadvantage when compared with the established firm. The main barriers to entry into the MMA sector are identified below.

### 3.2.1 Access to Markets and Tied Distribution Channels

Given that the vast majority of MMA manufactures are part of a string of large supply chain partners including large metals producers at one end and large capital goods manufacturers at the other, a new entrant would have to be confident that it could source its raw material metals competitively, and that it would have an downstream market to distribute and sell its products to. Exclusivity Agreements and established relationships that incumbent MMA producers have with downstream manufacturers may block any potential gaps in this already competitive sector. In any case, the new entrant would find itself competing with a mix of long-standing SMEs, with established manufacturing methods, interrelationships and reputations, as well as larger integrated firms such as large automobile manufacturers (that own and control some MMA manufacturers) that are likely to enjoy first mover and scale advantages.

### 3.2.2 Setup Costs and Availability of Finance

High setup costs involved in setting up a business in the MMA sector might act as a barrier to entry. In the short term relatively large outlays would have to be made to purchase machinery, and these costs would be especially high if the machinery is complex and relatively modern. The current relatively high prices of metals and energy might also make entry less feasible. The present global shortage of credit offered by banks, and the associated financial uncertainty, places a major restriction on the ability of incumbents to cover the above costs and to enter the sector with a credible business plan.

### 3.2.3 Economies of Scale

Economies of Scale occur when the long run average costs of the firm decline as output expands over time. They are likely to act as a significant barrier to entry for new entrants with no previous or similar experience in the MMA sector wishing to compete directly with larger incumbent MMA manufacturers. Economies of scale in production are likely to be lower in the SME sector, though still significant enough to deter entry. As identified earlier, however, it should be noted that economies of scale do not appear to be as important in some geographical areas of the EU MMA sector (such as Italy, where the number of MMA firms is relatively high) and hence economies of scale barriers are potentially less of a hindrance to entry.

### 3.2.4 Geographical Barriers

The complex supply chain that the MMA sector operates in, coupled with trend of increasingly consumer driven product specialisation, might mean that (in the short term at least) a new entrant would need to physically set up in close geographic proximity to supply chain partners to develop effective relationships; especially downstream partners where design input and production innovation are important.

### 3.2.5 Legal Barriers

Legal barriers include Health and Safety legislation, environmental regulations, fiscal laws, building planning and regulations, and competition policy.

### 3.2.6 Research and Development and Intellectual Property

The MMA sector contains some very specialised firms with high levels of continuous Research and Development and downstream client involvement. The IEEF (2004) suggests that the emphasis of manufacturers is increasingly on incremental product development and process innovation. The high levels of continuous innovation and specialisation required in the MMA sector might act as a barrier to entry if new entrants are unwilling to commit to high levels of innovation. Also, a potential entrant is even less likely to enter into an industry where innovation and ideas are important if their Intellectual Property is not adequately protected (to prevent counterfeit products entering the market for example), and is something that certain MMA producers have been concerned about. A new entrant would need strong reassurances that its future innovations would be protected, and given that concerns exist it may act as a significant barrier to entry.

### 3.2.7 The Global Economic Slowdown

The current economic climate is likely to act as a significant barrier to entry into the MMA sector. There is a currently a lack of demand in the MMA sector, due mainly to a fall in demand for finished capital goods such as automobiles, where demand is highly sensitive to the functioning of the financial markets and to normal access to credit from financial institutions (Orgalime, 2008b). An offshoot of low consumer confidence and

demand in key downstream sectors is excess MMA manufacturing capacity, limiting the potential and motivation for new entry into the sector.

### 3.3 The MMA Supply Chain Position

#### 3.3.1 The MMA sector and the supply chain

Orgalime (2008a) argues that the MMA sector is an essential link in the EU's manufacturing landscape, and transforms metals into components and finished products for most other sectors of manufacturing. DTI (2002) also note that the metals sector is critical as the industry is a feeder for many key supply chains. To put this into perspective, examples of some of the manufacturing industries it supplies are given below (Orgalime, 2008a)

- Components for the automotive, aerospace and transport and mechanical engineering.
- Steel profiles and sheets for steel frame buildings, reinforcing bars, steel frame infrastructure and cladding for building.
- Vessels and containers for the pharmaceuticals, chemicals and oil sectors.
- A wide range of finished products and accessories used by and industry and consumers such as screws, tools and fasteners.

This suggests therefore that the efficiency of the MMA sector, and the cost and quality of its output, has the potential to influence the competitiveness of EU manufacturing as a whole. Moreover, the MMA sector has a marked influence on the efficiency of manufacturers because it interlinks many sectors of the supply chain and allows vital interaction between producers and end users to occur. This in turn helps to create an efficient industrial network and an environment that allows product and process development and innovation to flourish.

It has already been outlined in the previous section that the MMA sector is positioned between large supply-chain partners. Firms in the MMA sector purchase inputs such as steel and energy from large suppliers, which are then processed to add value, and are then sold to major capital goods producers such as the automotive and aerospace engineering industries. Approximately 40% of output (tools and finished metal goods including fixings, fasteners and gardening products) is distributed to consumers predominantly via large retail outlets or distributors (Orgalime, 2006).

The MMA sector thus plays a crucial role in the manufacture of capital goods as a whole and this should not be underestimated. Supply chain clients with complex end products rely heavily on a well functioning and efficient industrial network, and the MMA sector provides the environment for this to occur. It is a core driver of innovation due to the sectors ability to develop in depth relationships with clients and specialise output to reflect customer needs in a flexible and speedy fashion.

A significant change that has occurred in the manufacturing supply chains in the past decade has been that the relations between of MMA manufacturers and clients have become deeper. The DTI (2002) identify the development of the metals industry, and

even greater integration of the metal industry needs in designing an optimal supply chain, as an important means of improving the performance of the UK automobile sector. Not only is the MMA sector now required to supply bespoke finished metal articles, but they are now more involved in the design and marketing of the products (Orgalime, 2008a) and whilst this places constraints and a loss of control on the MMA sector it can also be beneficial. According to the IEEF (2004) such inter-linkage can be beneficial as it can serve to cement relationships with key customers, increase the value of end products and most importantly create dependency.

### 3.3.2 Supplier Industries





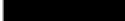
Responses from the first questionnaire to national associations indicated:

#### *Bargaining position*

*The MMA sector has little or no bargaining power with suppliers. Energy suppliers in particular seem to have all the bargaining power across all responses. MMA companies appear to have some bargaining power with suppliers of equipment and transport services.*

The bargaining power of the MMA sector (as answered in questionnaire)

	Suppliers				Customers
	Raw Materials	Equipment	Energy	Services (Transport)	Finished Products
<b>Germany</b>					
<b>Italy</b>					
<b>France</b>					
<b>Austria</b>					
<b>Belgium</b>					
<b>Lithuania</b>					

 suppliers/customers have all the bargaining power  
 suppliers/customers have more bargaining power  
 bargaining power is roughly equal between suppliers/customers and the MMA sector  
 the MMA sector has more bargaining power  
 the MMA sector has all the bargaining power

#### *Raw materials*

*Raw materials typically account for the highest input costs, as a percentage of turnover. In Belgium, raw material costs are as high as 75% of turnover, dropping to 50% in Germany and averaging around 40-50% in France and Italy. Equipment costs are the highest in Italy (20%) and Lithuania (15%), however they do not go above 5% in the other countries that responded.*

*Steel, cast iron and aluminium are the most important raw materials imported by the MMA sector in Lithuania, Belgium and Italy. Steel is the single most important raw material needed by the French MMA industry. These raw inputs are imported because often they are not available at a national level.*

*For Germany, the most important inputs for the MMA sector are wire rod, aluminium*



*and copper products, which are imported because the import price is cheaper than the domestic price.*

Interview responses revealed:

#### *Prices and bargaining power*

*The price level set by major suppliers is viewed by the majority of interviewed firms and associations as an important factor influencing their competitiveness. The only exception is construction accessories industry (such as concrete anchors, components for façade claddings), where supplier prices bear little importance.*

*The bargaining power of the sector varies somewhat across different sub-sectors. The general trend appears to be that firms have less or equal bargaining power with respect to principal suppliers. The only exception occurs in the confectioning of concrete reinforcing steel sector in Germany, which has more bargaining power than its suppliers.*

#### *Steel*

Steel is a major input into the MMA sector and according to Orgalime (2006) two thirds of raw steel produced in the EU is consumed by the MMA sector. The EU steel sector has become increasingly concentrated between 1993 and 2000, and this trend has continued. In 1980, Europe's five largest steel companies accounted for 30% of steel production in the EU compared to over 60% nowadays. Merger activity in the steel sector has been extensive (some of the major merger activity involving steel producers is detailed above) and this has led to the creation of some very large and powerful suppliers to the MMA sector including Arcelor-Mittal, Corus (Tata Steel), ThyssenKrupp Stahl and Riva. In the eyes of SME firms in the MMA sector these companies are "mega-sized companies...based on an economy of scale philosophy" (Orgalime, 2008a).

The steel industry has a number of competitiveness challenges itself that impact directly on the competitiveness of the MMA sector, especially issues that create increased uncertainty and cost for steel producers. The table below shows how the competitiveness challenges facing the steel industry have similar and/or knock on effects on the MMA sector.

The relatively large size of steel input suppliers to the MMA sector compared to the relatively small size of MMA producers makes it difficult for SMEs to earn economies of scale from their inputs and engage in effective bargaining. The MMA sector has a distinct lack of control over its input costs and this is seen as very restrictive and a major threat to its competitiveness.

Table 3.2 Knock-on effects from steel sector competitiveness challenges to the MMA sector

Steel Sector Competitiveness Challenge	MMA Sector Competitiveness Challenge
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Steel Sector Competitiveness Challenge	MMA Sector Competitiveness Challenge
<p>Competition from China and emerging economies such as Brazil and India</p> <p>Decreasing EU share in world production</p> <p>Decision power moves out of Europe</p>	<p>As steel production moves outside of the EU, the close relationship it has with the MMA sector (which has been identified as being important for the efficient functionality of the manufacturing supply chain as a whole) would be lost. This might affect MMA producers ability to innovate.</p>
<p>Imbalances in demand and supply for raw materials</p>	<p>The issue of whether the EU's metals and metal products enterprises will be able to secure supply at affordable prices has clear downstream consequences (Eurostat, 2007). Any increases in costs brought about by rises in raw material costs that cannot be absorbed by steel producers are likely to be passed on the MMA sector in the form of higher input prices. The relatively price elastic nature of demand of many MMA end products would make it difficult for MMA producers to pass these cost rises on to consumers or clients. Further merger activity in the raw materials sectors may lead to continued price increases for the EU steelmakers' raw materials, which would have knock on effects in the MMA sector.</p>
<p>Increasing freight rates and malfunctioning transport markets and logistic infrastructure</p>	<p>The MMA sector operates in a supply chain that requires flexibility and fast delivery and feedback speeds, and any delay to this brought about by poor logistical infrastructure would hinder its competitive advantage.</p>
<p>Access to energy and malfunctioning energy markets</p>	<p>Again, if restricted energy markets, or lack of energy, result in cost rises for steelmakers they are likely to be passed on the MMA sector, especially to SMEs with relatively weak bargaining power. The MMA sector is effectively hit twice by artificially high energy costs in the form of higher input prices and higher costs of manufacturing the metal itself.</p>
<p>Environmental regulations</p>	<p>Environmental regulations that discourage investment or the expansion of steel production, or increase costs, are likely to hit the MMA sector. Similarly, environmental regulations might limit what a MMA firm is able to manufacture. There is evidence in some Non-EU countries, such as China, of state involvement (by subsidising energy costs and tax rebates on exports) to support metals manufacture in order to promote economic growth (Metal Worker, 2009).</p>
<p>Operating On An Uneven Playing Field</p>	<p>Similarly, emissions regulation and Health and Safety legislation is significantly less stringent and costly in Non-EU emerging economies. This creates a very uneven playing field and puts EU steel makers at a competitive disadvantage. Again, if metals of comparable quality can be produced in China more cheaply than they can be made in the EU, the lower cost will be reflected in the downstream</p>



Steel Sector Competitiveness Challenge	MMA Sector Competitiveness Challenge
	Chinese MMA sector and beyond. MMA imports from China into the EU have increased rapidly in recent years (see later section on Trade), and lower cost has been a main driver behind this increase.

### Energy

Compared with energy-intensive sectors such as basic metal production, the metal processing sector has generally a lower share in energy consumption and in CO<sub>2</sub>-emissions.

Within the metal processing industry energy is mainly used for:

- drives (machine tools, logistics, ventilation, pumps),
- compressed air (machine tools, hand workshop tools, logistics) and
- process heat (cleaning of parts, varnishing respectively drying).

The metal processing industry uses technologies such as boring, turning, milling, eroding, planing, lapping, broaching, levelling, sawing, grinding, sharpening, welding, splicing, cutting of and writing on metals by means of laser beams. Technologies such as varnishing and cleaning are used additionally. Main supporting processes are the cooling and lubrication of the machining process, air compression (needed for pneumatic valves, sealing air etc.) and ventilation (extraction from machines and room ventilation).

However, supply chains in the metal processing industry are widely distributed. Single enterprises are often highly specialised in a few processes and cover only a small part of the supply chain. Companies regularly collaborate with a number of partner enterprises.

### General energy challenges for the sector

- Huge differences still exist between the European countries (with respect to regulations, state of the art, awareness);
- Some energy saving measures are well-known. But there is no budget for SMEs to implement the measures. Their budgets are needed for major investments in new products and manufacturing technologies. The return on investment is too low or payback periods are too long. Energy efficiency requires very often long-term investments and continuing improvements;
  - There is a limited availability of capital for investments in energy efficiency (equity and loans);
  - There is not enough capacity within SMEs to manage all requirements (customer's demands, legal compliance, employees' needs, energy efficiency etc.) with a high-level awareness and elaborateness;
- In some cases long-term power-supply contracts avoid energy savings (the delivered quantity shall not exceed or fall short of the ordered quantity). SME do have a little negotiating power to change power-supply contracts. In some countries (e. g. Hungary) the liberalisation of the energy market is not implemented yet.

- SMEs still face confusing messages regarding European and National energy policy, the scientific background of climate change and the effectiveness of energy saving technologies.

### 3.3.3 Interviews with suppliers

This section analyses the interview answers of suppliers to the MMA sector. Unfortunately, only two interviews were carried out with suppliers: the European Association of Steel Service Centres (EASSC) and Wirtschaftsvereinigung Stahl (the German Steel Trade Association).

#### *Output sold to the MMA sector*

EASSC members supply hot-rolled, cold-rolled and coated steel coils, strips, sheets and blanks to the MMA industry. The percentage of output supplied to MMA manufacturers depends on the specialisation of the EASSC member companies (between 10% and 70%). Members of the German Steel Trade Association generally supply rolled steel, such as hot white strip and rolled wire, to MMA companies; the percentage of output supplied is around 25-30% of total output.

According to the German Steel Association, 65% of the sales made to MMA sector are to manufacturers operating within the same country, while 25% are made to manufacturers based in the EU15.

#### *The process of trade between suppliers and the MMA industry*

Trade relationships between the MMA sector and suppliers can be both transaction-based, relying on contractual agreements focusing mainly on price, and relationship-based, drawing on past experience and placing importance on quality and reliability, depending on the sub-sector, product and market environment. EASSC points out that transaction-based relationships may also focus on availability and quality, not just price.

#### *Bargaining power with respect to the MMA industry*

Both interviewees said that, generally, the bargaining power is roughly equal between suppliers and the MMA sector, but the picture is more diverse when looking at different sub-sectors. When looking at the influence the industry/ supplier firms have over the prices they charge to the MMA customers, a similar picture emerges.

#### *Prices and competitiveness*

Both EASSC and the German Steel Trade Association point out that the prices the industry/firms face from suppliers have an important impact on their competitiveness. Furthermore, both associations agree that their members face competitive pressures from other companies based in the EU15. Product prices, manufacturing costs, product and service quality are also seen as important factors affecting industry/firm competitiveness.

#### *Production techniques*

Both associations expect a slow change in production techniques employed by their members over the next decade.

#### *Technological change and competitiveness*

In order to remain competitive in the face of technological change the interviewed associations underlined the importance of investing in best-practice techniques and R&D (both in-house and external R&D).

#### 3.3.4 Customer Industries

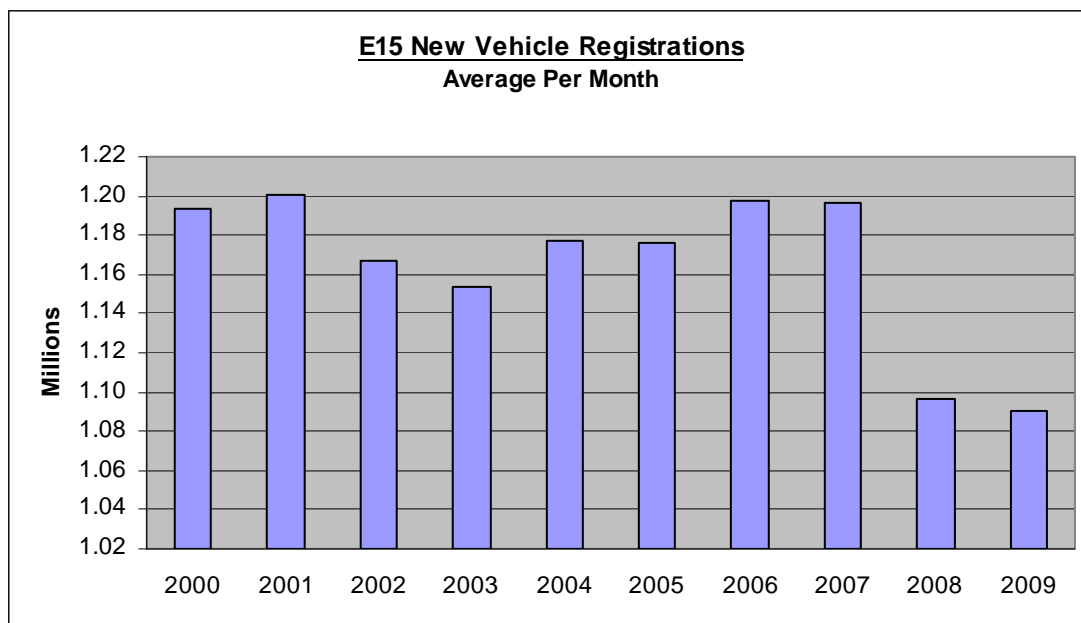
Not only are the upstream supply chain partners of the MMA sector large and powerful, but so too are many of its downstream partners (or clients). Clients of the MMA sector include automobile manufacturers, aerospace, transport and mechanical engineering sectors. Many of these partners are large and globalised, especially in the automobiles sector, and this again limits the bargaining power of MMA manufacturers.

#### *The Automobile Sector*

The automobile sector purchases a wide range of metal products from the MMA sector ranging from major engine parts to technologically advanced coated surface metals. The vast majority of such items are manufactured and processed further by the largely globalised automobile sector and its partners to add further value and form the overall car package. A key feature of the automobile sector (like many other MMA clients) is that it itself operates in a very competitive environment and faces many competitiveness challenges of its own. Many segments of the automobile sector have become increasingly price sensitive and this has been driven by the influx of cars manufactured in Non-EU countries and consumer credit restraints. The pressure that this puts on the automobile sector to cut costs and remain competitive is also felt by the MMA sector, where the demands of automobile clients are becoming more differentiated and complex.

It is well documented that the automobile sector has been hard hit by the global economic slowdown and the tight availability of car finance, resulting in a stark fall in car production.

Chart 3.1 New vehicle registrations



(Compiled using figures from European Automobile Manufacturers Association)  
Average monthly E15 new car registrations in millions per month in the given calendar year. 2009 Figure is up until May only.

The ACEA describe the automobile sector as the “engine of manufacturing in Europe”, creating 10 million indirect jobs in its supply chain. The sector has significant multiplier effects for other sectors and industries, particularly for small and medium sized businesses ([www.europarl.europa.eu/news](http://www.europarl.europa.eu/news)), making the MMA sector especially vulnerable to the fall in car demand. The EEF (2009) notes that companies in the automotive supply chain have felt the full impact of the production holidays of large car manufacturers. Similarly, The European Metalworkers Federation (2009) states that the dramatic fall in new vehicle registrations has had a “devastating impact in the supply chain”, and this has to an extent been witnessed in the MMA sector. According to business tendency surveys carried by Orgalime (2006), the major obstacles for future expansion of the MMA sector have switched from concerns about labour shortages and capacity concerns, to lack of demand.

#### *Other Clients*

The sectors of many of the other MMA supply chain clients have also been impacted by the economic slowdown. Demand has reportedly fallen in the airline industry and the construction sector especially, and also in markets where metals form a significant part of finished ‘big ticket’ purchases in articles such as dishwashers for instance. A significant proportion of MMA sector finished output is sold to distributors such as retail outlets. Again, such outlets (including ‘Do-It-Yourself’ firms) are large, and operate with economies of scale philosophy and they themselves operate in very competitive consumer markets. This is yet another example of a client to the MMA sector that has considerable bargaining power over smaller SME firms in the sector.

Responses from the first questionnaire to national associations indicated:

Generally, transactions between MMA companies and suppliers/ customers are relationship-based, relying on past experience. From a country perspective, the exception is France, where transactions tend much more to be contract based. On the supply side, the exception to this is energy.

	Suppliers			Customers	
	Raw Materials	Equipment	Energy	Services (Transport)	Finished Products
Germany					
Italy					
France					
Austria					
Belgium					
Lithuania					

Relationship between MMA sector and suppliers and customers (as answered in questionnaire)

	transactions based, relying on contractual agreements focusing mainly on price
	relationship-based, drawing on past experience and placing importance on quality and reliability
	Both

### Bargaining power

Customers also have a relatively strong bargaining position with respect to the MMA sector, reflecting perhaps the sector's dependence on large customers (such as the motor vehicles industry) as well as the lack of consolidation.

The bargaining power of the MMA sector (as answered in questionnaire)

	Suppliers				Customers
	Raw Materials	Equipment	Energy	Services (Transport)	Finished Products
Germany					
Italy					
France					
Austria					
Belgium					
Lithuania					

	suppliers/customers have all the bargaining power
	suppliers/customers have more bargaining power
	bargaining power is roughly equal between suppliers/customers and the MMA sector
	the MMA sector has more bargaining power
	the MMA sector has all the bargaining power

#### *Most important customers*

*The automotive sector appears to be the most important customer of the MMA sector in France and Germany. In Germany the automotive sector accounts for 75% of demand for MMA products; in France it is 42%.*

#### Interview responses revealed:

#### *Prices and bargaining power*

*The MMA sector has less or equal bargaining power in setting customer prices, the only exception being the confectioning of concrete reinforcing steel sector and the specialist foundries in Germany.*

#### *Metal Substitutes*

Another problem that the MMA sector is faced with is the use of metal substitutes by its supply chain clients. Plastic is one general substitute for metal products and mirrors a number of metal characteristics, especially in the packaging sector, but can do so at reduced cost or weight, or for design purposes. The metals surface treatment segment of the MMA sector is an example of a segment that has had to deal with metal substitutes. For example, electrolytic or chemical metal surface treatments can be substituted with solvent painting; this is evident in the automobile sector where painted door handles have largely replaced chrome plated ones (European Commission, 2006). Similarly the switch of some container packaging from metal to plastic (paint containers are for instance now typically plastic instead of metal) reduces the demand for metal coating. Another example is the production of car light reflectors; they can now be moulded from plastic with vapour deposition of a metal, rather than metal plating of a steel pressing (European Commission, 2006). The availability of metal substitutes that offer superior performance or features (and lower cost) creates a significant competitiveness problem for the MMA sector, and only serves to further increase the bargaining of its downstream clients. The metals sector has reacted to these pressures by developing its own products with more advanced physical and technical properties (European Commission, 2003) and is exemplified later.

#### Interview responses revealed:

*Substitute materials are seen to represent a major opportunity for one interviewee and a major challenge for the structural metal products sector in Germany. However, they were perceived by most interviewees as having little impact. Data for Spanish companies was not available on this topic.*

### 3.3.5 Interviews with customer industries

This section analyses the interview answers of customers of the MMA sector. Five interviews were carried out. Three of these were from German firms, two were Spanish, and one was Dutch.

#### *Output purchased from the MMA sector*

The customer firms were asked whether they purchase certain products from the metal working sub-sectors. These sub-sectors were as follows; casting, forging treatment and coating of metals, structural metal products, tanks, reservoirs, boilers, metal containers and steam generators and metal packaging and finally tools and finished metal goods.

All of the firms that responded to this question confirmed that they purchased products from the casting, forging treatment and coating of metals sub-sector. Conversely, all of these firms stated that they did not make purchases in the tanks, reservoirs, boilers, metal containers and steam generators or metal packaging sub-sectors. As for the other two sectors mentioned, the responses were more of a mixed bag. Two of the firms confirmed that they made purchases from the structural metal products sub-sector. In fact one firm stated that they made most of their purchases in this sector. Finally, only two of the firms answered yes to the question of whether they made purchases in the tools and finished metal goods sub-sectors.

#### *Important pre-products purchased*

The most important pre-products purchased from the MMA sector by the customer firms were mixed. However, some pre-products were mentioned more than once. Metal plates were thought to be one of the most important pre-products purchased from the MMA sector by three out of the five firms. Furthermore, four out of five firms mentioned some sort of steel product. In two cases bar steel was mentioned, but other types of steel products indicated were magnetic, cold-rolled, forged and concrete steel, as well as steel joist. Aside from this there were no further patterns in the pre-products declared, although other products were mentioned, specifically tubes and pipe connections, beams and hollow sections, nickel, palladium, zinc and platinum.

#### *Proportion of input costs*

There was no obvious pattern between the responders with regard to the proportion of input costs that are accounted for by MMA products, as the responses varied between 30% and close to 100%. One respondent stated that this proportion of input costs very much depended on the product, and for this reason it estimated that the proportion of input costs accounted for by MMA products could be anywhere between 30-80%. Another, which stated that the proportion of input costs was 40%, added that this amount was due to steel.

#### *The process of trade between customers and the MMA industry*

The interviewees were asked to state whether the process of trade with the MMA sector was transaction-based, relying on contractual agreements focusing mainly on price, or whether it was relationship-based, drawing on past experience and placing importance on quality and reliability. The majority of respondents stated that their process of trade with the MMA sector was focused more on a relationship basis. Furthermore, those firms that



thought their trade process was more transaction-based, added that the process was in fact mixed, and that a relationship-based approach is important and that it is used more for non-standardised products.

#### *Bargaining power with respect to the MMA industry*

In three out of five responses the customer firms believed the MMA sector has more bargaining power than their own industry and in one case the firm believed that the MMA sector had all the bargaining power. The reasons for these viewpoints included the belief that there is a high concentration of firms within the MMA sector, leading to monopolistic powers. The firms that gave this response noted that their firm or industry is much smaller in comparison to the firms that supplied them from the MMA sector, or that they are small in comparison to other customer sectors, and so they had little means for negotiation.

One interviewee believed the opposite to be true: their firm or industry had more bargaining power than the MMA sector. This was based on the belief that trade between the MMA sector and their own was a buyers market, in which the industry at the end of the value added chain is the one with the best bargaining position.

#### *Purchases from specific regions*

In general it seems that the largest proportion of MMA inputs were purchased from EU15 countries which are regarded as ‘established’ Member States. Out of the firms that responded, most stated that they purchased between 30-60% of their inputs from these established Member States. After this, 15-40% of MMA inputs comes from within their own countries. Inputs from the EU12 (defined as the Newer Member States that have joined the EU since May 2004) and inputs from outside of the EU made up the smallest portions of total MMA inputs, usually with a share of between 15-20% each, or not at all. Purchasing from the EU12 was most infrequent, with two of the five firms stating that none of their MMA inputs came from this region.

#### *Prices and competitiveness*

Interviewees were asked to rate on a scale of one to five the importance of prices with regards to their own competitiveness, with one being not important and five being very important. The majority of the firms considered the prices they faced from MMA suppliers to be very important for their competitiveness: rating it either four or five. One interviewee noted the challenge and importance of controlling costs (prices) when some final products require many different resources. In this context, prices faced from the MMA sector are very important. Only one firm took a neutral stance and deemed prices to be neither important nor unimportant.

#### *Influence on prices charged*

The customer firms had to decide on a scale of one to five how much influence they had over the prices that they charge to their main customers, with one being little influence and five being strong influence. This question threw up diverse results. Two firms felt that they had relatively little influence, giving a score of two, although one of these firms noted that this is true of common products but for innovative products they would have more influence on price. Second, two firms gave a score of four, indicating that they do have an influence on price (although one of these firms stated that they were between a



score of three and four on the rating scale). Lastly, one interviewee thought that their firm had a strong influence on price, choosing the highest rating of five.

### *Technological change*

When choosing the speed of change with regards to the techniques of production in the industry, customer firms were asked to choose a rating on a scale of one to five, with one equalling very slow change and five equalling very quick change. The responses to this question were very similar for all five firms, with all them believing change would not be fast. One firm noted that it thought that the change in the techniques of production within their industry would be slow but constant.

### *Technological change and competitiveness*

Five different options were presented to the interviewees with regards to their plan to remain competitive in the face of technological change, with most firms stating that they would use more than one of the plans set out in order to remain competitive. Four out of the five firms believed investment in best-practice techniques to be one plan they would consider in order to remain competitive. This plan was not only the most frequently mentioned, but proved most popular compared to other plans as well, since some firms mentioned that they would use this investment as their main plan of action, or that it would be their first option.

No other patterns could be discerned from the questionnaire results for this question, as each firm tended to choose a different mixture of plans. The only additional point to note is that only one firm considered the option of becoming acquired by a high-technology business to be part of its plan to remain competitive in the face of technological change.

The other plans that were suggested in the question included the firm carrying out its own research and development or commissioning someone else to do this. An additional plan cited was to acquire high-technology businesses. All of these plans proved equally popular, with each being chosen twice as part of a mixture of options.

### *Main pressure of competition*

Respondents were asked to distinguish whether the main pressure of competition comes from within the EU15, commonly thought of as the 'established' Member States, within the Newer Member States or from outside of the EU altogether. Some firms chose more than one area as a main competitor, and some trends between the responses can be observed.

A vast majority (four out of five) of the firms stated that the main pressure of competition comes from outside of the EU, specifically from far Eastern countries such as China, Japan or Vietnam. India and Turkey were also mentioned as main competitors.

Three of the firms also revealed that they face competition from within the EU15, with two of these attributing this competition to firms in Germany. A final point to note is that only one firm considered the Newer Member States to be a main competitor, yet they still considered it to be a secondary competitor to regions outside of the EU.

### *Increased production*

This question asked the customer firms to rate the improvement in competitiveness due to producing more of its current range of products on a scale of one to five, with one being not at all and five being very much. The results to this question were very mixed. Two of the firms felt that if they produced more of their current range in products then their

competitiveness would not be improved at all. One interviewee stated that they believed this to be true due to the current crisis in the motor vehicles industry. At the other end of the scale, two firms decided that their competitiveness would be greatly improved if they increased production. Only one interviewee believed that producing more would have some positive effect on competition.

#### *Important competitiveness factors*

Respondents were asked to rate certain indicators, that could be deemed a factor determining the level of competitiveness, in terms of its importance, with one equalling not important and five equalling very important.

The quality of the product is considered to be very important, and the results show that product quality is a very important factor influencing competition since it was given a score of five by most firms.

All of the firms believed that price is also a very important factor when determining how competitive a firm is within their industry, with each firm choosing a rating of either four or five. One noted that price is more important now than it used to be (before the economic crisis), when other factors such as quality would have been more important for competitiveness.

With one exception, most firms thought that costs of production are a very important factor influencing competitiveness. As one interviewee pointed out, this is to be expected as there is obviously a positive relationship between production costs and the resulting prices.

The quality of the service provided was deemed to be the least important element affecting the competitiveness of firms within their respective industries. Two out of the five firms took a neutral stance and chose a score of three for importance, and whilst the other three firms acknowledged that it was important to some degree, only one considered it to be very important.

### 3.3.6 Analysis of regional I-O tables

The following is an analysis of the MMA sector's relations with supplier and customer industries in a selection of Member States. It is based upon the most recent regional data available. For the UK, France and Germany detailed data is available in which the data is disaggregated to at least the NACE 3-digit level. For all other regions analysed here the data available is disaggregated into 42 industries at the NACE 2-digit level.

Table 3.2 I-O data availability and sources

<b><u>I-O DATA AVAILABILITY AND SOURCES</u></b>				
<u>Country</u>	<u>Sector classification</u>	<u>Equivalent NACE Rev 1.1 classification</u>	<u>Latest year of data available</u>	<u>Source of data</u>
UK	57 Structural metal products	NACE 28.1	2007	UK Office for National Statistics
	58 Metal boilers and radiators	NACE 28.2 + NACE 28.3		
	59 Metal forging, pressing, etc	NACE 28.4 + NACE 28.5		
	60 Cutlery, tools, etc.	NACE 28.6		
	61 Other metal products	NACE 28.7		
	GF53 FONDERIE - NACE 27.5	NACE 27.5		
France	GF55 FABRICATION DE PRODUITS METALLIQUES	NACE 28	2006	National Institute of Statistics and Economic Studies, France
<u>Country</u>	<u>Sector classification</u>	<u>Equivalent NACE Rev 1.1 classification</u>	<u>Latest year of data available</u>	<u>Source of data</u>
Germany	Gießereierzeugnisse	NACE 27.5	2005	Federal Statistics Office, Germany
	Metallerzeugnisse	NACE 28		
Italy	15 Basic metals	NACE 28	2000	E3ME <sup>(1)</sup>
Spain	15 Basic metals	NACE 28	2000	E3ME <sup>(1)</sup>
Austria	15 Basic metals	NACE 28	2000	E3ME <sup>(1)</sup>
Netherlands	15 Basic metals	NACE 28	2000	E3ME <sup>(1)</sup>
Belgium	15 Basic metals	NACE 28	2000	E3ME <sup>(1)</sup>
Poland	15 Basic metals	NACE 28	2000	E3ME <sup>(1)</sup>
Czech Republic	15 Basic metals	NACE 28	2000	E3ME <sup>(1)</sup>

Note(s): (1) E3ME is Cambridge Econometrics' Energy, Environment, Economy model of Europe; which in this case uses I-O data from OECD.

### *Cross-country comparison*

Across the regions, several similarities and differences can be found. On the demand side, there are several industries which are consistently the largest consumers of the metal goods industry's output. The mechanical engineering industry, for example, often consumes a large share of output, as does the metal goods industry itself. The construction and the motor vehicles industries are also often large consumers, but less so than mechanical engineering and machinery. Construction is one of the top three consumers in only France and Germany, under the metal products industry classification. The construction industry is a particularly important consumer in France, where it is responsible for consuming 8.7% of all output. The picture is a little different for the motor vehicles industry. Within the metal goods industry in Italy, the Netherlands and

Poland and the metal casting industry in France and Germany the motor vehicles industry is one of the top three consumers of output. The motor vehicles industry consumes a particularly large share of 14.4% of output in Italy. The data show that other industries which are often important consumers include the oil and gas industry, and the coal industry. In general, demand for the metal goods industry's output across all regions is relatively concentrated, with the largest ten consumers normally accounting for between 55-65% of all industry output.

On the supply side similar trends can be observed. Across all the regions covered, the basic metals industry, or the pig iron and steel industry (depending on how the data are classified) are frequently the biggest input suppliers to the metal goods sector. If not, then it is often the case that the metal goods industry itself has the largest share of input. Nonetheless, the basic metals or steel industry generally accounts for between 15-20% of total inputs to the metal goods sector. The basic metals industry is most important in Belgium and the Czech Republic, where it accounts for 20% of all inputs in both cases. Other industries that are responsible for large shares of input across regions also include distribution and mechanical engineering. The concentration of input suppliers to the metal goods industry is slightly lower than the concentration of output consumers mentioned previously. In general, the largest ten supplying industries in each region account for a share of between 45-55% of all inputs.

Another area to consider is the composition of the customer sectors that are important to the main suppliers for the metals industry. By considering this it is possible to determine how important the metals industry itself is to its main suppliers. As previously noted, in the majority of cases the basic metals or steel industry is the most important supplier to the metal goods industry. The metal goods industry is also in most cases an important customer to the basic metals or steel industry, often accounting for the largest or second largest share of output, coming second only to the basic metals or steel industry itself.

### *France*

For France, the data available covers both the metal products industry (NACE 28) and the metal casting industry (NACE 27.5). Within the metal products industry the top three customers for the industry's output are metal products for construction, machinery tools and metal products itself. The construction sector is by far the largest consumer of the metal products industry's output, taking 8.7% of output alone. Together, the top three customer sectors consume a share of 21% of the total metal products industry output, whilst the top ten customers are accountable for consumption of around 56% of industry output in total. This signifies a rather high concentration of consumers for the metal products sector's output.

As for the metal casting sector, the top three customers for the industry's output are the manufacturing of equipment for cars, the manufacture of agricultural machinery and the manufacture of bicycles and motorcycles, with the manufacture of equipment for cars consuming the largest individual share of 4.8%. Together, these three sectors account for a consumption share of around 11.5% of all output from the metal casting industry, whilst the top ten customers are accountable for consumption of around 26.3% of output, which is a notably smaller share than the top ten consumers of the metal products industry.

On the supply side, the top three suppliers to the metal products industry are the steel industry, industrial services of metalworking and the metal products industry itself. Collectively, these three sectors account for a share of 28.9% of total industry inputs, of which the steel industry is responsible for the largest portion of 15.6%. The top ten suppliers account for a vast majority of total inputs, with a collective share of 43.1%.

For the metal casting industry, the top three suppliers are non-ferrous metals, ceramics and construction materials and business administration, accounting for 19.4% of all inputs in total. The metal products sector is surprisingly low down in the list as the fifth biggest supplier, behind the slightly less obvious sectors of business administration and cleaning, security and other services. The steel industry is not a very important input supplier to the metal casting industry, accounting for only 0.11% of all inputs.

A final point to consider is the composition of customer sectors for the main supplier industries and how important the metals sector is as a customer. In France the steel industry is a relatively important supplier in the metal products industry, accounting for a share of 15.6% of output. On the outset this may seem quite a large proportion but it is in fact less than half the share of output that the steel industry itself consumes. As previously mentioned the non-ferrous metals sector is the largest supplier to the metal casting industry. The casting industry is also an important customer to the non-ferrous metals sector, as the third largest customer with a share of 11% of output. However, again this is dwarfed by the large 43.8% of output that the non-ferrous metals sector itself consumes.

### *Germany*

For Germany the data covers both the metal products sector (NACE 28) and the metal casting sector (NACE 27.5). Within the metal products industry, the top three consumers of output are the manufacture of fabricated metal products (except machinery and equipment), building and other construction and finally the manufacture of machinery and equipment. The manufacture of fabricated metal products (except machinery and equipment) is by far the most important customer, as it accounts for a share of 14.5%, which is almost double the share taken by building and other construction, the second largest customer. Whilst construction should be recognised as an important consumer, its share of output is only slightly larger than both the manufacture of machinery and equipment and the mining of coal sectors. The three largest consumers are jointly accountable for a share of 27.1% of all industry output, whilst altogether the top ten customers account for a large share of 52% of total output.

As for the metal casting sector, the top three customers are the metal casting sector itself, the manufacture of motor vehicles, trailers and semi-trailers and the manufacture of machinery and equipment. These three customers consume a rather low share of 5.2% of total output. Of this the manufacture of motor vehicles, trailers and semi-trailers accounts for 1.7%, so not a very large amount but the second largest customer nonetheless. The glass manufacturing sector is surprisingly one of the ten largest consumers of the metal casting sector's output. Whilst the glass manufacturing sector may use outputs from the metal casting sector for the purpose of moulding glass, it is surprising that it is one of the largest consumers. Having said that, even though it is one of the largest customers, it only consumes 0.1% of all industry output.

On the supply side, the top three inputting sectors to the metal products industry are the manufacture of fabricated metal products (except machinery and equipment), pig iron, steel, pipes and semi-finished products thereof and wholesale trade and commission trade (except of motor vehicles and motorcycles). These account for 27.5% of all inputs, whilst the top ten suppliers in total account for 40.6%. Whilst the pig iron, steel, pipes and semi-finished products thereof industry isn't the largest supplier to the metal products sector, it does account for almost 10% of total input. Within the ten largest suppliers there are some surprising industries. For example, real estate activities are the eighth largest supplier to the sector, ahead of the arguably more expected chemicals sector.

For the metal casting industry the top three suppliers are the manufacture of basic precious and non-ferrous metals, chemicals and wholesale trade and commission trade (except of motor vehicles and motorcycles). These account for a share of 24.6% of total inputs, whilst the top ten in total account for a share of 37.9%. Surprisingly, pig iron, steel, pipes and semi-finished products thereof is only the seventh largest supplier to the industry, supplying a smaller share of inputs than the less obvious sector of other business activities.

Pig iron, steel, pipes and semi-finished products thereof is a key supplier in both the casting of metals and the metal products industries, although it is considerably more important in the latter. The metal products industry itself is actually a main customer of the pig iron and steel etc industry, with a share of 9.2% of output, making it the second largest supplier. Although this is the second largest customer, it is in fact considerably smaller than the largest customer, the pig iron and steel sector itself, which consumes 46.9% of output. The manufacture of basic precious and non-ferrous metals is the principal supplier to the metal casting sector. The metal casting sector is also an extremely important customer to the basic precious and non-ferrous metals sector, consuming 16.9% of output – more than five times the amount consumed by the third largest customer, the metal products industry.

