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European Competitiveness Report 2010

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**An integrated Industrial Policy for the Globalisation Era
Putting Competitiveness and Sustainability at Front Stage**

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COMMISSION STAFF WORKING DOCUMENT

European Competitiveness Report 2010

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5. INNOVATION AND COMPETITIVENESS OF THE CREATIVE INDUSTRIES IN THE EU

5.1. Introduction

Broadly speaking, the creative industries comprise activities 'at the crossroads between arts, business and technology' and produce 'symbolic products with a heavy reliance on intellectual property' (UNCTAD, 2004, p. 4). In European countries, the term 'creative industries' was first introduced by the UK's Department of Culture, Media and Sport (DCMS) in 1998, to denote 'those industries that have their origin in individual creativity, skill, and talent and that have a potential for wealth and job creation through the generation and exploitation of intellectual property' (DCMS, 1998, 2001). The significant size of the creative industries and the fast rate at which it has grown over the last two decades has aroused considerable interest among policymakers at national, regional, and international levels, in particular among those concerned with urban planning, regional development, labour market and education policies and, more recently, innovation policy (Caves, 2000; Hesmondhalgh, 2007; Landry, 2000; Stoneman, 2010 and Miles and Green, 2008).

While the term 'creative industries' has been commonly used in EU countries for more than a decade, in the US the focus has been more on creative knowledge workers or the 'creative class' as it is labelled by Florida (2002). Creative workers such as engineers, scientists, architects, artists and writers generate ideas and knowledge and are seen as the driving force behind regional growth. Creative industries do not have a monopoly on creative occupations: creative workers can also be found in other skill-intensive manufacturing or business services activities. In the related literature, the growth effects of creative industries and the creative workforce and their role in the wider economy are subjects of intensive debate.

The growth of the creative industries is driven by various trends (UNCTAD, 2008): reduced working time (more leisure), improved education, and growing real income have all triggered changes in preferences, resulting in increased demand for goods and services with creative, cultural, and artistic content. Areas like film, music, performing arts, and lifestyle products are the predictable beneficiaries of these trends, all of which have direct consequences on the overall contribution of the sector to national employment and GDP. In addition, new technologies — especially innovations in information and communication technologies (ICT) — have had a massive impact on many creative industry segments and contributed to the rapid growth of software and multimedia services. ICT and the internet are leading to new forms of distribution, more choices for consumers, and a more efficient production process. However, it has also initiated the profound ongoing restructuring of the traditional publishing and media industry. Furthermore, firms in the creative industries are increasingly being regarded not merely as users of new technologies that trigger demand for innovative solutions, but also as a source of innovative ideas and services (e.g. images, design, and symbols).

While there is a widespread perception that creative industries comprise a highly diverse set of economic activities, they are also often seen to have a number of common characteristics. Most of the firms are small (employing fewer than 10 people) and most of the workers are highly-skilled self-employed professionals. In addition, many people within the creative industries work part-time and/or have temporary contracts. Creative industries also often feature a high degree of networking, intensive supply-chain and other inter-firm linkages, and are concentrated in major cities, in many cases organised in regional clusters. Regional

authorities can play an important role as facilitators and catalysts of such clusters in order to boost their competitiveness.

The main objective of this report is to provide a comprehensive picture of the innovation performance and competitiveness of the creative industries, along with their relative size and economic performance in the EU-27 countries. In doing so, it explores the growth drivers of the creative industries as well as their economic impact on the wider economy. This impact (Chartrand, 1984; Heng and Choo, 2003 and Potts and Cunningham, 2008) is summarised in Figure 5.1 The study looks at four main types of impact: primary, secondary, tertiary and quaternary. The 'primary' economic impact of the creative industries refers to their direct contribution to the economy — usually in terms of employment and some output measure, such as value added or exports. 'Secondary' economic impact involves spillovers into the wider economy as a result of economic activity in the creative industries. For instance, those creative industries' segments which produce intermediate inputs for other sectors rather than final products (such as graphics and design) are expected to profit from enterprises' growing efforts to establish dedicated brands and enhance brand recognition. Secondary impacts can be assessed by investigating how important the creative industries are in stimulating (i) regional growth through regional spillovers and (ii) demand in other sectors of the economy through sectoral spillovers. 'Tertiary' economic impact, meanwhile, embraces the direct, but less quantifiable contributions of the creative industries to innovation. It addresses the question of how innovative the creative industries are and how they make other sectors innovative. This report touches only briefly on the 'quaternary' economic impact of the creative industries, examining such aspects as the creative industries' role in improving quality of life, maintaining and/or restoring a sense of cultural identity and realising a wide range of other societal objectives. These indirect and non-quantifiable contributions of the creative industries are referred to only in the policy conclusions. Finally, the last section explores the scope and opportunities for policy intervention.

Figure 5.1: Economic impacts of the Creative industries: Structure of the report
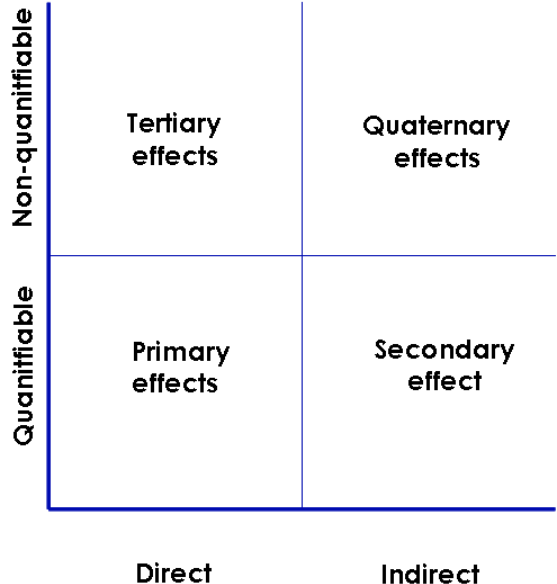
Source: WIFO (2010) based on Chartrand (1984).

This four-part framework, where the three first elements are of an economic nature, provides a basis on which to answer a number of questions about competitiveness and innovation in the creative industries:

- What is the relative size of the sector and its evolution over time in terms of employment, value added and exports?

- How and to what extent is the current recession affecting the creative industries?

- What do the different creative industries have in common? How do they differ?

- To what extent are creative industries and the creative workforce spatially clustered and what are the underlying factors?

- How innovative are firms in the selected creative industries in terms of technological innovations as compared to firms in other industries? Which sources of knowledge and innovation partners are most relevant for the innovation process?

- What characterises urban areas and regions with a high population share of creative individuals? Do these regions exhibit high levels of growth?

- To what extent do creative industries contribute to innovation in the wider economy? What contribution do design innovations make to firms in non-creative industries?

- What is the role of government in supporting and promoting the creative industries?

This study complements the work undertaken by Power and Nielsén (2010) and KEA (2006) in a number of ways. Firstly, different concepts of creativity (i.e. both creative industries and the creative workforce) are considered, and different data sources are used (EU labour force survey at the individual level, structural business statistics, and the firm-level AMADEUS firm level database). Secondly, new evidence is provided on the growth effects of the creative industries at regional level, as well as on the drivers of the creative industries.

5.2. Stylised facts on the creative industries in the EU

5.2.1. Definition of the creative industries

Creative industries have their origin in individual creativity, skill, and talent and have a potential for wealth and job creation through the generation and exploitation of intellectual property' (UK Department of Culture Media and Sport (DCMS), 1998). As noted by Cunningham (2001), the 'creative industries' concept embraced activities from the new economy era that were not included in the 'art', 'media' or 'culture' concepts. While creative industries link creative content to job and wealth creation, cultural industries are not first and foremost defined by their business value. According to UNESCO, cultural activities correspond 'to those activities, goods and services, which at the time they are considered as a specific attribute, use or purpose, embody or convey cultural expressions, irrespective of the commercial value they may have'[1]. Dealing with creative industries is therefore not exactly the same as dealing with cultural industries. Cultural industries are considered by some as an 'adjunct' of the creative sectors and vice versa. While the scope here is limited to creative industries, the broader perspective taken by the European Commission Green Paper (European Commission, 2010) includes both creative and cultural industries, therefore reconciling both economic and cultural objectives.

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[1] http://portal.unesco.org/culture/en/ev.php-URL_ID=33232&URL_DO=DO_TOPIC&URL_SECTION=201.html.

In practice, the sectors encompassed in these two concepts are quite similar. Creative industries include business market services that are not usually considered 'cultural' such as architecture, advertising, design, fashion and software services. Besides, creative industries, as defined by DCMS, do not include non-profit activities. If one takes a statistical approach and sums up the various sub-sectors included in these different concepts, the aggregates are very similar. In practice, economic policy rationales tend to dominate in the case of creative industries while cultural policies tend to prevail for cultural industries. Indeed, the survey of policy rationales among policymakers at national level in the 27 Member States reveals that cultural objectives rank below economic policy rationales when they deal with creative industries.

The statistical definition of 'the creative industries' applied here is based on the definition developed by the UK Department of Culture Media and Sport (DCMS). A number of reasons led to using this definition. The DCMS definition enjoys a first-mover advantage; it is well known and broadly acknowledged world-wide. Moreover, the statistical definition of an industry will always remain ill-defined if its conceptual foundations are too broad.

In future, the work of Eurostat will serve the purpose of sharing commonly agreed definitions. A network of several ESS (European Statistical Systems) (ESSnet-culture) was set up in 2009 at Eurostat[2] to further coordinate the harmonisation of statistics on cultural and creative activities.

Once translated into industrial classifications NACE rev. 2 and NACE rev. 1.1, the primary impact of creative industries (their share in the EU economy) can be estimated. The exact choice of sectors is detailed in Table 5.1 (NACE rev. 2) below and in Table A.1 (NACE rev. 1.1) in the Appendix. As will be explained later, the definitions are most sensitive to whether software is included or not, as this sector greatly influences the growth of creative industries.

Table 5.1: Definition of the creative industries (according to NACE Rev.2)

	NACE Rev. 2	Description	Proportion of code taken
Information services	J58	Publishing activities (publishing of books, periodicals and software publishing), motion picture, video and television programme production,	1.00
		Sound recording and music publishing activities	1.00
	J60	Programming and broadcasting activities	1.00
	J62	Computer programming, consultancy and related activities	1.00
Business services	M711	Architectural and engineering activities and related technical consultancy	0.25
	M731	Advertising	1.00
	M741	Specialised design activities	1.00
	M742	Photographic activities	0.25
	M743	Translation and interpretation activities	1.00
Art and entertainment	R90	Creative, arts and entertainment activities	1.00

Source: Söndermann (2009). Wilkinson (2007, p. 33).

5.2.2. *Size and evolution of the creative industries in the EU*

The creative industries account for 3.0 per cent of total employment (2008) and 3.3 per cent of GDP (2006). The number of employees in the creative industries in the EU-27 was 6.7 million in 2008 (based on the NACE Rev. 2). The corresponding employment shares for EU-15 and EU-11 (EU-12 excluding Malta) are 3.2 and 2.0 per cent, respectively (Figure 5.2). In terms of exports, creative goods account for 4.3 per cent of the EU-27's external exports.