### *Italy*

For Italy the data is disaggregated into 42 sectors, of which one is the metal goods sector. The top three customers of the metal goods industry are the mechanical engineering sector, the motor vehicles sector and the metal goods sector itself. Together, these three consumers account for a 39.3% share of total industry output with 14.4% attributed to the motor vehicles sector. Construction is slightly less important than other sectors, but is the fifth largest consumer nevertheless with a share of 6% of output in total. The top ten consumers collectively account for 66.3%, so a high majority of output consumption is concentrated into a relatively small number of sectors. Surprisingly, rubber and plastics is the tenth largest consumer of the metal goods industry, with a share of 2% of output.

The top three suppliers to the metal goods industry in Italy are the basic metals industry, the metal goods industry itself and banking and finance. The basic metals industry is the largest input supplier with a share of 22.5%, over double the share of any other sector, confirming how important the industry is for the metal goods sector. The top three suppliers account for a total share of 36.8% of inputs to the metal goods industry, whilst the top ten suppliers in total account for quite a large majority of 54.1% of all inputs.



Within the ten largest input suppliers there are some interesting and surprising figures. Whilst banking and finance may be an important input for any sector, it is surprising that it is the fourth largest input supplier in this case, with a share of 4.4%. It is also unexpected that the wood and paper industry is the tenth largest input supplier to the metal goods industry, although it does only supply 1.1% of inputs.

The metal goods industry in Italy also accounts for a large share of consumption of the basic metals industry output. As the second largest consumer in this sector, 22.5% of output consumption is attributed to the metal goods industry. This is almost equal to the 23.2% share that the largest consumer, the basic metals industry itself, is responsible for. The metal goods sector is also a relatively important customer within banking and finance, consuming 4.4%. This is, however, a minor share when compared with the 43.4% share that insurance is accountable for.

### *Spain*

Within the metal goods industry in Spain, the top three customers are basic metals, mechanical engineering and oil and gas. Construction is also a relatively important sector as the fifth largest consumer with an output share of 5.5%. The motor vehicles industry is less important, taking a share of just 3.5%, which is not a sizeable amount taking into account the fact that the largest three sectors account for a share of 34.4% of total output, whilst the combined share of the top ten consumers is 68.3%. This last point signifies a large majority of output being consumed by a relatively small number of sectors.

In the Spanish metal goods industry the top three input suppliers are basic metals, metal goods itself and mechanical engineering. These three account for 4.1% of all inputs whilst the top ten in total account for 5.7%, which is not a large majority collectively but does indicate that the share of inputs within the top ten is supplied mostly by the top three suppliers. The largest supplier, the basic metals industry, alone accounts for 2.6% of input supply.

The metal goods industry is reasonably important as a customer to its supplying industries. For its biggest supplier, the basic metals industry, metal goods is by far the largest consumer of its output, with a share of 25.7%. However, the metal goods industry is less important to its second and third largest suppliers, the metals industry itself and the mechanical engineering industry, consuming shares of output which are noticeably smaller than other customer sectors.

### *UK*

The data available for the UK is more detailed than the data for the other countries considered here. It is disaggregated into 108 sectors, in which there are several metal sectors which are relevant, namely structural metal products (NACE 28.1), metal boilers and radiators (NACE 28.2 + NACE 28.3), metal forging and pressing etc (NACE 28.4 + NACE 28.5), cutlery and tools etc (NACE 28.6) and other metal products (NACE 28.7). These sectors are considered in turn.

#### **Structural metal products**

Within the structural metal products industry the top three consumers of output are miscellaneous manufacturing, structural metal products itself and general purpose

machinery. These account for 11.1% of the share of output, whilst the top ten account for 21.3%. Construction is relatively important, as the sixth largest consumer with a share of output equal to 1.8%.

On the supply side the three most important suppliers are the iron and steel, non-ferrous metals and metal casting sector, the metal forging and pressing sector and the structural metal products industry itself. The iron and steel etc sector is a considerably larger supplier than any other industry, providing 24.6% of all inputs, whilst the metal forging and pressing industry, for example, only provides 5.6% of inputs despite being the second largest supplier.

Additionally, the structural metal products industry counts as a vital customer to the iron and steel etc industry. It is the third largest consumer with a share of 24.6% of output, following the iron and steel sector itself and the other metal products sector, both of which account for slightly greater shares of around 27%.

### **Metal boilers and radiators**

Within the metal boilers and radiators industry, the metal boilers and radiators sector itself, shipbuilding and repair and electricity production and distribution are the key consumers. As the fifth largest consumer, construction is also important, although it only accounts for a share of 0.5%. Whilst this is not a very large share, the concentration of consumers for output seems very dispersed, with only the metal boilers and radiators sector itself consuming a reasonable share of output above 2%. Within the ten largest consumers of output there are some surprising industries, namely fishing and jewellery and related products, which are the fourth and tenth largest consumers respectively.

The iron and steel, non ferrous metals and metal castings sector is the largest supplier of inputs, with a share of 10.2%. The second and third largest suppliers are the metal boilers and radiators sector itself and the metal forging and pressing sector respectively. Collectively the three aforementioned industries account for a share of 23.7% of all inputs, whilst the top ten accounts for 38.8%.

With regards to the composition of customer demand for supplier industries, the metal boilers and radiators sector is not a particularly important consumer. Notwithstanding the metal boilers and radiators sector, in which it is its own largest customer, it is not one of the largest ten consumers in any other key supplying industry.

### **Metal forging and pressing**

The top three consumers of the metal forging industry in the UK are the mechanical power equipment sector, the agricultural machinery sector and the aircraft and spacecraft industry. The motor vehicles industry is also a key consumer, with a share of 6.4% of output making it the eighth largest customer. Together, the largest ten consumers account for a vast majority of 80% of output consumption.

On the supply side, the iron and steel etc sector is again the largest input supplier just as it was with the metal boilers and radiators and the structural metal products sectors. Within the metal forging and pressing industry it supplies 17.5% of inputs. The metal forging and pressing industry and the electricity production and distribution industries are the



second and third largest suppliers respectively. Together, the top three supplying industries account for a share of 28.4% of all inputs to the metal forging industry, whilst the top ten accounts for 37.2%.

Metal forging and pressing is relatively important as a customer to the iron and steel etc industry, as the fifth largest customer. It accounts for a fairly large share of output of 17.3%. Considering the largest customer for this sector only consumes an extra 10% of output on top of this, it is a respectable share.

### **Cutlery, tools etc**

The cutlery and tools sector's top three customers are the cutlery and tools industry itself, taking a 3.2% share of total output. Wood and wood products is the second largest customer, whilst mechanical power equipment is the third. These top three consumers account for a 7.6% share of output, whilst the top ten customers collectively only take a share of 16.7% which is a relatively small share compared to the other metal industries within the UK.

On the supply side the iron and steel, non-ferrous metals and metal castings industry is by far the largest supplier of inputs, with a share of 10.5% in total. The top ten suppliers collectively supply 28.4%, of which metal forging and pressing supplies 3.3% and cutlery and tools supplies 3.2%. Altogether then, this indicates that the supply to the cutlery and tools sector is somewhat dispersed, as only one industry supplies a large amount. Within the largest suppliers there are some surprising sectors. For example, fertilisers, plastics and synthetic resins and pesticides is the fourth largest supplier, whilst paper and paperboard and soap and toilet preparations are the fifth and tenth largest suppliers respectively.

Cutlery and tools is a relatively important customer sector to its main supplier, the iron and steel etc sector. Although it is the ninth largest customer, so is less of a key sector than others such as other metal products and structural metal products, it nevertheless accounts for a 10.5% share of output. Cutlery and tools is less of a key customer sector for its second largest supplier, the metal forging and pressing sector. Here it only accounts for 3.3% of output, whereas other sectors such as mechanical power equipment and agricultural machinery account for shares of output of around 10% each.

### **Other metal products**

On the demand side the top three customer sectors are all accountable for consuming similar shares of output, with miscellaneous manufacturing responsible for a share of 7.5%, the soft drinks and mineral waters sector consuming 6.3% and the alcoholic beverages sector consuming a share of 5.6%. Collectively, these three customers therefore consume a share of 19.4%, with the largest ten output consumers accounting for a consumption share of 40%. Within these ten key consumers there are some surprising industries, namely rubber products, plastic products and soap and toilet preparations, all of which are more important customers than perhaps more obvious sectors such as electric motors and generators and shipbuilding and repair.

On the supply side, the main input supplier to the other metal products industry is the iron and steel, non-ferrous metals and metal casting industry, as was the case with the other

metal sectors within the UK. Within the other metal products sector iron and steel etc represents a large share of 27.4% of inputs. Other vital suppliers are the other metal products industry itself and the other land transport sector, each with a share of 3.7% and 3.1% of inputs respectively.

Other metal products is a particularly key customer sector to its main supplier, the iron and steel etc sector, and is more important than the other metal sectors mentioned here. It is the second largest customer to this sector; behind the iron and steel sector itself, although the two sectors are accountable for consuming almost equal shares of output of around 27%. The other metal products sector is considerably less important as a consumer in other key supplying industries however, consuming 3.7% of output in the other metal products sector itself and just 3.1% in the other land transport sector.

#### *Austria*

The three principle customers of the metal goods sector in Austria are the metal goods industry itself, the mechanical engineering industry and the oil and gas sector, with shares of output of 16.0%, 9.1% and 6.8% respectively. Construction and the motor vehicles industry are also both important customers with output consumption shares of 4.1% and 2.8%. Collectively, the largest ten consumers account for large majority of 56.4% of all output consumption.

For the supply side, the share of inputs is largely dominated by the metal goods industry itself, with a share of 16.0% and the basic metals industry with a share of 15.4%. The distribution industry accounts for the third largest share of 4.1% of inputs. Rubber and plastics is perhaps the only surprising sector to have one of the largest inputs into the metal goods industry, although its share of 2.3% could be considered minor when compared to the two key input suppliers.

The metal goods sector is also a very important customer itself to its main supplying industries. As mentioned, the two key suppliers to the industry are the metal goods industry itself and the basic metals industry, consuming shares of 16.0% and 15.4% respectively. Whilst this is a high share in the metal goods sector, the 15.4% share of the basic metals sector is not very large considering the fact that the basic metals industry itself consumes 31.7% of its own output. However, the metal goods industry does consume more than twice the output consumed by the electrical engineering and instruments sector, the third largest customer.

#### *Netherlands*

The top three customers of the metal goods industry in the Netherlands are the metal goods industry itself with a share of 21.3%, the mechanical engineering industry with 7.5% and the motor vehicles industry with 7.2%. Altogether, the ten largest consumers account for 59.4% of the total share of output. As mentioned, the motor vehicles industry is a key customer with a large share of total output. Construction on the other hand is less important, consuming almost half as much as the motor vehicles industry with an output share of 3.9%.

On the supply side the three key input suppliers to the metal goods industry in the Netherlands are the metal goods industry itself with a share of 21.3%, the basic metals

industry with a share of 19.7% and the professional services industry, which supplies a share of 3.6%. It is slightly surprising to see the professional services industry with such an important role in supplying the metal goods industry, being responsible for more inputs than the distribution or mechanical engineering sectors for example.

As previously mentioned the metal goods industry is an extremely important customer and, intuitively, supplier to itself, consuming the biggest majority of its output. The second largest supplier to the industry is the basic metals sector, which again the metal goods industry is an important customer to, consuming a large share of almost 20% of all output. This is a considerable amount seeing as the mechanical engineering industry (the next largest consumer) is only responsible for consuming a share of 5.4%.

### *Belgium*

On the demand side the top three customers for the metal goods industry in Belgium are the metal goods industry itself, which consumes 12.6% of output, the mechanical engineering industry, which consumes 9.7% of output and the other transport equipment sector which consumes a share of 7.1%. Construction is also an important consumer, consuming a share of 4.6% of total output. The motor vehicles industry on the other hand is less important but is the sixth largest consumer nonetheless with a share of 3.1%.

The basic metals industry is by far the largest supplier to the metal goods sector in Belgium, accounting for a share of 20% of inputs. This share of inputs is far greater than the amount of input that the metal goods industry supplies to itself, a share of 12.6%. Distribution is also a main supplier, with its inputs adding up to a share of 8.9%.

The metal goods industry is also a fairly important customer to the basic metals industry. Whilst it accounts for a consumption share of 20% of all output, this is not a very sizeable amount bearing in mind the fact that the largest consumer, the basic metals industry itself, consumes a huge share of 41.9% of its own output. The metal goods industry is however, a large consumer in both the metal goods industry itself and the distribution industry, both of which are major suppliers.

### *Poland*

The motor vehicles industry is a vital customer to the metal goods industry in Poland, responsible for consuming 10.5% of all output. The coal industry and mechanical engineering are also major customers, consuming shares of 6.6% and 6.5% respectively. Construction is a smaller customer but consumes 3.2% nevertheless.

On the supply side the basic metals industry is the largest input supplier for metal goods with a substantial share of 19.8%. Distribution and the metal goods sector itself are again large suppliers, with shares of 6.4% and 5.5% of inputs respectively. All together, the top ten suppliers to this industry account for 50.3% of all inputs.

The metal goods industry in turn is also an important customer to the basic metals sector, its biggest supplier. Whilst it is only the second largest customer, its share of 19.8% of output is only a touch smaller than the 25.8% that the basic metals industry consumes itself. The metal goods industry is however not such a vital customer to its other main

suppliers, the distribution sector and metal goods industry. In these sectors there are many other sectors which are much greater consumers of output.

### *Czech Republic*

For the metal goods industry in the Czech Republic, the top three consumers are the metal goods industry itself with a 38.7% share of output, the mechanical engineering industry with a share of 14.3% and finally the coal industry with a share of 9.1%. The motor vehicles industry is also an important consumer of output, taking a share of 3.6% of output. The construction industry is only slightly less important, with a share of 3.3%. The top ten consumers collectively make up a vast majority of the consumption of output, consuming 83.4% of all output. It is slightly surprising to see coal as the third highest consumer, ahead of more expected sectors such as motor vehicles and construction.

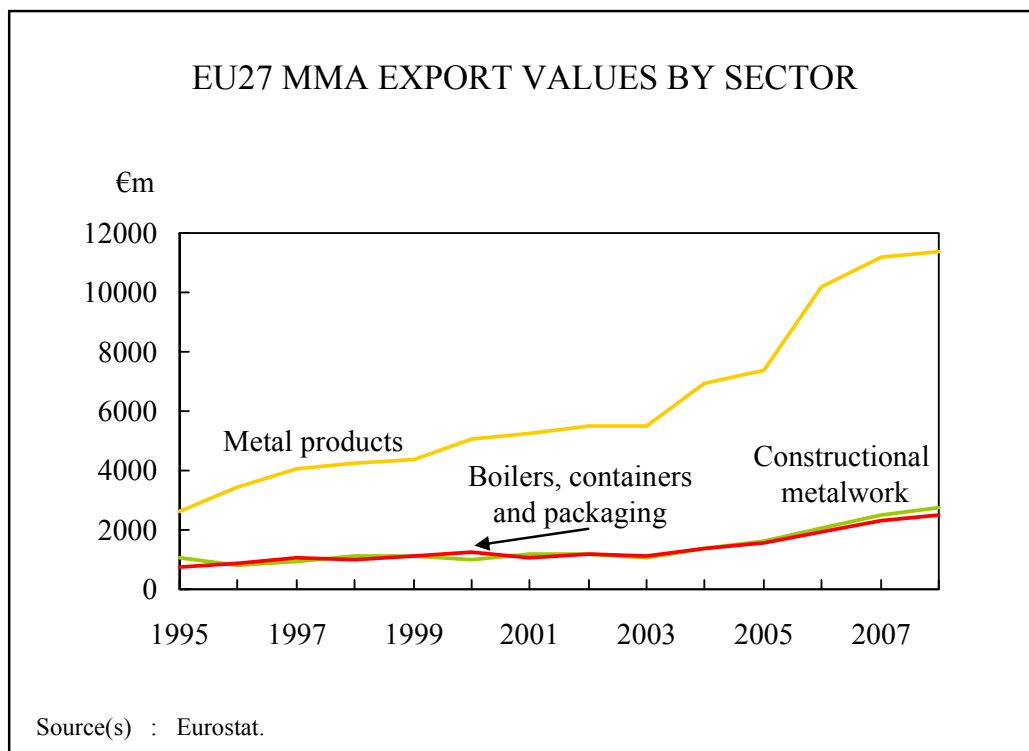
On the supply side the largest supplier is the metal goods industry itself, supplying a 38.7% share of total inputs, basic metals is the second largest supplier with a share of inputs of 20% and finally the mechanical engineering industry is the third key supplier with a share of 2.7%. It is worth noting that there is a huge difference between the shares of output accountable to the second and third largest suppliers. Whilst the largest ten suppliers make up for 72.1% of all inputs, the two most important sectors account for 81% of this.

The metal goods industry is an important consumer to its major supplying industries. First, it is the single biggest customer to itself as already mentioned, with its share of consumption being vastly larger than any other sectors'. The metal goods industry is also an important consumer to the basic metals industry, consuming the second largest share of 20%. This is however considerably less than the 37.5% that the basic metals industry itself consumes. For other supplying industries the metal goods sector is not a particularly important customer, typically consuming around 3% of output or less.

## 3.4 Competitiveness on World Markets

The MMA sector has a significant indirect influence on world trade in that many metal products form part of finished downstream capital goods which are then sold on world markets. The MMA sector represents a third of manufactured exports of the European Union and in 2006 exports accounted for only 7% of total sector output (Orgalime, 2006), but the chart below show that exports have increased significantly in value in the past decade, particularly in the manufactured metal products sector.

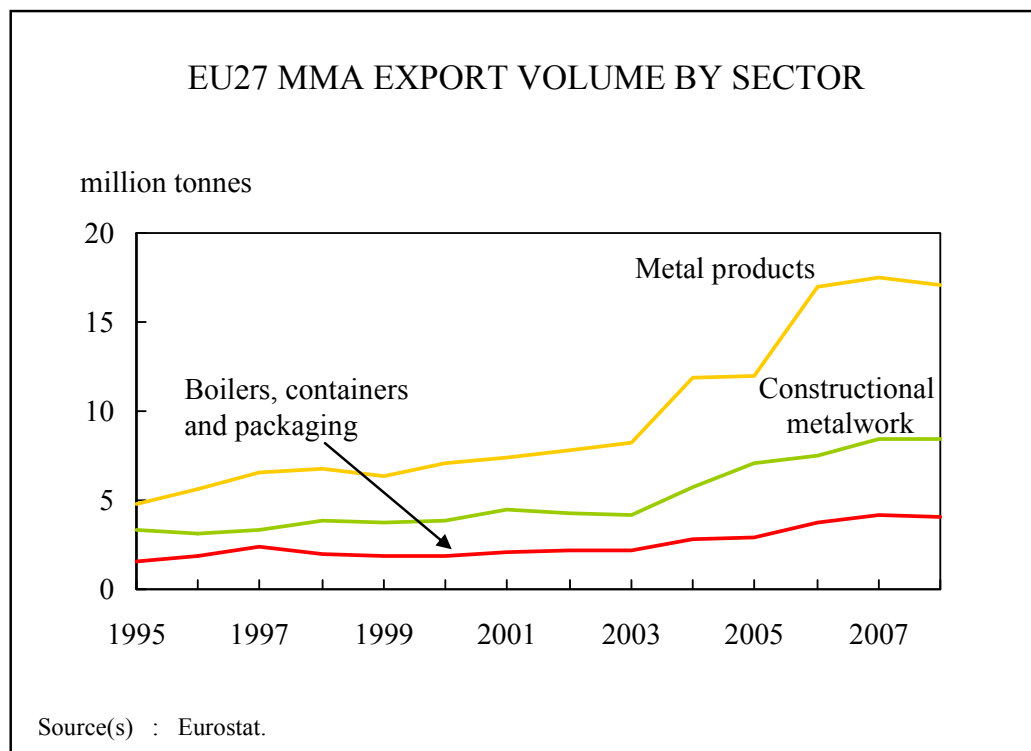
Chart 3.2 Export values by sector



Note: Due to restrictions on the data available, the figures exclude the Metal Processing subsector. Import figures are for major trade partners only and depicts total trade between EU members including Germany, Italy, Spain, France, United Kingdom, Poland, Austria, Netherlands and Belgium and Non-EU Members including China, United States, Switzerland, Turkey, Taiwan, Japan, India, Korea and South Korea.

In terms of value, constructional steelwork and boilers, metal containers and packaging have increased in the past six or seven years, but not to the same extent that metal products have. When the volume of MMA exports is considered it can be seen that the output of construction steelwork in particular, is closer to metal product exports.

Chart 3.3 Export volume by sector



Due to restrictions on the data available, the figures exclude the Metal Processing subsector. Export figures are for major trade partners only outlined under the previous chart..

This shows that metal product exports are of relatively high value and number, and this likely to be because such items are more specialised. The export values of constructional steelwork have increased less significantly than their volumes, suggesting that products in such sectors have lower value added. The trends in export growth imply that the MMA sector has a competitive advantage in the manufacturing of its products, especially in manufactured metal products, where it appears that Non-EU firms are increasingly demanding EU value added MMA products (up until 2008 at least).

EU Member States also import a significant value of MMA products from outside of the EU, the vast majority of which is manufactured metal products.

Interview responses from MMA firms revealed:

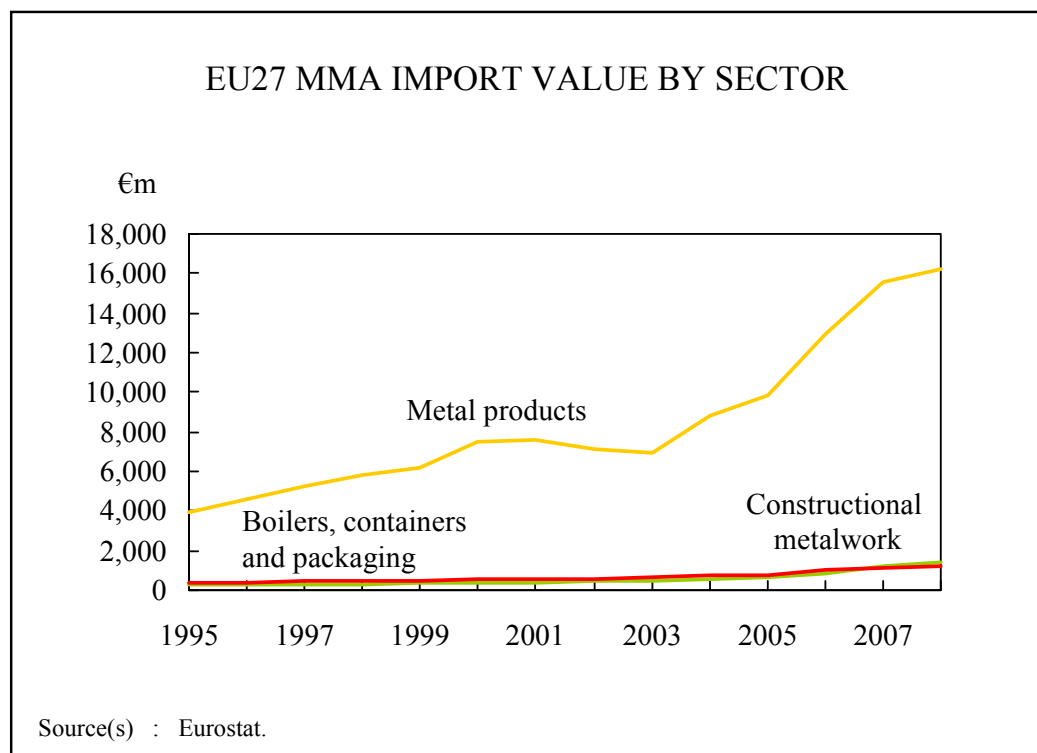
*Competition on the product market*

*The majority of interviewed companies face competitive pressures from within the EU15. New member states also add to the competitive pressure in the sector, particularly for German MMA manufacturers. Interviewed firms also named eastern European countries, Turkey, China and other Asian countries as a source of competition. The only sector that does not seem to be affected by competition from outside the country is the confectioning of concrete reinforcing steel sector in Germany, which is a regional business, exhibiting little cross-border activity.*

*Increasing the production of the current range of products would have different effects on competitiveness, depending on the sub-sector the interviewed company operates in. It would little or no effect for companies producing concrete reinforcing steel, parts for the automotive industry and mills. Producing a greater mix of metal goods will generally have little impact on foundries and companies that manufacture products needed by the construction sector. Furthermore, some companies believe that the competitiveness of the metal goods sector might be improved if businesses produced more of the inputs that are required and carried out more final processing on the goods produced.*

*Other important factors affecting the sector's competitiveness are product prices, cost of manufacturing and the product and, to a slightly lesser extent, service quality.*

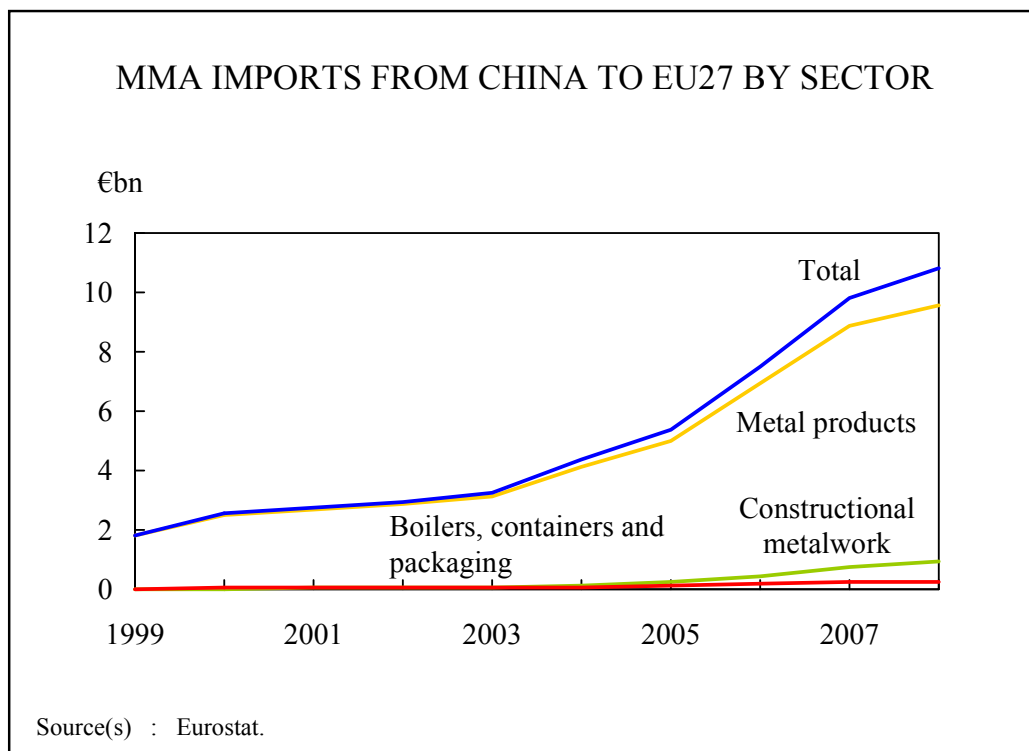
Chart 3.4 Import value by sector



Due to restrictions on the data available, the figures exclude the Metal Processing subsector. Import figures are for major trade partners only.

One factor that is of concern to all MMA manufactures is the impact that emerging economies are having on their businesses, especially ones that are able to supply the EU with comparable products at lower cost. China is an example of such one country that targets such exports at EU members, and other foreign consumers.

Chart 3.5 MMA imports from China



Due to restrictions on the data available, the figures exclude the Metal Processing subsector and refers to E25/27 imports.

The chart above shows that the imports (by value) from China have increased overwhelmingly over the past decade, and the acceleration in imports since 2005 is especially remarkable. The vast majority of MMA products from China are manufactured metal products, many of which are direct substitutes to those produced in Europe. China is seen as a significant competitiveness threat to the MMA sector. Its ability to produce manufactured metal products at lower cost than most EU producers inevitably has direct implications for the demand of finished goods produced in the MMA sector. Also, China indirectly affects the MMA sector due to the major foothold it has in world steel production and its access to raw materials.



### 3.5 Recent trends

Interviews with MMA firms revealed:

#### *Impact of the credit crunch and recession*

*Unfortunately we only have information on the impact of the credit crunch and recession from German companies. In most cases, order levels experienced double digit falls in 2008 and 2009. In one case, the falls were faster in 2008 than in 2009. In the case of another, extra-EU order levels actually grew in 2008 before falling in 2009.*

#### MMA order levels

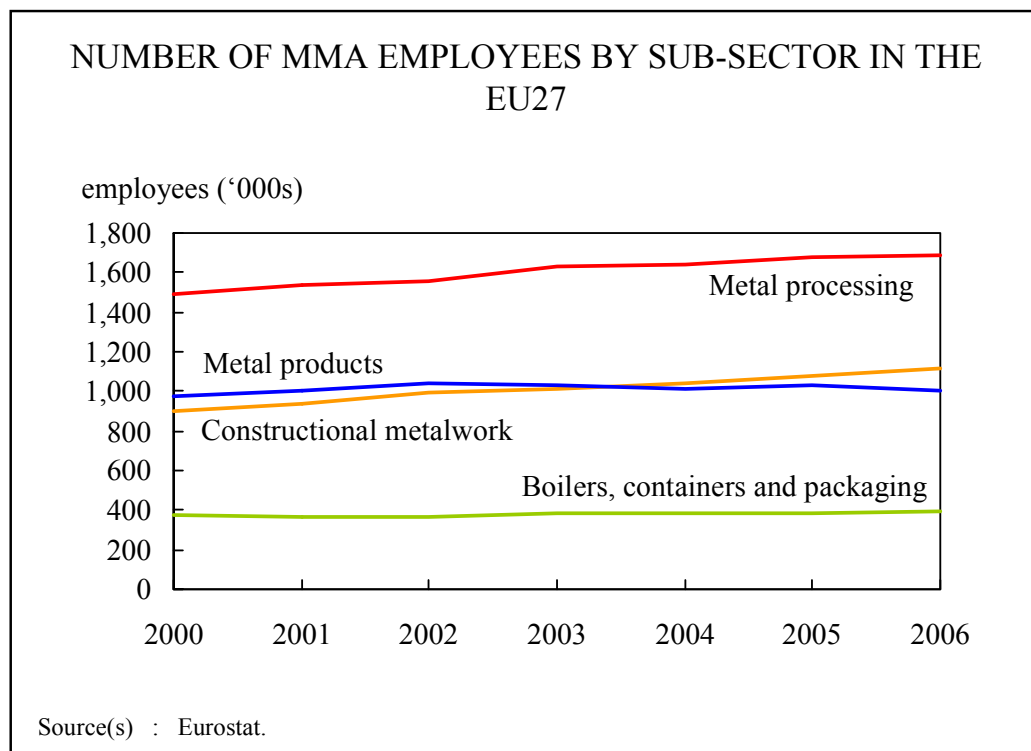
	<u>Interview 1</u>		<u>Interview 2</u>		<u>Interview 3</u>		<u>Interview 4</u>	
	<u>2008</u>	<u>2009</u>	<u>2008</u>	<u>2009</u>	<u>2008</u>	<u>2009</u>	<u>2008</u>	<u>2009</u>
Intra-EU	Fell	Fell	Fell by	Fell by	Fell	Fell	Fell by	Fell by
Order	by	by	more than	40%	by	by	30-50%	30-50%
Levels	7%	39%	10%		42%	24%		
Extra-EU	Grew	Fell	Fell by	Fell by	Fell	Fell	Fell by	Fell by
Order	by	by	more than	40%	by	by	30-50%	30-50%
Levels	28%	12%	10%		42%	24%		

*Employment also fell moderately across interviewed MMA firms. Investment in 2009 remained constant or fell by a small amount in most interviewed companies, with one exception, which so far in 2009 has reduced its investment by 20%.*

#### 3.5.1 Employment and Productivity

Given the specialised nature of the products manufactured in the MMA sector, and the high proportion of SMEs, the labour intensity of the MMA sector is relatively high compared to manufacturing as a whole. The chart below shows that employment numbers differs significantly between sub-sectors. Metal processing is the largest employer with around 1¾m employees. This has grown steadily from around 1½m in 2000. Constructional metal work is the next largest employer with around 1.1m, this has risen steadily from 900,000 in 2000. Just behind Constructional Metalwork, Metal Products employs 1m. This number has fallen back in recent years but the sector still employs more than it did in 2000. The BCP sub-sector is the smallest employer by a distance, employing just 400,000 in 2006. This has risen from 370,000 on 2000. For the most part, all sub-sectors have seen modest increases in employment over 2000-06 and this is a sign that even though technology has advanced and changed, it has not replaced workers. The strongest increases have come in Metal Processing and Constructional Metalwork.

Chart 3.6 Number of MMA employees by sub-sector in the EU27



### 3.5.2 Labour Productivity

This section compares labour productivity and costs in the Metalworking and Metal Articles (MMA) sector as defined for this study (NACE 28 plus 27.5) across the EU-27 Member States, using the Eurostat NewCronos database.

Labour productivity (output per worker or per hour worked) is a commonly used indicator of efficiency. However, it is a partial indicator of overall productivity. It is affected in particular by the quantity and quality of capital available per worker. Capital-labour ratios in the same industry can vary systematically between regions according to the relative prices of the two factors of production.

Measurements of labour productivity can be affected also by variations in product-mix and in the degree of vertical integration (and hence the ratio of value added to gross output). In these circumstances, variations in labour productivity can be false indicators of efficiency differences.

But in empirical work, capital inputs are hard to measure, while output and employment data are relatively easy to acquire. Labour productivity can be used with caution as a key performance indicator (KPI) of the productive efficiency of firms and industries in the same sector. It generally correlates positively with other KPIs such as trade and output growth.

The NewCronos database records value added per employee from 1995 in €'000 at current prices. To estimate real productivity levels, these data have been recalculated at constant (2005) prices, using the Harmonised Index of Consumer Prices (HICP) for each Member State.

It is recognised that this method is deficient in estimating productivity levels accurately because:

The HICP does not reflect prices of manufactured goods for intermediate markets, and

Does not adjust for the effect of currency exchange rate movements *vis-à-vis* the € for those Member States that are outside the Euro area, but

GDP and Purchasing Power Parity (PPP) deflators are not readily available for all EU-27 Member States.

In addition, the calculation of labour productivity using employment numbers does not take account of cross-country variations in hours worked, for which the ratio of full-to-part-time workers is an important factor.

But despite these limitations, measures of real value added per employee are likely to give a reasonable guide to relative efficiency levels.

Chart 3.7 compares apparent labour productivity (gross value added per person employed in thousands of Euro) for MMA and all manufacturing in EU-27 in 2004 by size of enterprise as measured by employment. Overall labour productivity is one-fifth (21%) higher in manufacturing than in MMA. Productivity increases with size of enterprise in both MMA and manufacturing.

The productivity advantage for manufacturing *vis-à-vis* MMA is most marked in large enterprises (250 or more employees), reflecting the effect of economies of scale, which are less pronounced in MMA.

Chart 3.7 Labour productivity by employment size

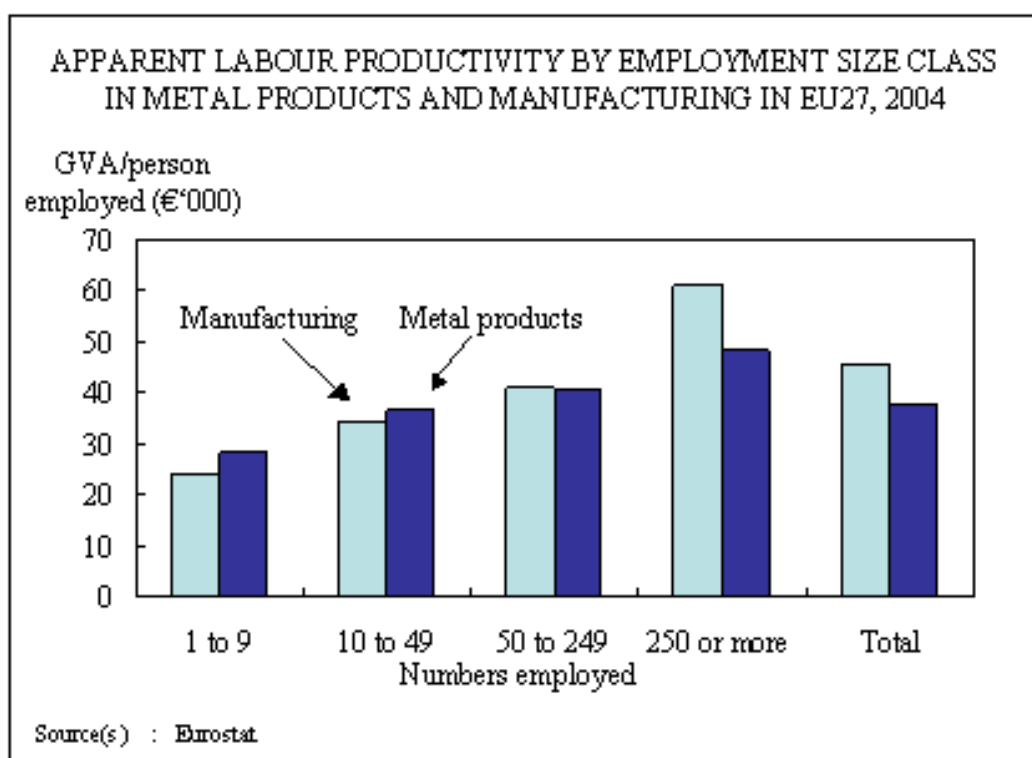
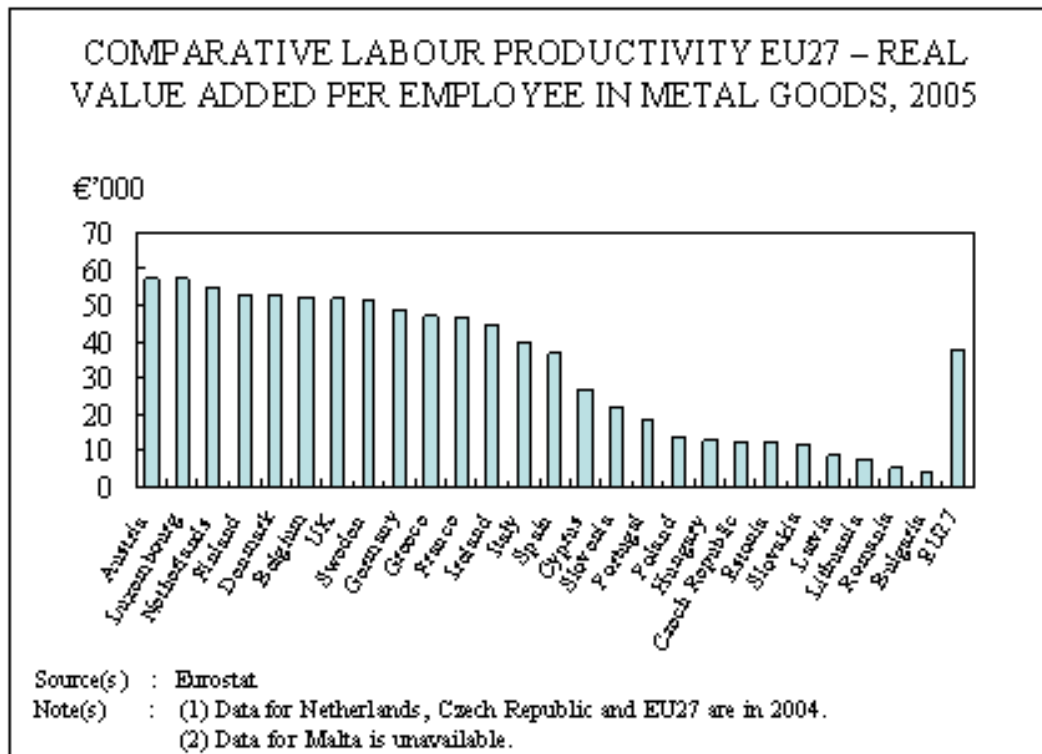


Chart 3.8 compares labour productivity in MMA across the EU-27 Member States in 2005.

Chart 3.8 Labour productivity by Member State



It is clear that the EU-27 mean is depressed by the long tail of the productivity distribution. The presence of the more recent Accession States is the chief cause of this. However, low productivity is generally offset to some extent by low hourly labour costs. The EU-27 mean is €37.7 thousand. The range across the eight leading producer Member States is from €57.2 thousand (Austria) to €37.0 thousand (Spain).

It is clear that the EU-27 mean is depressed by the long tail of the productivity distribution. This is caused in general by the presence of the more recent Accession States. However, these also typically have low hourly labour costs, which offset to varying degrees the productivity deficit (see Sections 1.2 and 1.3 below).

Chart 3.9 shows the levels of labour productivity among the leading MMA producing Member States between 1999 and 2005. Over the period labour productivity was highest in the UK and in Germany. The productivity trend has been upward in each Member State, with Spain achieving a substantial improvement. Productivity levels have tended to converge. This is so particularly for the UK, Germany and France. Convergence of productivity reflects increasing competition and structural integration in the EU Single Market.

Chart 3.9 Labour productivity by lead-producing Member State, 1999-2005

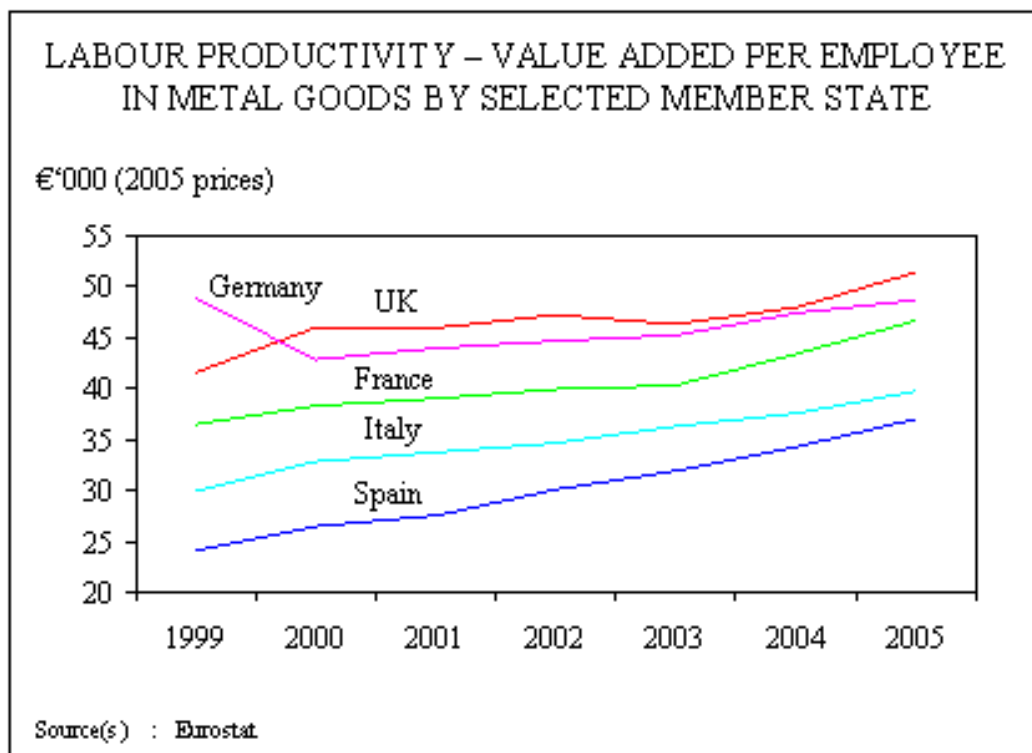
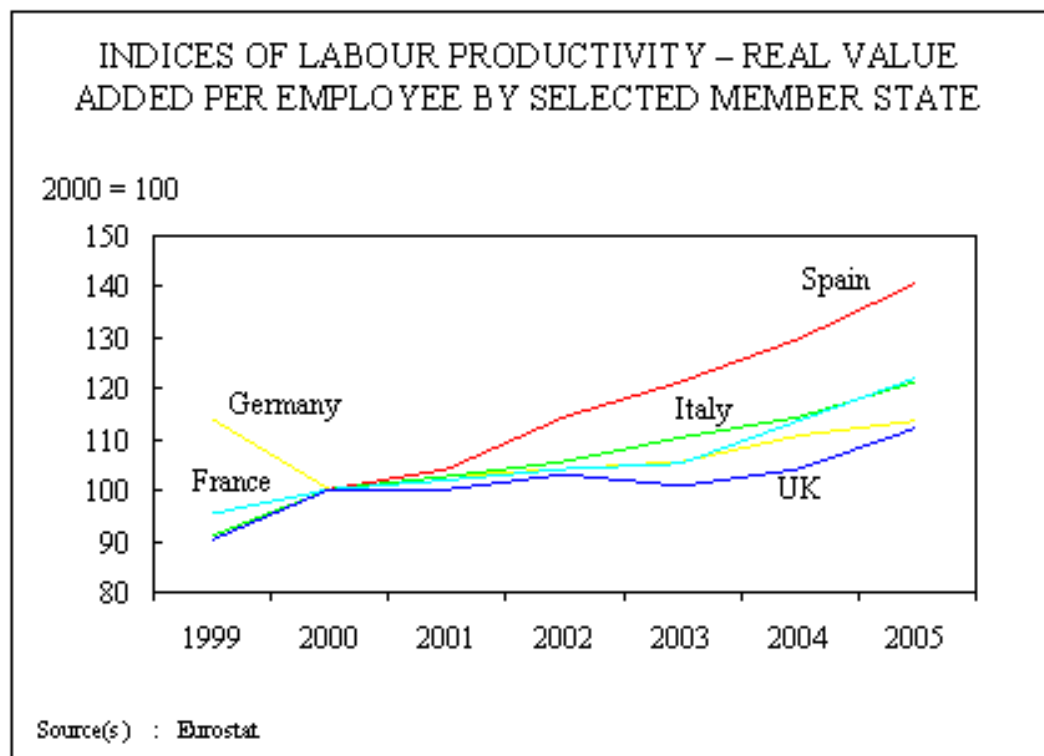


Chart 3.10 compares the rates of growth of labour productivity in the leading producer Member States since 1999, using indexes based on 2000 = 100.

Between the base year and 2005, labour productivity in Spain grew by 40 per cent and in France and Italy by a little more than 20 per cent. But productivity growth was slower in the two high productivity Member States: Germany (14%) and the UK (12%).

Chart 3.10 Index of labour productivity by lead-producing Member State, 1999-2005



The revealed pattern of productivity levels and growth among the main MMA-producing Member States reflects the influence of the following factors:

**UK:** High relative productivity is influenced by higher degrees of vertical and horizontal integration than in other main MMA-producing Member States, which yield economies of scale. Workforce skills are well developed, particularly in those parts of the sector that are close to the engineering industries. But prospective productivity gains are limited, because the sector is in the mature stage of development and the product range is broad.

**Germany:** A focus on specialist high value-added products, coupled with a skilled workforce and competitiveness honed in export markets combine to drive productivity. But the sector is mature and competition from low-cost centres of production is intense.

**France:** Productivity has been enhanced recently as the MMA sector has undergone rationalisation and the overall growth of manufacturing activity has accelerated.

**Italy:** The relative productivity performance of the MMA sector reflects the fragmented enterprise structure and the emphasis on relatively low-value added products and processes.

**Spain:** Fast productivity growth from a low base is characteristic of a developing sector in a developing economy that is catching up with technically advanced competitors.

Against this background, labour productivity in the sector as a whole can be expected to go on improving in the medium term, with increasing convergence, as the Member States

with relatively low productivity move progressively to the standards set by the more mature economies. In the absence of specific initiatives or a technological shock that would boost productivity, the sector's rate of productivity growth overall is likely to slow to the pace of the mature economies – that is, slightly more than 2 per cent a year.

The scope for boosting productivity depends on a combination of market forces and policy initiatives that would impact on three interconnected parts of the MMA sector: the Recent Accession States (RAS); small and medium size enterprises (SMEs); and the leading producer Member States.

**RAS:** The long tail of the productivity distribution across Member States (Chart 2) suggests that overall labour productivity could be raised significantly by consolidating production on larger and more efficient enterprises and on those Member States that are best endowed with capital and skilled workforces. Measures to improve workforce skills would increase efficiency still more.

Steps to carry forward the Single Market initiative would stimulate cross-border trade in finished goods and semi-manufactures, and encourage inward direct investment and mergers and acquisitions, involving enterprises based in the leading producer Member States, and elsewhere. The effect would be to support the development of both competitive and comparative advantage among the Recent Accession States.

**SMEs:** The MMA sector is characterised generally by a preponderance of SMEs, and among the RAS' in particular. The challenges for SMEs in this sector include: limited network relationships among themselves and with principal suppliers and customers; a continuing price-cost squeeze that restricts investment in efficiency-improving innovation; little scope for maintaining and improving workforce skills; and a principal focus on national markets rather than the EU as a whole, which reflects an absence of marketing capabilities.

Measures to address these challenges will include a combination of self-help; trade association advice and support; and appropriate industrial policy measures at both Member State and EU levels that are consistent with the principles of the Single Market.

**Leading producer Member States:** Recognising that horizontal and vertical scale economies play a significant part in productivity and efficiency, there is evident scope for further consolidation of MMA production through mergers and acquisitions, subject to the provisions of competition law. Enterprises may also use cross-border direct investment to secure interests in RAS producers that have potential for growth and that can provide access to low-cost centres of production.

### 3.5.3 Cluster study: Lithuania

#### Facts

<p>Number of MMA companies: more than 700</p> <p>Size of companies: The average company has 10-11 people employed.</p>
--

Number of Employees: more than 25,000  
MMA sector turnover: €960m (2007)

**Typical MMA companies in Lithuania are:**

<p><b>ALGA KONCERNAS, UAB</b> produces antenna towers and masts up to 126 m high for telecommunications and other aerials. Metal building constructions, steel containers, non-standard steel products according to customer's specification. Alga exports to Sweden, Germany and Norway.</p> <p>Employees: 230 Turnover: €55m</p> <p><a href="http://www.alga.lt">www.alga.lt</a></p>	<p><b>Arginta, UAB.</b> produces frameless glass constructions, and non-standard metal items according to customer's specifications. Arginta exports to the Netherlands, Denmark and Sweden.</p> <p>Employees: 96 Turnover: €2.3m</p> <p><a href="http://www.arginta.lt">www.arginta.lt</a></p>
<p><b>Salda, UAB</b> produces ventilation equipment for industrial enterprises and manufacturing premises, offices, cafes, hotels as well as individual houses. Salda exports to most of Europe.</p> <p>Employees: 300</p> <p><a href="http://www.salda.lt">www.salda.lt</a></p>	<p><b>Astra, AB</b> produces containers and other stainless steel products such as industrial laundry, ironing, dry cleaning equipment; car lifts, heating boilers, non-standard equipment and constructions. Design and production on contracts.</p> <p>Employees: 300 employees Turnover: €10m (2004)</p> <p><a href="http://www.astramachinery.lt">www.astramachinery.lt</a></p>

The Lithuanian MMA sector produces almost 10% of the output of the Lithuanian manufacturing sector (measured as gross value added). The sector is dominated by companies with 10 – 11 employees, and many companies have been formed the last 10 years. The companies produce a wide diversity of products.

Fabricated metal products such as cast iron parts, stainless steel technological equipment for food, chemical, pressure vessels, industrial and household boilers and other heating equipment, tools for metal machining, welded metal structures, railway turnouts and joints as well as various sub-contracted metal articles.

Machinery and equipment such as various mechatronical systems and components, metal and wood processing machines, agricultural machines, automated technological equipment for the food, and chemical industries, as well as refrigerators, washing machines, heavy duty cleaning machines, air compressors and valves.

The MMA companies export to almost all European countries. The most important export markets according to product group are:

1. Fabricated metal products – Denmark, Latvia, Germany, Norway, Sweden
2. Machinery and equipment – Russia, Germany, Ukraine, Sweden, Latvia, Spain

During the past 8 to 10 years, companies in the MMA sector have prospered. However, with the financial crisis companies are cutting costs and it has been necessary to lay off employees. In 1998-1999 the Lithuanian industry experienced a crisis on the Russian market which resulted in exports reverting from the East to West. Thus, Lithuania has handled crises previously. The industry organisation Linpra estimates that about 20% of the companies are experiencing difficulties – but most of them are optimistic about the future.



The MMA sector is important in Lithuania because it produces and supplies the means of production, technologies, and solutions to other sectors of its manufacturing industry and the economy in general, thus being a central factor in the country's technological progress and competitiveness.

#### Productivity, innovation and skills below international standards

The main competitive factor for Lithuanian MMA sector companies is low labour costs. However, from the perspective of the EU and global market productivity, innovation and skills are still substandard.

According to Linpra, the key enabler to improve the current situation and enhance competitiveness is to strengthen the skills levels of the whole workforce in the sector. The sector is affected by insufficient skills levels in the workforce due to insufficient levels of training in the Lithuanian education and training institutions. Moreover, the SMEs do not have sufficient resources to let their employees train abroad. Very often they lack both the time, money and the skills to increase the competences and skills of their workforce in particular production processes, innovation and management.

Linpra organises training in materials, processes, and technologies, using its own funds, national funds, and EU structural funds to accelerate skills formation. One current project involves more than 30 companies and about 350 employees. According to Linpra, industry organisation involvement in projects is important to create knowledge centres with advanced and practical knowhow. Projects with individual companies mostly benefit large companies and projects with universities without the industry tend to be too academic for practical deployment in the SMEs. Linpra works with technological institutes from Denmark and Finland to organise technical knowledge centres for the SMEs. Such branch institutes already existed in Soviet times, but the privatisation process turned the institutes towards production and the technology centres have largely disappeared.

The Lithuanian government has just reformed the university system, which in 2 or 3 years will make universities and technical school more attentive to business needs.

According to Linpra, it will be difficult to strengthen the competitiveness of the sector without the involvement of the industry associations. The associations are vital for developing a knowledge infrastructure and creating partnerships with Lithuanian companies and networks abroad and generally speeding up the process. This can be achieved by inviting business associations to participate in projects and integrating the associations more.

#### 3.5.4 Labour Costs

NewCronos data give labour cost per employee details at Member State level across EU-27 from 1995 for fabricated metal goods production (NACE28). These data are summarised here and used to estimate comparative labour cost per unit of output. Labour costs include taxes and social costs in addition to wages and salaries received by employees.

Chart 3.11 compares labour costs per employee across EU-27 in 2005. There is a wide range around the mean of €28.6 for EU-27. Among the leading metal goods producers

labour costs per employee range from €27.1 for Spain to €44.3 for Germany, a difference for Germany of more than one-and-a-half times. For Poland, the leading metal goods producer among the New Member States, labour costs per employee are €7.2, or one-quarter of the EU-27 average.

Chart 3.11 Labour costs per employee, 2005

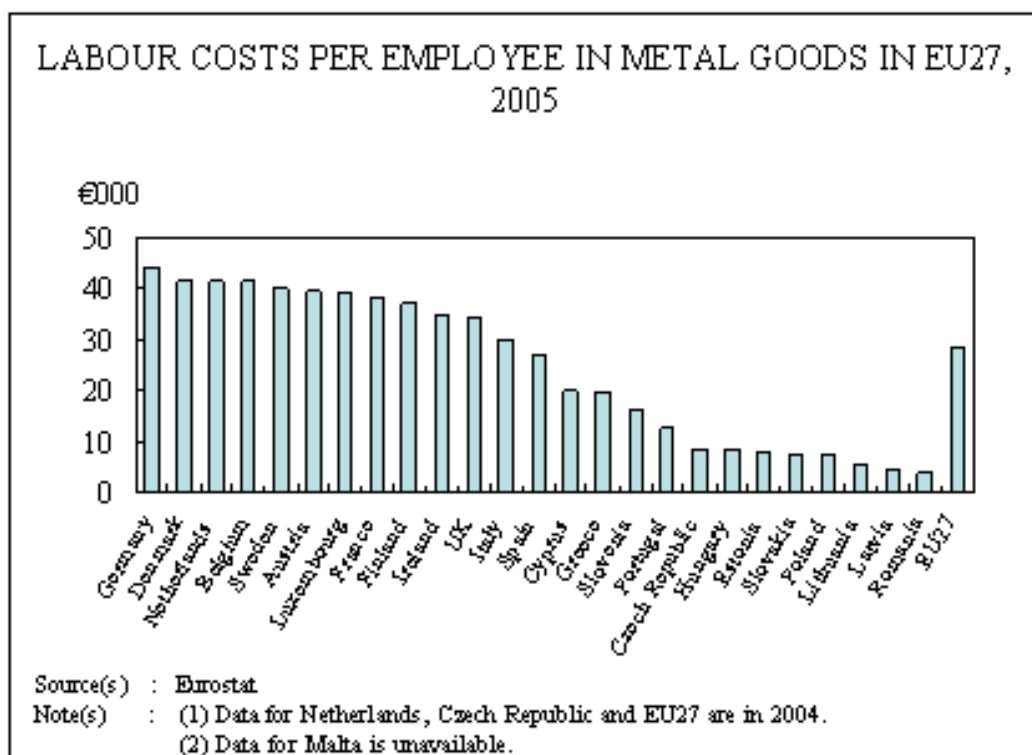


Chart 3.12 shows the movement in labour costs per employee for the leading metal goods producers between 1999 and 2005. The general trend was for costs in € to increase. The exception is the UK, which is outside the Euro area. This outcome will reflect in part offsetting currency movements against labour cost increases measured in local currency.

Chart 3.12 Labour costs per employee, 1995-2005

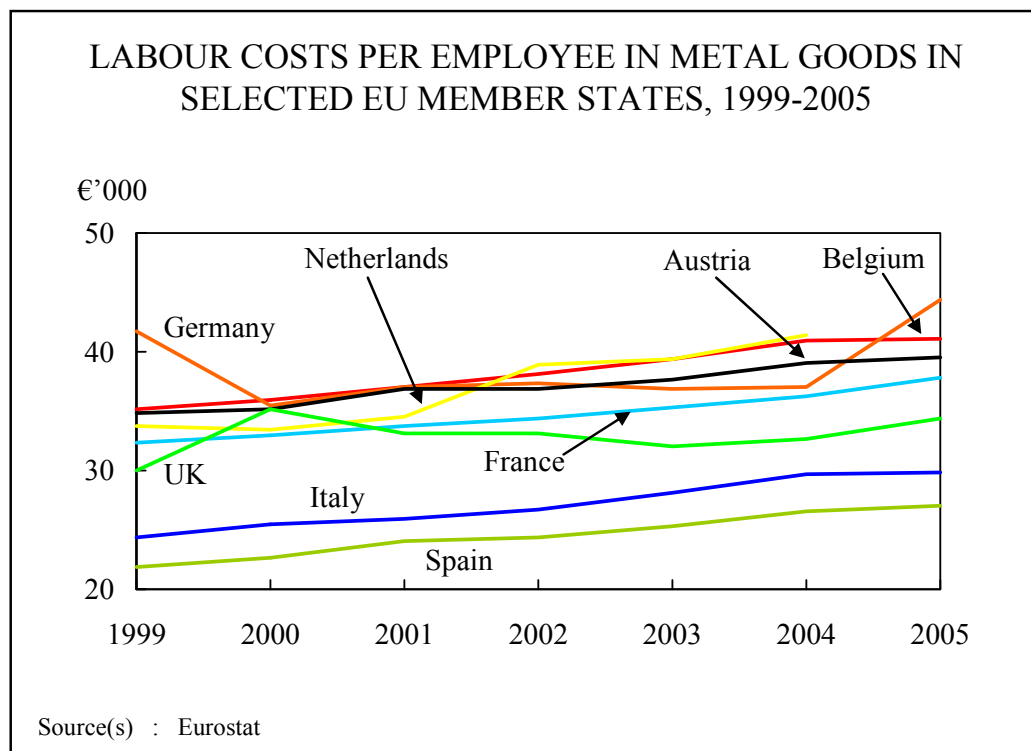
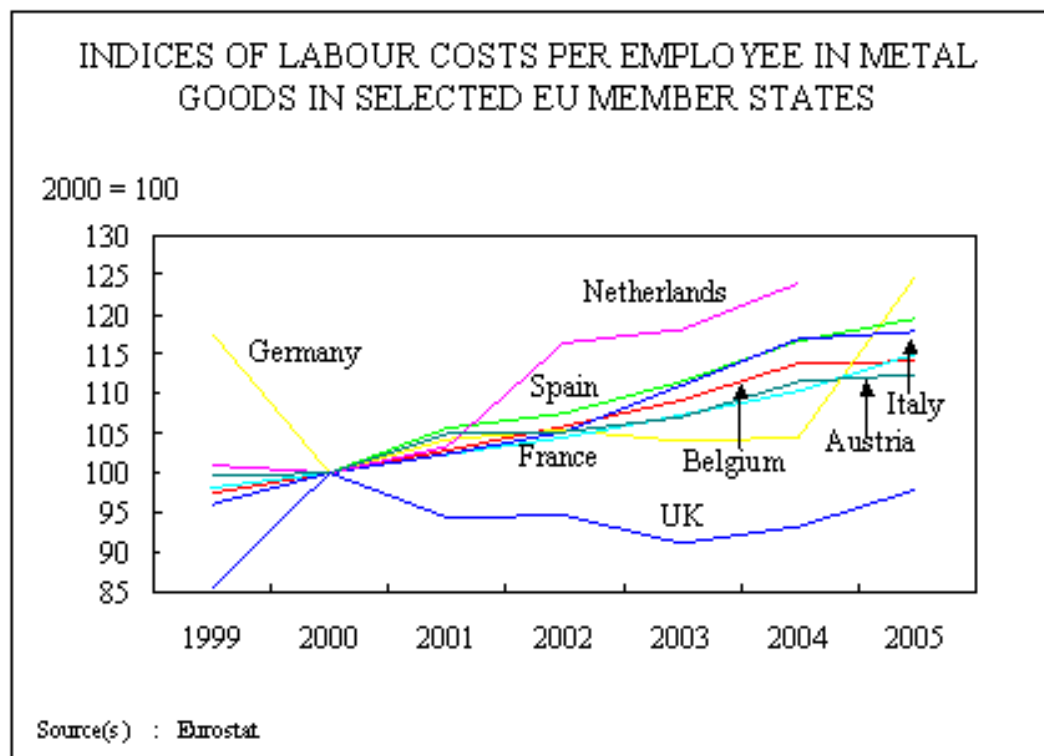


Chart 3.13 presents the labour costs per employee in index form (2000 = 100), in order to compare the rates of growth of costs. Between 2000 and 2005, Euro area Member States experienced labour cost increases of between 12.5% (Austria) and 25% (Germany). The Netherlands encountered fast cost inflation from 2001. In the UK, costs tended to fall after 2000.

Chart 3.13 Index of unit labour costs, 1995-2005



### 3.5.5 Unit Labour Costs

The effect of cross-country differences in labour costs per employee on overall cost competitiveness depends on:

- Labour productivity (output per employee), and
- The share of labour costs in total costs. Total costs include the costs of capital and of bought-in materials and services.

The impact of high labour costs per employee, relative to other countries, on employment costs per unit of output can be wholly or partly offset by high relative productivity.

Empirically, total costs per unit of output, including capital and other non-labour costs, are difficult to estimate. Generally, labour costs per unit of output (unit labour costs - ULC) can be taken as a proxy guide to total unit costs and, hence, to cost competitiveness.

Charts 3.14 – 3.15 compare ULCs across EU-27 and among the leading metal goods producers. Total labour costs (TLC) are calculated as the product of labour costs per employee and the number of employees.

Aggregate physical output data for MMA production are not available, or appropriate, on account of the diversity of the goods manufactured. Here, annual output is proxied by real value added (RVA), in € millions at 2005 prices. This measure captures levels and

movements in both quantity and quality but does not take account of cross-country differences in the degree of vertical integration, which affects the amount of value added.

Estimates of (synthetic) ULCs are generated as the quotient of total labour costs and output (TLC/RVA). The unit of measurement is €'000 per €1 million of RVA.

Chart 3.14 shows estimated indexed unit labour costs (EU-27 = 100) in 2004 for the leading producer Member States. The range is from index 88 for the UK to index 108 for France, a variance of 20% *vis-à-vis* France. Austria and the UK are notable for their low relative unit labour costs.

Chart 3.14 Index of unit labour costs, 2004

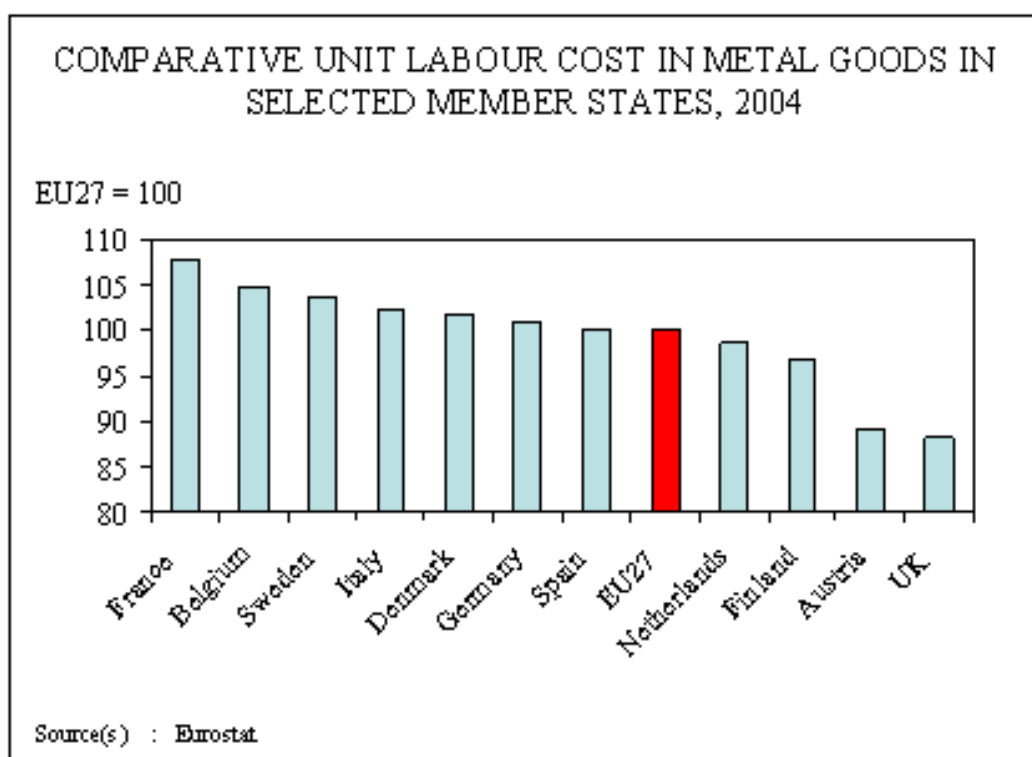
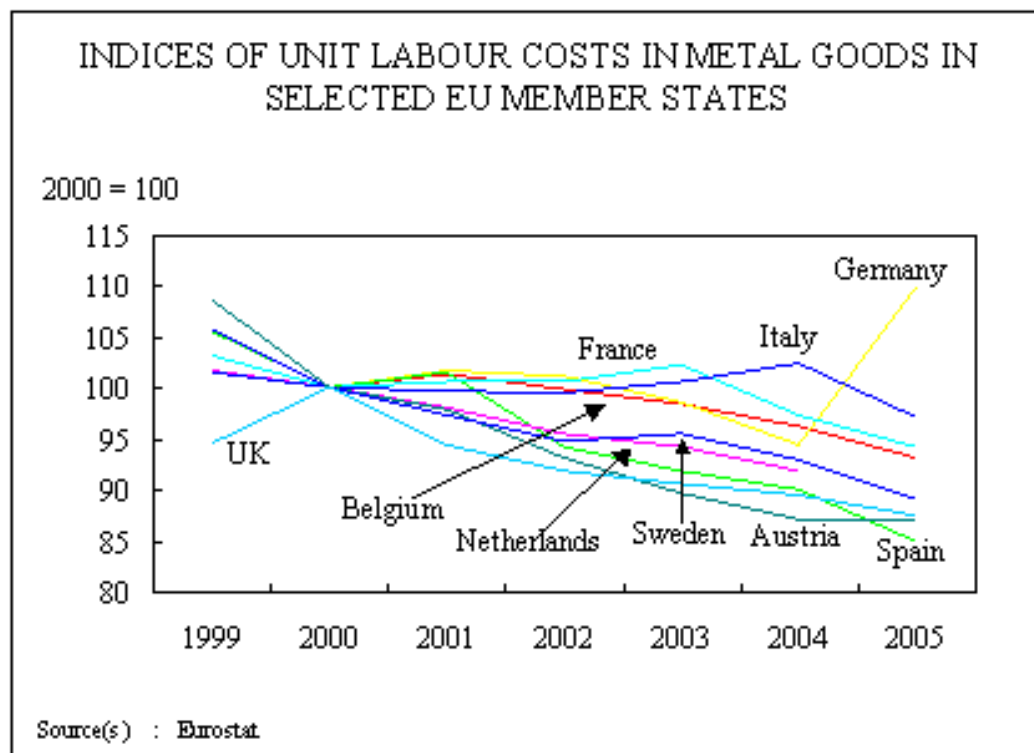


Chart 3.15 shows estimated unit labour costs (in €'000) for the leading producer Member States between 1999 and 2005, indexed for 2000=100. Disregarding the outlier value for Germany in 2005 (presumably affected by recession), the trend of unit labour costs is clearly downward. But, in contrast to movements in productivity, there is no evidence of convergence of unit labour costs over this period. Comparing the highest with the lowest in 1999 and 2004, the ratios were 1.26:1 (Spain/UK) in the first case and 1.22:1 (France/UK) in the second.

Chart 3.15 Labour costs, 1999-2005



The table below assesses the relative impact on unit labour costs of, respectively, labour costs per employee and productivity (output per employee) for the leading metal goods producing Member States. Each Member State is ranked in terms of the three indicators:

- For labour cost per employee, the ranking (1 to 9) is from lowest-to-highest
- For productivity, the ranking is from highest-to-lowest
- For unit labour cost, the ranking is from lowest-to-highest.

The Member States with the greatest unit labour cost advantage are: the UK, Austria and the Netherlands. Low employment costs contribute to low unit labour costs for the UK, while high productivity is the principal source of advantage for Austria and the Netherlands. At the other end of the ranking by unit labour cost, Belgium's productivity advantage is more than offset by high costs of employment, while France suffers mainly from low productivity.

An important implication of this analysis is that integration of EU labour market, leading to convergence of employment costs across the Member States, will increase the stress on improvements in underlying labour productivity so as to sustain international competitiveness.

Table 3.3 Metal Goods: Comparative Ranking of Leading Producer EU Member States by Unit Labour Cost, Labour cost per Employee and Productivity, 2005.

Member State	Unit Labour Cost	Labour Cost/Employee	Productivity (Output/Employee)	Factors influencing ULC rank
	(Chart 8)	(Chart 5)	(Chart 3)	
Rank				
UK	1	3	4	Low labour cost
Austria	2	5	1	High productivity
Netherlands	3	8	2	High productivity
Spain	4	1	9	Low labour cost
Germany	5	9	6	High labour cost
Italy	6	2	8	Low productivity
Sweden	7	6	5	High labour cost
Belgium	8	7	3	High labour cost overwhelms productivity advantage
France	9	4	7	Low productivity

### 3.5.6 Review

The analysis of labour productivity and costs has found evidence of overall productivity gains in the MMA sector in EU-27, and of convergence in productivity levels among the leading producer Member States. But notwithstanding the Single Market, there is wide divergence in employment costs (labour costs per employee) among the Member States, more than offsetting any convergence of productivity levels. The result is that variations among the Member States in unit labour costs are wide and show no signs of convergence. Hence significant differences in cost competitiveness in MMA production persist across the EU.

### 3.5.7 Innovation and Production Technology

Interview responses from MMA firms revealed:

#### *Production techniques and technological change*

*In order to remain competitive in the face of technological change interviewed companies tend to focus on investing in best-practice techniques and R&D (mostly in-house R&D). Most interviewed companies and associations do not expect a very rapid change in production techniques over the next decade. The only companies that expect a fast change in production techniques are in the confectioning of concrete reinforcing steel sector in Germany, and those involved in the manufacture of equipment, plants and technologies for heat recovery, air or gases heating and abatement.*

*The challenges of a low carbon economy*

*The move towards a low-carbon generally represents an opportunity for the German MMA sector, and in particular to the specialized foundries, which have a leading role in the wind power business.*

There is a range of academic literature that identifies the unique advantages that SMEs have in industry (see Carol, 1984, Mascarenhas, 1996, and Liesch and Knight, 1999) compared to its competitors. Three relevant advantages that SMEs possess include their ability to innovate, customer orientation and rapid adaptation to new technologies, and changes in demand. These three characteristics are crucial for SMEs in the MMA sector in order to satisfy the increasing product and process demands, and associated innovation, from large supply chain clients. Given that the end markets for many capital goods are becoming increasingly consumer driven and more specialised in their demands, the structure of the MMA sector, and their ability to innovate, is well suited to serve manufacturing industries.

The competitiveness challenges that face supply chain partners in both directions has emphasised the need for the MMA sector to increasingly compete on the basis of high value product differentiation as opposed to just cost alone. The existence of comparable new low-cost competition from Non-EU countries has forced supply chain partners to adapt their strategies in order to survive. One way they have done this is by focussing on manufacturing value added goods in order to differentiate themselves in the marketplace and one of the key drivers of this type of output is innovation. This is evident in Ireland where manufacturers of automotive parts and manufacturing machinery have developed a focus on intellectual property as the central source of value and competitive advantage (IEEF, 2004).

The changing strategies of supply chain clients inevitably has consequences for the MMA sector, and it increases the need for innovative products and processes. As discussed above, SMEs in general are good at “adapting existing products to the needs of customers” (OECD, 2000, page 6) and this an important feature of firms in the MMA sector given the dynamic demands of supply chain clients and end consumers.

Whilst many factors have created problems for supply chain partners, and indeed the MMA sector itself, many of the problems have also created opportunities for the MMA sector to innovate. For example, many MMA manufacturers face the very significant challenges of price sensitive end users, non metal substitutes, the high cost of steel and energy, and complying with strict environmental regulation, but there are numerous examples of how these challenges have created endless opportunities for the sector.

One example to illustrate this is in canned food manufacturing. Increased consumer pressures and Government Directives aimed at retailers and food manufacturers to become more environmentally friendly has encouraged them to engage in technical innovation with the MMA sector to reduce the environmental impact of canned food. Heinz, a large UK food manufacturer, with close cooperation from steel companies and



the MMA sector, has managed to devise a new type of can that is thinner and lighter, without compromising quality, strength or style. According to Heinz, the lightweighted cans “bring down costs, reduce energy use and cut emissions” (WRAP, 2007, page 2), saving 1,400 tonnes of steel and cutting carbon emissions by 585 tonnes per annum. At the same time Heinz has made major cost savings due technical innovation and the MMA sector has benefited by making possible substitutes less appealing, hence protecting its competitive position.

According to the IEEF (2004), engineering firms that have focussed on innovation have performed better than traditional engineering companies engaged in the production of basic products. As a case study example, Carlton Laser Services Limited, a UK owned SME manufacturer of metal goods is a good example of a firm that has successfully adapted its business strategy in order to survive in response to changing economic conditions; particularly the threat of new low-cost competition. The Case Study can be seen in the Appendix to the report.

### 3.5.8 Cluster study: Pays de la Loire (France)

#### Facts

<p>Number of MMA companies: 4.000</p> <p>Size of companies : All kinds from major leaders (STX, Airbus) to SME</p> <p>Number of employees: 120.000</p>
--

#### Typical MMA companies in Pays de la Loire are:

<p><b>Manitou BF S.A.</b>'s principal activity is to design and manufacture rough-terrain handling equipment such as fork lift trucks, personnel lift platforms, articulated loaders and other industrial equipment. These products are used in the construction, industrial and agricultural sectors. The group mainly operates in Europe.</p> <p>Employees: 2,700 (2007) Turnover: €1,260m</p> <p><a href="http://www.manitou.com/">http://www.manitou.com/</a></p>	<p><b>Groupe Gruau</b> manufactures commercial vehicles with traditional bodywork products and products with short runs for manufacturers of minibuses, high-cube van bodies, extension and raising of minivans or compact vans and multipurpose urban vehicles.</p> <p><a href="http://www.gruau.com/">http://www.gruau.com/</a></p>
<p><b>Daher</b> has expertise in composites, metalwork and welding. The group develops its own products such as structural assemblies and systems, fitted cells and sections, complete aircraft (TBM850), overall management of final assembly line (FAL), nuclear containers, technical fixtures, transport equipment, Integrated shelters, standard or special containers, ground support equipment, Tanks, tooling, etc.</p> <p>Employees: 7,000 Turnover: €607m (2008)</p> <p><a href="http://www.daher.com/">http://www.daher.com/</a></p>	<p><b>Mécachrome</b> designs, engineers, manufactures and assembles complex precision-engineered components for aircraft and automotive applications, including aero-structural and aircraft engine components, high-end automobile engine components and motor racing engines. Mécachrome operates in France and Canada</p> <p>Employees: 2,000 employees (2007) Turnover: €295m (2007)</p> <p><a href="http://www.mecachrome.com/">http://www.mecachrome.com/</a></p>

Pays de la Loire consists of 5 counties: Loire-Atlantique, Maine et Loire, Mayenne, Sarthe, and Vendée. Pays de la Loire is the fourth largest economic region in France with a GDP of €70bn (2002). Almost 12% of the machine and equipment manufacturing industry in France is located here together with 9% of the metallurgy and metalworking sector. The mechanics, metallurgy and automobile sectors represent about one quarter of

the regional industrial workforce – with more than 65,000 jobs. The metallurgy sector is driven by the needs of the food, aviation, shipbuilding and the automotive industries. Almost 44% of the French shipbuilding industry is placed in the Pays de la Loire.

France strengthened its competitiveness and the innovation capacity of its companies by supporting the creation of 71 dedicated innovative clusters in 2005. More than 2000 R&D projects representing more than €4bn were initiated by the clusters from 2005 to 2007, including almost €2bn of public aid. The projects involve over 10,000 researchers belonging to private or public organisations and more than 5,000 companies, 80% of which are of a small or medium-sized employing 640,000 people. One of the competitive clusters is the EMC2 in Pays de la Loire.

#### Creation of the formal cluster EMC2

EMC2 was formed as a formal collaboration between public and private organisations in the Pays de la Loire to support the composite and metallic industry. EMC2 was founded by industry leaders such as Airbus, STX France (Alstom Marine), DCN Propulsion and Bénéteau group and ACI (Renault Group), and gathering industries (Valeo, Mecachrome, Sora composite), training and R&D institutes, and industrial inter-regional networks.

The aim of EMC2 is to increase the competitiveness of the member companies by offering an extensive range of research and development facilities as well as other forms of business development. The EMC2 has five key objectives:

- Develop high-performance composite materials;
- Master new processes for implementation of materials and structure assembly;
- Deploy technologies of co-design and simultaneous engineering among all cluster members;
- Optimise the physical flow and the information flow throughout the production and integration operations;
- Develop and pool new skills in which local training programmes will develop leading expertise.

Innovative and collaborative projects have priority, and EMC2 assists at every step of the development process. Companies of all sizes are eligible for assistance from EMC2, and according to EMC2 80 percent of the participating companies in the cluster are SMEs. EMC2 has attracted 150 members working on 70 projects worth in excess of €200m. The main fields of the EMC2 projects are: “aerostructure”, “naval structures”, “surface transportation”, and “composite structures” while the main performances aspects targeted in the projects are industrial processes, sustainable development, and collaborative engineering.

The research and development infrastructure is composed of 35 regional laboratories, 12 joint research units and 14 engineering schools. Among them are Ecole Centrale de Nantes, Ecole des Mines de Nantes, Ecole de Management Audencia Nantes, Ecole Nationale Supérieure des Arts et Métiers (ENSAM), Ecole Supérieure d'Electronique de l'Ouest (ESEO), Commissariat à l'Energie Atomique (CEA), Centre Technique des Industries Mécaniques (CETIM).

The research themes cover five technological topics; joint design, materials and processes, characterisation and tests, sustainable development (eco-design, energy use, energy efficient transportation, recycling composite waste and products at the end of their lifecycle), and extended enterprise. Collaboration is a very important dimension, and in all projects EMC2 demands that at least 2 companies are involved. The EMC2 encourages collaboration among companies on logistics, management, innovative ideas, and shared training.

Public funds are available to initiate new projects, with up to €1m being granted in some

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#### ***The Linear Friction Welding project***

*A typical project in the EMC2 is the Linear Friction Welding Project.*

*The project develops a new joining procedure that does not require filler material. The material in the welding zone is heated by rubbing together the two pieces to be joined (an oscillatory movement). When the material becomes soft, the two parts are pressed together (action of forging) and the joint is created at the atomic scale.*

*The expected results of the project are*

*Reduced material consumption and improved production times  
Good metallurgical structure  
Homogeneous or heterogeneous joins of different sections and complex shapes*

*The principle applications of the linear friction welding are aircraft motors and air frames.*

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cases. The EMC2 cluster also seeks private funding.

One research centre is the EMC2 TechnoCampus near Nantes which provides support to industrial groups, small enterprises, industries and laboratories. The TechnoCampus opened in early 2009 and employs 300 people. The research and technology platform covers projects from the theoretical and applied research stage up to the development of component materials and the creation of functional prototypes, built to a 1:1 scale.

The EMC2 points out several advantages to participating companies. A member company gets access to:

**Results of research programmes** and early information, since the French government uses the formal clusters as a communication channel to innovative companies. Dissemination and promotion of innovation and results are important activities of the EMC2 network and staff.

**Funding from national agencies**, because the government uses it to ensure consistency and complementarities of different projects, avoid duplication and maximise the benefits of public funding.

**Public R&D programmes**, because competitiveness clusters are a major lever industrial policy for the French state with about €500m per year from agencies such as ANR (Agence Nationale de Recherche) AII (an agency for industrial innovation) and Oséo.

In the light of the current economic crisis the cluster structure has proved to be of value for company managers according to the EMC2. Company managers share insights on innovation, share ideas, and find new business opportunities within the framework of EMC2. The EMC2 also aims to develop international business relationships within Europe and abroad

The programme serves to develop the competitiveness of SMEs and SMIs by improving their purchasing performance. Over 80 companies and 100 professionals have participated in the programme.