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[2] http://ec.europa.eu/culture/our-policy-development/doc1577_en.htm.

Figure 5.2: Employment share of the creative industries in the EU and USA in 2008 (in percent)
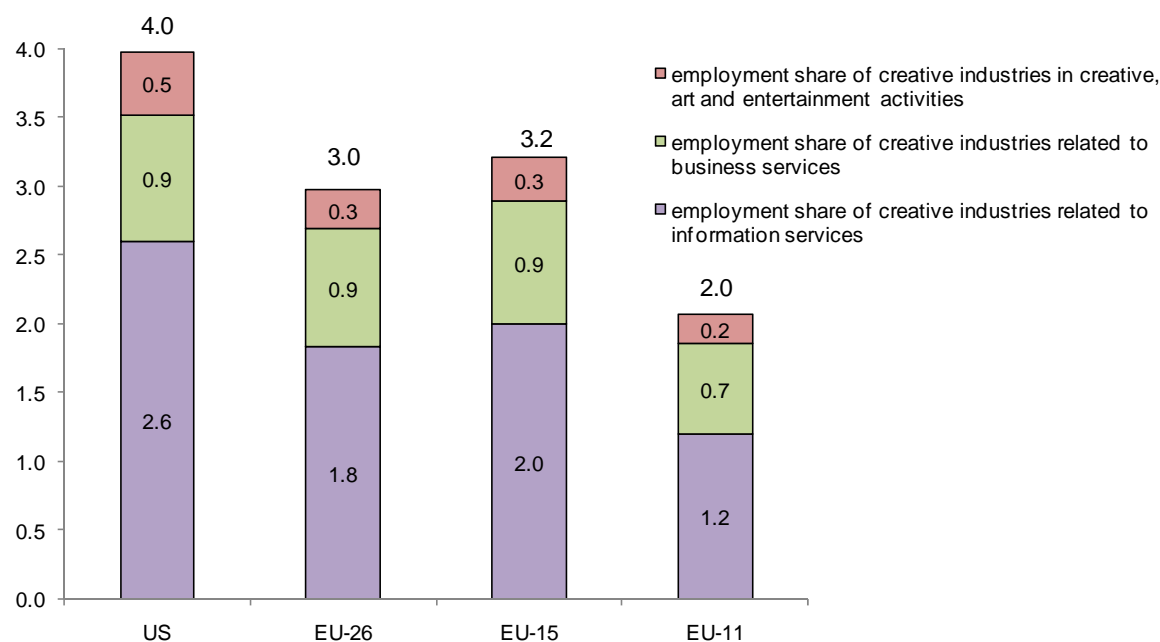
Note: EU-11 and EU-26 respectively represent the latest countries that joined the EU and all the EU member states except Cyprus in both cases. Data for the EU are based on NACE Rev. 2. US data are based on NAICS. Employment in architecture and photographic activities is weighted by 0.25.

Source: SBS, New Cronos, US Bureau of Labour Statistics.

Figure 5.2 also shows that, in the EU-26, creative industries related to information services accounted for the bulk of total employment in the creative industries in 2008 (62 per cent, or 1.8 per cent of all EU-26 employment)[3]. Creative industries in professional services represented 29 per cent of total employment, and the remaining group — creative, arts and entertainment activities — accounted for 10 per cent. In the US, the employment share of the creative industries was 4.0 per cent in 2008, based on BLS data and a very similar definition of the creative industries (Figure 5.2). The employment share of the creative industries is sensitive to the definition applied. When both architecture and photographic activities are fully incorporated into the classification of industries, it amounts to 3.9 per cent in the EU-27, 4.2 per cent in the EU-15 and 4.7 per cent in the US. The reason for the difference in the size of the employment share of the creative industries between the US and EU lies in their disparate structure: the US has a larger share of audiovisual and computer software sector activities as compared to both the EU-15 and the EU-27.

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[3]   EU-26 is defined as EU-27 excluding Malta.

**Figure 5.3: Evolution of employment in the creative industries**
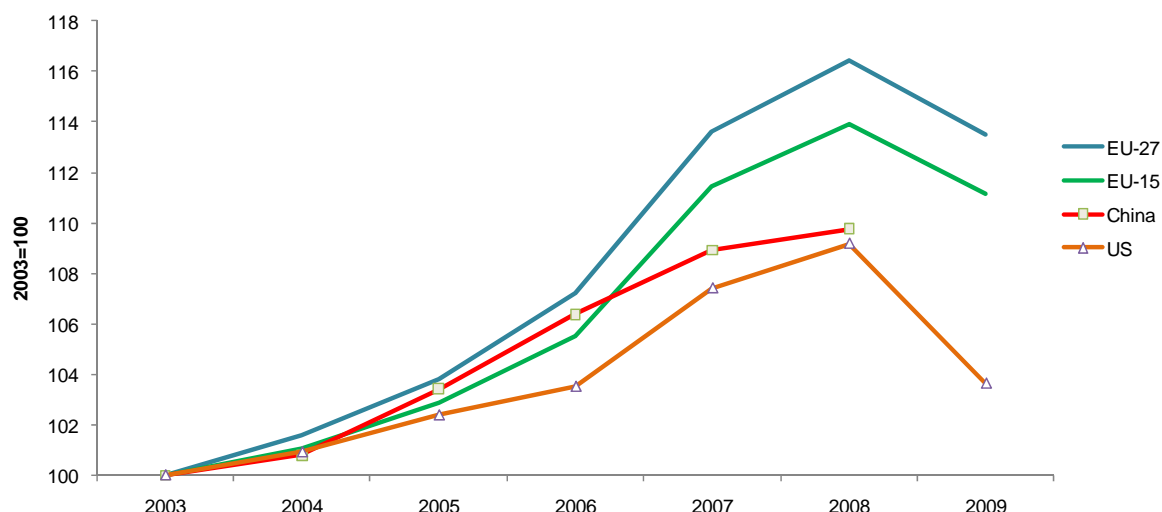
Note: For the EU-15 and the EU-27, data are extrapolated from 2008 onwards based on short-term business statistics containing information on the evolution of labour input for publishing, motion pictures, video and television programme production, sound recording and music publishing activities, programming and broadcasting activities, computer programming, consulting, and related activities. Employment data for architectural and engineering activities, technical testing and analysis, and advertising and market research are interpolated based on the evolution of turnover in constant prices and an output elasticity of 0.5.

Source: SBS, New Cronos, U.S. Bureau of Labour Statistics, Chinese Statistical Yearbook (various issues).

Between 2000 and 2007, employment in the creative industries grew by an average of 3.5 per cent per annum, compared to 1 per cent in the overall EU-27 economy. In the US and China the creative industries also grew quickly, averaging employment growth rates of 1.8 and 1.9 per cent per annum, respectively (Figure 5.3).

However, employment growth in the creative industries varied greatly from one subsector to another. While software consulting and supply showed the highest employment growth of all sub-industries (+5.4 per cent on average since 2000), publishing did not grow much at all (Figure 5.4). The audiovisual sector (including media, arts, and entertainment) and architecture also grew faster than overall employment in the EU-27. In the US the fastest-growing creative industries are architectural and engineering services, computer services, radio and television, broadcasting and internet publishing, independent artists and performing arts (excluding spectator sports).

**Figure 5.4: Average annual employment growth of the creative industries
in the EU by sub-sector, 2000-2007 (in percent)**
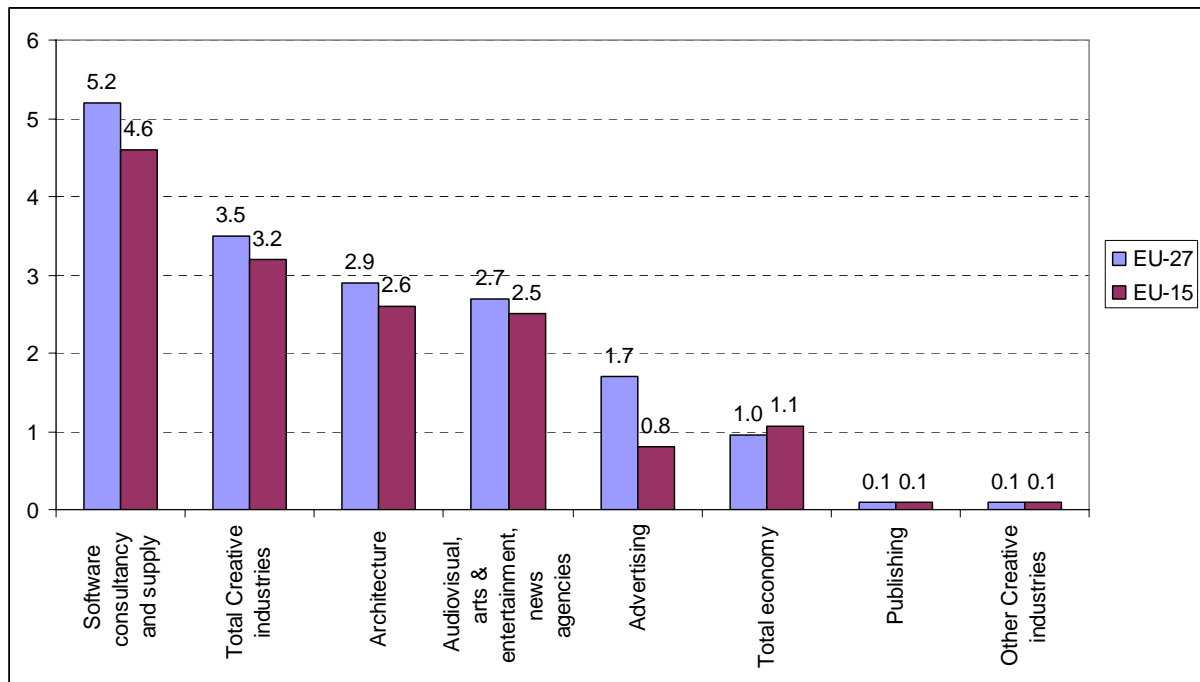
Source: SBS, New Cronos.

The source of employment growth in the creative industries is concentrated in a handful of sub-sectors. A breakdown of the figures shows that software consulting and supply accounts for more than half the employment growth in creative industries in the EU-27 in the period 2000–2007 (Figure A.1 in the Appendix). As can be seen, advertising is most sensitive to variations in the business cycle. Recent research for the UK also suggests that the rapid growth of the creative industries varies greatly from one firm to another. In particular, NESTA analysis with the Economic Research Institute of Northern Ireland (ERINI) and Aston University suggests that just 7.5 per cent of 'high-growth' businesses accounted for the overall employment growth in the creative industries in 2005 to 2008. Software, computer games, and electronic publishing companies accounted for 45.3 per cent of all these high-growth creative businesses.