### 3.5.9 Barriers to Innovation

The importance of innovation in the MMA sector has been detailed above but certain factors limit the potential for firms to engage in effective high value innovation.

#### *Small Firms in the MMA Sector*

The high proportion of SMEs in the MMA sector means that the costs of investing in Research and Development to add value to their products and processes is too high. Also, the relatively labour intensive nature of the MMA sector also makes ongoing Research and Development a major challenge. According to The EEF (2003) the metals and metal products sector in the UK spends less than 1% of sales on Research and Development. As discussed above, firms in the MMA sector are required to manufacture increasingly bespoke metal articles for supply chain clients, and they are becoming increasingly involved in product design and marketing, creating a heavy financial burden (Orgalime, 2008a).

#### *Insufficient Intellectual Property Protection*

Those firms in the MMA sector that do have the financial and human resources to be able to undertake effective Research and Development are often not rewarded for their innovation in the form of increased sales, due the unlawful counterfeiting of its products or techniques. Few individual firms in the MMA sector can devote the resources necessary to effectively protect their intellectual property, compared to larger firms (Orgalime, 2008a), and even then there are no definite guarantees that their findings will not be imitated.

Interview responses from MMA firms revealed:

*Innovation, obstacles and protection*

*The main obstacle which prevent or make it harder for German companies to protect their inventions/innovations, is the ease with which other companies in other countries copy them. Companies state they do not have any adequate methods to prevent others from copying their inventions/innovations.*

### 3.5.10 Cluster study: Valencia (Spain)

**Facts**

Number of MMA companies: 4.579  
Size of companies: 95 % SME companies  
Number of employees: 35.000

Source: IVE

**Typical MMA companies in Valencia are:**

<p><b>Industrias Ochoa</b></p> <p>Industrias Ochoa is a contract manufacturer since 1970. Its core business is the design and production of moulds and dies, tooling and special machines used in metallic products production. Its customers belong to a wide range of sectors, including the electrical or the automotive sector, being local and international companies.</p> <p><a href="http://www.ind-ochoa.es">www.ind-ochoa.es</a></p>	<p><b>Mariner</b></p> <p>Mariner is a lamp- manufacturer since 1893. Its products, are home designed, adapting the latest design trends and innovations. Mariner offers the best available materials and quality in their products as uses a combination of tradition and innovation in their production processes.</p> <p>Mariner has international presence, with customers all around the world.</p> <p><a href="http://www.mariner.es">www.mariner.es</a></p>
<p><b>Galol</b></p> <p>Galol a group of supplier companies that offer their surface finishing services to manufacturers of metallic and non-metallic parts since 1974. The surface finishes offered cover a wide range of treatments for our customer's products. Galol offers their customers a full service, from transportation, surface finishing and delivery to their facilities. Galol offers electrolytic, chemical, organic, conversion layers, zinc flake coatings and other surface finishing processes.</p> <p><a href="http://www.galol.com">www.galol.com</a></p>	<p><b>Tabervall</b></p> <p>Tabervall is a metallic furniture manufacturer since 1974. They offer a wide range of garden and school furniture.</p> <p>Tabervall employs around 250 people and exports almost 60% of its production, mainly to European countries.</p> <p><a href="http://www.tabervall.com">www.tabervall.com</a></p>

The MMA sector has traditionally played a strong role in the economy of the region of Valencia. Historically the principal activities of the sector in the region have centred on the production of lamps and iron-works, as well as on subcontracting for other sectors. With the presence of foreign investments, especially those related with the automotive sector, has expanded the sector and opened markets and diversified the technologies related with the MMA sector.

The MMA sector has always been characterised as offering high quality products at highly competitive prices, although increasing competition from emergent economies has made a change necessary in the strategy of the companies to focus on innovation and the

development of products of high added value. In 2007 nearly 60 million Euros were allocated to Research, Development and Innovation.

The sector is characterised by its dispersion throughout the region, principally as provider for other sectors such as furniture or automotive. The average company size is under 20 employees, and the majority of companies employ fewer than 5 workers.

The MMA companies in the region specialise in subcontracting and production for other companies, rather than in the development of own products.

#### [A combination of strong local and international companies](#)

The MMA sector in Valencia consists of almost eight thousand companies employing 85,000 employees. The MMA sector is the dominant industrial sector in the region with a share of about 30% of the local industrial sector. It is one of the three most significant MMA clusters in Spain with a share of 7% – 10% of enterprises and employees. The accumulated knowhow among the companies gives them a strong potential to expand their activities to other sectors such as aeronautics, renewable energies, or electrical cars.

The cluster of MMA companies benefits from the presence of technical schools, engineering universities, research and scientific centres, and employer's organisations such as Femeval.

Femeval was established in 1977 as an employer's organisation in order to regroup and be able to represent all the companies in the metal trade in Valencia. Its main purpose is to protect the personal and individual interests of its associates and increment companies' competitiveness. Foreign investments are concentrated in the automotive sector and in the metallurgical sector. A significant part of the MMA sector in the region is supplier of the automotive sector.

Local companies, especially those in the lighting sector, have a long export tradition in a wide range of principal markets such as the EU, United States, or Russia.

Only a few companies benefit from EU funding due to their small size and lack of expertise in managing EU projects, but Femeval has undertaken several projects in order to increase the number of companies participating in European projects. . The lack of R&D activities in most of the SMEs do not provide them with a strong internal capacity to accelerate innovation through European collaboration in the R&D Framework Programmes, but the new EU strategy focused on SME's could stimulate their access to EU programmes.

## SWOT analysis of the MMA sector in Valencia

### Strengths

High production flexibility  
Widespread production knowhow  
Near to prominent transport infrastructure

Presence of research and scientific services centres

### Opportunities

Entry into new and technologically complex sectors  
Integration into high added value activities

### Weaknesses

Small enterprises  
Lack of innovation culture in traditional sectors  
Too production capacity in low valued-added segment  
Lack of highly renowned companies

### Threats

Increasing competition from emerging countries  
Environmental legislation compared with emerging countries  
Lack of skilled workers in emerging technologies  
Increment of energy and raw materials costs

## Education and Innovation as the future of the sector

The best-case scenario includes the adoption of a new economic model, whereby which the sector builds capacity to deploy their core competences obtained in the automotive sector in new sectors, especially those related to emerging technologies such as renewable energy, new materials, or aerospace. This scenario would increase the profitability of the companies, creating high-skilled jobs and stimulating the creation and growth of new companies.

This scenario demands an industrial policy focused on innovation and the creation of funding programmes to stimulate entrepreneurial growth of high tech firms. Secondly it would require a strategic dialogue between the sector and educational providers in the region in order to anticipate and identify the type of qualifications needed in these new growth areas as a basis for curriculum reform.<sup>13</sup>

The worst-case scenario includes a relocation of the automotive sector to regions with lower cost structures, and the reduction of activities of sectors related to the MMA sector such as ceramics or furniture. This scenario would dramatically reduce the number of companies in the MMA sector, and would take a long time to recover due to the lack of leading companies. This scenario would decrease the profitability of the companies, which are local suppliers for specific local markets in which there are no international companies. It could result in a serious skills miss-match heavily impacting the transition to work for new graduates who will no longer be able to find job opportunities in the metal sector.

To avoid this scenario, industrial policy must focus on stimulate innovation in existing sector as well as prioritise innovation and entrepreneurial policies targeting new and emerging high tech sector building on the regional technological strongholds and core competences.

## Innovation

Companies in the Valencia MMA sector need to have access to technological development in core technologies as a precondition to entering highly technological sectors:

Use of new materials used by highly technological sectors

<sup>13</sup> This type of process has been initiated in Mexico with the organisation CONOCER- See OECD/CERI Review- systemic innovation processes in VET.



Implementation of different technologies in products  
Increase flexibility of the production systems through process innovation  
Research into new commercial applications for existing metals and alloys  
Management improvements. Implementation of innovation management systems

### Education

Close collaboration between industry, universities, and education authorities is needed to increase the competitiveness of the industry, improve access to new technologies, and create innovative companies. Strategic dialogues between industry and key knowledge providers should furthermore develop capacity to anticipate likely skills needs in emerging technological fields with a view to ensure a match between supply and changing demands for specialised skills.

Educational programs in which students from an early age get exposed to technologies in an entrepreneurial manner will be central to stimulating that more young people choose a technological career. Policies which ensure a coherent approach between Technological, economic and education policies could lead to a better efficiency in public policy intervention.

### Barriers to Innovation

#### *Lack of Skills*

Responses from the first questionnaire to national associations revealed:

*The availability of skilled workforce appears to be one of the most important factors affecting MMA sector. The R&D base and the transport links/services also appear important in particular for Germany, Austria and Belgium, but less so in the new member state.*

*The main drivers for innovation are the need to cut costs and competition from other firms. The need for innovation has led German companies to invest in high skilled people and automated processes, while outsourcing manual task to new member states. Companies in Italy, on the other hand, appear to have focused more on niche products in order to maintain their market share. In France, companies meet difficulties to hire skilled manpower due to a general negative image of the industry. Belgium, because of high labour costs, is evolving towards a country where only prototypes and first series are made.*

Interview responses from MMA firms revealed:

#### *Recruitment and training*

*Generally, the interviewed companies experience little difficulty in recruiting and retraining workers with the appropriate skills. The exception is the concrete reinforcement sector in Germany. For this sector, even during the current slowdown it is difficult to recruit engineers. In particular, the working conditions in the confectioning of concrete reinforcing steel sub-sector are not attractive (hard, dirty*



*work and three shift operation), while most other metalworking companies provide better conditions. Foundries in Germany operating in urban and industrialized areas also have some recruitment problems, as they face competition with more attractive, bigger companies.*

There is evidence in many areas of manufacturing to suggest that a lack of high skilled workers acts as a disincentive to innovate. In the UK 14% of workers in the manufacture of basic metals and metal products sector have no qualifications (SEMTA, 2008). According to The EEF (2004) in Germany and the UK nearly 70% of firms that are experiencing skills shortages that constrain innovation cite shortages of engineers as a problem. Similarly, the IEEF (2004) states that there is a distinct lack of personnel that have the adequate skills to operate new technologies. The EEF (2003) identify metal processing and forming as one of the engineering processes most affected by skills gaps. It is evident that this lack of skills is also reflected in the MMA subsector where there is a shortage of technicians, engineers and researchers; the drivers of innovation.

### 3.5.11 Cluster study: Vorarlberg (Austria)

#### Facts

Number of MMA companies: 100  
Size of companies : Between 50 and 4.000 employees  
Number of employees: 12,500  
MMA sector turnover: EUR 4 billion p.a.

#### Typical MMA companies in Vorarlberg:

<p><b>Julius Blum GmbH.</b> Julius Blum GmbH has six plants in the Vorarlberg area that manufacture hinges, lifts and pullout systems for the global market. The company was founded in Höchst in Vorarlberg, and today the company has production facilities in Austria, Poland, USA, and Brazil. The company has 3,993 employees in Vorarlberg. <a href="http://www.blum.com/eu/en/04/70/20/10/index.php">http://www.blum.com/eu/en/04/70/20/10/index.php</a></p>	<p><b>Grass GmbH.</b> Grass GmbH is an international manufacturer of furniture fittings and process machinery. The company's headquarters are located in Höchst in Vorarlberg.  <a href="http://www.grass.eu">http://www.grass.eu</a></p>
<p><b>Liebherr Group.</b> The Liebherr Group is a global company with two sites in Vorarlberg. Liebherr-Werk Nenzing GmbH manufactures and sells a range of products including ship, offshore and harbour mobile cranes as well as an extensive range of hydraulic duty cycle crawler cranes and lift cranes. <a href="http://www.liebherr.com/lh/en/35228.asp">http://www.liebherr.com/lh/en/35228.asp</a></p>	<p><b>Doppelmayr.</b> The Doppelmayr/Garaventa Group is a global ropeway engineering company. The Doppelmayr Group has production facilities, sales and service locations in over 33 countries worldwide. Until today, the company has built more than 13,970 installations in more than 80 countries. <a href="http://www.doppelmayr.at/?lid=2">http://www.doppelmayr.at/?lid=2</a></p>

The industrial sector in Vorarlberg, Austria, has been massively transformed in the past 20 - 30 years. To adapt to this structural change the retraining of workforce has been necessary. A close partnership between the regional enterprises and local vocational schools engaged in retraining and training of apprentices has enabled the transformation.

The industry created the V.E.M. [Vorarlberger Elektro- und Metall-Industrie] organisation 30 years ago to handle collaboration between enterprises in relation to the training and education of the workforce. Today 8,5% of the workforce of Vorarlberg is employed in the MMA sector, and the V.E.M. companies generate almost one third of the yearly turnover in Vorarlberg.

There is no technical university in Vorarlberg, and cooperation with the university of applied science (Fachhochschule Vorarlberg) is very limited. However, the V-Research Centre ([www.v-research.at](http://www.v-research.at)) is a centre for industrial research and development in Vorarlberg. 51 percent of V-Research is owned by an association of 15 companies and institutions, and 49 percent is owned by the province of Vorarlberg.

#### Cooperation with educational institutes and promoting of technical qualifications

The industry cooperates with educational institutions at every level of qualification from primary school to higher technical education institutes. V.E.M. believes that the close partnership in education is a major factor in the successful transformation of the MMA sector in the region.

The V.E.M. works with the 3 higher technical education institutes (HTLs) in Vorarlberg. One example is the HTL in Bregenz ([www.htl-bregenz.ac.at](http://www.htl-bregenz.ac.at)), where a long list exhibits local companies as sponsors to the school (<http://www.htl-bregenz.ac.at/mentor/index.htm>). Companies contribute with direct sponsorship and technical equipment and machines.

In order to promote interest in technical qualifications, a number of concrete actions have been taken by the Wirtschaftskammer Vorarlberg<sup>14</sup> beginning with the “**Schaffar**”-day for 3<sup>rd</sup> to 4<sup>th</sup> grades<sup>15</sup> and the “**up2work**” initiative for 5<sup>th</sup> to 6<sup>th</sup> grades in the primary school<sup>16</sup>, as well as initiatives in the (Gymnasium) and secondary modern school (Hauptschule).

Other initiatives are the **BIFO fair** which every second year invites 7<sup>th</sup> to 8<sup>th</sup> grades to visit their exhibition (<http://www.bifo.at/>) and **FIT** – Frauen in technische Zukunftsberufe (Women in future technological professions) which every year invites girls from the 7<sup>th</sup> to 9<sup>th</sup> grades to visit companies and technical schools along with their teachers.

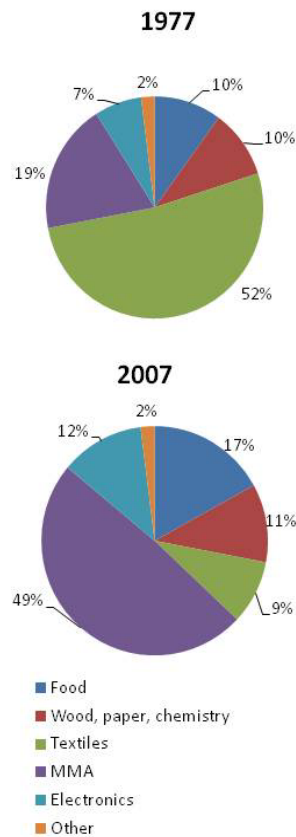
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<sup>14</sup> The Economic Chamber of Vorarlberg – part of The Austrian Federal Economic Chamber WKO

<sup>15</sup> On “Schaffar”-day the schools are invited to visit local companies. In 2008, 1700 children participated. One of the local companies reports the events on the “Schaffar”-day at their homepage. <http://www.vvg.at/index2.php?pid=10&nHglD=14>

<sup>16</sup> In the up2work initiative in 2009 a total of 1900 children visited 160 local companies for a day of work. The company Collini Gmbh reports on this event on their homepage. [http://www.collini.at/content/news/news.asp?newsID=NewsML\\_2057593107&backLink=news](http://www.collini.at/content/news/news.asp?newsID=NewsML_2057593107&backLink=news)

**From textiles to MMA in 30 years**  
**Industrial production in Vorarlberg**  
**1977 – 2007 divided by sectors**



**WKÖ, 2008**

The V.E.M also promotes interest in technical qualifications among youth people with a competition, awarding 4,500 Euros to apprentices which receive a positive assessment by the end of their second year. The reward is sponsored by the V.E.M. companies through a voluntary fee. Through this scheme approximately €1 million is awarded each year.

**The MMA sector in Vorarlberg is an export sector with a highly skilled workforce**

The Vorarlberg MMA sector is an internationally-oriented sector which exports approximately 96% of its output. The sector is a strong asset to the region with almost 15,000 people employed in about 100 companies. The workforce is highly skilled and able to deliver high-value products with a high degree of customisation and flexibility. The major strengths of the Vorarlberg MMA sector are the skills level of the workforce, a high level of

innovation, and focus on quality. Most companies are family-owned SMEs. The sector's has experienced a relative high export percentage and high growth rates over the past 7 years, but currently the MMA sector's dependence on declining markets is affecting its economic performance.

One of the major challenges is a highly regulated labour market with protective social agreements<sup>17</sup>. In the declining markets, protective social agreements between employers

<sup>17</sup> Wages in the Austrian labour market are decided through collective bargaining between the social partners. More than 500 collective agreements are concluded every year.

Traditionally the wages of blue- and white-collar workers in the metal sector are the first to be negotiated each year, and the metalworkers set the pace for other unions and sectors which enter the bargaining process in the following months. Agreements apply for 12 months and determine wages, pensions, co-determination rights, redundancy programmes, etc. The provisions of the collective agreements are legally binding for all

and labour organisations are perceived by the employers as a barrier to adapting costs to fit with the declining market, which affects the sector's overall cost structures in a negative manner. Medium to long term it is predicted that the MMA sector will have difficulties in signing sufficient numbers of apprentice contracts.

#### The future of the MMA sector in Vorarlberg

The current credit crunch is affecting companies in Vorarlberg. According to the V.E.M., the overall labour costs form a large share of the productions costs in the MMA sector in Vorarlberg. Moreover, as their markets decline, businesses find it difficult to control their costs due to the highly regulated labour market policies in Austria impacting regulations regarding wage-cuts and lay-offs. Another concern is the possibility of financing problems due to the Basel II Accord. The combination of a regulated labour market and stricter financial controls currently puts the Vorarlberg businesses under a strong structural pressure.

The only solution perceived by employers is a lay-off of employees in a way to stay below the 5 % threshold and that the Austrian government takes over some guarantees for company loans.

The MMA sector companies in Vorarlberg are calling for urgent changes in national and EU-level labour market regulations concerning lay-offs and salary reductions. The V.E.M. in Vorarlberg is concerned that if no action is taken, many MMA companies will be under serious financial pressure or even bankruptcy in 2010.

Medium term, demographic developments could reduce the sector's access to a well qualified workforce. The V.E.M.'s strategy is to create early interest in technology among pupils in public schools and to recruit a greater share of females.

The business strategy for companies in Vorarlberg continues to be to invest in education and innovation to increase the level of profitability.

Finally, there is a call for policies which can facilitate access to liquidity at national as well as at EU level.

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contracts of employment. Employers are legally obliged to be members of the Federal Economic Chamber (WKO), which is the legal representative of the employers in the collective bargaining process.

Austrian companies can regulate the size of the workforce in various ways: layoffs, part time contracts, reduced working hours, layoff combined with a guaranteed reemployment, and wage cuts. Labour market legislation requires that if layoffs are higher than 5% there has to be social plan and the company has to inform authorities 1 month in advance. Each social plan must be negotiated with the social partners.

### 3.6 Conclusion: Competitiveness Challenges and Prospects

To conclude, following a review of a range of literature the main competitiveness challenges and prospects of the EU MMA sector industry are listed below.

#### Challenges:

Operating in an economic environment where a range of uncontrollable factors can hinder its prosperity and growth (such as steel prices and raw materials access).

The decreasing size of the sector relative to its larger supply chain partners.

The fall in demand for end products manufactured by supply chain clients, especially in the automobile sector, on which it is so dependant.

Rising unsold inventories and lower capacity utilisation.

Increased movement into downstream production and involvement by steel producers, putting smaller MMA firms at risk.

Its inability to engage in consolidation due to structural reasons and high levels of specialisation.

Difficulties in earning economies of scale due its small size and nature of their businesses.

Lack of resources to undertake high levels of Research and Development and innovation to protect and enhance its competitive position.

Restrictions in the availability of finance.

Improving relations and communication throughout the supply chain to stimulate effective innovation.

Costs and inconveniences in complying with regulation.

Lack of resources (compared to larger firms) to invest in practices that protect Intellectual Property. This also acts as a disincentive to innovate.

The growth in imports of comparable low-cost metal products and finished goods from emerging economies.

The EU is not on a level playing field in the global market in terms of Health and Safety, emissions and quality standards and this has a knock on effect on the sector.

A lack of highly skilled workers required to operate new technologies and to drive innovation.

Proportionately high administration costs for SMEs required by the local authorities and by the EU.

#### Prospects:

The sector plays a major role in linking its major partners in the supply.

Without this link the supply chain would break up and this creates dependence from supply chain partners.

Foreign companies in the supply chain have brought with them new ideas and methods as well as the diffusion of new technology, benefiting the sector.

Significant growth in value added export growth.

The weakening of the Euro makes capital goods and consumer durables manufactured by the industry cheaper in world markets, hence the prospect of increased export growth.

Lower oil prices and indications that raw material costs have started to fall.

New opportunities created by increased drives to protect the environment.

High number of SMEs that can tailor production to the increasingly complex needs of supply chain clients.

Many metalworking products are very easy to recycle.

Globalisation and has encouraged firms to specialise and innovate in order to prosper.

Unique products through high levels of continuous innovation, that are difficult to imitate.

Upward trend in employment productivity.

## 4 Horizontal aspects affecting competitiveness

### 4.1 Introduction

Task 4 of the MMA sectoral competitiveness study focuses on the regulatory and framework conditions. The goals are twofold:

- To identify the key sectoral issues of the regulatory environment and the framework conditions which influence sectoral performance and the competitive position of the MMA sector;
- To provide a comprehensive and structural assessment of the relevant regulatory conditions and framework conditions that determine the growth and competitive position of the MMA sector.

The framework conditions covered include geographical structure and cohesion, labour force, knowledge & skills, access to third country markets, competition from third country imports on EU markets and cost and availability of supply of energy.

### 4.2 The framework grid

#### 4.2.1 Introduction to the framework grid

The overall aim of the framework grid is to provide a general synthesis of regulations, conditions and effects from literature and from previous sector analyses in order to generate a clear and accurate view on the framework within which the MMA industry operates. This synthesis should subsequently allow us to identify the most relevant indicators for the completion of the competitiveness grid in relation to task 3 (assessment of competitive position). Furthermore, it will lead to the formulation of a number of both general and sub-sector-specific conclusions.

The framework grid is divided into three parts:

- Regulatory conditions;
- Framework conditions; and
- Exogenous conditions.

For each type of condition, a list of items and sub-items is listed, according to the regulations and topics that are applicable to the EU MMA industry.

It is at this level of sub-items that the grid is filled in, namely that importance, trend and specific sub-sectors affected are identified. Another column is added during the process

to map the potential effects of each of the conditions on the competitiveness of the EU MMA sector.

To comprehend the conditions and their effects described in the framework grid, it is important to point out the specific interpretation of each of the columns and the way they have been filled in.

#### *Importance*

The column “Importance” aims to indicate the importance of the condition for the MMA sector and its sub-sectors by means of a score between 1 and 10, 10 being most important. To grade the importance of the condition, a number of characteristics and issues were taken into account:

- Does the condition apply to the MMA industry more than to other industries due to its characteristics (cost structure, labour skills, energy intensity of the production process, use of raw materials, industry structure, etc.)?
- Does the condition apply to the MMA industry in a way that influences its competitive position relative to non-EU countries?
- Does the condition apply to the MMA industry in a way that influences its competitive position relative to substitute products?

#### *Trend*

The column “Trend” refers to the expectations stated in literature regarding the evolution of the condition’s impact. Will the impact of this regulation or issue increase/decrease/stay the same in the future? The underlying reasons for this trend can be, for example, an increasing importance of the characteristic to which the condition refers, or a strengthening of the regulation or condition.

#### *Specific sub-sectors*

The column “Specific sub-sectors” lists all sub-sectors of the MMA industry that might be affected by or that are the aim of the regulation or condition in question.

#### *Potential effects*

In the column “Potential effects”, a review of the most important potential effects of the conditions for the specified sub-sectors is presented. This review includes the effects that are found in empirical literature, indicated by [1], the effects that are described as ‘potential’ in literature [2] and the effects that on the base of our own assessments have a potential impact [3].



#### 4.2.2 The framework grid

MMA INDUSTRY		Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects [1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
<b>I Regulatory conditions</b>					
<ul style="list-style-type: none"> <li>Labour market regulations <ul style="list-style-type: none"> <li>Protection of workers from exposure to electro-magnetic fields<sup>i</sup></li> </ul> </li> </ul>		4	=	<ul style="list-style-type: none"> <li>Manufacturing of metal products</li> </ul>	<ul style="list-style-type: none"> <li>Production costs increase due to additional safety regulations (measurement of exposure, signs that indicate potential exposure, information for workers,...) [2]</li> <li>Competitive position weakens because this legislation does not apply outside EU (e.g. EU cannot compete with low social costs in China) [2]</li> <li>Potential relocation and subsequent loss of jobs [2]</li> </ul>
<ul style="list-style-type: none"> <li>Trade Policy <ul style="list-style-type: none"> <li>Definitive anti-dumping duty on imports of silico-manganese (China, Kazakhstan, Ukraine)<sup>ii</sup></li> <li>Request from steel industry for anti-dumping duty on imports of steel from China</li> </ul> </li> </ul>		3  5 <sup>iii</sup>	=  >	<ul style="list-style-type: none"> <li>Metal processing</li> <li>Metal processing</li> <li>Constructional steelwork</li> </ul>	<ul style="list-style-type: none"> <li>Imports become more expensive [3]</li> <li>Protection of domestic market for silico-manganese supply [3]</li> <li>This would lead to an even stronger position of the EU steel suppliers and thus probably to higher input prices for MMA industries using steel as an input. [3]</li> </ul>
<ul style="list-style-type: none"> <li>Industry-specific regulations and standards <ul style="list-style-type: none"> <li>Pressure equipment<sup>iv</sup></li> </ul> </li> </ul>		4	=	<ul style="list-style-type: none"> <li>Boilers, metal containers</li> <li>Manufacturing of</li> </ul>	<ul style="list-style-type: none"> <li>Administrative cost of compliance [3]</li> <li>Increase of regulation increases production switching costs [3]</li> </ul>

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects
				[1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
<ul style="list-style-type: none"> <li>Construction products <sup>v</sup></li> </ul>	6	=	<ul style="list-style-type: none"> <li>metal products</li> <li>Constructional steelwork</li> </ul>	<ul style="list-style-type: none"> <li>Administrative cost of compliance [3]</li> <li>Increase of regulation increases production switching costs [3]</li> <li>Production of specialised products increases, in which EU is relatively competitive [2]</li> <li>Importance of innovation increases [2]</li> <li>Importance of control on compliance (MS responsibility) [2]</li> </ul>
<ul style="list-style-type: none"> <li><b>Consumer standards (health and safety)</b> <ul style="list-style-type: none"> <li>Machinery <sup>vi</sup></li> </ul> </li> <li>Regulations for materials intended for contact with food <sup>vii</sup></li> </ul>	4	=	<ul style="list-style-type: none"> <li>Components, wires</li> </ul>	<ul style="list-style-type: none"> <li>Administrative cost of compliance [3]</li> <li>Increase of regulation increases production switching costs [2]</li> </ul>
	4	=	<ul style="list-style-type: none"> <li>(Light) metal packaging</li> </ul>	<ul style="list-style-type: none"> <li>Administrative cost of compliance and possibly switching cost [3]</li> <li>Competitive position on foreign markets will weaken if this legislation does not apply outside EU, but innovative solutions in answer to EU regulation will create a comparative advantage on the EU market [3]</li> </ul>
<ul style="list-style-type: none"> <li><b>Research, development and innovation policy</b> <ul style="list-style-type: none"> <li>LT projects (ULCOS (energy saving and ultra low CO2-emissions on steel); Strategic research agenda developed by ETPs (EuMaT);...</li> </ul> </li> </ul>	6	>	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Research agenda at high level is necessary to coordinate efforts and to avoid putting too much pressure on SMEs only. SMEs only have limited skills, resources and opportunities to engage in</li> </ul>

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects [1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
<ul style="list-style-type: none"> <li>Limited involvement of SMEs in innovation policy</li> </ul>				<p>such research projects but when effort is done, they can benefit from implementing results of applied research. This generates a competitiveness advantage for EU MMA industry. [2]</p> <ul style="list-style-type: none"> <li>However, policy should still take into account possibilities of SMEs to engage in research collaboration and networks in order involve them actively in research and adapt policy to their size and capabilities. [2]</li> </ul>
<ul style="list-style-type: none"> <li><b>Intellectual property right issues</b> <ul style="list-style-type: none"> <li>The market share approach in the Block Exemption Regulation for Technology Transfer Agreements<sup>viii</sup></li> </ul> </li> <li>Design protection<sup>ix</sup></li> <li>The European Commission's proposal to</li> </ul>	<p>2</p> <p>6</p> <p>6</p>	<p>=</p> <p>&gt;<sup>x</sup></p> <p>&gt;</p>	<ul style="list-style-type: none"> <li>All</li> <li>Manufacturing of metal products (components)</li> <li>Manufacturing of</li> </ul>	<ul style="list-style-type: none"> <li>Reduces the strength of IPR and since IPR enhances competitiveness of the EU MMA Industries, also has a negative effect on competitiveness. [2]</li> <li>Remark here that when SMEs are concerned, the market share thresholds are not often binding, thus the effect will be very limited for SMEs. [3]</li> <li>Ensuring a high level of protection for industrial property and encouraging investment in manufacturing with respect to the appearance of a product or its components [2]</li> <li>Decrease of counterfeited imports, especially important because of the increasing counterfeiting activities from competitors [2]</li> <li>Increase of competitiveness [3]</li> <li>Reduction of IPR [2]</li> </ul>

MMA INDUSTRY		Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects [1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
modify the design protection directive (98/71) on the national protection of spare parts as designs and models <sup>xi</sup>  ▪ Enforcement of IPR <sup>xii</sup>		8	=	metal products (components in particular spare parts for automotive industry, agricultural and industrial machines and vehicles, cookware etc.)  ▪ All	▪ More uniform protection regime throughout all Member States, encouraging security and free trade, potentially also leading to price decreases [2] ▪ Increase in competition in EU market, especially beneficial for SMEs and towards consumer choice [2] ▪ No adverse effects on competition, since no (or limited) design protection applies in third countries either [2] ▪ Decrease of counterfeited imports, especially important because of the increasing counterfeiting activities from competitors in certain areas [2] ▪ Increase of competitiveness [3] ▪ Highly necessary to stimulate innovation and R&D efforts [3]
▪ <b>Environmental regulations and issues</b>  ▪ RoHS Directive (Hazardous Substances) <sup>xiii</sup>		7	=	▪ Metal processing ▪ Boilers, metal	▪ Switching costs and administrative burden [2] ▪ Environmental regulation often leads to a competitive disadvantage as compared to substitutes (e.g. wood, concrete,...) [2] ▪ Innovative reactions to environmental regulation also creates opportunities that lead to comparative advantages (e.g. low-energy-using lamps as a reaction to EuP regulation) [2] ▪ Might lead to product level differences between Member States, as there is room for different

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects
				[1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
<ul style="list-style-type: none"> <li>WEEE Directive (Electrical and Electronic Equipment)<sup>xiv</sup></li> </ul>	7	=	<ul style="list-style-type: none"> <li>containers and packaging</li> <li>Boilers, metal containers and packaging</li> <li>Manufacturing of metal products</li> </ul>	<p>interpretation in the specific application per Member State. [2]</p> <ul style="list-style-type: none"> <li>Administrative burden [3]</li> <li>Consists of minimum requirements, thus differences may occur between Member States due to specific transposition. [2]</li> <li>Often implemented as a so-called ‘visible fee’, where consumers pay for the cost of waste elimination. Cost effects are thus limited for producers. [2]</li> </ul>
<ul style="list-style-type: none"> <li>Packaging waste regulation (consumer sector)<sup>xv</sup></li> </ul>	4	=	<ul style="list-style-type: none"> <li>Packaging and light metal packaging</li> </ul>	<ul style="list-style-type: none"> <li>Harmonization of national regulation leads to a decrease of non-tariff trade barriers between Member States [2]</li> <li>Compliance requires additional efforts in terms of administration and production changes, which might affect the competitive position towards third countries [3]</li> <li>Applies the same to substitutes for the metal packaging, so no (or limited) distortional effect there [3]</li> </ul>
<ul style="list-style-type: none"> <li>Higher energy efficiency requirements in building products (consumer sector)<sup>xvi</sup></li> </ul>	6	=	<ul style="list-style-type: none"> <li>Constructional steelwork</li> </ul>	<ul style="list-style-type: none"> <li>Switching costs [3]</li> <li>Importance of innovation increases [2]</li> <li>Production of specialised products increases, in which EU is relatively competitive [2]</li> </ul>
<ul style="list-style-type: none"> <li>Eco-design requirements for energy-using products (EuP)<sup>xvii</sup></li> </ul>	8 <sup>xviii</sup>	>	<ul style="list-style-type: none"> <li>Boilers, steam generators</li> </ul>	<ul style="list-style-type: none"> <li>Increase of production costs [3]</li> <li>Development of a specific niche market for</li> </ul>

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects
				[1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
<ul style="list-style-type: none"> <li>IPPC directive (dioxine emissions)<sup>xix</sup></li> </ul>	7	=	<ul style="list-style-type: none"> <li>Manufacturing of metal products (Tools; Hardware components;...)</li> <li>Metal processing</li> </ul>	<ul style="list-style-type: none"> <li>energy-efficient products [2]</li> <li>Development of know-how and innovation [3]</li> <li>Protection of know-how and innovation becomes more important in order to benefit from this competitive advantage [3]</li> <li>Compliance costs [3]</li> <li>Recycling increases, which decreases the production costs (thanks to cheaper input materials and energy savings in the production process) [2]</li> <li>Competitive position weakens due to the fact that this legislation does not apply outside of the EU [3]</li> </ul>
<ul style="list-style-type: none"> <li>Greenhouse gas emission <sup>xx</sup> and proposal for EU ETS revision</li> </ul>	4	>	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Indirect effect when cost increases of basic metal industry due to compliance with EU ETS are shifted onto consumer industries like MMA industry [3]</li> <li>Modernisation and innovation benefit from the efforts to reduce CO2-emissions [1]</li> <li>The EU ETS revision increases the share of allowances that will be traded, thereby increasing uncertainty for firms (consumers of the MMA sector) and creating reluctance to plan ahead and invest for the long term [2]</li> </ul>
<ul style="list-style-type: none"> <li>REACH <sup>xxi</sup></li> </ul>	7 <sup>xxii</sup>	=	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Indirect impact because MMA is using chemicals as inputs [2]</li> <li>Users need to identify and explain to suppliers</li> </ul>

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects [1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
<ul style="list-style-type: none"> <li>Product safety<sup>xxiii</sup></li> </ul>	5	=	<ul style="list-style-type: none"> <li>All</li> </ul>	<p>how they use the chemicals, which leads to an additional administrative burden, which is heavy especially for SMEs [2]</p> <ul style="list-style-type: none"> <li>There is a risk of price increase of chemical products due to a reduction in the number of allowed chemical products and a potential shift to substitute chemicals [2]</li> <li>Specialisation might change due to the possible phasing-out of speciality chemicals [2]</li> <li>Imported goods are less well adapted to the legislation and will thus have a comparative disadvantage at the benefit of EU producers [2]</li> <li>Exported goods from the EU will be more expensive as compared to producers that do not have to comply with this regulation. EU producers thus have a comparative disadvantage [2]</li> <li>Part of the fees (see Reg 340/2008) may be shifted to downstream (transforming) industries in the EU. [3]</li> <li>Within the EU, trade barriers are lowered [1]</li> <li>Importers into the EU need to comply with these stricter rules, which requires adaptation costs and thus can form a (temporary) trade barrier [1]</li> <li>Control process is important in order to enforce compliance [3]</li> </ul>
II Framework conditions				

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects
				[1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
<ul style="list-style-type: none"> <li>Geographical location and cohesion               <ul style="list-style-type: none"> <li>Highly centralized production</li> <li>Geographical proximity of metals' supply chain and their related industries</li> </ul> </li> </ul>	7  7	=  =	<ul style="list-style-type: none"> <li>All</li> <li>Metal processing</li> <li>Constructional steelwork</li> </ul>	<ul style="list-style-type: none"> <li>Regional sensitivity to demand shifts or other sectoral issues [3]</li> <li>Mutual dependency and interest, thus strength for EU production which gives it a comparative advantage and a stronger position towards its downstream industries [3]</li> <li>Close relationship allows to make high-performing tailor-made metal products, so that EU products are well in line with demand [3]</li> <li>Proximity to clients allows for timely, secure and flexible supply to the just-in-time downstream production, again ensuring that EU production is well geared to demand [2]</li> <li>The investments and growth in third countries like China,... might require a shift of MMA production to these countries with new downstream markets [2]</li> <li>Threat of relocation of production for the home market to a foreign country with lower input cost is small. [3]</li> </ul>
<ul style="list-style-type: none"> <li>Labour force &amp; knowledge skills               <ul style="list-style-type: none"> <li>Skill shortage in EU</li> </ul> </li> </ul>	8	>	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Shortage of appropriate skills (because of ambitious environment requirements and evolution towards more automation but also because of ageing of the work force), hampers production and</li> </ul>



MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects
				[1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
<ul style="list-style-type: none"> <li>Large work force</li> </ul>	8	=	<ul style="list-style-type: none"> <li>All</li> </ul>	<p>growth and might even lead to shifts of production to locations where these skills are more readily available. [2]</p> <ul style="list-style-type: none"> <li>Increasing wages for the appropriately skilled workers in order to attract new workers and retain the existing workforce [1]</li> <li>And thus higher production costs and less competitive production in the EU e.g. in comparison with China, where engineering skills are more available [3]</li> <li>MMA Industries are a large employer, which makes production shifts in the sector all the more important for shifts in labour demand. [3]</li> </ul>
<ul style="list-style-type: none"> <li><b>Access to third countries / EU market access (trade and investment)</b> <ul style="list-style-type: none"> <li>Net export</li> </ul> </li> <li>Growing production in developing countries (mainly China and India)</li> </ul>	6	=	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Risk of production shift towards markets with higher demand, especially towards developing countries [2]</li> </ul>
	7	>	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Higher demand for input materials in developing countries which leads to a (temporary) increase in input prices for EU producers. There is no structural scarcity of inputs but adaptation to demand fluctuations is slow and thus creates temporary scarcity of inputs when demand increases. [1]</li> <li>Large part of this production is meant for local markets, but there is also a substantial import in</li> </ul>

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects
				[1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
				the EU thanks to lower cost structures reducing prices [2]
<ul style="list-style-type: none"> <li>Knowledge base development <ul style="list-style-type: none"> <li>R&amp;D</li> <li>Efficient use of raw materials and recycling</li> <li>More involvement by clients in design and marketing of metal articles</li> </ul> </li> </ul>	8   5   7	=   =<	<ul style="list-style-type: none"> <li>All</li> <li>Mainly the large companies have substantial R&amp;D activities</li> <li>All</li> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>For many subsectors, mainly research for innovation in the production process and materials [2]</li> <li>Innovation resulting in high value products and higher productivity is a way to reduce competition from low-cost producers outside EU [2]</li> <li>These innovations lead to a less input intensive production process, in terms of raw materials and often also in terms of energy supply [2]</li> <li>Switching costs [3]</li> <li>Once the processes are optimized, the cost effectiveness results in a competitive advantage [3]</li> <li>Distance matters, so relocation of activities becomes less attractive [3]</li> <li>Important innovative knowledge built up [3]</li> <li>Skill shortage, especially in SMEs [3]</li> <li>Heavy financial burden, especially for SMEs [3]</li> </ul>
<ul style="list-style-type: none"> <li>Physical aspects and infrastructure <ul style="list-style-type: none"> <li>Input material intensive</li> </ul> </li> </ul>	6	=	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Sensitive to price fluctuations of inputs and indirectly of suppliers' inputs as MMA industry has a relatively weak bargaining position towards its suppliers [3]</li> </ul>

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects [1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
<ul style="list-style-type: none"> <li>Long investment cycles</li> </ul>	7	=	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Even more increasing competition on inputs market, due to increasing production outside of the EU (e.g. China and India) thus leads to negative effect on competitiveness [3]</li> <li>Importance of steel price and availability, because steel suppliers are large and few in number in the EU.</li> <li>If policy is unpredictable or is expected to change, investments will be postponed [2]</li> <li>SMEs do not have the financial resources to continuously renew their equipment and machinery to establish state of the art production processes [2]</li> </ul>
<ul style="list-style-type: none"> <li>High representation of SMEs</li> </ul>	8	=	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Decreases bargaining power, especially since both suppliers (e.g. steel) and buyers (e.g. automotive, equipment builders) are often large companies [3]</li> <li>Higher input prices and lower output prices [3]</li> <li>Some SMEs depend on one sector only and are thus particularly vulnerable for fluctuations in demand by this sector (e.g. automotive industry due to economic crisis) [2]</li> <li>High demand in terms of design work etc. by the consumer industries is even more difficult to accommodate for SMEs who often lack flexibility in capacity, skills and financial resources [3]</li> <li>R&amp;D is difficult to organize, as well as</li> </ul>