The short-term structural business statistics allow for a more detailed examination of the creative industries' growth by subgroup at the NACE Rev. 2 level. The data for the EU-27 suggest that this strong growth is not limited to software consulting and supply; it also includes activities in motion pictures, video and television programme production, sound recording, and music publishing, which averaged an employment growth rate of 1.9 per cent per year between 2000 and 2008. However, employment in programming and broadcasting activities increased by less than the average of the creative industries at large.

With respect to the structure of the creative industries classified at the NACE Rev. 2, it can be seen that in the EU-27 the largest sub-sector is computer programming and consulting, accounting for 37 per cent of total employment in the creative industries in 2008. Advertising services is also an important sector, with 15 per cent in the same year. The employment share of activities in motion pictures, video and television production, sound recording, and music publishing activities was 6.2 per cent. Specialised design activities — introduced in NACE

Rev. 2 for the first time — account for 2.5 per cent (Table A.2 in the Appendix). Programming and broadcasting activities have a share of 3.3 per cent.

The increasing importance of the creative economy also becomes evident when its growth is measured in terms of creative occupations. 'Creative occupations' is a broader concept than 'creative industries'. It embraces the professions that are 'creative' in essence, no matter whether they belong to the so-called 'creative industries'. Table 5.2 details the occupations considered 'creative': engineers, architects, writers, creative and performing artists and artistic and entertainment professionals, etc. These 'knowledge workers' produce intangible assets such as ideas, knowledge, and information that increase firms' value added. A large number of creative occupations are embedded outside the creative industries. In the EU-15 in 2008, 62 per cent of creative occupations were in sectors other than information and communication services, professional, scientific, and technical activities and the arts, entertainment, and recreation.

Table 5.2: Evolution of the core creative occupations between 2002 and 2008

		EU -15			EU-7		
		Persons employed in 1000s		Average annual growth rate	Persons employed in 1000s		Average annual growth rate
		2002	2008	per cent	2002	2008	per cent
211	Physicists, chemists and related professionals	260	287	1.6	23	31	4.7
212	Mathematicians, statisticians and related professionals	37	47	4.0	8	8	1.7
213	Computing professionals	1 528	1 845	3.2	84	124	6.8
214	Architects, engineers & related professionals	3 088	3 724	3.2	186	219	2.8
221	Life science professionals	332	298	-1.8	25	33	4.8
222	Health professionals	1 769	1 978	1.9	129	150	2.6
243	Archivists, librarians & related information prof.	198	193	-0.5	24	29	3.3
244	Social science & related professionals	1 057	1 413	5.0	98	116	2.9
245	Writers and creative or performing artists	1 016	1 175	2.5	73	85	2.7
347+521	Artistic, entertainment & sports assoc.	897	1 250	5.7	46	60	4.5
	total creative occupations	10 183	12 211	3.1	695	856	3.5
	employment share of the creative occupations	6.6	7.7		5.2	6.0	

Note: EU-7 includes CY, CZ, EE, HU, LT, LV and SK. In the individual anonymised data of the EU Labour Force Survey for SI, PL and BG there is no information on ISCO 88 at the three digit level. ISCO corresponds to International Standard Classification of Occupations. In addition, for RO there is no data on ISCO 88 at the 3 digit level before 2005. Creative occupations include physical, mathematical and engineering science professionals, life science professionals, health professionals (except nursing), archivists, librarians and related information professionals, social science and related professionals, writers and creative or performing artists, artistic, entertainment and sports associate professionals and fashion and other models.

Source: EULFS, WIFO calculations.

Calculations based on the EU LFS for the EU-15 show that the core creative occupations grew by an average of 3.1 per cent per year between 2002 and 2008 (see Table 5.2). The corresponding employment share of the core creative occupations increased from 6.6 to 7.7 per cent of persons employed in the EU-15 during the same period (Table 5.2). The highest employment growth can be observed for artistic and entertainment professionals– averaging 5.7 per cent per year — followed by social science and related professionals (5.0 per cent), mathematical and statistical professionals (4.0 per cent), computing professionals (3.2 per cent), and engineers and architects (3.2 per cent). Similar trends can be observed through an aggregate of new member states.

5.2.3. Drivers of the creative industries

A number of demand and supply factors have contributed to the rise of the creative industries. Key drivers of the creative economy include innovation, information and communication technologies, talent, and skills. Other factors include wealth (i.e. GDP per capita), leisure time

and disposable household income, macroeconomic performance, and the initial level of the creative industry in the economy.

Well-educated and skilled workers are the key resource in the creative economy. Indeed, evidence based on the EU labour force survey of 26 EU countries shows that the workforce in the creative industries has the highest proportion of persons with tertiary education (The International Standard Classification of Education - ISCED levels 5 and 6). In the EU-26 in 2008, information services (NACE Rev. 2 J, of which the associated creative industries account for more than 70 per cent of industry employment) is the sector of the EU economy with the third-largest share of workers with tertiary education (behind the education sector and professional, scientific and technical activities), boasting more than 50 per cent compared to 26 per cent for the total EU economy[4]. Similarly, creative, arts and entertainment activities and the business-led creative industries (i.e. architecture, advertising, design, and so on) are characterised by significantly higher skill intensity than the rest of the economy. In the EU-26 in 2008, professional, scientific and technical activities and arts, entertainment, and recreation (of which the associated creative industries represent a significant part) had a tertiary education share of 57 and 35 per cent, respectively.

Other supply-side factors include the rapid advance of digital technologies, the globalisation of networks, and the de-regulation of media. The internet has created new distribution channels and business models. For instance, the rise in online advertising has changed the entire advertising industry, leading to declining sales for traditional advertising media. In four out of 15 EU countries, the share of online advertising is already about 20 or more per cent (IAB Europe, 2009). A recent study on the European software industry revealed that the rapid growth of online advertising is being driven by the growth of the worldwide online population, broadband access development, and an increase in time spent online (Pierre Audoin Consultants SAS (PAC), 2009). A recent JRC-IPTS study on videogames yields similar results (De Prato and al, 2010). The shift to digitisation, as well as the increase in broadband access, have decreased the cost of media distribution, in particular for recorded music and films. In recent years, digital distribution of recorded music and other media via the internet has created a whole new business model (Stoneman, 2010). Global digital music sales are growing rapidly, whereas physical music sales have fallen in the last five years (IFPI, 2009). Recent unpublished data show that in the UK, revenues from digital sales outstripped physical sales for the first time in 2009.

Correlations based on aggregate country data find a strong relationship between broadband penetration and the size of the creative industries (with a correlation of 0.80 for 27 EU countries in 2008). In addition, there is a significant correlation between the increase in broadband penetration and the increase in the employment share of creative industries across the EU countries. However, the EU-15 is lagging behind both the US and Japan in digital music distribution. In the EU-15 the share of digital music in retail sales is estimated at 12 per cent for 2009, compared to 33 per cent in the US and 19 per cent in Japan according to the IFPI (International Federation of Phonographic Industries). Similarly, the EU is well behind the US in both online advertising and the deployment of ultra-high broadband (IAB Europe, 2009).

The demand-side factors include the increase in available leisure time and disposable household income (Andari et al., 2007). Available empirical evidence for nine EU countries reveals that spending on cultural services increased from 1.0 to 1.3 per cent of GDP between

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[4]   Calculations are based on the EU Labour Force Survey 2008 where all numbers are weighted to reflect the total population of persons employed.

1999 and 2005[5]. It is worth noting that cultural services include license fees for television equipment and subscriptions to television networks. Similarly, household spending on communication increased steadily due to rising expenditure on internet connection services. In 2005, spending on cultural services surpassed traditional media (i.e. books and newspapers) in the same eight countries. Between 1998 and 2005 there was even a decline in household consumption of these products, further indicating that internet media are replacing traditional media. Similar trends can be observed in the structure of US household consumption spending (Beyers, 2008).

Another explanation of the fast growth of the creative industries in the EU is that a number of less advanced EU countries are starting to catch up with the more developed Member States. In fact, empirical evidence shows that EU countries with a low initial employment share in creative industries exhibited a significantly stronger increase in the same employment share between 2000 and 2007 (with a correlation of -0.45). This relationship remains robust and highly significant when software consultancy and supply is excluded from the creative industries. Macroeconomic growth also explains the rapid increase in the overall share of the creative industries. EU countries with high growth rates experienced a higher-than-average increase in their employment share in creative industries.

Besides, creative industries are very dependent on business cycles. There are various reasons why creative industries have been affected more severely by the recession than other sectors. Firstly, falling consumer spending is expected to have a large impact on those industries that sell a large portion of their output to final demand (i.e. end-users), such as arts and entertainment and the audiovisual sector. It is well known that decreases in consumer spending have a high impact on creative goods and services characterised by high income elasticity, such as opera tickets and other luxury items. Secondly, creative industries are affected indirectly as a result of intensive supply-chain linkages to other sectors. This particularly concerns creative industries that have a large number of business-to-business transactions with industries that are badly affected by recession.

Available evidence for the EU-27 shows that, in each of the creative industries, turnover (in current prices) and labour decreased in 2009 for the first time in the last 10 years. Advertising saw the strongest decrease between 2008 and 2009 (approximately 12.4 per cent, see Table 5.3). It is obvious that the decline was caused by intensive supply-chain linkages to other sectors of the economy that have been hit hardest. Most firms have cut their advertising budgets during the recessionary period. Publishing turnover decreased by 6.8 per cent, while computer programming/consulting and architecture were less affected (a 5.0 per cent decline).

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[5]   The nine EU countries are Belgium, Greece, Spain, France, Italy, Luxembourg, the Netherlands, Portugal, and the United Kingdom.

Table 5.3: Annual change in turnover in current prices and labour input in 2008 and 2009 (in per cent)

	EU-15		EU-27	
	Change in turnover in current prices in per cent			
	2008	2009	2008	2009
Total services (except retail trade and repair)	5.2	-9.8	5.5	-9.9
Publishing activities	0.6	-6.7	0.9	-6.8
Motion picture, video and television programme production, sound recording and music publishing activities	4.4	-3.9	4.3	-3.9
Programming and broadcasting activities	0.7	-7.0	1.6	-8.2
Computer programming, consultancy and related activities	4.4	-5.5	4.9	-5.0
Architectural and engineering activities; technical testing	7.1	-5.5	7.7	-5.0
Advertising and market research	0.6	-12.6	2.6	-12.4
	Change in labour input in per cent			
	2008	2009	2008	2009
Total services (except retail trade and repair)	1.3	-3.2	1.7	-3.3
Publishing activities	0.0	-4.0	0.2	-3.2
Motion picture, video and television programme production, sound recording and music publishing activities	1.4	-3.5	0.8	-5.7
Programming and broadcasting activities	0.6	-0.9	0.4	-3.5
Computer programming, consultancy and related activities	4.3	0.1	4.5	0.3

Source: SBS, New Cronos.

The number of employees (measured by the labour index) also decreased, with the exception of computer programming and consulting, where employment was stable in 2009. The explanation for this pro-cyclical behaviour lies in the labour hoarding of skilled workers. For the arts, entertainment, and recreation sector there is no information on turnover on a regular basis. Available evidence for France suggests that the output (in current prices) of this sector decreased only moderately, showing declines of between 3.7 per cent for performing arts and 5.0 per cent for artistic creation. Turnover in the operation of arts facilities even increased between 2008 and 2009 (Table A.3 in the Appendix).

5.2.4. Industry and labour market characteristics

Creative industries are dominated by a large number of micro firms (with nine or fewer employees, including one-person firms). Based on the Eurostat SBS data for the EU-22, 95 per cent of the 1.2 million firms in the core creative industries employ fewer than 10 people (Table 5.4). This share is much higher than that of manufacturing industries (80 per cent). However, the share of micro firms is similar to that of all business services except advertising, which has a higher share of these small enterprises. Overall, a large share of small firms is a common characteristic of the creative industry and shared by most sub-industries. Furthermore, the majority (58 per cent) of businesses in the creative industry consist of self-employed people (Table 5.4). The share of self-employed people in all businesses is even higher in the culture and recreation sector (63 per cent) and advertising (67 per cent). When the employment distribution is considered, the findings again indicate the predominance of micro firms. Such firms account for 35 per cent of all employment in the creative industries in the EU-22. This is similar to the corresponding share in all business services. Furthermore, the self-employment rate in creative industries is about 13 per cent — much higher than the aggregate self-employment rate (excluding agricultural employment).

**Table 5.4: Size distribution of employment and firms
in creative industries in the EU-22, 2007**

Firm size (persons employed)	Size distribution of firms		Size distribution of employment	
	Number of firms	percentage	Number of persons employed	percentage
Zero	669 170	58	658 921	13
Between 1 and 4	376 537	32	752 344	15
Between 5 and 9	56 479	5	386 023	8
10 or more	58 961	5	3 267 222	65
Total	1 161 148	100	5 064 510	100

Note: Creative industries are restricted to publishing, software consultancy and supply, architecture, advertising, motion picture and video activities, radio and television activities, arts and entertainment, news agencies. For architecture, all numbers are weighted by 0.25. The EU-22 refers to BG, CZ, DK, DE, EE, ES, FR, IT, CY, LV, LT, LU, HU, NL, AT, PT, RO, SI, SK, FI, SE and UK. The data refers to 2007 or the latest available year. For 221 and 223 the split into the three smallest size classes is based on additional data sources.

Source: SBS, WIFO calculations.

In creative industries, labour costs account for a high percentage of value added, indicating that production is both labour- and human-capital-intensive. Creative industries also differ in their average labour productivity and part-time ratio as compared to all business services. In particular, software consultancy and supply industries have the highest level of labour productivity of all the business services considered.

It is often argued that the different creative industries are so intertwined that they can be viewed as a single sector. Indeed, available evidence based on detailed input-output tables (at the three-digit level) shows strong supply-chain linkages among the different creative industries. First and quite obviously, there are strong supply-chain linkages between publishing and advertising. Second, it is well known that advertising is one of the two main sources of revenue of the traditional media industry and online advertising, besides consumer and end-use spending. Picard (2009) suggests that book publishers rely on contract writers, editors, printers and binders and distribution services. Magazine publishers engage independent writers, photographers and printing and distribution firms. These interactions require ongoing contacts and coordination, and often lead service firms and individuals to establish themselves near those who require their services. Such interactions and processes have historically produced self-generating media clusters and a high degree of path dependency.

The supply-chain linkages among different creative industries can be described based on Danish supply-and-use tables, which are available at the three-digit level for 2005. For advertising, the share of intermediate inputs supplied by publishing is 48 per cent (Figure A.2 in the Appendix). The second-most important suppliers of advertising are recreational and cultural industries belonging to the market sector (i.e. excluding non-market firms such as museums, libraries etc.). They contribute 17 per cent of all domestic inputs in advertising. This is clearly related to the close integration between advertising and the audiovisual sector. However, there are surprisingly few linkages between software consultancy and supply and the remaining creative industries.

Table 5.5 shows the EU-15 labour-market characteristics of creative workers, defined by creative occupations based on the European Labour Force Survey for 2008. Here the focus is on occupations that are most prevalent in the creative industries. These characteristics include percentages of creative workers with tertiary education (ISCED levels 5-6), self-employed

individuals, creative workers with temporary contracts, part-time workers, creative workers at micro firms, and multiple job holders[6].

Table 5.5: Labour market characteristics of creative occupations in EU-15, 2008
(in per cent)

Creative occupations	ISCO 88	Tertiary education	Self employ ment rate	Tempo- rary contracts	Part time	Working in micro firms	Multiple job holders
EU-15							
Physicists, chemists and related professionals	211	87	7	13	7	11	3
Mathematicians, statisticians and related professionals	212	81	11	15	7	11	6
Computing professionals	213	70	10	8	7	9	3
Architects, engineers & related professionals	214	85	19	7	7	12	3
Life science professionals	221	91	10	14	10	15	4
Health professionals	222	95	40	14	14	26	8
Archivists, librarians & relat. information prof.	243	78	3	12	31	22	6
Social science & related professionals	244	86	16	15	30	14	8
Writers and creative or performing artists	245	65	44	13	26	14	10
Artistic, entertainment & sports associate prof. & fashion	347	42	38	14	30	24	9
Creative occupations		78	24	11	16	16	6
Non-creative occupations		24	15	12	21	26	4

Note: All numbers are weighted in order to reflect total population.
Source: EU Labour Force Survey 2008.

The different creative occupations share a number of common characteristics. First, for creative occupations in the EU-15, the proportion of employees with tertiary education is 78 per cent against 24 per cent for workers in non-creative occupations. The proportion of employees with tertiary education ranges from 42 per cent for artistic, entertainment, and sports associate professionals to 65 per cent for writers and creative/performing artists, and over 80 per cent for physical, mathematical, and engineering science professionals. Another common characteristic of creative occupations is a higher self-employment rate. In the EU-15, the self-employment rate is nine percentage points higher for workers in creative occupations than for those in non-creative occupations. Artists and writers tend to work fewer hours, as indicated by the part-time ratio. Furthermore, 6 per cent of creative professionals hold multiple jobs, compared to 4 per cent for those in non-creative occupations. Among writers and performing artists, nearly one in ten is a multiple job holder. Overall, non-standard forms of employment such as self-employment, part-time employment, and employment in multiple jobs are more prevalent among creative occupations than among non-creative occupations. However, the creative occupations are highly heterogeneous themselves, with wide variations between physical, mathematical, and engineering science professionals on the one hand and writers and creative/performing artists on the other.

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[6] Based on the EU LFS, microfirms can only be defined as firms with 10 or fewer persons employed instead of 9 or less persons employed based on SBS.

5.2.5. Trade in creative industry goods and services

Sectoral competitiveness is invariably and closely related to trade performance. But it is important to highlight that the EU, and its member states, have chosen to preserve their capacity to define and implement policies for the purpose of preserving cultural diversity when joining the General Agreement on Trade in Services (GATS). The question of trade is therefore not a straightforward one. While a number of studies, policy documents in particular, point at the growing importance of trade in creative industry products, and the sound export performance of the creative industries, this issue has until now almost never been studied in a thorough way. This is mainly due to the limitations of trade statistical data. Notable exceptions are the contributions of Disdier et al. (2010) on cultural goods and the UNCTAD report (2008) on the creative economy. Services play a large part in the creative industries; but services are by nature less tradable than goods. This may explain why creative industry trade issues are seldom analysed. They are nevertheless quite dynamic. Unfortunately, the coverage of services in trade statistics leaves a lot to be desired. For this reason, evidence is limited to a small number of EU countries as far as trade in services is concerned while the geographical coverage of trade in creative industries' goods is more exhaustive.

5.2.5.1. Trade in creative industry goods

Breakdown by region

The share of creative industries' goods in total world exports was 3.6 per cent on average during the years 2000–2005 (based on the UNCTAD global databank) but its growth dynamics were lower than for total export goods. Its share fluctuated between 3.7 per cent and 3.8 per cent until 2003 and declined to 3.3 per cent in 2005. This indicates that trade in creative industries' goods did not grow as much as global trade at that time. World exports of creative industries' goods grew at an average annual rate of only 1.7 per cent between 2000 and 2005, reaching a value of approximately €270 billion in 2005.

In 2005, three economic regions accounted for two thirds of the world's exports of creative goods (the exports within the regions not being taken into account): a third from China, almost a quarter from the EU-27 and 11 per cent from the US.

Figure 5.5: Exports breakdown of creative industries' goods and exports of all goods, excluding intra-regional trade (2005) in %
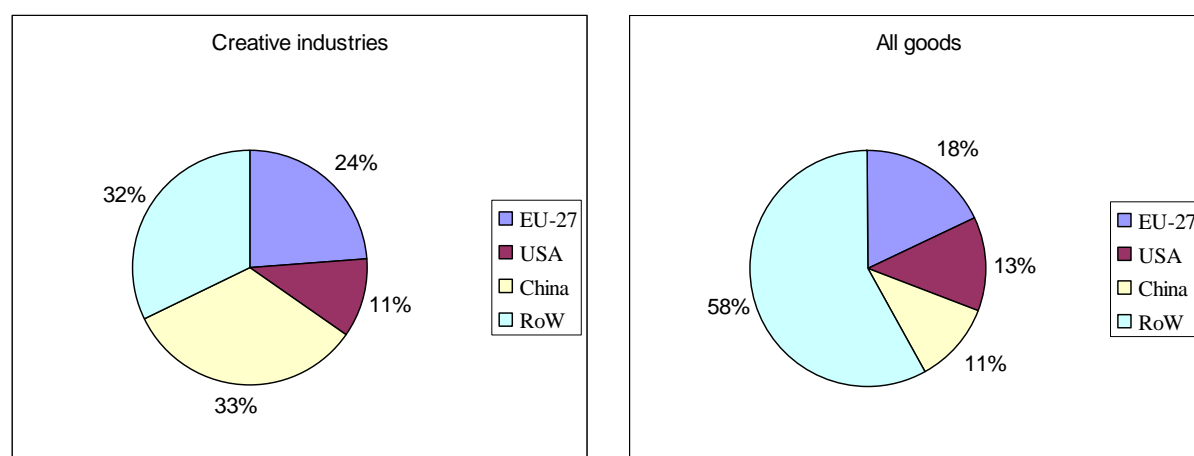
Source: UNCTAD Global Databank on world trade in creative products (left panel), UN Comtrade (right panel) — WIFO calculations.

Breakdown by creative domains

When the focus is on the types of creative goods exported by region, more heterogeneity in the structure of exports can be observed (Figure 5.6 and Table 5.6).

World: In 2005, two-thirds of world exports in creative industries' goods were classified as design, followed by publishing with only 13 per cent. Strikingly, the sectors that account for the lowest share of world exports, music (4 %) audiovisuals (0.2 %) and new media (4 %) are also the ones with the highest growth between 2000 and 2005 (9.4 %, 5.7 % and 5.2 % respectively). This trend is in line with the change of consumer habits towards increased media/new media consumption highlighted in section '5.2.3 Drivers of creative industries'. It is worth noticing that at this level of aggregation (world trade in creative industries' domains) the structure of exports remains relatively stable over time.