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects
				[1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
				investments in equipment and machinery for new processes or to improve productivity [3]
<ul style="list-style-type: none"> <li>Cost and availability of energy</li> </ul>	6	>	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Disparity between countries on energy costs due to different contractual conditions, might lead to shifts in geographical concentration and shifts outside of the EU [2]</li> </ul>
<b>III Exogenous conditions</b>				
<ul style="list-style-type: none"> <li>Economic crisis / Credit crunch</li> </ul>	7	= (LT <)	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>The credit crunch has an overall impact on economy [3]</li> <li>Large effect on SMEs, especially micro-enterprises with limited equity and financial resources [2]</li> <li>And also influence on MMA's purchasing industries such as automotive, building,... so that there is also an indirect pressure effect on MMA industry [3]</li> </ul>
<ul style="list-style-type: none"> <li>Cost and availability of energy and raw materials               <ul style="list-style-type: none"> <li>Increasing energy prices</li> </ul> </li> <li>Dollar price</li> </ul>	6	>	<ul style="list-style-type: none"> <li>All, especially metal processing</li> </ul>	<ul style="list-style-type: none"> <li>Increasing input prices leading to increasing product prices, even more so since the metal processing subsector is rather energy intensive [2]</li> <li>EU will need to ensure energy supply at competitive prices [2]</li> </ul>
	5	<	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Relatively weak dollar makes EU products relatively more expensive, so that export decreases and import increases. The competitive position of EU MMA industry weakens. [3]</li> </ul>

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects
				[1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
<ul style="list-style-type: none"> <li>Slow adaptation of input supply to demand fluctuations</li> </ul>	6	=	<ul style="list-style-type: none"> <li>Metal processing</li> <li>Constructional steelwork</li> </ul>	<ul style="list-style-type: none"> <li>Input prices are sensitive to dollar prices. Exchange rate uncertainty at the cost side is thus an important condition for the MMA Industry.</li> <li>Demand increases lead to temporary scarcity of inputs. This in turn leads to higher input prices in the short run. The other way around, a decrease in input demand pushes down prices. Recently, production in developing countries is increasing, thus the first case applies. [1]</li> </ul>
<ul style="list-style-type: none"> <li>Basic metals</li> </ul>	5	=	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Increasing prices (also due to price increase and sometimes availability issues of ores and concentrates for production of basic metals) lead to increasing production costs of MMA [2]</li> <li>To some extent this leads to increasing prices of MMA and thus to a less competitive position as compared to its substitutes (like wood and concrete,...) [2]</li> </ul>
<ul style="list-style-type: none"> <li>Steel demand and prices</li> </ul>	7	>	<ul style="list-style-type: none"> <li>Metal processing</li> <li>Constructional steelwork</li> </ul>	<ul style="list-style-type: none"> <li>Steel prices for MMA will differ from those for large purchasers such as automotive industry, but this is also due to size of the firms. [2]</li> <li>Shortage in steel (also due to growing production outside of the EU) leads to higher prices and might even lead to continuity problems in the production process [2]</li> </ul>
<ul style="list-style-type: none"> <li>Concentration steel suppliers</li> </ul>	7	>=	<ul style="list-style-type: none"> <li>Metal processing</li> <li>Constructional steelwork</li> </ul>	<ul style="list-style-type: none"> <li>Large concentration in steel suppliers in Europe, which influence price bargaining [2]</li> <li>Suppliers have requested anti-dumping measures</li> </ul>

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects
				[1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
				against Chinese suppliers, which would lead to duties on steel imports from outside the EU, thus entailing a threat for price increases due to reduction of competitiveness in this steel supply market [2]
<ul style="list-style-type: none"> <li>Technological change <ul style="list-style-type: none"> <li>Environmental requirements</li> </ul> </li> </ul>	7	>	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Challenge but also opportunity, as EU industries have a strong knowledge and a comparative advantage in these fields of energy efficiency and environmental issues [3]</li> <li>Innovation mainly in production processes, instead of products, so implementation of these research results also require investment in technology and infrastructure [3]</li> </ul>
<ul style="list-style-type: none"> <li>Increase in design requirements</li> </ul>	7	>	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Investments in R&amp;D [2]</li> <li>Change of required skills (more engineering and design skills) [2]</li> <li>Human and financials resources to make this switch are not (often) available in SMEs [2]</li> <li>Yet comparative advantage in EU industries to provide a tailor-made and flexible answer to the design requirements of their clients thanks to innovation and research efforts and consequent knowledge build-up [3]</li> <li>Importance of control on counterfeiting increases, since profits from R&amp;D investments depend on</li> </ul>

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects
				[1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
				this control [2]
<ul style="list-style-type: none"> <li>Downstream industries</li> </ul>	7	>	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Industries with larger concentration, thus larger bargaining power than firms in the MMA industry (mainly SMEs) [2]</li> <li>Dependency on the needs (and thus on the production) of downstream industries like shipbuilding, automotive, aerospace, chemicals, electrical and mechanical machinery, construction...) which might also be loosing market share to cheaper production locations and also suffer from the economic crisis [2]</li> </ul>
<ul style="list-style-type: none"> <li>Importance of proximity to MMA industry</li> </ul>	6	=	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>When the MMA industry shifts outside of EU, the consumer industries will follow to a certain extent, since proximity is an important issue for most of them [2]</li> <li>Yet, the other way around, growing consumer industries in EU will also attract more production in the EU MMA industry [3]</li> </ul>
<ul style="list-style-type: none"> <li>Regulations</li> </ul>	3	=	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Regulation applying to consumer industries also indirectly affect the MMA industry in terms of compliance costs, but also in terms of increased demand for specialized product, in which EU firms in general have an advantage over third countries. [3]</li> <li>Knowledge and technology development adapted to regulatory conditions restricting consumer industries. Geographic proximity thus becomes</li> </ul>

MMA INDUSTRY	Importance 1-10	Trend < / = / >	Specific sub-sectors affected	Potential effects
				[1]=empirical literature; [2]=theoretical literature; [3]=own appreciation based on economic theory
				even more important [3]
<ul style="list-style-type: none"> <li>Global competition           <ul style="list-style-type: none"> <li>Increasing production in developing countries e.g. China and India</li> <li>Competition from substitutes (wood, concrete,..)</li> <li>Counterfeiting and (lack of) control mechanisms</li> </ul> </li> </ul>	<p>8</p> <p>5</p> <p>7</p>	<p>&gt;</p> <p>&gt;</p> <p>&gt;</p>	<ul style="list-style-type: none"> <li>All</li> <li>Constructional steelwork</li> <li>Manufacturing of metal products</li> <li>Packaging</li> <li>Metal processing / General mechanical engineering</li> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Increased competition and pressure on prices [3].</li> <li>Shift of production outside of EU because of better production conditions and because of importance of proximity to the downstream industries.</li> <li>Reduces the competitive position of the MMA sector with respect to other sectors (in all countries), especially when price differences increase (e.g. metal cans versus plastic cans) [2]</li> <li>Decreases the downstream bargaining power towards industries that can also turn to alternative materials (like wood or concrete in the building sector, plastics, paper, glass or wood in packaging or tools,...)</li> <li>At the moment, it is the producer of imported goods that signs a declaration of conformity with EC regulation, there is little external control on compliance [3]</li> <li>Diminishes expected profits derived from investment in research and innovation and thus R&amp;D efforts [3]</li> </ul>



#### 4.2.3 Conclusions from the framework grid

The systematic analysis of the framework profile of the metal working and metal articles industry indicates that the main conditions are:

- Large share of SMEs and dependency on upstream and downstream firms (which are typically larger and more powerful);
- Environmental regulations;
- Skills and training;
- Innovation, R&D and protection of intellectual property rights.

We remark that there are substantial differences between and within sub-sectors in terms of labour intensity, energy intensity, raw materials, expectations of customer firms, productivity and efficiency and so on, which also lead to differences concerning the specific influence of the conditions. For example, the subsector of casting, forging and coating faces different types of suppliers (basic metal, steel) and customers than the other subsectors. Moreover, within this subsector, there are large differences in the need for innovation or efficiency gains between, for example, producers for the standardized automotives sector on the one hand and producers for the quickly evolving specialist sector of windpower plants on the other hand.

Furthermore, the geographic concentration of production leads to different effects between regions/Member States. To the extent that they account for the greatest shares of MMA output and employment, Germany, France, Italy, Spain and the UK will be affected more than other Member States, when for example standards for MMA products are changed or introduced. Also, given the specialisation of France in the BCP subsector, the minimum energy efficiency requirements for boilers and water heaters will have a relatively more substantial effect in this country than in other Member States. However, in terms of concentration or specialisation within manufacturing, the countries most affected will be Austria, Slovenia, Estonia, Spain and Italy. In these countries the MMA sector accounts for 10-13% of manufacturing output, more than in any other Member State.

Beyond this, the macro-economic environment plays a large role for MMA industries. The economic crisis has had a direct effect on the automotive industry and construction, and thus indirectly generated a fall in demand for MMA products. This is due to the MMA sector's transforming character and thus the business-to-business environment in which it operates. Government expenditures in construction, therefore, will indirectly boost demand for MMA sector outputs (including structural metal products; tools; metal wire and fasteners), while car scrappage schemes such as those implemented in Germany and the UK will also support demand for MMA products.

The conclusions on the four main conditions and on Member State specific conditions and New Member States, are presented in the next paragraphs.

##### *Large share of SMEs and dependency on upstream and downstream firms*

The MMA industry consists mainly of SMEs. Especially for micro enterprises (more than 80% of all enterprises in the MMA sector in 2006), this has an influence on several

aspects, such as the bargaining power towards upstream and downstream firms and the ability to engage in R&D.<sup>18</sup>

The upstream firms are often large firms producing basic metals or steel. In the EU, for example, two large firms dominate steel supply. These large firms are well organized and better co-ordinated compared to the MMA SMEs and can increase their profit margin at the expense of the SMEs' margin. Moreover, many inputs are supplied by importers to the EU. When the EU imposes anti-dumping duties (e.g. on aluminium), this is shifted to a large extent onto the MMA SMEs, so their cost increases further.

This weak bargaining position towards upstream firms was also illustrated by the observation of a stakeholder in a large MMA firm that higher input quantities do not always result in lower unit prices. When this stakeholder acquired a small firm it discovered that the small firm paid an even lower unit price for inputs. This example indicates that not all interactions are transactions-based (relying on contractual agreements focusing mainly on price) and highlight that there is room for relationship-based interactions (which draw on past experience and place importance on quality and reliability). This suggests that small size need not always be barrier to competitively priced supplies.

The downstream industries are dominated by large firms as well. Automotive and aerospace are both industries in which concentration is much higher than in the MMA industry. The construction sector is less concentrated but it does have a few large, pan-European players such as Vinci, Bouygues or Hochtief. Therefore, on the one hand, the MMA industry (especially the subsectors of casting, forging and coating; structural metal products; and packaging, containers and boilers) struggles to be a price setter and, on the other hand, has to adapt to the specific demands in terms of product characteristics of the downstream industries.

It was emphasized at several points that this market structure has serious consequences for the performance, challenges and opportunities of the sector.

### *Environmental regulations*

As in many (manufacturing) industries, environmental regulation has a substantial impact on the MMA industry. Both the direct and indirect effects are important in this case.

Regulations affecting the MMA industry directly cover waste prevention and control, the integrated product policy (e.g. eco-design requirements for energy-using products), specific product standards or regulations (boilers, constructional products, electrical and electronic equipment). These regulations require compliance measures, adaptation of the production process, and implementation of new technologies. These adaptations can form a serious challenge for the MMA sector, given the high concentration of SMEs in the sector. Yet at the same time, when rules apply to all products used in the EU, the opportunity for the EU MMA industry lies in the competitive advantage over importers to serve this EU market. It is recognized in one of the interviews with customer firms that

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<sup>18</sup> From the interviews with the sector, we learn that medium (3% of all MMA firms in 2006) to large firms (0.5% of all MMA firms in 2006) do have some bargaining power (still depending on the other sides of the market) and often engage in R&D, even through their own R&D centre.

the EU industry is better aware of regulatory conditions and that this is an advantage over extra-EU suppliers. Moreover, several interviewees of the MMA sector indicate that the evolution towards low-carbon production is regarded as an opportunity for the industry, rather than a threat.

Some of the regulations directly affecting the MMA sector also affect the sector indirectly where they also apply to products of downstream industries and influence demand for MMA products. Apart from that, we also identify indirect effects from emission control regulation and other specific product standards (low-energy-consuming end products). We add here that initiatives which are currently undertaken to face the economic crisis in these downstream industries, will also affect the product range and production process in the MMA sector. The EC Communication on reviewing Community innovation policy in a changing world<sup>19</sup>, for example, refers to the European Economic Recovery Plan to launch public-private partnerships for green cars, energy-efficient buildings and ‘factories for the future’. This plan thus aims to offer a sustainable answer to the crisis by directing these industries, and consequently the MMA sector that supplies them, towards environmentally friendly and hi-tech niches.

Given the relatively weak bargaining position of the MMA firms towards their downstream industries, the indirect effects of environmental regulations can be substantial and are therefore taken into consideration in the framework grid.

### *Skills and training*

Skills are changing in the EU MMA industry (as in many manufacturing industries). More and more technological development has led to automation of production and an increased need of engineers instead of workers. This shift is also reinforced by the growing need to differentiate and engage in R&D.

However, these newly required skills run short in the European labour market, which results in competition from other companies and industries in attracting these skills. Given the relatively negative image of the MMA industry (‘heavy industry’) and the impact this has on the supply of labour, this situation leads to a serious threat from a lack of appropriate skills. Skills are more readily available in emerging countries like China and are thus not currently a restricting condition to production and productivity growth in these competing countries.

Unsurprisingly therefore, stakeholders mentioned skills shortages as having an important negative effect on the competitiveness of the sector. Moreover, stakeholders indicated that the availability of skilled workers is one of the most important location choice factors in the MMA industry. This means that EU’s strong knowledge base has been an advantage for holding firms here in the past, and that the lack of appropriate workers could now lead to shifts in production to outside the EU in the future. This thus emphasizes the importance of adequate education and training and of the introduction of more flexibility into the European labour market.

Stakeholders also recognize the importance of employee training to absorb the right skills, rather than (and next to) attracting them from outside the firm. In this respect, it

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<sup>19</sup> COM(2009) 442

was observed (in a study on the Dutch metalektrö industry<sup>20</sup>) that the economic downturn and consequent decreases of production creates time and availability for education and on the job training. Mainly medium to large firms with more than 100 employees use this lower degree of activity as an opportunity for education of their workers.

#### *Innovation, R&D and protection of intellectual property rights*

Innovation is necessary to further increase productivity and reduce costs to face up to the effects of globalisation and stronger competition from upcoming economies like China and India. It is of high importance to identify opportunities for the sector in this respect. Moreover, innovation is needed in order to comply with certain regulations (mainly environmental or safety regulations). These two factors have so far been the main drivers of innovation, and this will probably not change in the near future (as these needs continue to exist).

Innovation in a number of subsectors of the MMA industry is mainly focusing on the production process (e.g. the metal products subsector). Some products are not very complex (simple components, tools, cutlery for example), but producing them at lower cost thanks to changes in the production process does remain interesting. Yet, also product technology innovation and the search for new materials is mentioned by stakeholders to be one of the biggest challenges for the future. In a study on the Dutch metalektrö industry<sup>21</sup>, it is illustrated that services and technological innovation are the main directions of research and change that are maintained throughout the economic crisis, while the importance of logistics and new products is somewhat decreasing.

To keep up with technological changes, the main actions of the industry are to identify and implement best practices (e.g. also between different factories of the same enterprise) and to conduct in-house research. Commissioning research or acquiring a high-tech firm are not common practice according to stakeholders.

This, together with the high representation of SMEs in the industry, leads us to conclude that rationalization (efficiency) in SMEs is not primarily sought through integration, although larger firms do find that acquisitions have the advantage of being able to share R&D and to offer constant quality for clients at the different locations of the consolidated firm.

Furthermore, we also conclude that the relatively weak bargaining position in relation to larger upstream and downstream firms does not prevent firms from innovating and conducting research. The reason for this is probably the necessity to innovate in order to survive, namely by creating competition on the basis of high value product differentiation. The stakeholder interviews show that for more quality driven and more specialized products, profit margins can generally be higher than for price driven or standardized products.

With respect to R&D, the EU in general has built a broad knowledge base which has led to substantial advantages through application in product differentiation and productivity. However, the MMA industry is characterized by a large share of SMEs with limited

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<sup>20</sup> B. Kriechel, de Grip A., van Breugel G., Coenen J. (2009) *Arbeidsmarktmonitor Metalektrö Editie 2009*, Research Centre for Education and the Labour market (ROA), University of Maastricht.

<sup>21</sup> B. Kriechel, de Grip A., van Breugel G., Coenen J. (2009) *Arbeidsmarktmonitor Metalektrö Editie 2009*, Research Centre for Education and the Labour market (ROA), University of Maastricht.

financial and human capital, and this is a restricting condition for stimulating R&D and implementing R&D results in the firms. It has even been observed that investments are recently down in the EU, but that emerging countries like China have started to specialise more. It is thus an important issue for the EU to try keep the comparative advantage of the knowledge base and keep stimulating R&D and its implementation, also in SMEs.

A second issue, next to stimulating R&D, is to make sure that the results from this R&D can be attributed, protected and exploited by their rightful owner. Enforcement of intellectual property rights protection is therefore crucial for the ability to reap the profits from R&D and to further stimulate it. So far, IPR protection is acknowledged in regulation, but the enforcement is not always sufficient. MMA firms hesitate to apply for patents when this means that they have to publish a detailed description of the process or product. The fear exists that competitors can sail round the protection of this patent, and that this description then clears the way for them to imitate the innovation. It is therefore considered safer not to apply for patents but instead to keep the innovation a secret within the firm as long as possible. Next to the lack of protection from patenting, there also seems to be insufficient assessment and control mechanisms at higher levels to truly discourage counterfeiters.

#### *MS specific regulations*

The EU regulatory framework sets out the lines for individual Member States' regulations. In some cases, Member States can choose to go beyond the provisions of the EU and apply even stricter rules. Other regulations only foresee minimum requirements and leave the implementation specificities to the Member State, so that quite substantial differences might occur between Member States. In this sense, Member States' implementation choices may thus create non-tariff barriers to trade or influence intra-EU competitiveness one way or the other. Nevertheless, stakeholders do not seem to experience barriers within the EU, so these differences seem to have a limited effect on competitiveness between countries.

#### *New Member States*

New Member States so far do not play as large a role as other, older Member States in the MMA sector. Among the EU12, the Czech Republic, Poland and, to a somewhat lesser extent, Hungary and Romania are the countries with the highest presence of MMA firms, although it is far lower than the presence in the five major EU15 producing countries (Germany, France, Italy, Spain and the UK). It appears that they are mostly involved in the production of basic metals, although a process of growing specialisation and diversification is ongoing (e.g. in Hungary).

In terms of framework conditions, there are both similarities and differences with western European Member States. There are also large shares of SMEs in MMA and productivity is also expected to rise. However, wages are still at a considerably lower level, as is productivity and their comparative advantage lies in lower value added products rather than higher value added products.

Geographic proximity is an important counterpart for low-cost production. From the stakeholder interviews we learn for example that customer firms from within the EU15 tend to purchase the majority of their MMA input products within the EU15 as well.

MMA stakeholders have not observed so far, and do not expect to observe in the near future, a major shift of production towards NMS. Yet, production sites in NMS are often foreign owned and often by western EU firms. It has been interesting for some to set up production plants in eastern Europe. The distance to the western European headquarters is not unbridgeable and given that production costs are already pushed down, it prevents shifts further away and outside of the EU which could also take with them the R&D centres. In other words, foreign direct investments in NMS help to keep MMA firms within the EU for development and production.

Under heading 4.3 we translate these framework conditions into their effects on the competitiveness aspects of the MMA industry.

## 4.3 Effect of the framework conditions on the competitive position

### 4.3.1 The competitiveness grid

In what follows, a competitiveness grid is drawn up to present potential impacts of the framework conditions on indicators of the economic and competitive position of the MMA sector in the EU. These impacts are indicated by means of lighter or darker grey crossing between the condition and the indicator in question (depending on the intensity of the effect). For each shadowed crossing, the direction of the effect<sup>22</sup> and the source through which we have identified the effect<sup>23</sup> is given.

First, the regulatory conditions are shown, followed by the grid of the other framework conditions and finally of the exogenous conditions. After presenting the competitiveness grid as a whole we focus in more detail on the effects that each individual competitiveness indicator encounters through the framework conditions.

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<sup>22</sup> + means positive effect dominates  
 - means negative effect dominates  
 + - means no dominant positive or negative effect

<sup>23</sup> This indication is consistent with the one in the framework grid and is thus defined as [1]: effects that are found in empirical literature; [2]: the effects that are described as 'potential' in literature; and [3]: the effects that on the base of our own assessments have a potential impact.

## Regulatory conditions:

### Metalworking and metal articles sector

Indicators																						
Outcomes	Production and Value added				+ [3]	+ [3]	+ [3]	+ [3]	+ [2]	- [3]	+ [2]	+ [2]	+ [2]	+ - [2]	+ - [2]		+ [3]	+ [3]				+ [3]
	Employment	- [2]										+ - [2]	+ [3]									
	Productivity								+ [2]													
	Profitability	- [2]	- [3]	- [3]	+ - [3]	+ - [3]	+ - [2]	+ - [3]	+ [2]	- [2]	+ [3]	+ - [2]	+ [3]	+ - [3]	+ - [2]	+ - [3]	+ - [3]	+ - [3]	+ - [2]	- [3]	+ - [3]	+ - [3]
	Exports and Trade				+ - [3]	+ - [3]	+ - [3]	+ - [3]			+ [2]	+ - [2]	+ [2]	+ - [3]	+ - [3]	+ - [2]	+ - [3]	+ - [3]	+ - [3]		+ [2]	+ [1]
Processes	Intra-industry relations											+ [2]				- [3]						
	Production processes	+ - [3]			+ - [3]	+ - [3]	+ - [2]	+ - [3]	+ [2]					+ - [2]	+ - [2]	+ - [3]	+ - [3]	+ - [3]	+ - [2]	+ - [3]		
	Organisation	- [2]							+ - [3]													
Structure	Industrial structure		- [3]	- [3]					+ - [2]	+ [3]		+ [2]			+ - [2]	+ - [2]						
	Size of enterprises																					
	Level of specialisation				+ [3]	+ [2]	+ [3]	+ [3]	+ - [2]	- [2]	+ [3]	- [3]	+ [2]	+ [3]	+ [3]		+ [2]	+ [3]			+ [3]	
	Segmentation										+ [2]	- [2]	+ [3]									
Inputs	Labour					- [3]			+ [2]													
	Capital																					
	(Intermediate) goods & services		- [3]	- [3]										+ - [3]	+ - [3]	+ - [3]			+ - [2]	+ - [2]	+ - [3]	
	Knowledge & technology				+ [3]	+ [2]	+ [3]	+ [3]	+ [2]	- [2]	+ [2]	- [2]	+ [2]	+ [3]	+ [3]	+ [3]	+ [2]	+ [3]	+ [3]	+ [1]	+ [3]	+ [3]
Framework conditions		Labour market regulations: protection electro-magnetic fields																				
		Competition policy: silico-manganese																				
		Competition policy: proposal steel																				
		Industry specific regulations and standards: pressure equipment																				
		Industry specific regulations and standards: construction products																				
		Consumer standards: machinery																				
		Consumer standards: materials food																				
		R&D policy																				
		IPR: exemption of technology transfer																				
		IPR: design protection																				
		IPR: proposal to modify design protection																				
		IPR: enforcement																				
		Energy & Environment: hazardous substances (RoHS)																				
		Energy & Environment: electrical and electronic equipment (WEEE)																				
		Energy & Environment: packaging waste																				
		Energy & Environment: building products																				
		Energy & Environment: eco-design energy using products																				
		Energy & Environment: IPPC directive																				
		Energy & Environment: greenhouse gas emission																				
		Energy & Environment: REACH																				
		Energy & Environment: product safety																				
Regulatory conditions																						

Other framework conditions:

**Metalworking and metal articles sector**

<b>Indicators</b>												
Outcomes	Production and Value added		+ [2;3]	- [2]		+ - [2]	+ [2]				- [3]	
	Employment		+ [3]	- [2]	+ - [3]	- [2]						
	Productivity						+ [2]					
	Profitability		+ [2;3]			- [3]	+ [2]	+ [2]	+ - [3]	- [3]	- [3]	- [3]
	Exports and Trade	+ - [3]	+ [3]	- [3]		- [2]	+ [2]					
Processes	Intra-industry relations		+ [2;3]			- [3]	+ [2]			- [3]	- [3]	- [3]
	Production processes			- [2]			+ [2]		+ - [3]	- [3]	- [3]	
	Organisation											
Structure	Industrial structure	+ - [3]										- [3]
	Size of enterprises											
	Level of specialisation						+ [2]		+ [3]			
	Segmentation						+ [3]					
Inputs	Labour			- [1]	+ - [3]		+ [3]		+ [2]			
	Capital								+ [2]		+ [2]	- [3]
	Intermediate goods & services					- [1]		- [2]		+ [2]	- [3]	+ [3]
	Knowledge & technology						+ [2]	+ [2]	+ [2]		- [3]	
<b>Framework conditions</b>	Geographical location and cohesion: highly centralized production											
	Geographical location and cohesion: geographical proximity to value chain											
	Labour force & knowledge skills: skill shortage											
	Labour force & knowledge skills: large work force											
	EU Market access (Trade & FDI): production in developing or high demand countries											
	Knowledge base development: R&D											
	Knowledge base development: efficient use of raw materials and recycling											
	Knowledge base development: involvement clients design and marketing (service-oriented)											
	Physical aspects & Infrastructure: input material intensive											
	Physical aspects & Infrastructure: long investment cycle											
	High representation of SMEs											
	Energy cost and availability											
Other framework conditions												



Exogenous conditions:

**Metalworking and metal articles sector**

Indicators												
Outcomes	Production and Value added	- [2]	- [3]		- [3]	- [3]	+ - [3]	+ [3]	+ - [3]	- [3]		- [3]
	Employment	- [3]	- [3]		- [3]	- [3]				- [3]		- [3]
	Productivity											
	Profitability		- [3]	+ - [1]	- [2]	- [2]			- [2]	- [3]	- [2]	- [3]
	Exports and Trade		- [3]							- [3]		
Processes	Intra-industry relations				- [3]	- [3]			- [3]		- [2]	
	Production processes						+ - [3]					
	Organisation											
Structure	Industrial structure											
	Size of enterprises											
	Level of specialisation											- [3]
	Segmentation											
Inputs	Labour							+ [2]				
	Capital	- [2]	+ [3]	+ - [1]			+ [3]	+ [2]				
	Intermediate goods & services			+ - [1]	+ [2]	+ [2]						
	Knowledge & technology						+ [3]	+ [2]				- [3]
Framework conditions		Credit crunch										
		Availability of energy and raw materials: increasing energy prices and dependency dollar price										
		Availability of energy and raw materials: input supply										
		Availability of energy and raw materials: basic metals										
		Availability of energy and raw materials: steel										
		Technological change: environmental requirements										
		Design requirements										
		Downstream industries										
		Global competition: competition low-cost producers										
		Global competition: competition from substitutes										
Global competition: counterfeiting activities and lack of control												
Exogenous conditions												



#### 4.3.2 Conclusions from the competitiveness grid

##### *Production and value added*

**Production** in **quantitative** terms is negatively affected by **global competition**, both legitimate and illegitimate (e.g. from counterfeiters). On the one hand, counterfeited or standardized products are often cheaper due to lower wages and more readily available inputs in the producer's country; and in the case of counterfeited goods, no need to recoup R&D costs. On the other hand, in developing countries the demand and thus local production and trade are also growing. This puts pressure on the demand for inputs. For rare inputs, this leads to a price increase for EU producers, for other inputs that are not flexibly adapting to demand changes, prices start fluctuating. Given the dependency of the MMA industry on its inputs, these effects worsen the competitive position of EU producers and lead to production decreases. A strong point limiting this fall in production is the importance of proximity to the rest of the value chain, and especially the consumer industries. According to industry, Europe is a good base for access to Europe, Asia and Africa.

In terms of value added of production, EU MMA firms have become increasingly specialised in **high value added products**. Their knowledge base is strong and further stimulated towards environmental friendly solutions, which gives them a competitive advantage in this respect. Conditions related to R&D, innovation and the protection thereof are likely to affect the value added of products. Yet, we remark that in the subsector of metal products, the focus is on process innovation rather than product innovation because products are not very complex and already in a mature stage. The advantage here lies mainly in productivity and profitability. In the next paragraphs, we discuss these different influencing factors of value added (focus on environmental issues; R&D policy; IPR) in more detail.

First, **consumer and producer standards from EU regulations**, mainly concerning energy and environmental policies, stimulate research and development of new, high value products. Also more **general environmental issues**, like the eco-design directive, the product safety directive and potentially the energy end-use efficiency directive, push EU producers in the direction of innovation and value added. This environmental and energy-minimizing focus can be seen as an opportunity by the MMA sector. Demand tends to shift to niche products as a result of this focus, e.g. minimum energy efficiency requirements for boilers and water heaters will lead to a shift in demand towards more energy efficient products. The same opportunity lies in lighting equipment and electric motors, of which energy efficiency is stimulated by measures under the EuP Directive. EU MMA firms can build up a strong position in these niches, as they adapt to the standards and low-carbon focus in their customer industries in the EU, and furthermore are stimulated to be more environmentally friendly producers themselves.

Second, the **R&D stimulating policy** (often related content-wise to the focus on environmental initiatives) of the EU is also beneficial to innovation and indirectly to the value added of EU products. As mentioned before in paragraph 4.2.3, recent policy initiatives also take into account the objective of improving SME participation in R&D programmes. The **strong representation of SMEs**, however, is still a limiting factor to

the effectiveness of this policy. SMEs still find it difficult to engage in large R&D projects and often do not have the financial or human means to do research in-house. The **shortage of skilled people** (e.g. engineers) is restricting also the implementing capabilities of R&D results in MMA firms.

Finally, there is the **IPR legislation** and its enforcement. Thanks to the fact that inventions can be protected from counterfeiting, they pay off for the producers and allow them to effectively differentiate from competitors in terms of production process or product types. This protection is thus a strong stimulating factor for R&D. As mentioned before, the lack of enforcement reduces the strength of IPR. In this respect, the proposal to also modify the design protection rules and (to a lesser extent since SMEs are only lightly affected by it) the exemption rule of technology transfer based on market shares are identified by the sector as reducing IPR and therefore the incentives to do research. However, these are to the benefit of competition and consumer information and choice, and should thus be weighed against these advantages.

#### *Employment*

Employment is mainly affected in an indirect manner. Factors influencing **demand**, such as overall competition, counterfeiting, the economic crisis and credit crunch also decrease demand for labour in the MMA sector.

There are also more qualitative effects on employment. The **large work force** employed by the MMA sector, for example, leads to the fact that changes in production or competitiveness can have large effects in terms of numbers of employees.

Also **skills shortages** may eventually lead to the industry employing less because there is a natural restriction. The overall **negative perception** of the MMA industry does not help in this respect, even though it is at odds with the reality of a forward looking, hi-tech industry, in some sub-sectors at least. A sensitisation campaign to improve its image might therefore have a positive effect on the available pool of engineers for the MMA industry and thus limit the pressure on the labour market.

#### *Productivity*

**Globalisation** is a driving force behind productivity increases. As mentioned before, innovation and value added are important opportunities for the EU MMA industry in their battle for competitiveness and market share. For relatively standardised products like metal tools, packaging etc., innovation is often focussing on the production process, on how to do the same or better with less input, energy, workers, and improve labour productivity and resource efficiency.

#### *Profitability*

Profitability is affected in many different ways and by many different framework conditions. This is almost always connected to the effect of these conditions on production costs, but sometimes also to a direct effect on the competitive position.

With respect to regulatory conditions, we find that on the one hand, they can increase costs for producers directly, for example because **additional investments** are necessary. This is the case with the labour market regulations and various environmental regulations.

On the other hand, also **administrative costs of reporting** in compliance with the regulations (e.g. IPPC) can influence the profitability of EU producers. Since these regulations affect only EU producers, their non-EU competitors have a competitive advantage in terms of costs. Whereas some of the costs can be shifted on to consumers, e.g. those resulting from the WEEE Directive, many of these costs will have to be internalized given the relatively weak position of MMA producers in bargaining with their upstream and downstream industries.

Yet regulations can also have a positive impact on competitiveness or profitability when it leads to **alternatives that are cheaper or of better quality**. For example, the regulation on energy using products has led to the development of low-energy-using lamps and the IPPC Directive or REACH could lead to the use of alternative, recycled inputs which are cheaper or require a less energy-intensive production process. Another positive effect comes from the product safety Directive, **applying also to imported goods**. Given the existence of this legislation, the EU producers are better aware of and adapted to the rules and thus might have a competitive advantage in complying with them. The magnitude of these positive effects on profitability, however, remains unclear.

Next to regulatory conditions, there is a more direct pressure on the profit margin coming from the position of the transforming MMA industry towards its upstream and downstream industries. On both sides of its value chain, the MMA industry faces a limited number of well-organized large firms, while consisting mainly of SMEs itself. Its **bargaining position** and profit margins are thus seriously compromised. Especially suppliers to automotive industry, aerospace industry, construction industry and buyers of the steel industry, suffer from this condition.

In this respect, **knowledge creation** is important for profitability. When innovation leads to more specialized, unique, value added products, the bargaining position of the producer increases. One specific trend related to this, is the increasing demand for services like marketing or involvement of the clients in design of the product. MMA industries try to adapt to this trend in order to gain competitive advantages for their EU clients.

Also towards global competition, knowledge creation and even more so, **protection thereof**, are crucial, for they recognize and value the innovative adaptation to environmental and other regulations. At the same time they decrease counterfeited imports and they thus increase the competitive position of EU producers.

Also, **R&D on the technological production process** could decrease costs, even though this effect is estimated to be relatively small since many production processes in the MMA sector are already at a mature stage. Moreover, the physical aspects and infrastructure of the MMA sector are characterised by **long investment cycles**. This limits flexible adaptation of production processes, but also leads to postponed investments in times of uncertain economic conditions, like the current economic crisis.

The latter effect is even further aggravated by the **credit crunch**, making it more difficult to find capital to invest. In particular, micro-enterprises with limited access to financial resources are severely affected by this. The credit crunch also influences the MMA sector indirectly e.g. through its downstream construction industry (which is one of the industries worst hit by the credit crunch, and at the same time is an important purchaser for the MMA industry).

On the input side, the MMA producers face **input price fluctuations** due to growing world demand. Moreover, they may even be threatened by a less competitive price for steel, given the protection against dumping imports demanded by the steel producers in the EU. These are serious negative impacts for all subsectors since they are rather input intensive. The negative impacts are further exacerbated in those sub-sectors where valid **substitutes** exist (e.g. wood, concrete in the construction products sub-sector, plastic in the packaging products sub-sector). For example, stakeholders mention that there has been a shift of the paint sector from metal packaging to plastic packaging in recent years, due to increasing price differences. Because the input prices for metal packaging have been increasing, some plastic products now have prices up to 30% below the prices of the equivalent metal products.

Also the (lack of) human capital could become a profitability deteriorating condition for the MMA sector. There is a **shortage of high-skilled workers**, while they are increasingly demanded by the EU MMA industry as it becomes more and more knowledge-based. This trend is also visible in other industries, which aggravates the competition to attract the appropriate skills. This lack of skilled workers is not as marked in developing countries like China, where educational plans have foreseen this and stimulated the relevant streams of education. Due to the relative scarcity of European engineers and skilled workers, their price (wages) will go up more than in the developing countries, creating an additional cost disadvantage and a decrease in profitability for the EU MMA industry.

#### *Exports and Trade*

Exports and trade depend on the relative competitive position of the EU producers as compared to competing producers outside of the EU. Naturally, this is affected by all measures and conditions that affect relative profitability and costs. Therefore, many of the effects described under the indicator “Profitability” have a derived effect on exports and trade.

In particular, **legislation** applying only within the EU can negatively affect the competitive position with regard to non-EU countries, e.g. because of administrative costs. At the same time, however, standards for all products used in the EU, regardless of their production location, can also lead to a competitive advantage for the EU producers in terms of awareness and better adaptation to this legislation. In other words, the legislation could form a greater trade barrier for non-EU producers than for EU-producers. The fact that construction products are required to become more energy-efficient, for example, benefits EU producers that have a comparative advantage in specialised products.

In general, measures and conditions affecting the **value added** of EU production in a positive way will enforce the strong points of the EU producers and influence their competitive position and their exports in a positive way. One condition for this effect to be substantial is that **IPR can be protected** in an effective way.

When both the cost argument and the value added argument apply, it depends on their relative importance how exports will be affected. Examples are the regulations on construction products standards and eco-design.

Due to the **changing needs of labour skills**, which will be higher in a more knowledge-based environment, and the shortage of these skills within Europe, a serious competitive disadvantage may arise. As mentioned before, comparative competitiveness of EU producers might decrease due to growing wage costs. Furthermore, if it reaches the point where too little appropriately skilled workers can be found and that the necessary tasks can no longer be performed, there is a risk that R&D centres and more knowledge-based production will move outside the EU.

#### *Intra-industry relations*

The intra-industry relations refer to substitute industries, and upstream and downstream industries. With regard to substitute industries, any regulation affecting only metal articles will trigger a change in its competitive position with respect to these substitutes. This, just like any change in bargaining power towards the upstream or downstream industries, will affect profitability and competitiveness of the industry.

**Competition from substitutes** is most prominent in the construction industry (concrete, wood, composite materials) and the packaging industry (plastics, paper, glass). Especially when price differences are large/increasing and there are no decisive characteristics that make the metal product preferable for the purpose (as in the case of plastic packaging for paint), the competitive position of metal products is under pressure. However, metal articles have specific intrinsic characteristics that cannot be replaced by the alternatives. For some applications, this gives metal articles a stronger competitive position.

Next to substitutes, raw materials also affect the intra-industry relations of the MMA industry. The energy intensity of the production process and the use of input materials like steel and basic metals, make the MMA industry relatively dependent on its input channels. Namely, input materials are the largest cost for MMA firms, so that price changes in these inputs directly affect costs and profit margins in a strong way. Moreover, weak availability of inputs is an issue because it creates inefficiencies. When materials are not readily available, this can lead to increasing delivery times and warehousing costs. It is therefore important to engage in structural and stable relations with the suppliers. Next to this natural dependency on inputs, there is also the fact that the upstream firms, especially in the steel sector, are often of a larger scale than the MMA SMEs. Consequently, **upstream bargaining power** of MMA firms is clearly limited.

The **downstream bargaining power** is relatively weak in most MMA sub-sectors as well. Examples of customer industries with large bargaining power are the automotive and aerospace industries, and to some extent the construction industry where there are some very large firms. This limited bargaining power of MMA producers increases the pressure on margins, leaving little breathing space for the MMA industry when costs increase.

Given the small scale of most MMA firms, many of them are highly specialized in a limited number of products and are very dependent on only a few buyers. Therefore, the

vulnerability of some of these downstream industries to the current economic downturn, is translated onto the specialized MMA firms as well. This is particularly worrisome in the sub-sectors that supply the automotive industry (metal products, metal processing). But not only shrinkage of downstream industries is a threat to domestic MMA industries, also the increasing demand of developing countries could become an important factor. Since MMA industries typically locate near their customers to reduce costs and maintain a feeling of the customer needs, it is possible that MMA firms will partly move out of the EU to follow demand (however, this is not considered realistic in the short run in interviews with stakeholders).

Finally, with regard to the intra-industry relations we also mention the **design protection** legislation. The spare parts, for as far as they are used to restore appearance of the product, are no longer protected from copies or alternatives. This means that a spare parts industry can develop in a more independent and competitive way, resulting in more competition in this market, but potentially at the expense of R&D in this segment.

#### *Production processes*

Innovation in the MMA industry is often focused on the production process. A study on the Dutch metalektro industry<sup>24</sup> illustrated that technological innovation is one of the main directions of research and change that are maintained throughout the economic crisis. Partly, this is driven by cost-efficiency goals, but partly also by regulation stimulating certain changes in the production process.

An example is the trend towards **higher energy-efficiency**. Part of this is inspired by cost-related motives, part by regulation.

In general, **environment- and energy-related regulations** have paved the way to technological changes in the production process. One case is the effect that IPPC and waste control of hazardous substances have on surface treatment processes and on electrical and electronic equipment. The legislation potentially also leads to the use of alternative inputs and thus requires the adaptation of the production process to these new inputs.

Also compliance with **labour regulations**, like the protection of workers from exposure to electromagnetic fields, has demanded changes in the production process, the working environment and in the safety regulations.

We remark, however, that innovation in the production process requires more highly **skilled workers and investment capital** (which is high given the long investment cycles). These are requirements that are not easily fulfilled in an SME environment and might therefore lead to a delay in implementing change. Also, the degree to which a production process can be made more efficient or can be automated all together depends on the type of products and their **degree of standardisation**. Therefore, the effects on production processes will vary for example, between the sub-sector of standard metal tools and the sub-sector of highly specialised parts for windpower plants.