EU: Apart from design, which dominates (65 % of exports), publishing and visual arts carry considerable weight in EU exports of creative industries' goods (each with 13 %). The fastest growing creative industries' goods exports in 2000-2005 were new media (8.7 % growth). When one looks at intra-regional trade in the EU, the most dynamic sectors were music (16.2 % growth) audiovisual (15.1 % growth).

China: With a share of 78 per cent, design goods dominate Chinese exports even more than they do globally, while publishing goods make up only 3 per cent of China's extra-territorial export volume. With a relative export share of 9 per cent, arts and crafts products account for a non-negligible share of China's total creative industries' products. In fact China is the leading exporter of arts and crafts products worldwide (UNCTAD, 2008). These findings are quite intuitive and emphasise the role of common languages and cultural norms in creative industries' trade. For instance, prevailing cultural and linguistic differences between China and the Western hemisphere make it almost impossible for the Chinese publishing and music industries to compete in world trade. When it comes to the fastest growing sectors, China significantly outpaces other regions in terms of new media exports. The observed average

annual growth of creative industries' trade reached an impressive 42.6 % in 2000-2005 (Table 5.6).

The US: The US was specialised in publishing and the visual arts in 2005, which come in at 22 per cent and 18 per cent respectively; it holds a comparatively large share in new media (7 per cent), but a distinctly lower relative share in design (44 per cent). In the US, only the music sector saw an increase in the volume of creative industries' goods in 2000-2005.

Figure 5.6: Share of creative industries' domains in export of creative industries' goods by region

(2005)
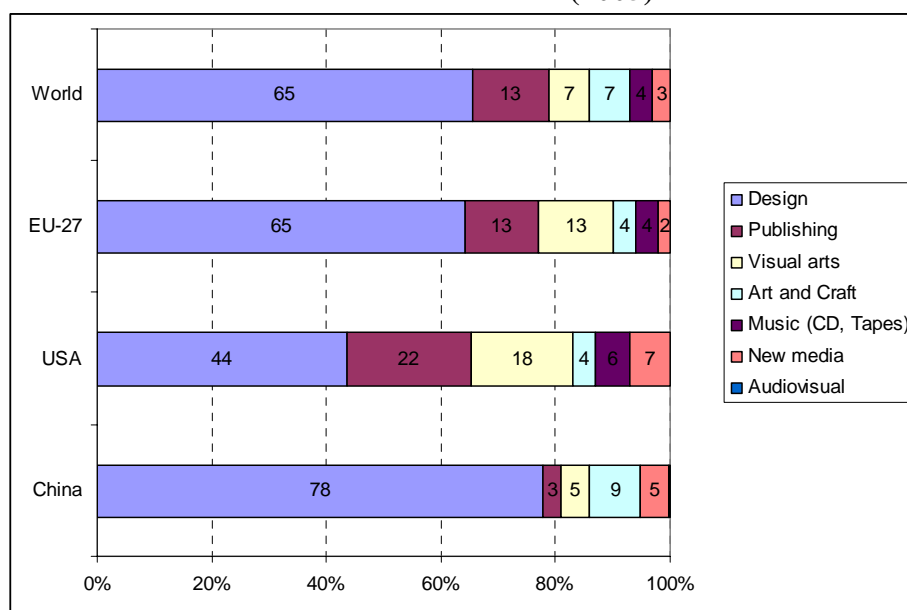
Note: Intra-regional trade is not included. *The share of Audiovisuals in exports of creative industries' goods accounts for 0.2 % of world exports, 0.1 % of both US and Extra-EU-27 exports and 0.003 % of Chinese extra-territorial exports (i.e. only three out of $ 1 000 US- of export earnings are derived from audiovisuals). The share of music exports from China is negligeable.

Source: UNCTAD Global Databank on world trade in creative products — WIFO calculations.

Table 5.6: Average annual growth in exports of creative industries' goods (2000 – 2005) by domains

	World	EU-27 (extra)	EU-27 (intra)	USA	China (gross)
All CREATIVE INDUSTRIES	1.7 %	1.0 %	3.4 %	-1.7 %	3.4 %
ARTS AND CRAFTS	-0.5 %	-3.2 %	2.6 %	-3.4 %	-1.4 %
AUDIOVISUALS	5.7 %	-1.2 %	15.1 %	-9.6 %	-17.0 %
DESIGN	2.0 %	1.2 %	2.8 %	-1.3 %	3.1 %
MUSIC (CDs, tapes)	9.4 %	0.7 %	16.2 %	2.2 %	-2.1 %
NEW MEDIA	5.2 %	8.7 %	-0.2 %	-0.1 %	41.6 %
PUBLISHING	-0.3 %	0.9 %	2.1 %	-3.8 %	6.5 %
VISUAL ARTS	-0.1 %	0.7 %	-0.6 %	-1.4 %	-1.3 %

Source: UNCTAD Global Databank on world trade in creative products — WIFO calculations.

Revealed comparative advantages

In 2005, the EU had a revealed comparative advantage in creative industries' exports for 13 out of 25 products. This means that the share of EU creative industry exports in total export is

higher than the share of creative industry exports in total export in the world. As can be seen in Figure A.3 (in Appendix), a number of products even increased their revealed comparative advantage in 2000-2005. The individual products that most improved their position were digital records (new media) and antiques. The publishing types of creative goods also enhanced their comparative advantage. In particular, the EU turned its former disadvantage in newspapers into an advantage. Interestingly, the EU still does not have a revealed comparative advantage in the fast-growing video games sector, but has nonetheless made considerable progress. Conversely, its competitive position in interior design deteriorated until the corresponding RCA index eventually became negative, indicating a revealed comparative disadvantage for this good. The ability of the EU to compete in arts and crafts goods was already low at the outset (2000), and had fallen further behind by 2005. A similar trend is observable for the visual arts, with the notable exception of antiques. Though the EU mostly retains its power to compete in design goods, its competitiveness there has definitely been eroded.

5.2.5.2. Trade in creative industry services

Consistent evidence on trade in creative industries' services is only available for 11 EU Member States. Between 2000–2005, this group of countries increased its aggregate exports of creative industries' services by nearly 60 per cent between 2000 and 2005, while the increase in imports of creative industries' services was less than 1 per cent p.a. Evidence derived from this limited group of countries strongly suggests that the great dynamics in trade of creative industries' services differs from the sluggish trend in trade of creative industries' goods. As of 2005, the 11 countries' sample remains to be a net importer of creative industries' services, but it certainly managed to improve its trade balance of creative industries' services to a considerable degree.

The group of 11 EU countries advanced its international competitiveness in architectural, engineering and other technical services. This finding is quite relevant in economic terms since this creative industries' service category at the same time forms the top service category of the sample under review. As of 2005 its share came to 30 per cent of total creative industries services. With a share of 24 per cent, royalties and licence fees ranked second which underlines the need to develop and enforce regulatory framework conditions that are responsive to the challenges of the digital age.

Table 5.7: Trade in creative industries' services in 11 EU countries, key figures

	Export of creative industries' services		Import of creative industries' services	
	Share in total creative industries' services (2005)	Average Annual Change (2000-2005)	Share in total CI services (2005)	Average Annual Change (2000-2005)
Total CI services	100%	9.5	100%	0.6
Royalties and license fees	24%	9.8	24%	1.1
Advertising, market research and public opinion polling services	16%	10.3	17%	1.8
Architectural, engineering and other technical services	30%	12.2	21%	1.2
Audio-visual and related services	3%	5.8	9%	-5.3
Research and development services	21%	7.7	17%	6.7
Personal, cultural and recreational services	6%	4.0	11%	-4.9

Note: The 11 EU countries includes Czech Republic, Finland, Germany, Italy, Latvia, Poland, Portugal, Romania, Slovenia, Spain, Sweden.

Source: UNCTAD Global Databank — WIFO calculations.

Since the internal market is an opportunity to boost intra-regional trade in creative industries' services, it is important to evaluate the current cross-border trade and the potential barriers. Another indicator of service trade is the percentage of firms carrying out cross-border trade. In the selected western EU countries, the percentage of firms ranges between 8.9 per cent in architecture and 23.1 per cent in software consultancy (Table 5.8). The corresponding share for advertising is 16.3 per cent. The sample of eastern EU countries shows similar shares except for software consultancy and supply.

Table 5.8: Share of enterprises carrying out cross-border trade, 2004

	EU-West	EU-East
Software consultancy and supply	23.1	17.4
Architectural & engineering activities	8.9	8.7
Advertising	16.3	15.2
All NACE branches — Total	13.0	12.4

Note: EU-West includes Spain, Sweden, Denmark, Italy, Ireland, Luxembourg and Portugal. EU-East includes Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Cyprus, Malta, Romania, Slovenia and Slovakia.

Source: Eurostat SBS- WIFO calculations.

Given the low share of exporters among service firms it is worth investigating the main barriers to export (e.g. taxation issues, language and cultural barriers etc.). Table A.4 (in Appendix) provides an overview of a number of potential barriers to service exports characterised by the degree of importance: somewhat, fairly, very and not important. All business service firms, exporting or non-exporting, were asked. The greatest barriers are said to be 'difficulties in identifying potential clients abroad', 'lack of international standards for services' and 'language and cultural barriers', while 'insurance, guarantee systems, etc. issues' and 'taxation issues' are less important.

*5.2.6. Evidence on the urban specialisation of the creative industries*

A major characteristic of creative industry firms is their geographical clustering. Firms that produce creative goods and services are located in close proximity. A large number of empirical studies show that the creative industries and creative professionals (also referred to as the 'creative class') are highly concentrated in metropolitan and urban areas. For a recent contribution, one can see Power and Nielsén, 2010 at the NUTS 2 level for the EU countries (NUTS 2 correponds to the Nomenclature of Territorial Units for Statistics representing basic regions for the application of regional policies). Calculations at NUTS 2 level for several EU countries reveal that the regional difference in the share of creative industries within countries is greater than the difference between EU countries, as indicated by the coefficient of variation. The same holds when the share of creative occupations is used to calculate the coefficient of variation between regions and industries.

Figure A.4 in the Appendix gives a first indication of the urban specialisation of the creative industries in the EU-27, based on the AMADEUS database in 2006 where specialisation is measured as the location quotient in 2006[7]. The evidence shows that cities have far higher concentrations of creative industry activity than does the national economy. In particular, Ljubljana, Warsaw, Bratislava, Prague, Vienna, Sofia, Rome, Copenhagen and Lisbon all have a location quotient of 2.0 or higher. Unpublished results show that the location quotient does not vary much when the spatial unit is defined as the core city or the metropolitan unit, except in the cases of London and Paris where the location quotients are much higher.