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<sup>24</sup> B. Kriechel, de Grip A., van Breugel G., Coenen J. (2009) *Arbeidsmarktmonitor Metalektro Editie 2009*, Research Centre for Education and the Labour market (ROA), University of Maastricht.



### *Organisation*

The main challenges for the internal organization of firms are regulatory requirements, e.g. resulting from the labour market regulations, and the implementation of R&D results in the production process. In this respect, we also mention the increased **administrative burden** due to additional control mechanisms or reporting requirements for environmental and safety regulations like, for example, the IPPC directive, the RoHS directive and the REACH directive.

### *Industrial structure*

Impact on the structure of the MMA industry is in particular due to the fact that it consists of several different sub-sectors. Where a regulation or condition does not regard all subsectors or does not affect it in the same way, the structure between MMA sub-sectors is influenced.

Moreover, when specific subsectors are affected, this is also reflected in a geographically concentrated impact, since most sub-sectors are concentrated in only a few Member States.

An example is **labour market regulation**. The effect of this regulation, increasing safety measures to the benefit of the workers, depends on the production process characteristics e.g. hand-made versus automated. Metal products like cutlery are more labour intensive than, for example, construction products or surface treatment. Therefore, this sub-sector and the countries in which it is concentrated (Germany and Italy) are affected to a larger extent than the others. Similarly, the **eco-design requirements** for energy-using products do not include all products and thus leaves space for distortion of competition between these groups of products.

Next to regulation, the **other framework conditions** also affect the industrial structure of the MMA industry. Stakeholders indicate availability of appropriately skilled workers to be the most important determining factor of location choice, together with transport links and services. Thus, for example, different levels of labour skill requirements influence the extent to which production in each of the sub-sectors is shifted to countries where low-skilled labour is cheaper or where high-skilled labour is more available.

Next to sub-sector differences, we also mention that there is little vertical integration in the MMA industry, nor is there consolidation towards larger firms. Given the dependency on upstream and downstream industries, and given the large concentration of SMEs, there might be room to implement these ideas in the sector. As mentioned before, there would particularly be room for consolidation in the construction products and metal processing sectors, for they appear to be less efficient than the other subsectors.

### *Size of enterprises*

The average size of an MMA producing enterprise depends somewhat on the sub-sector in which it operates. It is, however, a general conclusion that SMEs are highly represented in all subsectors and that this has a substantial impact on many other competitiveness indicators/drivers of the industry (like bargaining power, R&D intensity, product choice). Yet, many of these SMEs can compete effectively thanks to the

existence of regional and niche markets (for example, high-value parts for the aerospace and automotive industries).

#### *Level of specialisation*

Many framework conditions have a positive effect on the level of specialisation in the EU MMA sector. As mentioned before, specialisation is often a reaction to fierce competition from low-cost countries. Also EU regulation in several areas has increased the need for knowledge development and research, automatically leading to higher specialisation levels.

Examples of **regulations** that have required or that will stimulate R&D are regulations regarding construction products, pressure equipment, machinery and materials for contact with food or the eco-design requirements. These regulations have often led to specialisation in more environment-friendly and less energy-consuming products.

The REACH regulation leads to the phasing out of speciality chemicals, which potentially also affects the products in the MMA industry. Specialisation might therefore change, yet it is not necessarily the case that the level of specialisation will change.

Specialisation is also a solution to withstand **competition from low-cost producers or downstream bargaining power**. Differentiation can allow EU producers in this respect to remain profitable. However, an important pre-requisite for profitability of high levels of specialisation is the enforcement of **IPR protection** regulations. Most evolutions in this area thus also influence specialisation in a positive way.

#### *Segmentation*

Segmentation in the MMA industry is related closely to the level of specialisation. The same conditions are thus responsible for the development of niche markets, e.g. energy-efficient products. In these markets, the EU has a comparative advantage thanks to its strong **knowledge base**.

Two particular examples are:

- First, the reduction of design protection for spare parts that are used to restore the appearance of products, which leads the way for segmentation towards separate and independent spare part producers, and
- Second, the trend towards more service-oriented involvement of clients in the design and marketing of the product, which requires an adaption of the business model.

#### *Labour*

Labour as an input for the MMA production, is influenced to a great deal by the evolutions in the production process and in competition. Furthermore, there are specific qualitative aspects of and evolutions in labour demand to mention here.

First, the technical evolution of the production process has led to a higher demand of engineers/technicians thinking through the technical processes and understanding the working of complex machinery. Related to this, the increased specialisation (e.g.

environmental niches) and the development of the **knowledge base** are factors influencing the type of labour required.

Secondly, the increased service component with respect to design and marketing, can require (to a limited extent) different skills.

Finally, the **labour market regulations** also have an impact on labour cost and consequently on labour demand. An example at the EU level are the measures increasing safety for workers. But, also the typically rigid EU labour market has a negative effect on labour demand according to stakeholders. This can further depend on national legislations as well.

### *Capital*

The production of MMA is characterised by **long investment cycles**. Especially in the sub-sectors of metal processing and constructional metalwork, set up costs are high due to the capital needed for the purchase of the installations. A number of framework conditions further increase this capital need due to the additional investments required for compliance with the regulations. This is especially true for regulations related to environmental requirements like the IPPC and the waste related regulations, and for design and service requirements.

As mentioned before, the credit crunch, the dependency on inputs and the concentration of SMEs are conditions that make it difficult to always fulfil the capital requirements for innovation.

### *Intermediate goods & services*

Under this indicator, we focus on the inputs and energy requirements for the MMA production process.

MMA production is a rather **intensive user of energy**, and so are its (in bargaining and price shifting terms strong) buyers. This makes the industry relatively dependent on energy prices. Since energy prices have soared in recent years, this was felt in all MMA subsectors. Moreover, new equipment that is installed to implement regulations or meet technological developments also requires energy to run. Yet, on the positive side, these evolutions of the production process have equally led to the development of more **energy-efficient products**.

MMA is also **material intensive**. The largest proportion of its input costs goes to materials (according to stakeholders). One of the most important inputs for the MMA industry is **steel**. All factors influencing steel production and demand will thus also have an indirect effect on the MMA industry. The limited number of large steel producing firms and the increased demand for steel in developing countries, have lead to a stronger position of the upstream industry of MMA, and thus to a higher price to be paid for steel. This effect would be very much exacerbated if the demand for an anti-dumping duty on steel imports were complied with, because it would further reduce competition on the supply side of the EU steel market.

Concerning the other input materials and products, a number of regulations can influence which materials and how much of them are used in the production process, for example the restriction of hazardous substances or waste. Furthermore, thanks to the IPPC directive, a shift towards the use of recycled materials is possible (e.g. aluminium). It is not clear, however, how substantial this effect is/will be.

#### *Knowledge & technology*

Knowledge and technology have grown, according to industry representatives, mainly with the goal of **reducing costs**. For this, the fierce global competition of low-cost producers is the main driver leading to technological evolutions and automation.

However, we have argued before that **regulations** influence the extent and direction of knowledge development as well. The EU environmental regulations have led to research on how to increase the energy-efficiency of the production process and on how to optimize the products in terms of environment-friendliness. Moreover, standardisation that integrates these same environmental and energy-related issues, has the same effect. Examples are industry and consumer standards on construction products, machinery, materials for contact with food and pressure equipment.

Finally, the **IPR enforcement** that protects knowledge is a necessary condition to allow for the previous evolutions to have a substantial effect.

### 4.4 Concluding summary from the horizontal aspects affecting competitiveness

In the framework grid we have listed a large number of conditions affecting the competitiveness of the MMA industry to a smaller or larger extent. Already there, we indicated the (potential) impact mechanisms from these conditions. These were then further translated into the competitiveness grid, which summarizes for all framework conditions their effects on each of the outcome, process, structure and input indicators of the industry. After the detailed description of these effects, we now present a summary and highlight the most important conditions and effects in the following paragraphs.

#### *Large share of SMEs and dependency on upstream and downstream firms*

It was emphasized at several points that the market structure has serious consequences for the performance, challenges and opportunities of the sector. The main consequences are:

- MMA firms are price takers both at upstream as well as downstream level, so that margins are squeezed;
- Limited human and financial potential hinder the sector engaging in R&D or from engaging in research collaboration;
- Limited financial resources do not allow for the frequent introduction of new state-of-the-art technologies.

In order to tackle these challenges, there is a need for a more targeted policy towards the specific features and needs of SMEs. Current examples for improving the conditions for SME participation in research and innovation are the SME specific programme under the Competitiveness and Innovation Framework Programme (CIP) and the SME specific schemes in the 7<sup>th</sup> Research Framework Programme.

However, this sector structure also offers opportunities as SMEs are often targeting niche markets or produce high value products. Both of these characteristics are in line with the relatively strong points of the EU MMA sector and can thus be very important to outline the potential future strategy of the industry.

### *Environmental regulations*

There is both an upside and downside on environmental regulation. It makes the framework within which to produce stricter and narrower, and it causes switching costs and administrative burden. Yet, once these switching costs are made, innovative products can create an important comparative advantage in both reaching the aims of the environmental regulations and in reaching consumers who prefer environmentally sound products (potentially because they have to comply with environmental regulation as well). Products are thus more in line with demand in the EU, creating a competitive advantage for EU producers. Moreover, with high skilled workers in the producing firms and with efficient counterfeiting control, these advantages can be maintained and exploited for a substantial period of time, thus making eco-innovation more worthwhile.

Regulations that only apply to EU producers could worsen the competitive position of these firms as compared to their non EU competitors, but this effect should not be overemphasized, as a recent VITO study<sup>25</sup> on the effects of environmental policy on manufacturing industries moderates this reasoning. This study concludes that in general:

- the annualised environmental costs in the sectors in question are typically less than 2% of production value, even though the perception is much higher;
- there seem to be comparable levels of costs for firms in Australia and the US;
- innovation and integrated investments partly stabilise the unit costs of environmental protection;
- the cumulative effect of the different environmental policies is less than the costs would be of individual policies, thus there are synergies for the implementing firms.

The effect of environmental policy on the competitive position of EU manufacturing firms therefore seems to be limited. However, it would be wrong to conclude that no impact is felt by industry, as passing on costs to consumers is not automatically possible. The extent to which costs can be passed on, depends on the price elasticity of demand for metal products and relative bargaining positions, and will thus also differ across sub-sectors.

### *Skills and training*

Investments in skills are of crucial importance if Europe wants to maintain a strong profile in terms of research, innovation, implementation, etc. Now, a shortage of qualified engineers and technicians/mechanics is a threat to the future competitiveness of the sector. This is especially so since emerging countries like China are well organized in terms of education of qualified personnel and are less bounded by skill shortage than EU firms are.

Initiatives at different levels are (to be) undertaken to reduce the skills shortage:

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<sup>25</sup> P. Vercaemst, S. Vanassche, P. Campling, L. Vranken, P. Agnolucci, R. Salmons, B. Shaw, J. Jantzen, H. van der Woerd, M. Grünig and A. Best, "Sectoral Costs of Environmental Policy", VITO for EC DG Environment, 2007.

Focus on more flexible and apt (technological) education and training;  
Facilitate mobility within the EU by removing barriers e.g. EU-wide recognition of engineers' qualifications;  
Attract skills from third countries according to labour market needs ("Blue card" Directive<sup>26</sup>).

In this respect we also mention the relatively negative image that European workers seem to attribute to the MMA sector. Given the trend towards more knowledge-based production, this negative image is often not reflecting reality and could be improved (e.g. by sector initiatives) to the benefit of the supply of engineers and technicians.

#### *Innovation and protection of intellectual property rights*

As mentioned before, innovation offers important strength to EU manufacturing in the competition with upcoming economies. The EU's broad knowledge base allows for differentiation, higher value added products, targeting niche markets, reacting in a flexible way to changes in the demand market. Therefore, it is important to continue broadening and deepening this knowledge base.

In this respect, European Technology Platforms are specifically set up to bring together companies, research institutions, the financial world and regulatory authorities in order to define a common research agenda and mobilise a critical mass of resources from the public and private sectors. The purpose is to stimulate cooperation in research of relevant technologies for industry. The most relevant ETPs<sup>27</sup> for the MMA sector are EuMaT (Advanced Engineering Materials and Technologies) and MANUFUTURE (Future Manufacturing Technologies). Given its intermediate position in the supply chain and the diversity of MMA subsectors, a range of other ETPs could lead to interesting results for the industry, for example, on aeronautics (ACARE), construction technology (ECTP), nanoelectronics (ENIAC), Renewable Heating & Cooling (RHC). Furthermore, a number of research fields in the seventh Framework Programme (FP7) are related to the sector as well<sup>28</sup>.

#### *Nanosciences, nanotechnologies, materials & new production technologies (NMP), with emphasis on:*

Nanosciences and nanotechnologies - studying phenomena and manipulation of matter at the nanoscale and developing nanotechnologies leading to the manufacturing of new products and services;

Materials - using the knowledge of nanotechnologies and biotechnologies for new products and processes;

New production - creating conditions for continuous innovation and for developing generic production 'assets' (technologies, organisation and production facilities as well as human resources), while meeting safety and environmental requirements;

Integration of technologies for industrial applications - focusing on new technologies, materials and applications to address the needs identified by the different European Technology Platforms.

<sup>26</sup> Council Directive 2009/50/EC of 25 May 2009, OJ L 155, 18/06/2009 P. 0017 - 0029

<sup>27</sup> Website ETPs: [http://cordis.europa.eu/technology-platforms/individual\\_en.html](http://cordis.europa.eu/technology-platforms/individual_en.html)

<sup>28</sup> Website FP7: <http://ec.europa.eu/research/fp7/>

Transport (including aeronautics), with emphasis on:

Aeronautics and air transport;  
reduction of emissions, work on engines and alternative fuels;  
air traffic management, safety aspects of air transport;  
environmentally efficient aviation;  
Sustainable surface transport - rail, road and waterborne;  
development of clean and efficient engines and power trains;  
reducing the impact of transport on climate change;  
inter-modal regional and national transport;  
clean and safe vehicles;  
infrastructure construction and maintenance, integrative architectures.

Energy, with emphasis on:

Hydrogen and fuel cells  
Renewable electricity generation  
Renewable fuel production  
Renewables for heating and cooling  
CO<sub>2</sub> capture and storage technologies for zero emission power generation  
Clean Coal Technologies  
Smart energy networks  
Energy efficiency and savings  
Knowledge for energy policy making

Yet we mention here again that it is not easy for SMEs to either engage in large scale R&D or to implement results from R&D. To handle this is a challenge for the EU MMA industry. We repeat that the 7<sup>th</sup> Framework Programme and the Competitiveness and Innovation Framework Programme pay special attention to SME participation, but also other initiatives were mentioned by stakeholders: the French machine sharing programme, for example, allows SMEs to share technologically advanced machines instead of having to make this large investment each individually.

Also IPR enforcement lacks some strength to ban counterfeited products from the EU markets. If compliance with IPR policy can be watched more closely, the EU might gain directly in terms of competitiveness, but also indirectly by removing an important discouraging factor for R&D efforts. Of course, IPR regulation should always be weighed against its effects on competition and consumer choice.

*Reaction to the economic crisis*

In this chapter on framework conditions, a number of actions and ideas have come forth that can be applied as a reaction to the current economic crisis:

- A stimulating macro-economic environment (government expenditures) focussing on consumer-related industries of the MMA sector;
- A further stimulation of innovation, knowledge creation and transfer in order to differentiate from upcoming economies and a more pronounced move towards the new environmental niche markets like low-carbon industry and low-energy-using products;
- Integration of services in manufacturing to differentiate and to meet the demand of consumer industries for more integration of design and marketing.



## 5 Strategic outlook

This strategic outlook for the EU Metalworking and Metal Articles sector (EU MMA) is based on the analyses in preceding chapters of the report and discussions with sector experts. The purpose of the study is to assess the competitive position of the EU MMA sector.

The *first part* of the chapter comprises a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) of the EU MMA sector. The SWOT analysis themes have been chosen on the basis of their relative importance in the context of competitiveness.

After a brief outline of the SWOT analysis, more details of each topic are provided. Some topics are primarily relevant to micro, small, and medium-sized companies – this is reflected in the headlines. And some topics are more relevant to some sub-sectors than others – this is illustrated in tables accompanying the text.

Based on the SWOT analysis, the *second part* of the chapter presents a list of potential strategic responses for policy makers and stakeholders at a European Sector level, at a Member State level, and at an EU level. These proposed responses are aimed to improve future sector competitiveness and should thus be taken into account in future policy making and to the benefit of the competitiveness of the MMA sector in the EU. It should be noted that framework policies relevant to the competitiveness of the metal sector may vary substantially across the EU, between regions and at a firm level.

### 5.1 SWOT analysis

An overview of the four dimensions of the SWOT analysis is presented in the table below. Each topic is further discussed in the following sections. The SWOT analysis lists challenges for the sector, and as a point of departure for the proposed strategic options.



STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> <li>• <b>Geographical proximity</b> of metals supply chain and related industries is central to timely, reliable, and flexible supply to the just-in-time downstream production.</li> <li>• <b>High degree of specialisation and functional flexibility.</b> The MMA sector in general is highly specialised and has a strong functional ability to adapt to changes in customer preferences.</li> <li>• <b>High quality output and strong position in high end markets.</b> The EU MMA sector holds a relatively strong competitive position in high end markets based on high quality products, and a qualified labour force.</li> <li>• <b>Technology intensity and a strategic focus on innovation</b> have enabled the MMA sector to adjust and develop technology intensive production processes to the benefit of the sector's competitiveness.</li> <li>• <b>Efficient use of input materials and high degree of recycling.</b> Production in the EU MMA sector is characterised by efficient input material use and a high degree of recycling, thus contributing to efficient processes at a lower cost.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Upstream and downstream squeeze.</b> A higher degree of concentration in demand and supply industries limits the bargaining power of the EU MMA sector vis-à-vis suppliers (e.g. steel producers) and customers (e.g. automotive, shipbuilding, aerospace, and construction).</li> <li>• <b>High level of input material dependency</b> increases sensitivity to price fluctuations of inputs. While a weakness of the EU MMA sector, dependency on input material also applies to competitors.</li> <li>• <b>Labour intensity.</b> The MMA sector is more labour intensive than other manufacturing industries as a whole. The sector therefore has relatively higher labour costs in comparison with many non-European countries. In addition, labour productivity is relatively low compared to manufacturing as a whole, notably in the NMS.</li> <li>• <b>Recruitment problems.</b> Recruitment of skilled labour is a challenge rooted in image problems and shortage of required skills. Medium term the sector could also in numerical terms be affected by skills shortages.</li> </ul> <p><u>Particularly relevance for SMEs</u></p> <ul style="list-style-type: none"> <li>• <b>Weak financial position of SMEs and limited access to external finance</b> SMEs have limited access to external financing and are in particular vulnerable to for example a credit crunch due to limited equity and financial resources.</li> <li>• <b>Long investment cycles</b> in the MMA sector impact when a company and/ or external investors can expect return on investments. SMEs are especially vulnerable, as they often lack the flexibility in finances and resources to engage in long-term investments.</li> <li>• <b>Single client / market dependency.</b> Some SMEs are focused on one single industry, and in some cases a limited number of customers in that industry. This makes them vulnerable to fluctuations in demand: particularly in times of economic crisis, and to relocation of customers' activities</li> <li>• <b>Limited capacity, resources and skills to engage in R&amp;D activities.</b> This is a challenge for notably SMEs. This challenge will likely become more pronounced, as competition from non EU countries will likely require more efficient and high-value solutions under flexible conditions.</li> <li>• <b>Limited capacity, resources and skills to handle administrative requirements associated with regulation.</b> This is a challenge for notably the many SMEs in the MMA sector. Notably, the requirements following CO2 reduction regulation are highlighted by sector representatives.</li> </ul>



OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> <li>• <b>Increased consolidation</b> is an opportunity that will improve conditions for engaging in innovative activities and for increasing bargaining power vis-à-vis suppliers and customers.</li> <li>• <b>Improved market surveillance to support enforcement of regulation.</b> Enforcement of regulation and better market surveillance will support the competitive advantage in notably high end markets.</li> <li>• <b>Increased competitiveness through a modern IPR system.</b> A modern protection system that encourages investment in design and R&amp;D and reduces counterfeiting activities from competitors is a strategic opportunity.</li> <li>• <b>Higher energy efficiency solutions</b> and eco-design can be drivers for innovation and specialisation with focus on climate change: at the same time they can reduce production costs.</li> <li>• <b>Better products/services through enabling technologies.</b> Improving the functionality of metal products through new technologies and improve the image.</li> <li>• <b>Innovation networks and collaboration</b> may provide improved access to knowledge and creation of critical mass through networks and collaboration.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Demographic changes</b> create a structural barrier to the competitive edge of the EU MMA sector compared to countries which in numerical terms do not suffer from skills shortages.</li> <li>• <b>Variations in labour market flexibility across the EU.</b> Rigid labour market regulations in some EU countries, for example regarding EPL (Employment Protection Legislation), can hamper the capacity of the sector to structurally adapt to changing markets whilst maintaining a functionally flexible workforce.</li> <li>• <b>Growing production in developing countries.</b> Increased imports and competition from outside the EU constitute a potential risk to the EU MMA sector, coupled with an increased risk that customers offshore activities to reduce costs.</li> <li>• <b>Rising costs of input materials</b> and therefore also a rise in the price of products could lead to large clients offshoring to locations outside the EU in order to limit the costs on input materials.</li> <li>• <b>Protection of property rights and knowhow.</b> SMEs in the EU MMA sector do not have the resources to follow up on protection of patents in, for example, China. This increases the risk when exporting to countries outside the EU.</li> <li>• <b>A hidden sector.</b> There is a common perception within the sector that the voice of large companies in for example steel and automotives dominates policy making in the EU, and that the MMA sector remains somewhat invisible due to the sector structure with many SMEs. The effects of regulation, positive for the larger companies, can actually pose a threat for the MMA sector as a whole. The sector is also a hidden sector due to statistical tools. Since Eurostat deals with the metal &amp; metal products sector together a regular analysis of the metal products sector will continue to be difficult.</li> </ul>

### 5.1.1 Strengths of the EU Metalworking and Metal Articles sector

Strengths	Metal processing	Constructional metalwork	Boilers, containers, packaging	Metal products
Geographical proximity of metals supply chain and related industries	X		X	
High degree of specialisation and flexibility	X			
High quality output and strong position in high end markets	X	X	X	X
High technological level and awareness of the importance of innovation	X			X
Efficient use of input materials and high degree of recycling	X	X	X	

#### **Geographical proximity of metals supply chain and related industries**

Geographical proximity of metals supply chain and related industries and strong mutual interests across the supply chain and related industries are key aspects of the close relationship with customers and for development of supply networks. As a consequence, the MMA sector has the ability to adapt to demand with a prompt, secure, and flexible offer expressed as just-in-time downstream production.

#### **High degree of specialisation and flexibility**

In general, the EU MMA sector is highly specialised, with an ability to meet special requirements of customers as well as adapt to changes in customer preferences. Thus, the MMA sector is able to deliver high-performing tailor-made products/services aligned to demand and supported by close relationships with customers.

#### **High quality output and strong position in high end markets**

The EU MMA sector holds a competitive position in high end markets with its high quality products. This contributes to the sector's competitiveness in this market segment, notably in domestic markets. Producers can therefore charge a relatively high price for their products, and this creates new opportunities in high-end export markets. However, due to competition from other parts of the world the sector must remain vigilant and pursue an innovation strategy through continuous improvement of products and services whilst keeping costs low through lean processes.

**Technology intensity and strategic focus on innovation**

The EU MMA sector is characterised by a relative high degree of technology intensity, and the sector's ability to adjust and develop production processes has up until now been essential to maintaining a competitive position. Sector innovation, also through technological deployment, is acknowledged as a key to ensuring competitive products, flexibility in the offer, and service in delivery.

For some sub-sectors, however, innovation activities are related solely to process innovation rather than product innovation, and it is mainly companies of a certain size and with a capacity to exploit market opportunities through innovation and participation in R&D. As a consequence, mainly the large and medium-sized companies (companies of approx. 250 people) are drivers of innovation in the sector - small (10-50 employees) and micro enterprises (>10 employees) to a much lesser extent.

Continual priority of innovation is a precondition to the high value products and higher productivity and thus to differentiation from low-cost producers outside the EU. Consequently, innovation strategies which comprise an innovative deployment of technologies are necessary at all levels in all sub-sectors to maintain a competitive position medium term. New strategies for material innovation and applications are central features in a renewed and competitive EU metal production sector.

**Efficient use of input materials and high degree of recycling**

Current production in the EU MMA sector is characterised by relatively efficient input material use and a high degree of recycling. This results in less input intensive production processes and relative lower production costs due to substantial energy savings. Thus, recycling plays a crucial role in the current and continual competitiveness of the metal sector and forms an essential part of the sector's response to the environmental challenge. The level of recycling is expected to increase due to IPPC directive on dioxin emissions. However, the benefits are that this can contribute to a sector image as being *Green*.

Whilst expertise in recycling is a current strength of the EU MMA sector, there are limitations to further energy savings through the use of scrap. In some instances, using scrap may lead to energy savings, but in others, treating the scrap and ensuring the right quality of the metal involves so many stages that the amount of energy usage increases. Therefore, the energy-saving potential also depends on the characteristics of the scrap and the requirements for the resulting metal's quality. Moreover, structural barriers exist for recycling, e.g. in terms of replacing iron by scrap, therefore recycling levels in some areas may have reached their limits. Still, the expertise involved in recycling is a current strength of the EU MMA sector.

### 5.1.2 Weaknesses of the EU Metalworking and Metal Articles sector

Weaknesses	Metal processing	Constructional metalwork	Boilers, containers, packaging	Metal products
Upstream and downstream squeeze	X	X	X	X
High level of material input dependency	X	X	X	X
Labour intensive industry	X	X	X	X
Recruitments problems	X	X	X	X
Weak financial position and limited access to finance (SMEs)	X	X	X	X
Long investment cycles (SMEs)	X	X	X	X
Single client / market dependency (SMEs)	X			
Limited capacity, resources and skills to engage in R&D activities (SMEs)	X	X	X	X
Limited capacity, resources and skills to handle administrative burdens associated with regulation (SMEs)	X	X	X	X

#### Upstream and downstream squeeze

While the EU MMA sector is characterised by a large number of SMEs, suppliers (e.g. steel producers) and customers (e.g. automotive, shipbuilding, aerospace, and construction) are larger and fewer in numbers. As concentration directly correlates to bargaining power, the EU MMA sector has limited bargaining power vis-à-vis suppliers and customers. This results in relative higher input prices and lower output prices.

#### High level of material input dependency

The EU MMA sector depends on imported raw materials such as iron ore from third countries, directly as well as indirectly as consumers of steel. However, dependency on imported raw material is to some extent offset by the high level of recycling. Material input dependency causes sensitivity to price fluctuations of inputs. This, however, also applies to competitors. There is no structural scarcity of inputs but adaptation of input supply to demand fluctuations is slow and thus creates temporary scarcity of inputs when demand increases. The current increase in production in developing countries, especially China and India, leads to higher demand for input materials in developing countries, and thus to temporary scarcity of inputs. This in turn leads to higher input prices in the short-to medium term.

### **Labour intensive industry**

The MMA sector is more labour intensive than other manufacturing industries as a whole, which is a comparative disadvantage for the EU MMA sector, as European labour is relatively expensive compared to competitors in other regions, notably China and India. Moreover, labour productivity in the EU is relatively low compared to manufacturing as a whole, and notably in the new Member States. In 2006, labour productivity was just 83% of the value for manufacturing. Increasing labour productivity is thus a central feature in improved competitiveness, and the means to achieve this are a skilled labour force, leading edge managerial practices, and R&D. According to the European Metalworkers' Federation, up to 40% of labour productivity growth is generated by R&D.

Further rationalisation and increased labour productivity are necessary in some of the new Member States, notably in the metal processing sub-sector, where labour intensity is particularly high and where a relatively large number of enterprises account for a relative low share of total EU metal processing output.

In the short term, a positive aspect of being labour-intensive is that the MMS sector contributes to a relatively high percentage to the overall employment in Europe. However medium term a viable strategy must explore new avenues through restructuring in order to remain competitive, and this could negatively impact the current employment level in the sector unless it manages to gain market shares for example through R&D enabled product innovation and process and service innovation. In spite being labour intensive, for now the sector has remained competitive and achieved relative high profitability compared to other manufacturing industries.

### **Recruitment problems**

The MMA sector depends on a highly skilled and flexible workforce. Demand for skilled labour can be expected to continue to rise due to increasing complexity in production and pressures to accelerate innovation. The supply of labour is decreasing due to demographical changes, and the competition for high-skilled/qualified labour is increasing. Universities do not generally offer programmes specific to the MMA sector, though engineering schools, and institutions at the tertiary level- such as *fachhochschulen* offer programs relevant to the sector. Upper secondary vocational programmes are one of the main sources for recruitment of skilled labour to the sector. However, medium term the EU MMA sector may face serious difficulties in recruiting sufficient skilled workers and engineers with tertiary qualifications. Recruitment difficulties are amplified by an unappealing image. In this regard, it seems necessary for the MMA sector to give priority to promoting an image of a modern, technology-intensive industry.<sup>29</sup>

A shortage of skills with the right mix of qualifications could medium term hamper production and growth, and might even lead to relocation of production to locations where the necessary skills are more readily available in numerical terms. Moreover, skills shortages often lead to wage pressures. This in turn could negatively impact production costs and thus the competitiveness of the sector, e.g. in comparison with China, where engineering skills are more available. It is therefore urgent that the sector improves its

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<sup>29</sup> While some parts of the industry are still traditional 'dirty' industry, other parts are characterised as being high-tech, high-skilled and future oriented.

image. Given the time span from a person entering an upper secondary or tertiary educational program to graduation, recruitment strategies must also include retraining of the existing workforce to improve the functional flexibility in the sector. In response to these challenges the two main European employers' and workers' associations, CEEMET (the Council of European Employers of the Metal, Engineering and Technology-based Industries) and the EMF (the European Metalworkers' Federation), established a permanent working group in 2006 with focus on competitiveness, employment, education, and training, and followed up with a permanent social dialogue body in 2007 aimed to ensure high quality and sustainable employment. The ILO's Training Centre runs projects in support of these efforts.

### **Weak financial position and limited access to finance (SMEs)**

The many SMEs in the MMA sector have relatively poor access to external finance. Data from the Competitiveness Report 2008 furthermore suggest that there in general is an asymmetry of available information on external finance opportunities<sup>30</sup> and SMEs' actual knowledge about such opportunities at Member State and an EU level. SMEs are typically in a weaker credit position, and the current credit crunch has had a major effect on SMEs, with their limited equity and financial resources. As SMEs in the MMA sector do not have access to capital markets, they rely on banks. During the last 5-10 years, many companies in the MMA sector have grown to medium sized, and these are in a better financial position than the smaller companies. However, access to finance and up-to-date knowledge about external finance is still a strategic challenge for the majority of companies in the EU MMA sector.

Without access to external financing, companies are restricted from investing in new technology and innovation through R&D. At a company level this negatively impacts opportunities to invest in continuous innovation and in the medium to long term. Furthermore, in the current financial crisis the viability of SMEs is at risk due to lack of finance and investment capital. In some sub-sectors such as metal processing and metal products, lack of capital poses a significant entry barrier.

Due to the current world wide economic crisis, banks are generally more cautious in their credit requirements and more reluctant to any form of risk-taking. These developments should be seen in a context of an already relatively weak financial position of SMEs in the sector, although the market conditions also apply to larger companies, which have experienced major drops in sales and more limited options to invest in innovation.<sup>31</sup>

### **Long investment cycles (SMEs)**

The nature of investment cycles in the MMA sector causes a delay in when companies can expect return on investments. This counteracts SMEs' incentives to engage in long-term investment projects, also because SMEs often lack the flexibility in finances and resources.

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<sup>30</sup> <http://www.sme-finance-day.eu/index.php?id=8>

<sup>31</sup> Revisiting Corporate R&D Spending During a Recession" (1995) Research shows that companies which invested in innovation during the financial crisis in 1982 and in 1990-91 continued their growth, whilst competitors with modest investments lost market shares. (Dugal S Sanjiv, Morbev, Graham).



Even though the time to break-even in the industry has shortened during the last 5-10 years, the constant shortening of investment cycles remains a strategic challenge. Together with relatively high entry costs and high constant costs, the time to market is long.

#### **Single client / market dependency (SMEs)**

The numerous SMEs in the EU MMA sector are characterised by a high level of specialisation and of serving few clients. Whilst this often equals exclusive delivery agreements based on specialised products, it entails a significant weakness in so far that it equals single market dependency. In the MMA sector, many SMEs are highly dependent on single clients/customer industries, and are thus highly vulnerable to fluctuations in demand in this segment (e.g. automotive industry due to economic crisis). Likewise, such SMEs are highly affected by structural adjustment trends in their customer segment involving relocation decisions etc.

#### **Limited capacity, resources, and skills to engage in innovation and R&D activities (SMEs)**

At an EU level a number of measures have been taken to stimulate more SMEs to engage in innovation and participate in R&D<sup>32</sup>. Nevertheless, many SMEs are often hampered by an insufficient capacity to undertake R&D-driven innovation for reasons of time, risk, and resources. At the same time, most universities in Europe still have limited experience in bringing R&D solutions in partnerships with SMEs to the commercial markets. Though design offers other kinds of innovation opportunities, the lack of in-house engineering and design skills limits the opportunities for many SMEs to pursue such strategies of innovation and negatively impacts opportunities to increase competitiveness through flexible and unique products and services.

The size of the EU MMA companies is in many instances a barrier to participation in innovative EU network activities. Major EU research funding streams, such as the 7<sup>th</sup> Framework Programme and the recent recovery initiative ‘factories of the future’<sup>33</sup>, are more easily accessible for large companies and research institutes already involved in R&D. Structural Funds are often aimed to support SME policy initiatives, but depending upon the national implementation of the funds, the measures may be more or less aligned to a small company. To monitor progress, sector bodies could jointly with the European Commission assess to which extent there is a growing uptake of EU instruments such as the *Competitiveness and Innovation Framework Programme (CIP)*<sup>34</sup> and under this the *Entrepreneurship and innovation programme (EIP)*<sup>35</sup>, through benchmarking and documentation of promising innovation models involving SMEs in the EU.

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<sup>32</sup> E.g. IMP<sup>3</sup>rove - an initiative aimed at encouraging SMEs to develop and improve their innovation management capabilities. The starting point of IMP<sup>3</sup>rove is an on-line tool with which companies can assess their current capabilities. Once they have benchmarked their own performance against that of counterparts, IMP<sup>3</sup>rove offers them a consultancy service to improve their innovation management performance.

<sup>33</sup> [http://ec.europa.eu/research/industrial\\_technologies/lists/factories-of-the-future\\_en.html](http://ec.europa.eu/research/industrial_technologies/lists/factories-of-the-future_en.html)

<sup>34</sup> [http://ec.europa.eu/cip/index\\_en.htm](http://ec.europa.eu/cip/index_en.htm)

<sup>35</sup> [http://ec.europa.eu/cip/eip\\_en.htm](http://ec.europa.eu/cip/eip_en.htm)

### **Limited capacity, resources, and skills to handle administrative burdens associated with regulation (SMEs)**

Individual firms in the MMA sector are not energy-intensive. But the sector as a whole represents a high level of today's energy consumption. It is therefore likely that the sector also in a forward-looking perspective will be confronted with CO<sub>2</sub> reduction requirements through various forms of regulations.

Therefore, new energy-saving solutions should be a continual high priority within the EU MMA sector in order to reduce production costs and to respond to environmental challenges and regulations. The MMA sector will likely meet increasing energy efficiency requirements in the consumer sector, e.g. construction products.

Administrative requirements associated with different forms of regulation, including environmental regulation remain a challenge for the MMA sector.

#### *5.1.3 Opportunities for the EU Metalworking and Metal Articles sector*

Opportunities	Metal processing	Constructional metalwork	Boilers, containers, packaging	Metal products
Increased consolidation	X	X	X	X
Improved market surveillance to support enforcement of regulation	X	X	X	X
A modern IPR system	X	X	X	X
Higher energy efficiency solutions	X		X	
Better products through enabling technologies	X			X
Innovation networks, partnerships and collaboration	X	X	X	X

### **Increased consolidation**

One of the weaknesses of the MMA sector is, as described above, that the sector is composed of SMEs with limited bargaining power compared to the suppliers' and customers' industries. In order to create greater critical mass for bargaining power and to enable innovation in the sector as a whole, consolidation in the MMA sector and sub-sectors - i.e. through mergers and acquisitions - could be a strategic sector opportunity. Creating larger companies through mergers may also increase the capacity to engage in R&D.

Consolidation can potentially create large regional or global players with production facilities across the globe. A global presence increases the capacity to meet demands of global customers with considerable bargaining power and with specific product standards and requirements.

Moreover, increased consolidation could improve the foundation for shaping a business strategy designed to access the best capabilities, knowledge, and assets from wherever they reside and apply them as required, thus improving management capacity over the business cycle. Mergers and acquisitions may also offer opportunities to access markets outside the EU.

A study from 2009 from Boston Consulting brings an interesting perspective to the strategy of mergers and acquisitions to gain competitive advantage - that mergers and acquisitions will be used in the coming period to obtain long-term competitive advantage rather than improving short-term operational performance. The study suggests that two types of mergers and acquisitions will likely occur; One is transformational mergers and acquisitions that fundamentally transform sectors of economic activity, and the other are mergers and acquisitions with a view to restructuring to sharpen or radically alter the focus of companies portfolios' of business. Whilst it could be expected that companies adopt short-term defensive tactics to boost revenues in an uncertain financial climate, there are companies that pursue a longer term perspective, viewing the crisis as an opportunity to seize the strategic high ground. Whereas 42% of the firms across sectors state that their main reason for acquiring a company in the next 12 months is to "fill a strategic gap", only 16% state that cost-driven factors are the main driver, and only 8% say that it is "to secure new revenue streams to drive a slowing top line". For the metal sector in Europe, the survey indicates that 50% of the companies surveyed expect transformational deals in 2009. Furthermore the data suggest that transformational deals could be triggered by companies needing to sell themselves in order to survive. However the mergers and acquisitions strategy could be hampered by lack of finance for companies preparing to be bought, as well as for companies, which look for buy-up opportunities, and by shareholder requirements for short-term profitability versus long-term growth. Private equity firms are however becoming increasingly open to the notion of taking minority stakes (Boston Consulting 2008).

Other opportunities for SMEs in the sector may stem from tapping into local clusters formed by user industries. In this respect, *Europe Innova* with its cluster mapping activities constitutes a highly relevant platform.<sup>36</sup>

### **Improved market surveillance to support enforcement of regulation**

Improved market surveillance holds various potentials for the EU MMA sector regarding standardisation (ISO and regulation) requirements.

An example is high quality products with safety standards. Producing such products is only a competitive opportunity if safety requirement regulations are effectively enforced. Ensuring the proper functioning of such regulations requires market surveillance. From the perspective of the European MMA industry, more active and effective market surveillance is desirable so that authorities act not only when a serious safety violation is discovered; rather, more systematic and proactive surveillance is needed to avoid disadvantages to those who are compliant with safety standards at all levels.

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<sup>36</sup> <http://www.europe-innova.org/index.jsp>

With the required enforcement and market surveillance, product safety regulations<sup>37</sup> contribute to the maintenance of a competitive position in high-end markets. Properly functioning safety regulations would require compliance of importers of products into the EU and entail adaptation costs. Enforcement of such regulations should hinder the dumping of low-safety, low-price products and that EU companies lose market shares to competitors that produce products of lower quality and. Thus, such regulations constitute a trade barrier which should provide the EU MMA sector with a competitive advantage in high-end markets.

### **Increase competitiveness through a modern IPR system**

Protection of intellectual property rights is of importance to the competitiveness of the EU MMA sector. Two directives on IPR and design protection have a positive impact on the EU MMA sector. The directive on design protection<sup>38</sup> ensures that the holder of a registered design right has the exclusive rights to the design. The ‘(IPR) Enforcement Directive<sup>39</sup>’ or ‘IPRED’ requires all Member States to apply effective, dissuasive, and proportionate remedies and penalties against those engaged in counterfeiting and piracy.

Both these directives could be incentives for EU MMA companies to increase investment in innovation, design, and R&D, and thereby increase the competitiveness of the EU MMA sector. At the same time they could decrease the amount of counterfeited imports, which is important as the counterfeiting activities from competitors has been increasing.

This being said, the current IPR system and exercising of market power by large customers pose a threat to the EU MMA companies. This is described under heading *Protection of property rights and know-how*.

From the perspective of the EU MMA sector, there is a wish to modernise the IPR regime and make it simple, more flexible, and - at best - less expensive. This could be supported by appropriate market surveillance. Moreover, a modernised rights protection regime should take into account legal instruments for the protection of different types of innovative know-how (which cannot be patented). This could improve opportunities for increasing exports and collaboration between MMA companies.

### **Higher energy-efficient solutions**

Higher energy-efficient solutions constitute an opportunity that should be continually prioritised by the EU MMA sector.