A similar picture emerges when the location quotient is based on the occupational measure. Figure 5.7 shows the location quotient based on creative occupations at NUTS 1 and 2 levels for the 17 EU countries for which data is available.

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[7] The location quotient indicates whether and to what extent the share of creative industries (creative occupations alternatively) exceeds the national average. A location quotient of 1 indicates that the employment share of the creative industries in the given area is identical to that of the national economy. A quotient greater than one means that the creative industries are more prevalent in a given area than in the national economy.

Figure 5.7: Location quotient of creative occupations, 2002 and 2008
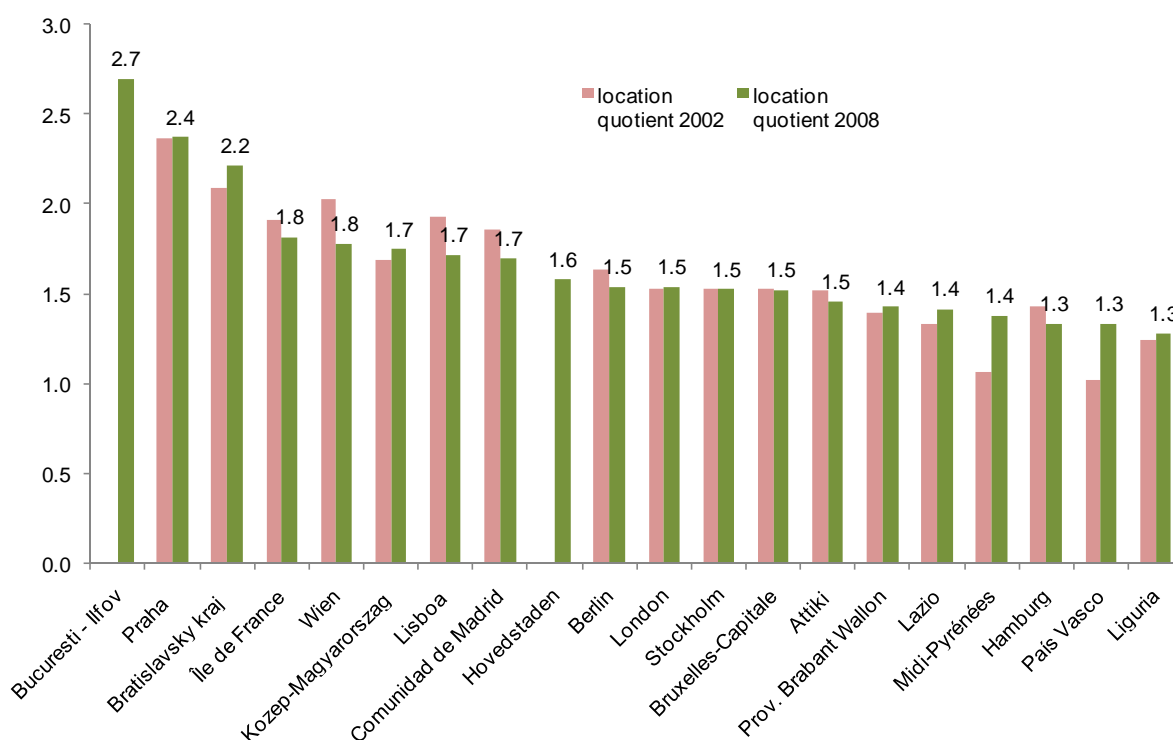
Note: Location quotients are calculated at NUTS 1 or 2 levels for the following countries: AT, BE, CZ, DK, DE, ES, ES, FI, FR, GR, HU, IE, IT, PT, RO, SE, SK and UK. It is not possible to calculate the location quotient of creative occupations for SI, PL and BG because there is no information on ISCO 88 at the three digit level in the EU LFS micro data. In addition, there is no regional information for EE, LT, LU, LV and NL. See Table 1 for the definition of creative occupations. All numbers are weighted to reflect national population weights.

Source: EU LFS 2002 and 2008.

The findings show that 17 out of 20 NUTS regions with the highest share of creative occupations are capital regions or semi-capital regions. Again, Bucharest, Bratislava and Prague have location quotients for creative occupations of 2.0 or more.

The finding that creative industries and creative workers are concentrated in urban areas is consistent with the related literature. A recent study conducted for the European Cluster Observatory also shows a high degree of urban clustering (Power and Nielsén, 2010). In particular, the authors find that large urban areas and capital city regions dominate the creative and cultural industries. Furthermore, empirical evidence for North America and the EU suggests that urban concentration is uneven across the different creative industries and among the different creative occupations. For Sweden, Hanson (2007) finds a higher degree of spatial concentration of 'Bohemians' (artists, writers, etc.) as compared to all creative workers (Hanson 2007). For the EU countries, Power and Nielsén (2010) find that sub-industries with the highest urban concentration includes (i) reproduction of computer media, sound recording and video recording, (ii) publishing of software and sound recordings, (iii) motion picture and video production and distribution and (iv) news agency activities. Similarly, evidence at regional level for the UK shows that the highest urban concentrations can be found for video, film, and photography, for music, visual, and performing arts and for radio and TV, with London location quotients of about 2.7, 2.4, and 3.1, respectively (De Propris et al., 2009). London also shows the highest urban concentration of advertising,

designer fashion and publishing as compared to the creative industries at large. The remaining creative industries are more evenly distributed across the British regions.

Using metropolitan data for the US for the year 2001, Schoales (2006) finds that independent artists, writers, and performers, and jobs in motion picture and video production, distribution and postproduction show the highest level of spatial concentration of all industrial activities and services except hotel casinos. The author suggests that these industries are very cluster-dependent because of an inherently rapid pace of product innovation.

Table 5.9 presents evidence on the degree of spatial specialisation for selected creative occupations based on the EU LFS for 2008.

Table 5.9: Location quotient of core creative occupations in urban, rural and intermediate populated areas, EU-14 and EU-7, in 2008

		EU-14			EU-7		
		Densely populated area	Inter-mediate area	Thinly pop-ulated area	Densely populated area	Inter-mediate area	Thinly populated area
	Share of creative occupations	9.6	6.2	4.5	7.2	4.6	2.5
	Total creative occupations	1.25	0.81	0.59	1.53	0.98	0.53
211	Physicists, chemists and related professionals	1.27	0.82	0.52	1.49	1.03	0.55
212	Mathematicians, statisticians and related professionals	1.57	0.46	0.23	2.09	0.63	0.20
213	Computing professionals	1.30	0.78	0.47	1.71	0.91	0.40
214	Architects, engineers & related professionals	1.20	0.91	0.57	1.51	1.01	0.55
221	Life science professionals	1.11	0.80	1.01	1.16	1.15	0.79
222	Health professionals	1.25	0.79	0.63	1.31	1.17	0.65
243	Archivists, librarians & related information prof.	1.27	0.61	0.84	1.46	1.16	0.52
244	Social science & related professionals	1.23	0.82	0.64	1.52	1.00	0.54
245	Writers and creative or performing artists	1.36	0.65	0.53	1.86	0.72	0.36
347	Artistic, entertainment & sports associate prof.	1.28	0.73	0.63	1.53	0.75	0.64
521	Fashion and other models	1.18	0.58	1.18	1.16	2.28	0.30

Note: EU-14 refers to AT, BE, DE, DK, ES, FI, FR, GR, IT, LU, NL, PT, SE and UK. EU-7 refers CY, CZ, EE, HU LT, LV and SK. All numbers are weighted to reflect national population weights. Densely populated areas are defined as local areas with a density superior to 500 inhabitants per square kilometre, where the total population for the set is at least 50 000 inhabitants. Intermediate areas have a density of 100 inhabitants per square kilometre and either with a total population for the set of at least 50 000 inhabitants. Thinly-populated areas contain areas that belong to neither types (see EU LFS User guide). The number of observations is sometimes fewer than 50 for 'Fashion and other models'.

Source: EU LFS 2008.

In the EU-14 (EU-15 excluding Ireland) the difference in location quotient between rural and urban areas is greatest for mathematical and statistical professionals, writers, creative/performing artists, and computing professionals. For artistic, entertainment, and sport occupations, the rural-urban gap is close to that of all creative occupations.

Based on Dutch urban areas and very long time series, Deinema and Kloosterman (2009) find that the arts show the highest degree of spatial concentration, followed by publishing as compared to advertising, architecture, and broadcasting. The magnitude of spatial concentration not only lasts for a long time, but also seems to be reinforced over a long period of time. In other words, some creative industries display a very high degree of path

dependence. Calculations based on EU data also show that the spatial pattern in the location of creative industries is highly persistent over time.

There are several reasons why creative industries are concentrated in urban areas. The main factors are (i) importance of specific local labour markets and tacit knowledge, (ii) spillovers from one specific creative industry to another, (iii) firms' access to dedicated infrastructure and collective resources, (iv) project-based work, (v) synergistic benefits of collective learning, and (vi) development of associated services, infrastructure, and supportive government policies (Lorenzen and Frederiksen, 2008; Malmberg and Maskell, 2002). Local labour markets are particularly relevant for the creative industries. Creative industry firms locate near one another in order to take advantage of a common pool of labour, knowledge, and ideas. Lorenzen and Frederiksen (2008) mention the high degree of mobility and labour flows between different creative industry firms. In addition, there is a significant number of multiple job holders (e.g. a film director involved in advertisement production). Localisation helps to decrease transaction costs due to the temporary and flexible nature of projects. The second point concerns knowledge spillovers. Typically, agglomeration economies related to knowledge spillovers are usually more pronounced in skill-intensive industries, as is the case for creative industries. The size, density, and compactness of urban centres foster interpersonal interaction, creating greater opportunities for enhanced information flows. As a result, cities have historically been the places where much innovation has occurred (Bettencourt et al., 2007). Another reason is firms' access to infrastructure — such as music schools and opera houses — and collective resources (universities, for example). Furthermore, clustering in the creative industries is also related to the fact that the work is often project-based with many face-to-face contacts due to high levels of uncertainty, instability, and project complexity, as well as short product cycles (Lorenzen and Frederiksen, 2008).

Evidence on interrelations between different creative industries can be obtained by investigating co-location patterns. Advertising businesses tend to favour highly centralised down-town locations in order to be close to national newspapers and television stations (Grabher, 2002). The media industry often manifests itself as a specialised form of cluster designed to produce media content, such as motion pictures, television programs/videos, broadcasts, audio recordings, books, newspapers, magazines, games, photography and designs, websites, and mobile content (Picard, 2009). Wu (2005) suggests that multimedia firms (i.e. firms that provide internet content) appear to settle in places where the traditional media sector (e.g. the film and music industry, entertainment) and the software industry are already in place.

There are also significant relations between the media industry and music and theatrical performance and festivals, sport and entertainment activities, information and communication technologies (computers, software, telecommunications), and hardware manufacturers (television and radio receivers, set-top boxes, game consoles, DVD players, etc.) (Picard, 2009).