Environmental regulations<sup>40</sup> can act as a driver for innovation and specialisation. Although energy efficiency and eco-design requirements through EC regulation in the short run will increase production costs for products aimed at the internal market, energy efficiency innovation will subsequently increase the production of specialised products in which the EU is relatively competitive, thus adding to the development of a specific niche market for energy-efficient products which will likely grow with an increased global

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<sup>37</sup> General Product Safety Regulations 2005 (Directive 2001/95/EC)

<sup>38</sup> Directive 98/71/EC

<sup>39</sup> Directive 2004/48/EC

<sup>40</sup> Directive 2002/91/EC on energy performance on buildings which is a follow-up on measures on boilers (92/42/EEC), plus Directive 2005/32/EC on ecodesign requirements for energy-using products.

awareness about climate change. Imported goods are less adapted to the legislation and will thus in the short- to medium term have a comparative disadvantage at the benefit of EU producers, especially in comparison to competitors in Third World countries, which may not have implemented environmental regulations to the same extent as in the EU.

Despite the fact that environmental regulations can be a commercial benefit and encourage creation of new business models, they are an extra cost for companies in the MMA sector that work with surfaces (chemicals). In certain areas, companies are driven out of EU15 to EU12/China due to environmental and other similar regulations.

Efficient use of energy, raw materials and recycling in the EU MMA sector has enabled final energy consumption of Europe's basic metal sector to remain constant or even decrease despite regular growth in metals production over the last 15 years. This is mainly due to innovation in production processes. Once the processes are optimised the cost effectiveness results in a competitive advantage for the MMA sector in Europe.

#### **Better products through enabling technologies**

The MMA sector can increase the use of new technology improve metal products and their functionality. An example is coating, which can improve many different types of products, a strategy that competitors pursue to a lesser extent. The technology can be applied to a large range of products it can create an opportunity for increased collaboration between SMEs in R&D projects and thereby also reduce costs relating to engaging in innovation activities.

#### **Innovation networks, partnerships and collaboration**

Different forms of collaboration within the sector and with customers can also drive non-technological innovation, which is typically less costly than technological innovation, and there is plenty of evidence to suggest that there is a value added from soft innovation approaches. Collaborations within the sector can also be a means to create the critical mass needed to negotiate prices on input from suppliers and thereby reduce costs. There are many examples of such regional networks (see for example the Pais Vasco case).

Sector bodies at both regional, national and an EU level have in this respect an important knowledge broker role.

#### 5.1.4 Threats for the EU Metalworking and Metal Articles sector

Threats	Metal processing	Constructional metalwork	Boilers, containers, packaging	Metal products
Demographic change	X	X	X	X
Inflexible social contracts	X	X	X	X
Growing production in developing countries				X
Rising costs on input materials	X	X	X	X
Protection of property rights and know-how	X	X	X	X
A hidden sector	X	X	X	X

#### Demographic changes – decreased access to qualified labour

Demographic changes will in the years to come likely impact the overall supply of incoming new labour to the sector. At the same time the number of students that apply to a technical programme in vocational schools, colleges, and universities is decreasing. This constitutes a structural threat to the EU MMA sector, as it does to other European industries compared to countries with different demographic patterns. It also puts pressures on the sector to improve its image to attract and retain the workforce in the sector. Thus competition for qualified labour could medium- term increase internally between industries in Europe as well as externally between companies in different countries/regions.

#### Labour market regulations - EPL

In some EU countries the level of EPL (employment protection legislation) makes companies less prone to absorb structural changes in the market. An example is the current economic climate. It has resulted in declining markets, and a structural adaptation of the labour force to cut operations costs have been seen all over Europe among small as well as large companies. Across Europe there are variations in the degree of EPL. For countries with high levels of EPL, it can in the short run be a disadvantage to the MMA sector.<sup>41</sup> However, without a perceived level of security it can be difficult to attract and retain skilled labour in the medium term. The Flexicurity model<sup>42</sup>, which is a portmanteau

<sup>41</sup> See e.g. Voralberg case, Austria.

<sup>42</sup> See: Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions: Towards Common Principles of Flexicurity: More and better jobs through flexibility and security.

[http://ec.europa.eu/employment\\_social/news/2007/jun/flexicurity\\_en.pdf](http://ec.europa.eu/employment_social/news/2007/jun/flexicurity_en.pdf)

of flexibility for the companies and security for the workers, provides a relevant model in countries or in companies where there are institutionalised approaches and practices for social dialogue.

### **Growing production in developing countries**

Growing metals production abroad makes the EU MMA sector vulnerable to an increase in imports of mass products to EU markets from countries that are highly cost-competitive. Factors such as copying, especially in Chinese products, increase the negative impact. In the longer run, increased competition in high-end domestic and foreign markets could constitute a significant threat if continuous innovation is not pursued at company level and at sector level - nationally and within the EU.

### **Rising costs on input materials**

Regulation aimed at input materials has a negative impact on the EU MMA sector, as this will often result in increased costs of input materials and subsequently products. The significant impact is caused by sector dependency on imported materials from abroad.

REACH is an example of this, as it places greater responsibility on industry to manage the risks that chemicals may pose to the health and environment. This will have an indirect impact on the MMA sector that uses chemicals unless innovative solutions are found, as there is a risk of a price increase of chemical products due to a reduction in the number of allowed chemical products. As it is, exported goods from the EU will be more expensive compared to those of producers that do not have to comply with this regulation. EU producers thus have a comparative disadvantage for the time being.

Council Regulation (EC) NO 1420/2007 of 4 December 2007 imposes a definitive anti-dumping duty on imports of silico-manganese originating in the People's Republic of China and Kazakhstan and it terminates the proceeding on imports of silico-manganese originating in Ukraine. This regulation means that imports become more expensive, which protects the domestic market from silico-manganese supply, but at the same time it increases production costs for input material for the EU MMA sector.

The regulation (EC) No 289/2009 is a provisional anti-dumping duty on imports of certain seamless pipes and tubes of iron or steel originating in the People's Republic of China. The regulation for anti-dumping duty on imports of steel from China should lead to a stronger position for EU steel suppliers, but at the same time higher input prices for MMA sector using steel as an input.

The worst case scenario for the MMA sector is that the costs will reach a level where the sector is no longer competitive with suppliers from non-EU countries, and the benefits of investment in innovation could be outweighed by cheaper prices at least in some market segments. This would potentially lead to relocation of large clients to locations outside the EU in order to limit the costs.

### **Protection of property rights and know-how**

In general, the current IPR regime poses problems for notably the SMEs in the MMA sector.<sup>43</sup> If a patent is defined in broad terms the actual protection is weak, but if defined too narrowly there is a high risk of copying. Many SMEs in the EU MMA sector do not have the resources to defend their rights, e.g. in China, by following up on patents and litigating against companies that do not adhere to IPR regulations. IPR violation in global markets could slow the globalisation of the MMA sector as companies become hesitant to export or locate in markets with a poor IPR protection.

Moreover, the exercising of market power by large customers has a negative effect on MMA companies as they may be dissuaded from applying for patents; it could also negatively impact the incentive to invest in innovations, if these are not properly protected and can easily be absorbed in some customer markets. Thus, MMA companies are situated in a complex position: they have to balance their own profit interests and know-how protection against their need to collaborate with customers. This challenge is exacerbated by their relative weak bargaining power.

### **A hidden sector**

One of the challenges for the EU MMA sector is the mismatch between R&D needs and actual uptake. However, measures such as The Competitiveness and Innovation Framework Programme (CIP) and better coordination between technology policies at member state level and at EU level could show a way forward.

The European Commissions' initiatives are perceived by MMA sector representatives to mainly target large companies, and therefore such programmes are of more relevance to sectors with mostly large companies such as the steel sector and the automotive sector.

Due to increased competitive pressure from MMA companies outside EU that are closing the technology gap, sector representatives believe that the European Commission should take action to implement R&D and innovation programs in addition to existing opportunities to accelerate innovation among SMEs in the EU MMA industry.

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<sup>43</sup> It should be noted that different types of innovative know-how are protected by different means – not exclusively in the form of a patented product/design. Differences exist across sub-sectors.



## 5.2 Possible strategic options

The SWOT analysis has analysed the relationship between strengths and weaknesses, and threats and opportunities, with focus on:

- how to further enhance existing strengths,
- how to pursue opportunities - based on existing strengths and unexploited potentials,
- how to reduce effects of or eliminate weaknesses by improving performance - based on existing strengths and unexploited potentials, and
- how to face/counteract threats - based on existing strengths and unexploited potentials, and by pursuing opportunities.

Six fields of actions have been identified through the SWOT analysis:

- Consolidation and strategic partnerships;
- Improve dissemination of information and knowledge sharing, taking into account the characteristics of SME's within the sector;
- Take policy measures and stimulate awareness among SMEs about the competitive opportunities of increased enterprise engagement in research collaboration and networks, whilst improving framework conditions for innovation for SMEs in the metal sector;
- Labour for the future – improve the image and attractiveness of the sector to ensure a qualified workforce in the medium term;
- Access to finance;
- Engaging in the climate change challenge.

A set of strategic options is proposed for each field of action. The strategic options address the industry, the Member States, and/or the EU. As with the challenges, the strategic options are interlinked. Thus, one option might be a (partial) answer to more challenges. Below, the strategic options are presented separately under the headline of one of the identified fields of actions.

### 5.2.1 *Consolidation and strategic partnerships*

There is significant room for increased consolidation in the EU MMA sector and its sub-sectors through mergers and acquisitions, notably to match players at the supply and the demand sides and to improve the metal sector's bargaining power. An increase in the bargaining power of the EU metal sector will likely improve its opportunities for achieving lower input costs and higher product prices. Increased consolidation is also a sustainable strategy for pursuing economies of scale in the production process, sharing of parts, and being present in more markets. Generally, SMEs are vulnerable to variation in metal consumption over the business cycle.

An increased consolidation can improve opportunities for accessing human capital at a global scale, thus improving management capacity over the business cycle.

Acquisitions of companies outside the EU and mergers or partnerships between EU companies and non-European companies also hold the potential of expanding access to new markets. Obviously, acquisitions and mergers do not in themselves result in better conditions and new business opportunities, but must be supplemented by post-merger integration, which remains an Achilles heel in many mergers and acquisitions, because post-merger integration too often is treated as a minor mechanical process (Boston Consulting 2008)<sup>44</sup>.

Consolidation of the EU MMA sector could compensate for the deficiency of scale and be a strategy for pursuing international collaboration in large-scale innovation projects, i.e. projects within the EU-funded 7<sup>th</sup> Framework Programme.

Strategic partnerships and networks at a horizontal level are an alternative to mergers. These hold a strong potential for improving robustness vis-à-vis demand fluctuations, for building up innovation capacity through knowledge and resource sharing, for increasing bargaining capacity, and for increasing the functional market flexibility of the SMEs. In addition to partnerships at the horizontal level, vertical and multi-sectoral partnerships with customers and suppliers in open innovation models show promising opportunities, but have yet to be properly evaluated to assess the impact on firm innovation and competitiveness over time.

Based on the above, the following strategic options are suggested:

	Level of response		
	Industry	Member state	EU
Development of business cases focusing on the potential of mergers and acquisitions	●	●	●
Improving profitability, cutting debts to prepare for a buy-up (SME-specific)	●		
Initiating strategic partnerships and collaboration at the horizontal level	●		
Engaging in strategic networks and collaborations at vertical and inter-sector levels.	●		
Investment in post-merger integration to ensure medium-term profitability			
Exploring open innovation business models to sustain functional flexibility and market diversification			

<sup>44</sup> [http://www.bcg.com/publications/files/MA\\_Down\\_but\\_Not\\_Out\\_Dec\\_2008.pdf](http://www.bcg.com/publications/files/MA_Down_but_Not_Out_Dec_2008.pdf), Kronimus Andre, Frankfurt Office et al

### 5.2.2 *Improving dissemination of information and proactive initiative in support of knowledge sharing, taking into account the special nature of SMEs*

In general, a strong focus on information and knowledge sharing is important for innovation and strategic capacity. As a minimum, open access to research results and relevant information is generally required.

Instruments to improve access to such information are comprised of investment in sector research programmes and institutions. Moreover, the setting up of knowledge platforms is a commonly-used instrument for ensuring access to such information. Even this minimum requirement is often insufficient to ensure benefit. Though large multi-national consultancy companies carry out sector-specific market surveillance based on an extensive data collection at the firm level, the costs of subscribing to such services and transforming these to the reality of the SME is often out of scope. As part of the European Commission's activities on sector competitiveness, current research could be extended to allow for a broader and continual collection of firm based data across the EU as the basis for efficient and evidence-based policy making.

Existing information platforms and programmes are mainly used by large companies; SMEs are rare users of such instruments be it through public policy measures or commercial providers. Thus, dissemination activities addressing SMEs specifically are needed, as well as proactive initiatives in support of actual take-up of available research results and business information.

Based on the above, the following strategic options are suggested:

	Level of response		
	Industry	Member state	EU
Initiatives to improve access to relevant strategic information, making use of a variety of channels	●	●	●
Active support from social partners to ensure successful take-up of research results	●		
Dissemination activities specifically addressing SMEs	●	●	●
Proactive initiatives supporting SMEs in the effective take-up of strategic business information and research results	●	●	●
Market surveillance at sector firm level and especially targeted to feed into SMEs' business strategies	●	●	●

### 5.2.3 *Take policy measures and stimulate awareness among SMEs about the competitive opportunities of increased engagement in research collaboration and networks, whilst improving framework conditions for innovation of SMEs in the MMA sector*

Most SMEs do not carry out significant innovation activities and do not take part in research projects. R&D is difficult to organise, and SMEs often have limited skills, resources and opportunities to engage in research projects. Thus, initiatives are needed to increase the engagement of SMEs in research collaborations and to improve the conditions for innovation of SMEs.

Coordination of technology policies between Member States and the EU level, and stronger involvement of SME representatives in the design of new programs or adaptation of existing programs, could be used to involve SMEs actively in shaping a research agenda aligned to their size and capabilities. This could be complemented by the involvement of actors in research collaboration with experience in collaborating with SMEs on competitiveness through continual innovation.

The Competitiveness and Innovation Framework Programme (CIP) is an example of a programme suitable for the EU MMA sector, but it is vital to make sure that the smaller companies receive information about the programmes suitable for them, so the organisations within the MMA sector need to inform the companies. In this context sector bodies could play a major role.

Another strategic option is to stimulate that transfer of knowledge to SMEs is part of the strategy in universities. An example of such a programme is the SEEKIT Programme<sup>45</sup> in Scotland, which is designed to support projects that will promote co-operation in R&D and knowledge transfer between SMEs and the public sector science base (mainly universities). This has resulted in an increased focus on pre-commercialisation in the universities strategies and thereby also an increased interest, to engage in R&D with SMEs as this is a must in order to receive additional support. Data from Europe as well as the USA and Australia, however also suggest that tertiary educational institutions might play a vital role as drivers of innovation among SMEs, in models which have been characterised as Mode 2 knowledge creation by Gibbons.<sup>46 47</sup>

More generally, national and EU program measures that prioritise SME engagement should be thoroughly evaluated with a view to assessing their actual impact with a view to forward looking and evidence based policy making.

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<sup>45</sup> <http://www.scotland.gov.uk/Topics/Business-Industry/support/16879/14127>

<sup>46</sup> Shapiro et al (2008) : The role of educational institutions in innovation- working paper for the European Commission

<sup>47</sup> Gibbons and colleagues argued that a new form of knowledge production started emerging from the mid 20th century which is context-driven, problem-focused and interdisciplinary. It involves multidisciplinary teams brought together for short periods of time to work on specific problems in the real world. Gibbons and his colleagues labelled this "mode 2" knowledge production. This he and his colleagues distinguished from traditional research, which they labelled "mode 1", which is academic, investigator-initiated and discipline-based knowledge production. So mode 1 knowledge production is investigator-initiated and discipline-based while mode 2 is problem-focused and interdisciplinary

Based on the above, the following strategic options are suggested:

	Level of response		
	Industry	Member state	EU
Research policy focusing on active involvement of SMEs in research and research collaborations		●	●
Coordinated efforts to support innovation by SMEs	●	●	●
Information of R&D programmes to SMEs	●		
Transfer of knowledge as part of university strategies		●	

#### 5.2.4 *Labour for the future – ensuring sufficient labour with adequate skills*

The EU MMA sector faces significant challenges regarding the future supply of a skilled workforce.

Attracting more high-skilled people to the sector is a precondition to maintaining and developing the EU MMA sector's competitive performance. Engineering, design, and managerial skills are in particular required to maintain a competitive edge in relation to technology-driven innovation, product quality, innovative high value solutions, and the pursuit of new business opportunities. Strategic competences at managerial level are very important in so far as enterprises count on growth through both acquisitions and new, extra-EU markets.

The Member States and industry should give priority to maintaining and developing the skills base of the MMA sector at all levels. The EU plays a vital role in that process through the open method of coordination and the specific initiatives taken to develop efficient, equitable and comprehensive lifelong learning measures, be they for low-skilled workers or for management programmes for potential mid-range and project leaders. Such strategies and training activities serve the dual purpose of ensuring the right skills in the right combination as well as retaining people. Comprehensive lifelong learning strategies should ensure the continual adaptability and employability of workers, particularly the most vulnerable. Moreover, priority should be given to avoid 'single person' dependency by establishing systems for the sharing and transfer of knowledge and experience.

The image of the industry must be improved in order to attract a skilled workforce. This is complex because the industry is differentiated, with some parts still having a traditional sector profile and other parts being high-tech and high-skilled. Apprentice programmes offering opportunities to undertake company-based training in more than one company can be a solution, as can short term placements, both nationally and through the Lifelong Learning programme at the EU level. Experiences with Young Foresight in partnerships with industry can not only be a means to improve the sector image, but can also stimulate

management awareness about business opportunities stemming from a creative behaviour, and demonstrate that engineering metal processes are not just about producing items for a car, it are also about making the car better and lighter and with an appealing and safe design.

In addition to image management, general information, branding and advertising initiatives are relevant in a wider image improvement process, e.g. in relation to design of products, investment in technology programmes, and development of cleaner products. Pictures – printed, on the Internet, on television - are effective in this regard; pictures that show that the industry is a modern, highly innovative and very diverse industry in which both young and elderly employees thrive.

Finally, active labour market policies are central to the future competitiveness of the MMA sector.

Active labour market policies can provide the flexibility needed to align and restructure the sector to market dynamics, whilst the individual is ensured rights in the case of lay off.

In this context it is important that economic reforms at Member State level are comprehensive, recognising the importance of labour market policies and lifelong learning policies to the competitiveness at national and an EU level. The established social dialogue body at a European sector level could play a transforming and proactive role in stimulating debates at national levels to balance requirements for profitability at the firm level whilst ensuring employees' against labour market risks, and more specifically in ensuring a social dialogue in early planning phases of restructuring. The European Commission has already undertaken efforts to integrate 'flexicurity' as a key policy concept in the European Employment strategy<sup>48</sup>.

Based on the above, the following strategic options are suggested:

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<sup>48</sup> This is documented, in particular, by the adaptation of Common Principles on Flexicurity by the European Council on 5 December 2007, the report and resolutions on flexicurity from the European Parliament on 29 November 2007, the joint labour market and flexicurity analysis presented by the European social partners on 18 October 2007, the Communication on flexicurity by the European Commission dated 27 June 2007 and Guideline 21 of the Integrated Guidelines. The latest steps is the development by EMCO of a set of Flexicurity Indicators (EMCO 2008)

	Level of response		
	Industry	Member state	EU
Initiatives to improve the links between education and training institutions and national sector bodies based on good practice knowledge of what characterises successful collaborations and their effects.	●	●	●
Initiatives focusing on retaining and development of talents.	●	●	
Analysis addressing the existing supply of and the current and future skills need/demand in the MMA sector as a basis for assessing the need for new targeted education and training programmes at different levels.	●	●	
Development and implementation of lifelong learning strategies for employees in the MMA sector.	●		
Establishment of systems for knowledge transfer and sharing.	●		
Initiatives to improve the image and the attractiveness of MMA sector – general information, branding and advertising.	●		
Ensure policy stimulate that the processes and debates within the European sector social dialogue are connected to and aligned with activities at a local level.	●		●

### 5.2.5 Access to finance

A large part of the EU MMA sector consists of SMEs, notably micro and small sized companies. These companies face the structural challenge of having weak access to external finance. This challenge is not caused by the current economic and financial crisis – but the crisis has exacerbated the financial obstacles. In general, weak access to external financing restricts companies from investing in new technology, R&D etc., and during times of crisis the credit crunch puts the survival of companies at risk. As many SMEs do not have access to capital markets, they rely on banks – and here they typically stand in a relative weak credit position.

Initiatives have been taken at EU level to support SMEs' involvement in research and development. One of the initiatives in the *Small Business Act*<sup>49</sup> is devoted to facilitating SMEs' access to finance. This includes more financial products from the European Investment Bank Group, particularly mezzanine finance, more available funds for micro-

<sup>49</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52008DC0394:EN:NOT>

credit, and facilitation of access to cross-border venture capital. In terms of funding through EU programmes, *the Practical Guide to EU funding for research, development and innovation*<sup>50</sup> is a help for companies to negotiate the different EU funding programmes and schemes. Nonetheless, exploitation of programme funding is low due to limited management capacity and awareness. Data from the Competitiveness Report 2008 furthermore suggest that there in general is an asymmetry of available information on external finance opportunities<sup>51</sup> and SMEs' knowledge of such opportunities at Member State and an EU level.

Despite these initiatives and options, access to finance and up-to-date knowledge about external finance is still a strategic challenge. Companies need advice about the possibilities of access to finance, especially the EU funding schemes. MMA sector organizations and MMA networks should provide information of the possibilities of funding in EU regime. Furthermore, SMEs should be encouraged to use the advisory services (national contact points) in order to take advantage of the possibilities of funding.

SMEs are particularly vulnerable to the credit crunch, as they often lack the excess resources to cope with post-delivery payments. Efficient capital flows are needed to avoid that the survival of otherwise healthy businesses is put at risk. Cash management can contribute to making cash flow more efficient; this includes with a review of customer and supplier terms to make sure that customers are compelled or incentivised, e.g. through the use of cash discounts, early payments, and ensuring that the business takes full advantage of any supplier credit lines available. From the perspective of the EU MMA sector, further investigation of the capital flow obstacles seems needed; the extent to which this is exaggerated because of the financial crisis, what the consequences are, and what can be done about to ensure efficient and manageable business systems.

	Level of response		
	Industry	Member state	EU
Focused initiatives to increase information flow to MMA companies on EU and national funding opportunities.	●		
Management training programmes: how to identify funding opportunities for micro- and small companies; how to apply for funding; and development of capacity to engage in funding programmes.	●	●	
Initiatives to further investigate capital flows in the MMA sector.	●	●	

<sup>50</sup> Website [http://cordis.europa.eu/fp7/consultation\\_en.html](http://cordis.europa.eu/fp7/consultation_en.html)

<sup>51</sup> <http://www.sme-finance-day.eu/index.php?id=8>



#### 5.2.6 *Engaging in the climate change challenge*

Compared to competitors outside the EU, the EU MMA sector is more energy efficient and in general more geared towards environmentally-friendly products, partly stimulated by regulation. Many energy-efficiency programs have already been set up in the sector. Further innovation, research and development in this field hold a strong potential in terms of implementing ever more energy-efficient production and solutions, leading to decreasing costs and to products that are appealing to environmentally conscious consumers. The increased global focus on climate change should be perceived a major opportunity for the EU MMA sector in this regard; climate awareness can be used as a stimulator for innovation and for maintaining and developing a competitive position.

Investments in technological innovation with a view to cleaner and safer technologies are required by legislation. Thus, innovation and investment in technology and production process improvements may be perceived as cost-increasing measures, but they are also strategic options for companies who wish to position themselves to customers who are increasingly prosperous, informed, environmentally conscious, and socially aware. The EU MMA sector is in a strong position to benefit from the climate change challenge by applying a pro-active strategy: rather than merely responding to the threats posed by legislation, the EU MMA sector can engage in the climate change challenge as a means of pursuing new business opportunities for products with high environmental standards. Efforts can be supported by for example a green label for metal products or other kinds of reliable information on environmental performance of metal products. SME business organisations and Chambers of Commerce do have a special role and obligation to convey these messages in a form so that SMEs in the metal sector are ready to take action. For example they could develop business cases based on real experiences demonstrating return of investments over time.

As mentioned, environmental legislation, notably regional CO<sub>2</sub> emission legislation and the EU's Emission Trading Scheme, is of considerable significance for the competitiveness of the EU MMA sector due to the energy consumption of the EU MMA sector as a whole. A barrier is the administrative burden associated with handling environmental regulation for SMEs, which tend to lack the resources to comply with such administrative requirements in an efficient manner. Therefore, policy should take into account how this can be better adopted to SME size and capabilities. Emerging e-government practices across a range of EU countries show promising results which can be disseminated further through SME organisations.

Moreover, it is important to ensure international coordination of CO<sub>2</sub> emissions regulations. The EU and the Member States should increase their efforts to establish a global CO<sub>2</sub> emission trading scheme, and if this is not possible they should consider ways to offset the competitive disadvantage of the EU MMA industry. One possible instrument in this connection is trade policy, where opportunities to act within the framework of the WTO agreements should be explored.

Finally, more energy security and reliability in terms of energy prices should be pursued to support the MMA sector in its efforts to maintain a competitive position. Energy is an important input factor in the metal production process, and consequently, energy security and reliability in terms of prices is of strategic importance to the MMA sector. However,

the negotiation power of SMEs is often too small. Therefore, further development in the EU energy markets is therefore of high importance to the sector's competitiveness. Against this background, the EU and the Member states should increase efforts to liberalise and improve the functioning of energy markets with a view to lowering prices and increasing stability and security. In this respect, policymakers should also bear in mind: 1) that measures to improve the energy efficiency are often not as profitable as required by shareholders and commercial banks - as such, there is a demand for alternative funding; 2) messages about future energy costs and regulations are often

Based on the above, the following strategic options are suggested:

	Level of response		
	Industry	Member state	EU
Development of business cases demonstrating return of investments based on green business models	●		
Development of business strategies that proactively respond to the climate challenge	●		
Investing in cleaner and safer technologies	●		
Increased investment in RTD-programmes suitable for SMEs with climate focus		●	●
Commitment to continual priority and investment in R&D with the aim of improving energy efficiency through the discovering of breakthrough technologies	●	●	●
Engaging in strategic networks and knowledge sharing within R&D in energy improving technologies	●		
Policy should address how to actively involve SMEs in research collaborations and networks, and should evaluate the impact of programs which specifically prioritise SME participation		●	●
Policy should address how to support SMEs in handling the administrative demands associated with environmental regulation		●	●
International coordination of CO2 emission regulation		●	●
Improving the functioning of the EU energy market		●	●
Disseminating promising e-government practices to reduce administrative burdens for SMEs	●	●	●

confusing to SMEs (e. g. CO<sub>2</sub> emission allowance certificates were given for free to energy suppliers while SMEs see less chance to profit from the emissions trading system); 3) the general public is often focused on Building Energy Efficiency, Renewable Energies etc. – however major levers to reduce energy consumption in the industry (qualified business energy advisers, increased awareness, adequate campaigns and R&D activities) could be envisaged

### 5.3 Postscript

The analysis and strategic options above present a strategic outlook for the EU MMA sector. However, more long-term strategic options require other methods, for example the scenario method. Thus, radical new long-term potential challenges might not be reflected in the above. Concerning the future long-term competitiveness of the EU MMA sector, the following questions might serve as a foundation for reflection:

What are the prospects of increased internationalisation and consolidation of the MMA sector? How likely are cross-regional mergers? Will mergers and acquisitions lead to a transformation of the sector, and will open innovation models prove to be a viable alternative?

- What breakthrough technologies can be envisioned, and who will be the main beneficiaries? What will implementation require, and what will be the consequences and the potential benefits for the EU MMA sector?

## 6 Conclusions

Although the MMA sector may not enjoy as high a profile as supplier or customer industries where large, global firms are major players, it is an important sector that should not be overlooked. It is a significant, and arguably the most important, employer within the EU manufacturing sector, employing just over 4m workers (or 12% of the EU manufacturing workforce). Basic Metals and Motor Vehicles employ less than 1m and 2-2¼m respectively. While it accounts for a smaller share of manufacturing output (7%), this is no smaller than that of the basic metals sector (5%). Profit levels in the MMA sector compare favourably against the other manufacturing sectors while profitability is comparatively high and above the average for the manufacturing sector as a whole. In some sense, the MMA sector punches above its weight.

Its Achilles heel appears to be its structure, with the very high proportion of SMEs creating a fragmented and less co-ordinated sector vis-a-vis its suppliers and customers. This lends itself to the argument that MMA SMEs are squeezed between larger customers and suppliers, and their competitiveness undermined. While the comparatively higher profitability of the sector compared to other sectors would suggest the adverse effects are less than suggested, the interviews and questionnaires provide some evidence for the hypothesis that MMA SMEs are squeezed. In relation to both customers and suppliers, the general tendency among MMA firms or national associations was to report little or no bargaining power, especially with regard to energy suppliers. This was cited as a major influence on competitiveness. Some MMA respondents did, however, report having some power over equipment and transport services suppliers. Suppliers and customers who were interviewed painted a more balanced (but still mixed) picture, but certainly not one where MMA firms hold all the power. Interview evidence also suggested that the price of supplies is not always directly correlated to size. Hence, while SMEs may often be squeezed, it seems that this need not always be the case.

The small size of many MMA firms also means that access to finance can be a challenge. This has a negative impact on investment in R&D and in some cases (but not all) firm growth. Bank loans are the major source of finance for MMA firms. This suggests that initiatives to improve MMA SMEs access to finance should focus on improving the bank loan model or on promoting alternative sources/mechanism to MMA firms and bringing them together (in collaboration with MMA representatives). Improved access to finance would help more firms engage in mergers & acquisitions, which most interviewees believed would help improve the competitiveness of the sector.

Concern over protection of inventions and innovations act as a disincentive for some firms to engage in R&D, or encourages firms to protect or hide their intellectual property in an unconventional manner. The issue of protection relates not only to foreign competitors, but also to other EU firms in the supply chain. In this field, it appears that initiatives need to focus on restricting third party access to patenting documentation and

providing an inexpensive and administratively simple system to allow MMA firms to protect their inventions and enforce their intellectual property rights.

Of course, there are regional and sub-sectoral variations across the MMA sector. MMA production is concentrated in Germany, Italy, France, UK, Spain, Austria, Belgium and the Netherlands. These Member States would be heavily affected by policies focusing on the MMA sector. Based on the share of the MMA sector in total manufacturing, Austria, Slovenia, Estonia, Spain and Italy would be most affected.

Similarly the distribution and location of the MMA sector varies within countries. In Lithuania, Belgium and France the geographical distribution of MMA sector is spread out across the country, while in others such as Germany and Austria, production is concentrated in two or three clusters. Thus, policy initiatives to help the MMA sector need to be taken at various levels and need to take into consideration the effect of other policy initiatives (possibly unrelated to the MMA sector) implemented at other levels.

There are also variations across the sub-sectors identified in the study and policymakers need to take account of these. SMEs account for the largest share of output and employment in Constructional Metalwork, for example, while in Metal Products they account for the smallest shares; the difference between the two is 20-25 pp. In addition, the regional locations and concentrations also vary across the sub-sectors. France, for example, is the major Member State in the boiler, container & packaging (BCP) sub-sector, when Germany & Italy dominate the other sub-sectors and the MMA sector as a whole.

Furthermore, the relative importance of the sub-sectors is not equal. Metal Processing dominates the MMA sector, accounting for around 40% of output, employment and enterprises. The second largest sub-sector is Constructional Metalwork which accounts for 25-30% of output, employment and enterprises. The smallest sector is the BCP sector with accounts for just 4% of all MMA enterprises and 11-12% of output and employment. This very varied, fragmented and disparate nature of the MMA sector makes it hard to imagine that any single or simple policy aimed at the MMA sector with a one size fits all approach could be effective or easily estimated. It suggests that initiatives targeted at a more micro level may be required to fully support or benefit the MMA sub-sectors or regions.

Labour productivity in the sector as a whole can be expected to go on improving in the medium term, with increasing convergence, as the Member States with relatively low productivity move progressively to the standards set by the more mature economies. The scope for boosting productivity depends on a combination of market forces and policy initiatives that would impact on three interconnected parts of the MMA sector: the Recent Accession States (RAS); small and medium size enterprises (SMEs); and the leading producer Member States.

The Member States with the greatest unit labour cost advantage are the UK, Austria and the Netherlands. Integration of the EU labour market, leading to convergence of employment costs across the Member States, will increase the stress on improvements in underlying labour productivity so as to sustain international competitiveness. Overall, there is wide divergence in employment costs (labour costs per employee) among the Member States, more than offsetting any convergence of productivity levels. The result is that variations among the Member States in unit labour costs are wide and show no

signs of convergence. Hence significant differences in cost competitiveness in MMA production persist across the EU.

The majority (75-80%) of trade is intra-EU. While support for the MMA sector should continue to help boost extra-EU exports, this suggests that more emphasis should be placed on the internal EU market, intra-EU competitiveness and the fairness of the intra-EU trade framework.

With regard to suppliers, the basic metals industry is frequently the biggest input supplier to the MMA sector, accounting for between 15-20% of total inputs to the MMA sector. Steel is a major input to the MMA sector and the relatively large size of steel input suppliers compared to the relatively small size of MMA producers makes it difficult for MMA SMEs to earn economies of scale from their inputs and engage in effective bargaining. This is seen as very restrictive and a major threat to its competitiveness. The importance of the whole MMA sector as a customer varies, accounting for anywhere between 10-70% of steel suppliers output, depending on the sub-sector or specialisation. This limits the bargaining power of the MMA sector in some areas and as a whole. However, the high percentage for some sub-sectors or specialisations suggests that some MMA firms or sub-sectors should be able to enjoy greater bargaining power. Other industries that are responsible for large shares of input across regions also include distribution and mechanical engineering. On the demand side, the mechanical engineering industry is the largest consumer of the sector's output. The construction and the motor vehicles industries are also large consumers, but less so than mechanical engineering. It is also worth noting that the MMA sector is often the largest or second largest customer of the basic metals sector. This suggests that weak bargaining positions are a reflection of the dominance of SMEs in the MMA sector, and that consolidation within the MMA sector would strengthen its position in relation to basic metals suppliers.

The key framework conditions affecting the MMA sector are:

- Large share of SMEs and dependency on upstream and downstream firms;
- Environmental regulations;
- Skills and training;
- Innovation, R&D and protection of intellectual property rights.

The strengths, weakness, opportunities and threats identified for the MMA sector can be summarised as follows:

#### Strengths

Geographical proximity of supply chain and close relationships with customers  
High degree of specialisation and functional flexibility  
High quality output and strong position in high-end markets  
Technology intensity and a strategic focus on innovation  
Efficient use of input materials and high degree of recycling

#### Weakness

Squeezed between upstream and downstream industries  
High level of input material dependency

Labour intensity  
Recruitment problems

Particularly in relation to SMEs:

Weak financial position of SMEs and limited access to external finance  
Long investment cycles  
Single client/market dependency  
Limited capacity, resources and skills to engage in R&D activities  
Limited capacity, resources and skills to handle administrative requirements associated with regulation

Opportunities

Increased consolidation  
Improved market surveillance to support enforcement of regulation  
Increased competitiveness through a modern IPR system  
Higher energy efficiency solutions  
Better products/services through enabling technologies  
Innovation networks and collaborations

Threats

Demographic change  
Variations in labour market flexibility across the EU  
Growing production in developing countries  
Rising costs of input materials  
Protection of property rights and know-how  
A hidden sector – voice of MMA drowned out by voice of large supply/customer firms

Six possible areas of action for policymakers and stakeholders are:

Consolidation and strategic partnerships  
Improve dissemination of information and knowledge sharing, taking into account the characteristics of SME's within the sector  
Take policy measures and stimulate awareness among SMEs about the competitive opportunities of increased enterprise engagement in research collaboration and networks, whilst improving framework conditions for innovation for SMEs in the MMA sector  
Labour for the future – improve the image and attractiveness of the sector to ensure a qualified workforce in the medium term  
Access to finance  
Engaging in the climate change challenge

# Appendix 1

## Funding opportunities for the MMA sector across the EU

The MMA sector has a high proportion of SME's, but also large innovative companies. There are also regional differences within the sector, especially between MMA companies in New Member States and 'Old' Member States. Some of the differences are highlighted below:

### **'Old' Member States**

- Concentration of companies (MMA sector and customers)
- Innovation and collaboration is the competitive advantage
- Prime knowledge sources are *networks, customers and local technical colleges*
- Many large foreign customers located in the region – some export
- Companies flexible to demand, highly skilled, high tech
- Industry organisations play a very important role
- Globalisation is a major threat (IPR, imitations, low-cost)
- Access to capital is difficult

### **New Member States**

- High level of export to EU and Russia
- Squeeze between low-cost labour (third countries) and high tech/high skill ('old' MS)
- Focus on upgrading skills and infrastructure (transport and innovation)
- Access to capital is difficult
- ERDF and other EU initiatives/programmes (not R&D) very important for the clusters in NMS
- Policy support vital.

The table below shows the *main* EU funding opportunities (focus on SMEs) relevant for the MMA sector. Comments on regional issues and MMA sector issues are included in the table.



<b>Table 1: Main EU funding opportunities relevant for the MMA sector</b>		
Programme	Focus	Comments
<i>LIFE+ Environment Policy and Governance</i>	Supports technological projects that offer significant environmental benefits, for example process or efficiency improvements	<a href="http://ec.europa.eu/environment/life/funding/lifeplus.htm">http://ec.europa.eu/environment/life/funding/lifeplus.htm</a>
<i>CIP- Entrepreneurship and Innovation Programme (EIP)</i>	<ol style="list-style-type: none"> <li>1. Access to finance for SMEs through "EU financial instruments"</li> <li>2. "Enterprise Europe Network": a network of business and innovation service centres</li> <li>3. Support for initiatives to foster entrepreneurship and innovation</li> <li>4. Eco-innovation - making sustainable development become a business reality</li> </ol>	<p>The EIP programme is the most relevant for MMA companies out of three programmes in the CIP Programme</p> <p><a href="http://ec.europa.eu/cip/eip_en.htm">http://ec.europa.eu/cip/eip_en.htm</a></p>
<i>The Seventh Framework Programme for Research and Technological Development</i>	<p>R&amp;D – 4 SME orientated programmes:</p> <ul style="list-style-type: none"> <li>- Co-operation" (circa €32.3 billion)</li> <li>- Ideas (circa €7.5 billion)</li> <li>- People" (circa €4.7 billion)</li> <li>- Capacities" (circa €4 billion).</li> </ul>	<p>Companies in the OMS are competing on innovation and could benefit from participating in the FP7 programmes, especially SME orientated programmes. Large MMA sector companies could also benefit from other FP 7 programmes.</p> <p><a href="http://cordis.europa.eu/fp7/">http://cordis.europa.eu/fp7/</a></p>
ERDF – European Regional Development Fund	<ol style="list-style-type: none"> <li>1. Entrepreneurship, innovation and competitiveness of SME</li> <li>2. improving the regional and local environment for SMEs</li> <li>3. Interregional and cross-border co-operation of SMEs;</li> <li>4. investment in human resources</li> </ol>	<p>ERDF are mainly relevant for the new member states for two main reasons. The funds available for the new member states are significantly larger than the 'old' member states and the level of funding in the next period are meant to further decrease in the 'old' member states.</p> <p>The MMA companies in the new member states have problems with</p>

		<p>innovation infrastructure (networks, access to information), where the MMA clusters in the 'old' member states often have strong networks.</p> <p><a href="http://ec.europa.eu/regional_policy/funds/feder/index_en.htm">http://ec.europa.eu/regional_policy/funds/feder/index_en.htm</a></p>
ESF – European Social Fund	<p>1. Increasing adaptability of workers and enterprises</p> <p>2. Enhancing access to employment and participation in the labour market</p> <p>3. Reinforcing social inclusion by combating discrimination and facilitating access to the labour market for disadvantaged people;</p> <p>4. Promoting partnership for reform in the fields of employment and inclusion.</p> <p>5. Efforts to expand and improve investment in human capital, in particular by improving education and training systems;</p> <p>6. Actions aimed at developing institutional capacity and the efficiency of public administrations, at national, regional and local level.</p>	<p>ESF is mainly aimed (€) at the new member states and the skill issue (upgrading) is a significant issue for the MMA companies in the new member states.</p> <p><a href="http://ec.europa.eu/employment_social/esf2000/2007-2013_en.html">http://ec.europa.eu/employment_social/esf2000/2007-2013_en.html</a></p>
<i>Joint European Resources for Micro and Medium Enterprises (JEREMIE)</i>	<p>It aims improve access to finance for micro to medium-sized enterprises and in particular the supply of micro-credit, venture capital finance or guarantees and other forms of innovative financing. Special emphasis will be given to supporting start-ups, technology transfer, technology and innovation funds and micro-credit</p>	<p>It is (or will be 2009) available in the following countries: Greece, Romania, Latvia, France (Languedoc-Roussillon region), Italy (Campania), Slovakia, Cyprus, Bulgaria.</p> <p><a href="http://www.eif.org/jeremie/">http://www.eif.org/jeremie/</a></p>

<i>Joint Action to Support Micro-finance Institutions in Europe - JASMINE</i>	The aim of the programme is to improve the access to finance of small businesses, unemployed people, or people not currently in employment who would like to become self-employed but who are unable to access traditional banking services.	<a href="http://ec.europa.eu/regional_policy/funds/2007/jii/micro_en.htm">http://ec.europa.eu/regional_policy/funds/2007/jii/micro_en.htm</a>
<i>Enterprise Europe Network</i>	<p>The Enterprise Europe Network is the largest network of contact points providing information and advice to EU companies on EU matters, in particular small and medium enterprises (SMEs). Including:</p> <p>Providing information and practical advice on market opportunities, European legislation and policies relevant to a company or sector. Helping SMEs to find suitable business partners using its business and technology cooperation database, providing information on tender opportunities and international networking.</p> <p>Developing the research and innovation capacities of SMEs by helping to create synergies with other research actors, foster technological cooperation and holding brokerage events.</p> <p>Helping SMEs to share research results, participate in research programs and apply for funding, particularly from the EU's 7<sup>th</sup> Framework Programme (FP7).</p> <p>Involving SMEs and business actors in the policy-making process, by transmitting feedback to the Commission and monitoring the implementation of EU policies in the field of competitiveness and innovation.</p>	<p>Sector- and cluster organisations should use the network to increase awareness to the MMA companies on the relevant EU activities for the MMA sector. MMA companies can use the network to get direct advice.</p> <p><a href="http://www.enterprise-europe-network.ec.europa.eu/index_en.htm">http://www.enterprise-europe-network.ec.europa.eu/index_en.htm</a></p>
<i>Access2finance</i>	Access2finance is not a direct funding tool, but advisory services for SMEs on EU funding. This includes information on what is available and help in the application process. There is a national contact point in all EU countries.	<a href="http://www.access2finance.eu/">http://www.access2finance.eu/</a>

Several EU programmes and funding opportunities are open to European enterprises. They are available to enterprises in all sectors, including the MMA sector. The funding opportunities and the funding procedures are explained on easily accessible websites. Sector organizations also assist and guide their members and help them to find the relevant information. The overview document from DG Enterprise "European Union Support Programmes for SMEs"<sup>52</sup> lists the main funding sources and programmes.