Currid and Williams (2010) find that several cultural subsectors show strong co-location patterns. Using highly disaggregated data for Los Angeles and New York, the authors find correlation coefficients across districts of 0.75 and higher for (i) performing arts and music, (ii) music and film, (iii) art and design, and (iv) art and film. The co-location patterns are explained by cultural infrastructure.

Not only are creative industries as a whole heavily concentrated in urban areas but the degree of urban concentration also depends on the type of creative industry. A very high degree of

spatial concentration can be found in film, music, and other arts. The tendency of the music industry to agglomerate in urban areas can be explained by the fact that the music industry is very often a highly localised cultural-product industry that draws on a local creative milieu and cultural forms (Power and Hallencreutz, 2002 and Hesmondhalgh, 1996). Another reason is that the national subsidiaries of major international record companies are also located in major cities. Within such music clusters, new project partners (e g. art direction, media, and event firms) can be easily found, which reduces transaction costs (Maskell and Lorenzen, 2004 and Step, 2003).

Given the degree of urban concentration in creative industries, it is natural to ask to what extent this is linked to factors such as population size, GDP per capita, availability of human capital, etc. It is obvious that size matters. Large cities have a large number of consumers with a high disposable income for spending on luxury goods and a significant amount of leisure time. The next step, therefore, is to explore the statistical relationship between the concentration of creative industries in cities and the size and wealth of the population of those cities. The data on metropolitan population, GDP per capita in PPS, and the tertiary share are obtained from the urban audit statistics and refer to 2006 or the latest available year. The location quotient is calculated based on the AMADEUS database and refers to 2006.

OLS (ordinary least squares) estimation results indicate that population size and human capital are the most important factors that affect the spatial concentration of creative industries in different urban areas in the EU. In particular, the larger the population of a European city or metropolitan area, the larger will be its share of creative industries relative to the national average. However, the elasticity of the 0.26 location quotient with respect to population size indicates that the degree of urban specialisation of the creative industries rises less than proportionally with an increase in population size. The significance of population is related to the fact that many cities have too few inhabitants to constitute sufficient consumer demand for the specialised services that creative industries offer. The elasticity for the tertiary graduate share indicates that the degree of urban specialisation of the creative industries rises proportionally with the tertiary education share. However, in general, causality can go both ways. For instance, the employment share of creative industries depends not only on a significant proportion of highly skilled labour: cities that offer a significant output of creative and cultural products as compared to the national average also tend to attract more highly skilled workers. GDP per capita is only significant at the 10 per cent level. The location quotient of capital cities is not significantly higher than that of non-capital cities. Other factors, such as past population growth and the share of foreign-born people, are not significant. Belonging to a capital city is not significantly related to the location quotient once cities' GDP per capita and human capital population size are controlled for.

5.3. Growth effects and the wider role of the creative industries

5.3.1. *Relationship between the size of creative industries and regional growth*

There is an ongoing debate about the effects of creative occupations and creative industries on regional growth in the EU and the US. Florida (2002, 2004) suggests that creative people are key drivers of urban and regional growth. This 'creative class' hypothesis has received much attention among scholars, policy makers, urban planners, and civic leaders. In particular, the creative class hypothesis links urban growth with the knowledge economy. According to Mellander and Florida (2009) the creative workforce can have an indirect impact on regional growth through its positive impact on high-tech employment, innovation, and entrepreneurship.

In recent years there have been numerous studies testing Florida's hypothesis using more rigorous econometric methods. So far, empirical evidence on the growth effects of the creative class hypothesis and/or the creative industries is mixed and controversial. However, the results based on regional data for EU countries tend to be more optimistic about the growth effects of the creative industries (Piergiovanni et al., 2009 for Italy; Stam et al., 2008; Marlet and Van Workens, 2007; and Oort et al., 2009 for the Netherlands; Falck et al., 2009 and Möller and Tubadji, 2009, both based on German regional data; Boschma and Fritsch, 2009 for two EU countries; and Chantelot, 2008, based on French data). Andersen (2010) validates Florida's theories with regard to larger Nordic city regions. Although these studies show positive results, it is difficult to generalise from the findings since they differ widely in their scope: they are based on different sample periods and countries, different definitions of the creative occupations, and on different model specifications and estimation techniques.

Much of the controversy concerns how to define and measure the creative class. The major critical point is that there is no clear distinction between the creative class and people with high educational attainment, since no high-skill occupations have been excluded from the creative class (Markusen, 2006). In fact, a number of empirical studies find a high degree of correlation between human capital (measured as the share of working-age population with tertiary education) and the creative class. Using Swedish regional data, Hansen (2007) shows that this correlation is 0.94. He captures the latter in terms of educational attainment levels. For the US, Glaeser (2005) finds a 0.75 correlation between the share of college graduates and the creative class. Based on regional data (at the NUTS 1 and 2 levels) drawn from the EU LFS from 2008, the correlation between the share of creative occupations and the share of workers with tertiary education is 0.8. This indicates that the creative class is little different from tertiary education (which often is the source of measurement of human capital) and raises serious doubts about how much the creative class concept introduced by Florida (2002) adds to the theory of human capital. From an empirical point of view, the high degree of multicollinearity makes it impossible to sort out the individual effects of the two explanatory variables.

Given the high degree of correlation between human capital and the creative class, it is not surprising that only a few studies come to the conclusion that the creative class measures explain growth better than human capital (Marlet and Van Workens, 2007 for the Dutch regions and Möller and Tubadji, 2009 for German regions). In a study of the 50 most important cities in the Netherlands, Marlet and Van Woerkens (2007) find that both the creative class concept and education are significant. More importantly, the professional categories which make up the creative class are better indicators for predicting economic growth than human capital. In contrast, the 'Bohemian index' is not a useful indicator for explaining the differences in economic performance among Dutch cities. In an influential study, based on US metropolitan data, Glaeser (2005) finds that the creative class becomes an insignificant factor of urban growth when human capital is included. Similar findings are obtained by Hoyman and Faricy (2009) based on US data. Rausch and Negrey (2006) also find that the concentration of creative class workers is insignificant in explaining metropolitan output growth after controlling for educational attainment.

Some studies do not even find that creative occupations have a direct effect on growth, even when human capital is not controlled for (Beckstead et al., 2008; Donegan et al., 2008; Rausch and Negrey, 2006; and Beyers, 2010). Few studies investigate whether creative occupations are a significant driver of growth not only in urban but also in rural areas. An exception is the study by McGranahan and Wojan (2007), who find that both urban and rural areas with higher levels of creative occupations are associated with higher rates of total employment growth. Overall, the literature suggests that the creative class is important, but is

not the dominant driver of metropolitan economic growth. Human capital and innovation are more important. An interesting result is obtained by Chantelot (2008) based on French urban data, namely that the growth effects of creative occupations are greater in metropolitan areas than in medium-sized cities.

Table A.5 in the Appendix provides OLS estimates of the relationship between the employment share of creative industries and the average annual change in GDP per capita in purchasing power parities between 2002 and 2007. Alternatively, the real growth rate of regional GDP at market prices between 2002 and 2006 is used. The underlying data are at NUTS 2 regional level and drawn from the New Cronos regional database, combined with the employment share of the creative industries drawn from the AMADEUS database, also at NUTS 2 level. All explanatory variables refer to 2002. Three specifications are provided. The first includes the initial log level of GDP per capita, the employment share of creative industries, and the dummy variable for capital city regions. Specification (ii) adds the investment ratio and specification (iii) includes the share of working age population with tertiary education as well.

The results show that the employment share of the creative industries in the initial year has a positive and highly significant impact on the average annual growth rate of regional GDP per capita in the next five years. This indicates that regions with a high employment share of creative industries grow faster than other regions (column i). The coefficient of 0.15 indicates that an increase in the employment share of the creative industries by one percentage point raises the average annual growth rate by 0.15 percentage points[8].

The coefficient of the share of creative industries remains positive and significant when the investment ratio is included in the regression equation. However, the coefficient of the employment share of the creative industries drops considerably when human capital is included in the regional growth equation as indicated by column (iii). Furthermore, the standard error of the coefficient on the employment share of creative industries is enlarged due to multicollinearity between the share of creative industries and the share of workers with tertiary education[9]. Wald-test statistics of joint significance indicate that both the employment share of creative industries and human capital are jointly significant at the 5 per cent level. Looking at the magnitude of the effects one can see that human capital is more important than the share of the creative industries in explaining regional growth[10]. The finding that human capital is one of the main drivers of regional economic growth is consistent with the literature (e.g. Glaeser et al., 2000).

As expected, lagged GDP per capita is significantly negative. The coefficient indicates that the speed of convergence is about 1 per cent per year, which is in line with earlier studies. The dummy variable for the capital city region is significantly negative indicating that these regions exhibit, ceteris paribus, lower growth rates of GDP per capita.

When the growth rate is measured as real growth of GDP per capita in EUR (rather than in current PPS), both human capital and the share of the creative industries are seen to have a positive and significant impact, as indicated by the Wald-test statistic (lower panel of Table

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[8]   However, the three variables (i.e. initial GDP per capita, employment share of the creative industries and the dummy variable for capital cities) in the basic equation explain only a small proportion of the variations in growth rates across European NUTS 2 regions, as indicated by the low R squared of 0.08.

[9]   The correlation between the two variables is 0.44.

[10]   In particular, an increase of one standard deviation in the tertiary graduates share leads to an increase in the growth rate of 0.5 percentage points (=0.057*0.084*100), whereas an increase in the employment share of CI's by one standard deviation raise the average annual growth rate by 0.2 percentage points (0.11*0.017*100).

A.5 in the Appendix). This means that the estimation results are not sensitive to whether GDP is measured in EUR or in PPS.

To sum up, the key result in this section is that the initial share of the creative industries has a positive and significant effect on the growth rate of GDP per capita at regional level in 10 EU countries. The positive growth effect of the creative industries remains robust even when allowing for general human capital. This means that the real growth rate increases when other firms from the creative industries decide to locate nearby. The positive growth effects could be related to the fact that the resulting increased concentration of creative industry firms within a region facilitates knowledge spillovers. It appears that aggregate growth depends on the industrial structure and/or the concentration of specific industries, and this result is consistent with Peneder (2003) who finds that aggregate growth is significantly positively related to technology-led and skill-intensive industries based on a sample of OECD countries.

### 5.3.2. *Supply-chain linkages between creative industries and the rest of the economy*

One way of investigating the wider effects of the creative industries is to look at the importance of creative goods and services as an intermediate input factor in other sectors. These supply-chain relationships may be an important factor for productivity gains and innovation. Innovation effects might reflect the direct provision of innovative services in the case of advertising companies, say, that are developing new brands for their clients, or design consultancies that are offering customers product design services. Knowledge spillovers may also occur if creative working practices 'rub off' onto their business clients in an unremunerated way. A second mechanism under consideration is the possibility that the creative industries support local innovation systems through channels — including knowledge spillovers — that operate specifically at the local level. These mechanisms are not necessarily mutually exclusive.