**The Enterprise Europe Network** is as a network for sector- and cluster organisations aimed at increasing the awareness of relevant EU activities ([http://www.enterprise-europe-network.ec.europa.eu/index\\_en.htm](http://www.enterprise-europe-network.ec.europa.eu/index_en.htm)). The Enterprise Europe Network is the largest network of contact points. It provides information and advice to EU companies on EU matters, in particular small and medium enterprises (SMEs) and:

- provides information and practical advice on market opportunities, European legislation and policies relevant to a company or sector. It helps SMEs to find suitable business partners by using its business and technology cooperation database, providing information on tender opportunities and international networking,

- develops the research and innovation capacities of SMEs by helping them to create synergies with other research actors, fostering technological cooperation and holding brokerage events,

- helps SMEs to share research results, participate in research programmes and apply for funding, particularly from the EU's 7th Framework Programme (FP7),

- involves SMEs and business actors in the policy-making process by transmitting feedback to the EU Commission and monitoring the implementation of EU policies in the fields of competitiveness and innovation.

Other important internet sites that provide an overview of funding opportunities are the European portal for SMEs, the Access2finance page, the Cordis practical guide, and the SME Techweb.

The EU Commission created **the European portal for SMEs** to provide easy access to information on all European Union policies and initiatives of relevance to small and medium-sized enterprises (SMEs). The portal has specific information on and links to funding opportunities

[http://ec.europa.eu/enterprise/sme/funding\\_en.htm](http://ec.europa.eu/enterprise/sme/funding_en.htm)

**Access2finance** is not a funding tool per se, but encompasses advisory services for SMEs on EU funding, including information on and assistance in connection with the application process. There is a national contact point in all EU countries.

<http://www.access2finance.eu/>

**Cordis practical guide to EU funding** aims to help potential applicants to find their way to the most relevant information on research and innovation funding opportunities ("getting through the maze").

<sup>52</sup> [http://ec.europa.eu/enterprise/newsroom/ct/document.cfm?action=display&doc\\_id=4619&userservice\\_id=1&request.id=0](http://ec.europa.eu/enterprise/newsroom/ct/document.cfm?action=display&doc_id=4619&userservice_id=1&request.id=0).

[http://cordis.europa.eu/eu-funding-guide/finding-sources\\_en.html](http://cordis.europa.eu/eu-funding-guide/finding-sources_en.html)

**The SME Techweb** is a guide to the 7<sup>th</sup> framework programme for research acquiring and research performing SMEs.

[http://ec.europa.eu/research/sme-techweb/index\\_en.cfm](http://ec.europa.eu/research/sme-techweb/index_en.cfm)

The “Grants Overview” at [http://ec.europa.eu/grants/index\\_en.htm](http://ec.europa.eu/grants/index_en.htm) is a guide to EU funding opportunities according to European Commission policy areas.

This appendix provides a brief overview of the *main* general EU funding opportunities relevant to MMA enterprises. The overview does not take the different terms and conditions in different types of project or activities into consideration. In practice, the availability of actual funding opportunities depends on the relevant project or activity, i.e., its contents, size, partners, location, etc.

Below, we describe the relevant funding opportunities in different programmes in relation to the six fields of actions of the Strategic Outlook.

## **1. Consolidation and strategic partnerships**

- a. None found

## **2. & 3. Knowledge sharing and Research collaboration**

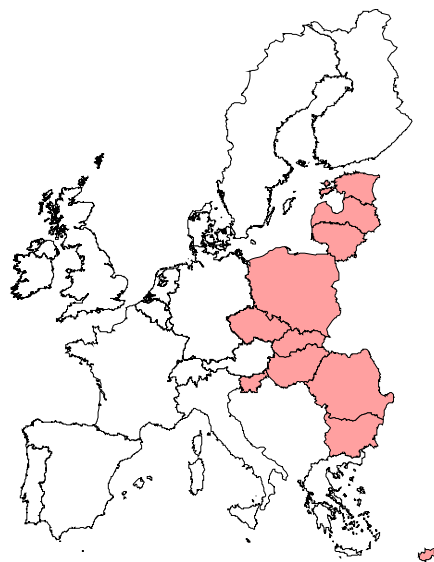
- o **Support for initiatives to foster entrepreneurship and innovation through CIP** [B3]. The European Commission supports innovation through a series of initiatives and actions by providing financial support to innovators, innovation support services for SMEs, notably start-ups, and by developing and testing new forms of business support and facilitating transnational cooperation with a view to mobilising more resources for the creation of a European Innovation Space. The main tool, administered by DG Enterprise and Industry, is the CIP programme and its financial instruments ([http://ec.europa.eu/cip/eip\\_en.htm](http://ec.europa.eu/cip/eip_en.htm))

## **4. Labour for the future**

- a. **European Social Fund** [E] ESF is the EU’s main financial instrument for investing in people and improving their job prospects. It supports skills development, education and training, and employment. Thus, the programme provides funding opportunities for improving the skills base in the MMA sector. ESF funding is available through the Member States and regions. Member States and regions devise their own ESF Operational Programmes in order to respond to the actual and specific local and regional needs. Each Member State together with the European Commission agrees on one or more Operational Programmes for ESF funding for each funding period as do those regions that have their own Operational Programmes (not all do). National Operational Programmes set the priorities for ESF intervention and their objectives. The homepage

[http://ec.europa.eu/employment\\_social/esf/index\\_en.htm](http://ec.europa.eu/employment_social/esf/index_en.htm) is the best way to get an overview country by country.

### **EU Member States where ESF funds are available**

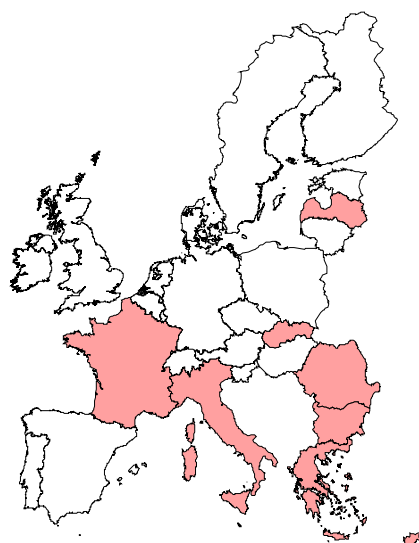


## **5. Access to finance**

- a. **GIF** and **SMEG** (B1) are two schemes under the Competitiveness and Innovation Framework Programme (CIP). CIP has several schemes and a budget of over €1bn to facilitate access to loans and equity finance for SMEs where market gaps have been identified. Each Euro spent leverages €6 on risk capital or €50 on bank loans on average. This means that it should generate some €30bn in new finance for SMEs from financial institutions and benefit up to 400,000 SMEs. Under previous programmes, over 360,000 SMEs have been helped by the €744m provided during the last decade. The European Investment Fund (EIF) implements the CIP financial instruments on behalf of the Commission on a trust basis. They cover different needs depending on the stage of development of the small business. SMEs wishing to apply for guaranteed financing should contact one of the financial intermediaries that have signed an agreement with the European Investment Fund. Further reading can be found at the Access to Finance website (<http://www.access2finance.eu/>).

- b. **Jeremie Programme [F]** aims to improve access to finance for micro, small and medium sized enterprises in Greece, Romania, Latvia, France (Languedoc-Roussillon region), Italy (Campania), Slovakia, Cyprus and Bulgaria.

**EU Member States where Jeremie funds are available**



- c. **Jasmine Programme [G]** Funds are available in all EU Member States. This aims to improve access to small businesses through micro-credits. Micro-credit in the EU means loans under €25,000, but typically, they average € 10,000 in the EU15 and € 3,800 in the EU12. The programme is tailored to micro-enterprises, employing fewer than 10 people, and unemployed or inactive people who want to become self-employed but do not have access to traditional banking services. The initiative focuses on the "non-bankable" segment of the market. Micro-credit is developing in the new as well and the old Member States. According to estimates based on *Eurostat* data, the potential demand for micro-credit in the EU could amount to more than 700,000 new loans, worth approximately € 6.1 billion in the short term.

**6. Engaging in the climate change challenge**

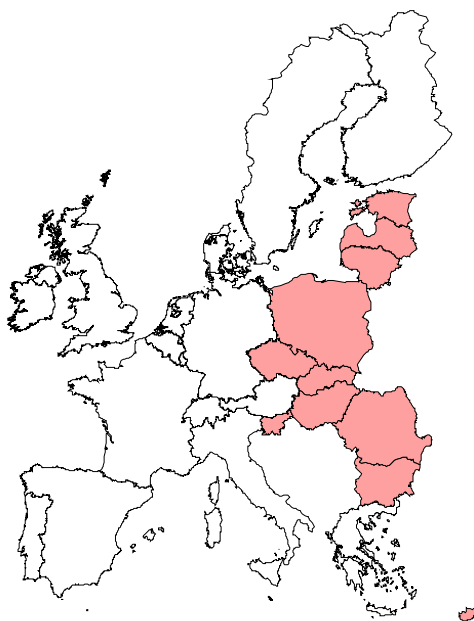
Several programmes give priority to projects with a green focus in light of climate change and sustainability:

- a. **Life+ [A]**. Funds are available in all EU Member States. Several countries have decided to have additional national criteria for applicants

to the Life+ Programme, i.e., Estonia, Finland, Italy, Latvia, the Netherlands, Poland, Romania, Slovenia and Sweden.

- b. CIP Programme on Eco-Innovation [B.4].** Funds are available in all EU Member States. Nearly € 200 million are available to fund Eco-innovation projects between 2008 and 2013. The programme gives priority to SMEs. Clusters of applicants and projects that can demonstrate a European added value and have a high potential for market replication are strongly encouraged to apply. The programme supports innovative, environmental-friendly projects in the area of material recycling (better sorting processes, innovative recycling products), sustainable buildings (innovative building processes and products), food & drink industrial processes (waste reduction, recycling & recovery), green business & smart purchasing.
- c. The ERDF programme [D]** aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions. In short, the ERDF finances direct aid to investments in companies, in particular SMEs, to create sustainable jobs, infrastructures linked notably to research and innovation, telecommunications, the environment, energy and transport, financial instruments (capital risk funds, local development funds, etc.) to support regional and local development and to foster cooperation between towns and regions, and technical assistance measures.

#### **EU Member States where ERDF funds are available**





## Summary of funding opportunities by country

	Country	A	B	C	D	E	F	G
		LIFE+ Environment Policy and Governance	CIP- (EIP)	7th Framework Programme	ERDF	ESF	JEREMIE	JASMINE
	Austria	•	•	•				•
	Belgium	•	•	•				•
	Bulgaria	•	•	•	•	•	•	•
	Cyprus	•	•	•	•	•	•	•
	Czech Republic	•	•	•	•	•		•
	Denmark	•	•	•				•
	Estonia	•	•	•	•	•		•
	Finland	•	•	•				•
	France	•	•	•			(•)	•
	Germany	•	•	•				•
	Greece	•	•	•			•	•
	Hungary	•	•	•	•	•		•
	Ireland	•	•	•				•
	Italy	•	•	•			(•)	•
	Latvia	•	•	•	•	•	•	•
	Lithuania	•	•	•	•	•		•
	Luxembourg	•	•	•				•
	Malta	•	•	•	•	•		•
	Netherlands	•	•	•				•
	Poland	•	•	•	•	•		•
	Portugal	•	•	•				•
	Romania	•	•	•	•	•	•	•
	Slovakia	•	•	•	•	•	•	•
	Slovenia	•	•	•	•	•		•
	Spain	•	•	•				•
	Sweden	•	•	•				•
	United Kingdom	•	•	•				•

## Appendix 2

### Province of Silesia

*Silesia is rich in mineral and natural resources, and includes several important industrial areas. Silesia's largest cities are Wrocław, its historical capital, and Katowice in Poland, and Ostrava in the Czech Republic.*

#### Overview: structure & recent trends

The Province of Silesia is a region of a high industrial culture (one of few regions of this type in Europe), with traditional industrial sectors, which is also decisive for its power. The metallurgical sector, developed in the Silesian region is one of the most modern and most effective in domestic industry. The coal production (almost 90 % of the domestic production) determines that Poland is the country, whose energy safety is secured by its own resources of primary fuels.

In this region – on the basis of restructured traditional industries – modern disciplines, connected with their service, i.e. first of all a modern machine industry, with an adequate stock of equipment and experienced and skilled human resources. After the difficult years of transformation processes in the beginning of '90s of the last century, this industry has been changed and modernised and today it constitutes an essential element of the economic landscape of the region.

The restructuring processes, which have been ongoing for a few years, cause systematic changes in the economic structure of the region. The share of mining and metallurgy in the whole industry – dominating until recently in our economy – is constantly decreasing and the position of the electric machine industry, IT, power sector and the most quickly – automotive industry (the region is the greatest manufacturer in Poland of cars) and food industry is constantly growing.

The Province of Silesia is the strongest industrial region in Poland and also one of more attractive regions as regards its landscape. The chief assets of the Province of Silesia is its geographic situation, a high transport accessibility, human capital and constantly improving quality of life. On its territory, two of ten trans-European transport routes intersect, as well as two motorways A-1 and A-4 and a modern airport in Pyrzowice is situated here. A high concentration of the population on a relatively small territory (almost 4,7 million inhabitants) constitutes a huge, potential sales market.

This relatively small region (12,3 thousand square kilometres) is the most industrialised and the most urbanised region in Poland, in which the average density of population is about 380 persons/km<sup>2</sup>, whereas the average density of population for the whole country

is 122 persons/km<sup>2</sup>. It is inhabited by about 4,7 million people which ranks this region at the 2nd place in Poland, after the Province of Mazovia. (13,4%).

The degree of urbanisation is proved by the fact that 78% of its inhabitants live in towns. We belong also to the strongest regions in Poland, from the economic point of view. Our region generates 13,0% of the GDP – the second place in Poland. GDP per capita amounts to 29,5 thousand PLN and is higher than the average Polish level by almost 2 thousand PLN. The ongoing economic transformation of the region may be illustrated by a distinct change in the structure of the generated gross added value (newly manufactured value). The share of market and on-market services accounts for almost 60% and of the industry – 33%.

On this area, there are located more than 427 thousand of business units (11,6% of the total amount of business units in Poland – 2nd place.). From this number, 18,7 thousand are public business units and 408,7 thousand – private business units. The number of employed persons in the region is above 1,6 million, which gives us 2nd place in Poland (11,9%).

There should be underlined here a considerable – almost 80% – share of natural persons who run their business activity.

The fact that should be stressed it is that the role of small and medium size enterprises grows systematically. The dynamic development of the region is impossible without development of this sector. It creates a possibility for workers laid off from restructured plants to find new jobs in other business sectors. It also opens a chance for taking advantage of the internal potential of the region and creating a diversified structure of employment, more resistant to changes in the economic climate.

The region is also one of the greatest in Poland scientific and academic centres. It has 44 universities and colleges with more than 200 thousand students and 10 thousand academic teachers.

The region has also at its disposal a huge research and development potential which makes the region the second largest centre in Poland. There are here 135 institutions that carry out research and development activities, which places our region on the 2nd place in Poland, after the Mazovian region (317 institutions). These institutions employ above 6,5 thousand persons.

Operation of research and development units in the region are focused primarily on environmental protection, efficiency of power engineering, automation, electronics and civil engineering. The scope of cooperation of these institutions with the SMEs sector is constantly growing.

On the basis of the existing scientific and technical basis, together with highly skilled staff of the scientific and research and development institutions, such advanced technologies as IT, automatics, automotive industry, food processing or highly specialised services develop very quickly.

Short distance to the Czech Republic, Germany, Hungary and Slovakia and the fact that within the radius of 600 kilometres there are 6 European capitals (Warsaw, Prague, Bratislava, Vienna, Budapest and Berlin) make this region very attractive from investors' point of view.

Within a distance of 34 km, northwards from Katowice, there is located the International Airport "Katowice", in Pyrzowice. The number of passengers served by this airport in 2008 was 2,43 million and shows a growing trend (in 2004 – 0,6 million persons). The situation with cargo traffic is similar – in the year 2004 about 5 thousand tons of goods were transported, whereas in 2008 – 12,7 thousand tons).

The region has direct railway connections with Prague, Bratislava, Vienna, Berlin, Kiev, Frankfurt, Dresden, Budapest and Lvov.

Another significant element of the railway system in the region is a terminal of the wide-track railway line (LHS). It is the only one railway line of this type in Poland, which enables a direct trade of merchandise with Ukraine and the remaining member states of the CIS.

The strength of the region is also enhanced by the Katowice Special Economic Zone (KSSE) – a leading zone in Poland – which by creating conditions for development of the high-tech sector, contributes in an essential way to creation and development of modern branches of economy and to change in the image of the whole region.

270 permits have been granted till now for carrying out new investments in the Zone, more than 200 new companies have been set up there and 4 billion euro (in 80 % originating from abroad) have been invested, which created about 37 thousand new jobs. Needs of the supply chains bring about synergy effects which create at least the same number of new jobs around the zone.

KSSE has absorbed about 50% of the total foreign capital, invested in all special economic zones in Poland. Among the largest investors in the Zone we have such companies as General Motors, Isuzu Motors, Delphi Automotive System, Roca, Guardian, NGK Ceramics, Fiat – GM Powertrain Polska or Electrolux.

It should be stressed that foreign investments (located not only in the Zone but also beyond it) exert considerable influence on regional development, as they both stimulate economic development of the region and give rise to innovativeness in companies which cooperate with them.

The reports worked out by the Research Institute on Market Economy confirm that the Province of Silesia is leading among the regions with a high degree of attractiveness from the investing point of view in Poland.

The Silesian region abounds in the most varied tourist attractions in Poland. We have extremely beautiful limestone rocks in the Krakow – Częstochowa Upland, with very good conditions for practicing rock climbing, mountain range of Beskid Śląski and Żywiecki, with well known all over Europe ski centres in Szczyrk, Ustroń, Wisła,

Korbielów, forests in the vicinity of Pszczyna, which witnessed the history of Princes of Pszczyna, or the Silesian conurbation with its industrial tradition going back to the 18th century. These areas have differentiated features but they altogether constitute one strong Province of Silesia.

Now, among important challenges that face the economy of our region, the most essential seems to be growth of innovativeness in our companies and development of the knowledge based economy. This goal is carried out, among other matters, by development of the innovative market, development and enhancement of the institutional environment which serves for cooperation between the R&D sector and the economy and support for the R&D sector.

Comprehensive and sustainable use of the regional resources should cause the Silesian region to become a region, in which modern economy, culture and education will ensure keeping its firm place as one of several centres of development of civilisation in Poland, being a modern region, open for cooperation with both Polish and foreign partners.

#### *Metal industry in the Province of Silesia*

The metal industry in the Silesian region is a showpiece of the Silesian economy. The sold production of the sections PKD 27-28 in the Province of Silesia makes a significant share in the domestic production of these sections (37%), as well as in the Silesian industry (25%).

The metal industry constitutes also a very important branch from the point of view of job generation. All in all, PKD sections 27-28 account for 26% share in the domestic employment in these sections and 16% in employment in the Silesian industry.

#### *Metal production*

The value of sold metals in the Silesian region in 2007 amounted to 27 billion PLN, which accounted for 18% of the industrial production in this region and 65% of metal production in Poland. In 2007, this sector developed by 13%. Employment in the metal production plants in the Silesian region in the year 2007 reached 36 thousand persons in almost two hundred companies, which accounted for 8% of the total employment in industrial production in this region and 52% of employment in metal production in Poland. In 2007, the employment in this sector grew by 1%.

#### *Manufacturing of metal products*

The value of sold metal products in the Silesian region in 2007 amounted to 11 billion PLN, which accounted for 7% of the total industrial production in this region and for 18% of manufacturing of metal products in Poland. In 2007, the sector developed at an annual pace of 30%. Employment in manufacturing of metal products in the Silesian region in 2007 was 37 thousand persons in almost one thousand companies, which accounted for 8% of employment in the industrial production in this region and 18% of employment in manufacturing of metal products in Poland. In 2007, the employment in this sector grew by 13%.

### Supporting framework

The metal sector in the Silesian region is supported by the technical education system, universities and research institutes. The most important – for the metal sector – are as follows:

- Silesian University of Technology,
- Faculty of Civil Engineering,
- Chair of Construction Engineering,
- Chair of Theory of Building Constructions,
- Chair of Building Constructions,
- Chair of Building Processes,
- Faculty of Mechanical Technology,
- Institute of Automation of Technological Processes and Integrated Manufacturing Processes,
- Institute of Engineering and Biomedical Materials,
- Chair of Welding Technology,
- Chair of Strength of Materials and Computer Aided Mechanics,
- Faculty of Material Engineering and Metallurgy,
- Chair of Metallurgy,
- Chair of Technology of Metal Alloys and Composites,
- Chair of Material Science,
- Institute of Iron Metallurgy,
- Institute of Non-ferrous Metals,
- Institute of Welding Technology,
- Institute of Building Technology,
- Institute of Ecology of Industrialised Areas.

Foreign investments in the Silesian region are directed mostly to the automotive industry – the Katowice Special Economic Zone has absorbed 60% of all capital outlays and 43% of employees.

In June 2009, 20 companies from the metal sector were active in the Katowice Special Economic Zone, 15 of them started already their manufacturing operations and the remaining five – are at various stages of their projects (construction, design). The companies from this sector have invested altogether above 880 million PLN and they employ more than 2.300 workers.

Eight companies among them are Polish companies, mostly small and medium size enterprises. The remaining twelve companies represent big companies with foreign capital.

### SWOT analysis

#### *Strengths:*

- significant position of the industry in the region and in the country,
- considerable direct foreign investments,
- well developed logistic network,
- easy access to semi-products – concentration of steel industry in Silesia,
- use of modern and innovative production processes,
- use of modern information technologies and infrastructure,

- high quality technical staff,
- long time professional experience,
- effective use of EU funds,
- representation of trade organisations,
- use of environmentally friendly technologies,
- wide range and flexibility of production/services,
- participation in trade fairs and conferences, also in the region.

*Weaknesses:*

- considerable impact on the environment,
- high cost of electric power,
- fragmentation of the sector,
- unfavourable image of the sector.

*Opportunities:*

- large consumers' market,
- well developed interregional and international cooperation,
- transit location of the Province of Silesia in the border zone along international transport and communication routes,
- second biggest in Poland scientific and educational centre,
- growing level of education,
- development of knowledge-based economy, research activities and interdisciplinary educational centres, as well as their financial support,
- work ethics,
- high concentration of well qualified scientific and technical human resources in the R&D sector,
- high level of financial outlays for R&D in enterprises in comparison with the average national figures,
- diversified structure of the economy,
- the largest in Poland power generation centre,
- significant development of the infrastructure (roads, airfields, stadiums),
- growing importance of the EU cohesion policy, availability of the structural funds earmarked for development of human resources,
- growing demand for innovative process engineering caused by implementation of climate package and emerging energy crisis,
- development of e-services and modern IT solutions,
- growing demand for high quality public spaces (order and aesthetics),
- cooperation within the framework of economic zones, clusters, incubators of entrepreneurship,
- easy access to exposition space (EXPO Silesia).

*Threats:*

- delays in implementation of the national program of motorways and expressways construction,
- fierce competition in the sector,
- slump caused by economic crisis in the global markets and connected with it reduction of foreign investments,

congestion in the transport system and incoherence of communication system, requiring constant improvements,  
 outflow of highly qualified human resources,  
 uneven access to education for inhabitants in towns and rural areas,  
 level of congress and fair facilities incompatible with European standards,  
 level of labour activity,  
 demographic trends (negative population growth, negative balance of migration, growing factor of society aging).

#### Outlook for the sector in Silesia

Development of the metal sector in the next years will be determined by development of infrastructure in our region (construction or modernisation of roads, extension of the airport, modernisation of the railway transport) and by development of the companies set up in the economic zones (including the dynamically growing automotive and machine sector).

According to the optimistic scenario, inflow of foreign investments to the Silesian region will remain at a high level and will stimulate development of the metal sector. The infrastructural projects already approved will not be abandoned.

According to the pessimistic scenario, because of the global crisis, prospective foreign investors will be less prone to invest in Poland and in the Silesian region. Delays in carrying out national and regional infrastructural projects entail treats which may cause a considerable drop in demand in the metal sector.

The report worked out by:

#### **Marshal Office of the Silesian Voivodeship**

Department of Economy

Tadeusz Adamski

Director

.....  
 Signature

#### **Polish Steel Association**

Romuald Talarek

Chairman

.....  
 Signature

#### **Regional Chamber of Commerce and Industry**

General information on the Province of  
 Silesia

The study concerning metalworking and  
 metal articles sector in Silesia Voivodeship

Coordination of the project



**in Katowice**

Tadeusz Donocik

President

.....  
Signature

**Translation office "Babel"**

Translation of the report

Witold Gorecki

### *ATTACHMENT*

(Data used for the report on metal sector in the Province of Silesia)

Statistical data relating to the Province of Silesia according to the classes which are within the groups 27.5, 28.1, 28.2, 28.3, 28.4, 28.5, 28.6, 28.7 of the classification:

PKD 2004 (Attachment 1):

altogether business units registered in the REGON system and according to the employment divisions:

0-9, 10-49, 50-249, 250-999, 1000 and more persons (state as of the end of the year),

persons employed according to the seat of the central office (state as of 31 December).

PKWiU 2004 (Attachment 2):

production manufactured industrial goods and value of sold products and services.

The following symbolic explanation marks were used in the report:

(-) – no occurrence,

# – means that the data cannot be given because of statistical secret according to the law on public statistics,

x – means that filling this point is impossible.

### Attachment 1

Group/class PKD 2004	Business units registered in the REGON system (state as of the end of the year)						Employees (state as of 31 December)
	total	0-9	10-49	50-249	250-999	Above 1000	
<b>27.5 Metal casting</b>	<b>135</b>	<b>78</b>	<b>36</b>	<b>15</b>	<b>6</b>	<b>-</b>	<b>4970</b>
27.51 Iron casting	52	26	15	7	4	-	2892
27.52 Steel casting	16	6	4	5	1	-	783
27.53 Light metals casting	35	24	10	-	1	-	949
27.54 Casting of other non-ferrous metals	32	22	7	3	-	-	346
<b>28.1 Production of metal construction elements</b>	<b>1445</b>	<b>1156</b>	<b>217</b>	<b>67</b>	<b>5</b>	<b>-</b>	<b>13469</b>
28.11 Production of metal constructions and their parts	986	751	172	59	4	-	11870
28.12 Production of metal elements of door and window joinery	459	405	45	8	1	-	1599
<b>28.2 Production of metal cisterns, containers and tanks; production of central heating radiators and boilers</b>	<b>211</b>	<b>176</b>	<b>28</b>	<b>4</b>	<b>3</b>	<b>-</b>	<b>2072</b>
28.21 Production of metal cisterns, tanks and containers	51	37	10	2	2	-	1097
28.22 Production of central heating radiators and boilers	160	139	18	2	1	-	975
<b>28.3 Production of steam generators</b>	<b>123</b>	<b>94</b>	<b>17</b>	<b>7</b>	<b>4</b>	<b>1</b>	<b>4880</b>

Group/class PKD 2004	Business units registered in the REGON system (state as of the end of the year)						Employees (state as of 31 December)
	total	0-9	10-49	50-249	250-999	Above 1000	
<b>with the exception of hot water central heating boilers</b>							
<b>28.4 Metal forging, pressing, drawing and rolling; powder metallurgy</b>	<b>159</b>	<b>141</b>	<b>11</b>	<b>6</b>	<b>1</b>	<b>-</b>	<b>2567</b>
<b>28.5 Metal processing and metal coating; machining of metal elements</b>	<b>3367</b>	<b>3138</b>	<b>199</b>	<b>28</b>	<b>2</b>	<b>-</b>	<b>7201</b>
28.51 Metal processing and metal coating	573	504	61	7	1	-	2264
28.52 Machining of metal elements	2794	2634	138	21	1	-	4937
<b>28.6 Produkcja wyrobów nożowniczych, narzędzi i wyrobów metalowych ogólnego przeznaczenia</b>	<b>285</b>	<b>247</b>	<b>25</b>	<b>13</b>	<b>-</b>	<b>-</b>	<b>2409</b>
28.61 Production of cutlery	29	29	-	-	-	-	-
28.62 Production of tools	136	106	21	9	-	-	1821
28.63 Production of locks and hinges	120	112	4	4	-	-	588
<b>28.7 Production of other finished metal goods</b>	<b>1490</b>	<b>1314</b>	<b>129</b>	<b>40</b>	<b>7</b>	<b>-</b>	<b>8845</b>
28.71 Production of	43	39	3	-	1	-	395

Group/class PKD 2004	Business units registered in the REGON system (state as of the end of the year)						Employees (state as of 31 December)
	total	0-9	10-49	50-249	250-999	Above 1000	
metal containers							
28.72 Production of packings made of light metals	9	3	4	2	-	-	350
28.73 Manufacturing of wire products	235	208	15	11	1	-	2202
28.74 Manufacturing of connectors, bolts, screws and springs	229	188	29	9	3	-	2944
28.75 Manufacturing of other finished metal goods not classified elsewhere	974	876	78	18	2	-	2954

## Attachment 2

Group/class PKWiU 2004	Manufactured industrial goods	Value of sold products and services
	<i>w tons</i>	<i>In thousand PLN</i>

Group/class PKWiU 2004	Manufactured industrial goods	Value of sold products and services
	<i>w tons</i>	<i>In thousand PLN</i>
<b>27.5 Foundry services</b>	#	#
27.51 Making iron castings	11831	58584,7
27.52 Making steel castings	7161	74126,8
27.53 Making light metal castings	4594	43287,0
27.54 Making castings from other non-ferrous metals	#	#
<b>28.1 Metal structures</b>	<b>739747</b>	<b>3613051,9</b>
28.11 Metal structures	726524	3346691,2
28.12 Metal elements of door and window joinery	13223	266360,7
<b>28.2 Metal cisterns, tanks and containers; radiators and central heating boilers</b>	<b>113885</b>	<b>838368,6</b>
28.21 Cisterns, tanks and containers made of cast iron, steel or aluminium	47914	396192,2
28.22 Central heating radiators and boilers	65971	442176,4
<b>28.3 Steam generators with the exclusion of central heating boilers</b>	<b>x</b>	<b>754379,3</b>
28.30 Steam generators with the exclusion of central heating boilers	x	754379,3
<b>28.4 Metal forging, pressing, drawing and rolling; services within the field of powder metallurgy</b>	<b>43544</b>	<b>494173,2</b>
28.40 Metal forging, pressing, drawing and rolling; services within the field of powder metallurgy	43544	494173,2
<b>28.5 Metal processing and metal coating; machining of metal elements</b>	<b>12536</b>	<b>1520825,1</b>
28.51 Metal processing and metal coating	-	711776,5
28.52 Machining of metal elements	12536	809048,6
<b>28.6 Cutlery, tools and small metal products for general use</b>	<b>#</b>	<b>#</b>
28.61 Cutlery	#	#

Group/class PKWiU 2004	Manufactured industrial goods	Value of sold products and services
	<i>w tons</i>	<i>In thousand PLN</i>
28.62 Tools	10316	285316,2
28.63 Locks and hinges	3650	102774,6
<b>28.7 Other finished metal products</b>	#	#
28.71 Metal containers	#	#
28.72 Packings made of light metals	2806	92933,6
28.73 Wires and wire products	68526	416519,0
28.74 Connecting element, bolts and screws, chains and springs	66505	492056,4
28.75 Other finished metal products, not classified elsewhere	320464	1701086,2

## Appendix 3

### Notes for framework grid

- i Directive 2004/40/EC of the European Parliament and of the Council of 29 April 2004 on the minimum health and safety requirements regarding the **exposure of workers** to the risks arising from **physical agents** (electromagnetic fields) and Directive 2008/46/EC of the European Parliament and of the Council of 23 April 2008 amending Directive 2004/40/EC in order to postpone its application with four years until 2012.
- ii Council Regulation (EC) NO 1420/2007 of 4 December 2007 imposing a definitive anti-dumping duty on imports of silico-manganese originating in the People's Republic of China and Kazakhstan and terminating the proceeding on imports of silico-manganese originating in Ukraine.
- iii Importance is attenuated by the fact that this is a proposition, not a condition already in place.
- iv Directive 97/23/EC of the European Parliament and of the Council of 29 May 1997 on the approximation of laws of the Member States concerning **pressure equipment**.
- v Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to **construction products**.
- vi Directive 98/37/EC of the European Parliament and of the Council of 22 June 1998 on the approximation of the laws of the Member States relating to **machinery**.  
This applies to machinery; interchangeable equipment; safety components; lifting accessories; chains, ropes and webbing; removable mechanical transmission devices; partly completed machinery but not to electrical and electronic products; safety components intended to be used as spare parts to replace identical components and supplied by the manufacturer of the original machinery and machinery specially designed or put into service for nuclear purposes which, in the event of failure, may result in an emission of radioactivity.
- vii Regulation (EC) No 1935/2004 of the European Parliament and of the Council of 27 October 2004 on **materials and articles intended to come into contact with food**.

- vii Commission Regulation (EC) No 772/2004 of 27 April 2004 on the application of Article 81(3) of the Treaty to categories of **technology transfer** agreements. Exemptions are based on a **market share approach**. When the market share passes a threshold (depending on whether the firms of the agreement are competitors or not), the agreement is no longer exempted.
- ix Directive 98/71/EC of the European Parliament and of the Council of 13 October 1998: **design protection**.
- x Of growing importance, since design is more and more a service requested by consumer industries and delivered by MMA industries.
- xi Proposal for a Directive of the European Parliament and of the Council amending Directive 98/71/EC on the legal **protection of designs** - COM(2004) 582 final. This applies only to **spare parts** to restore the appearance of the product, not for parts used in the assembly of new products.
- xii Directive 2004/48/EC of the European Parliament and of the Council of 29 April 2004: **enforcement of intellectual property rights**.
- xiii Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain **hazardous substances in electrical and electronic equipment** (RoHS) and Directive 2008/35/EC of the European Parliament and of the Council of 11 March 2008 amending Directive 2002/95/EC as regards the implementing powers conferred on the Commission.
- xiv Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on **waste electrical and electronic equipment** (WEEE) and Directive 2008/34/EC of the European Parliament and of the Council of 11 March 2008 amending Directive 2002/96/EC as regards the implementing powers conferred on the Commission.
- xv Directive 94/62/EC of 20 December 1994 on **packaging and packaging waste** – recycling, reusing, recovering. Has the aim of preventing packaging waste and stimulating recycling of this waste.
- xvi Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the **energy performance of buildings**. This Directive is a follow-up to the measures on boilers (92/42/EEC), construction products (89/106/EEC) and SAVE programme provisions on buildings.
- xvii Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of **ecodesign** requirements for energy-using products. This Directive aims to increase energy efficiency and the level of environmental protection while increasing the security of energy supply. It applies to all sectors producing products which use energy, yet only for those products that meet certain criteria such as environmental impact and the volume of trade in the internal market and where a clear potential for improvement is perceived. One specific implementing measure is Directive 92/42/EEC of 21 May 1992 on efficiency



requirements for new **hot-water boilers** fired with liquid or gaseous fuels (amended by Directive 93/68/EEC, Directive 2004/8/EC and Directive 2005/32/EC).

- xviii Of growing importance, as emphasized by EU policy directions towards ecological production and product life cycles.
- xix Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control (**IPPC**).
- xx Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for **greenhouse gas emission allowance trading** within the Community. This Directive aims at reducing CO<sub>2</sub> emissions as agreed in the Kyoto Protocol.
- xxi Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (**REACH**), establishing a European Chemicals Agency. REACH aims at improving the protection of human health and the environment, while maintaining the competitiveness and enhancing the innovative capacity of the EU chemicals industry.
- xxii REACH has an important impact, but there are also many exemptions for ores, recycled waste and for transforming industries e.g. producers/importers only have to register substances intentionally released from articles or present in articles but with high concern; unless these substances were already registered for this use.
- xxiii Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on **general product safety**. It is horizontal legislation, applying to all sectors, for as far as there are no individual product regulations installed.

## Appendix 4

### Notes for cluster studies

#### *Sources*

##### Basque country, Spain

#### *Interviews*

Interview and written input from Joseba Sainz de Baranda from Federación Vizcaína de Empresas del Metal WSM

#### *Desk research*

<http://www.isc.hbs.edu/CAON%20Basque%20Country%2004-17-02%20CK2.pdf>

<http://www.basques.euskadi.net/t32-7413/en/>

<http://www.enovatinglab.com/doc/libros/techint.pdf>

<http://www.fatronik.com/>

<http://www.imh.es/>

<http://www.camaradealava.com/subcontratacion/estudiopaisvasco03.pdf>

#### *Companies*

<http://www.caf.net/ingles/home/index.php>

<http://www.tecnichapa.com/en/index.php>

<http://www.cieautomotive.com/>

##### Brescia, Italy

#### **Sources**

Interview with Davide Fedregghini, AIB

Web pages of companies and research institutions

##### Flanders, Belgium

#### **Sources**

Interview with Peter Perremans, Agoria.be

[www.agoria.be](http://www.agoria.be)

##### Lithuania

#### **Sources**

Henrikas Mykolaitis, Linpra

Websites of companies

Website of Linpra.lt

##### Pays de la Loire (Draft – not validated)

#### **Sources**

<http://www.paysdelaloire.eu/>

<http://www.frenchentree.com/business-in-western-france/DisplayArticle.asp?ID=39168>  
<http://www.pole-emc2.fr/>

#### [Silesia, Poland](#)

##### **Sources**

Written input from the Polish Steel Association – HUTNICZA IZBA PRZEMYSŁOWO-HANDLOWA, HIPH  
[www.ksse.com.pl](http://www.ksse.com.pl)  
Statistical Office of Katowice

#### [South Westphalia, Germany](#)

##### **Sources**

Interview with Hauptgeschäftsführer Dr. Andreas Möhlenkamp, WSM  
Wirtschaftsverband Stahl-und Metallverarbeitung e.V  
Written input and information from Hauptgeschäftsführer Werner Sülberg, Märkischer Arbeitgeberverband e. V. [www.mav-net.de](http://www.mav-net.de)

##### **Webpages**

<http://www.suedwestfalen-invest.de/Fields-of-competence.792+M52087573ab0.0.html>  
[http://www.standort-hellweg.de/fileadmin/user\\_upload/Dateien/Region/Suedwestfalen/Prognos-Gutachten\\_Suedwestfalen.pdf](http://www.standort-hellweg.de/fileadmin/user_upload/Dateien/Region/Suedwestfalen/Prognos-Gutachten_Suedwestfalen.pdf)  
WSM Wirtschaftsverband Stahl- und Metallverarbeitung e. V. [www.wsm-net.de](http://www.wsm-net.de)  
<http://www3.fh-swf.de/foreign/english.htm>  
<http://www.nemas-sw.de/>  
[www.automotive-sw.de](http://www.automotive-sw.de)  
[http://www.nrwinvest.com/Publications/NI\\_PrognosStudie\\_e\\_v7.pdf](http://www.nrwinvest.com/Publications/NI_PrognosStudie_e_v7.pdf)

#### [Vorarlberg, Austria](#)

##### **Sources:**

Interview and written input with Sebastian Manhart at V.E.M.  
Web-pages for V.E.M. and local companies  
Krichmayr, Martina, Social partners: Collective bargaining in Austria

#### [Valencia, Spain](#)

##### **Sources:**

FEMEVAL. <http://www.femeval.es/>  
Web pages of companies

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