Business-to-business (B2B) transactions account for the majority of creative industry sales. The official UK supply and use tables show that around 60 per cent of creative products supplied to the UK economy are used as intermediate inputs for other industries (including other creative industries (Experian, 2007). B2B demand is particularly important for advertising, architecture, software and fashion products (Figure A.5 in the Appendix). For the latter two industries, notable growth can be observed over time. Architecture and software products also stimulate investment — adding to the future productive capacity of the UK economy (Figure A.6 in the Appendix). Other creative products — the arts, radio & TV and film — are primarily consumption goods.

Evidence based on structural business data for 12 EU countries in 2004 also shows that B2B transactions dominate in software architecture and advertising with a turnover share of 80 per cent or more in software and 93 per cent in advertising. Households account for 3 to 6 per cent depending on the sub-sector. The public sector accounts for the remaining part.

Industry purchases of creative products accounted for around 6 per cent of overall intermediate purchases by UK industries in 2004 and were equivalent to around 3 per cent of total gross industry output (Figure 5.8). These 'forward' supply chain linkages from the UK's creative industries appear to be stronger for certain services sectors than they are for manufacturing. Purchases of creative products were particularly important among the creative industries themselves: creative product purchases made up over 8 per cent of total gross output and accounted for 19 per cent of intermediate purchases by the creative industries.

Figure 5.8: UK Industry purchases of UK creative products, 1992–2004
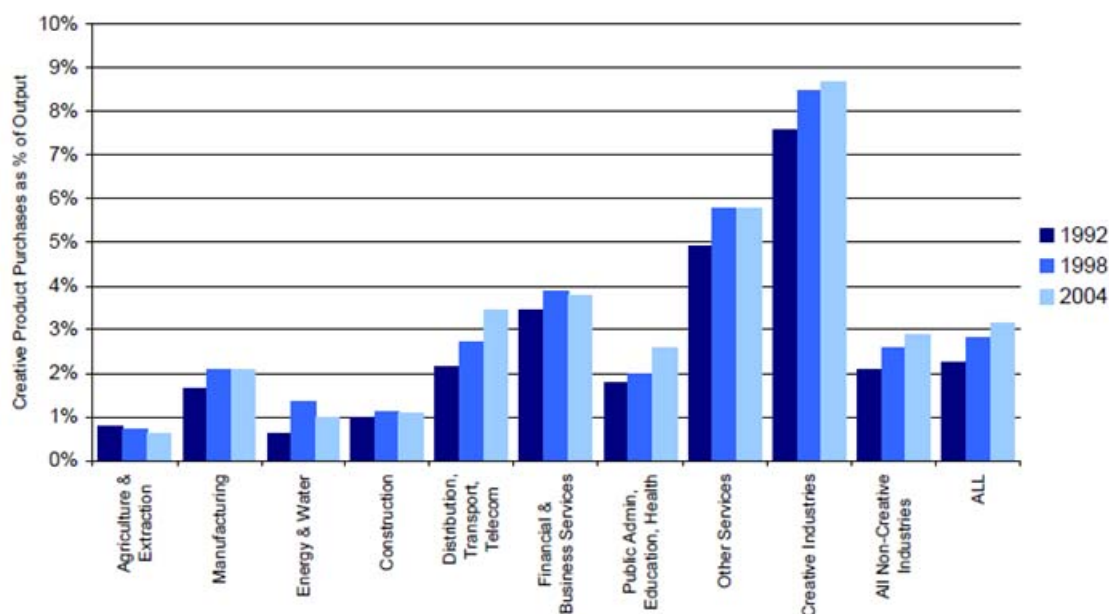
Source: ONS UK Input-Output Supply and Use Tables, used in Experian (2007).

Calculations based on input-output tables for Denmark lead to similar findings[11]. Figure A.7 in the Appendix shows the 20 largest industry users of creative inputs among 121 Danish industries at the three-digit level. Again, the creative industries themselves are the largest supplier, with a creative intermediate input share of 37 per cent. The real estate sector acquires 22 per cent of its input from the creative industries (mainly inputs from publishing and software consultancy and supply). Among the manufacturing industries, manufacturers of tobacco and beverages have the highest share of creative intermediate input due to their extensive use of advertising services. The education sector also has one of the highest usage rates of creative input (over 10 per cent), which is due to its close integration with the audiovisual sector. In addition, wholesale and retail trade have a higher than average rate of usage of creative inputs. Unpublished results show that advertising and software consulting have supply-chain linkages with all of the 116 non-creative industries.

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[11] Statistics Denmark provides a detailed input-output table (121 x 121 product industry matrix). For most EU countries official input-output tables are only available at the two-digit level.

5.4. The Role of Innovation in the creative industries — The Role of the creative industries in Innovation

The links between the creative industries and innovation are manifold. First, the innovation performance of the creative industries is above average[12], though often underrated due to the mostly non-technological nature of these activities (Stam et al., 2008 for the Netherlands; Bakhshi et al., 2008 and Bakhshi and McVittie, 2009, both for the UK; and Müller et al., 2009 for Austria). Creative industries' innovations rely on R&D inputs, and may not even promote the primary generation of new knowledge. Rather, innovations are driven by acts of creativity and cooperative efforts (Potts, 2009).

Second, this specific innovation behaviour of creative industries' firms helps increase the firms' dynamic capabilities and thus helps disseminate new technologies. Creative industry firms tend to make use of a large network of weak, heterogeneous relationships that ensure easy access to and fast absorption of new knowledge — an observation which fits in well with the evolutionary/systemic view of innovation. Knowledge and technology transfer is also driven by a strong functional or regional (business-to-business) network structure (Potts et al., 2008).

Third, the dynamic development of the creative industries is closely tied to technological progress and innovations in some key technologies developed elsewhere. Current means of mass (re)production, mass consumption, and commercialisation of artistic/creative content have been made possible mostly by technological advances in the fields of information and communication technology (Cunningham et al., 2004). In fact, creative industries are intense users of ICT innovations in particular, as well as other new technologies. For instance, digital technologies and compression methods for audio and video signals that allow efficient storage and rapid transmission with little loss of quality have created new, low-cost means of sales distribution. Such a development accelerates the diffusion of technological innovations from the supply side (Müller et al., 2009). Lastly, consumer habits, particularly those of young buyers with considerable affinity for technology, play a crucial role from the demand side (for the role of consumers see Hartley, 2008).

New data from the fifth UK Innovation Survey suggest that the creative industries have higher levels of product, process, and wider innovation activities than other sectors[13]. For example, 32 per cent of creative industry businesses introduced product innovations in the three years running up to 2007 (compared to 21 per cent in other industries), and 16 per cent introduced new process innovations (compared to 11 per cent outside the creative industries). The differences are greater when considering new-to-market, as opposed to new-to-firm, innovations: here, proportionately twice as many creative businesses were product-innovative (14 per cent, compared to 7 per cent in the rest of the economy) and process-innovative (6 per cent, compared to 3 per cent in other sectors). As many as 40 per cent of creative industry

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[12] A recent IPTS report supports this statement on the innovation performance of CIs and in particular that, quite outstanding, of the Software sector. The report indicates that, from 2002 to 2007 Business Expenditures in R&D (BERD) increased by 40% and employment of researchers by 56% in the Computer Services and Software sector (NACE REV 1.1 sector 72). See Turlea 2010.

[13] This survey covers the period 2005–2007 with a sample size of 14 870 firms. Traditionally, not all of the 4-digit SIC codes that define the creative industries have been covered by the sample frame, but the statistical authorities have in recent years made particular efforts to address this. Advertising, architecture, arts and antiques, designer fashion, most of publishing (except news agency activities), and most parts of video, film and photography, software, computer games, and electronic publishing are included. Radio and TV and all firms in artistic and literary creation and operation of arts facilities — which are part of the music, visual, and performing arts sector — are excluded.

firms introduced wider innovations in the three years prior to 2007 (that is, they made changes to their corporate strategies, management techniques, organisational structure, or marketing methods), compared to 29 per cent in other sectors.

Furthermore, new evidence based on the Community Innocation Survey (CIS) 2006 for 19 EU countries also shows that creative industry firms are more innovative than firms belonging to non-creative industries[14]. However, this innovativeness varies greatly from one industry to another. Most notably, it is very high in software consulting and supply, a little lower in architecture and close to average in advertising and publishing. In particular, for the seven EU-15 countries for which data are available, half of the software firms introduced new or significantly improved services and/or goods, while for other services the share was 12.7 per cent. Similar findings can be seen for the remaining EU countries. The difference in innovativeness is even more pronounced when market novelties are considered: 36 per cent of western European software firms were innovative in the three-year period 2004–2006, compared to only 4.6 per cent of other service industries.

Compared to non-creative service industries, the architecture and advertising industries also have a higher percentage of firms introducing new or significantly improved services — though the difference is less pronounced than in the case of the software industry. Firms in the publishing sector are no more innovative than other manufacturing industries. Turning to process innovations, one can see that software firms again show a higher proportion of innovation than firms in the non-creative services. For the remaining creative industries the evidence is not clear-cut. While publishing shows a higher share of firms with new production processes, architecture and advertising exhibit a similar proportion of innovators.

There is a similar pattern when different innovation-input activities (i.e. R&D and non-R&D innovation activities) are considered. Evidence based on the CIS 2006 survey for the UK suggests that creative industry businesses tend to engage in more innovation-related activities, undertake more R&D, invest in more training, and spend more on design than firms in other sectors (Figure A.9 in the Appendix). Descriptive evidence based on CIS 2006 data for 17 EU countries shows that software and architectural services have a significantly higher share of firms conducting R&D (47 and 27 per cent, respectively) compared to 6 per cent for other services (based on seven EU-15 countries). More generally, innovation activities in the creative industries are much broader than just R&D investment. The evidence shows that creative industry firms tend to engage more in training activities related to innovation and the acquisition of external expertise and new machinery as compared to firms outside the creative industries. This also holds for advertising and publishing.

Creative industry firms are not only more innovative in general but are also early adopters of internet and e-business practices. Evidence based on the e-business w@tch survey 2005 of seven EU countries shows that more than 30 per cent of creative industry firms had adopted e-business activities by 2000 or earlier, compared to 17 per cent for the remaining industries. More importantly, the majority of technological innovations (90 per cent of innovations in the publishing industry, for instance) are enabled by ICT.

Following the system of innovation literature, the ability of firms and industries to generate innovations depends not only on the performance of individual firms but also on their interaction and organisation. There are many additional players, including other firms

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[14] However, in CIS data for the 19 EU countries, coverage of the creative industries is limited to publishing, software consultancy and supply, architecture, and advertising, unlike the CIS data for the UK, which also includes arts and antiques, designer fashion, and most parts of video, film and photography, software, computer games, and electronic publishing.

(suppliers, customers, subcontractors, and competing firms) and intermediary organisations (consultants, technology centres, governmental offices, and regulatory agencies), as well as public and private research centres and universities. It is within these networks that people are able to learn about, imitate and eventually create new products and ideas. Müller et al. (2009) note that, as a rich source of ideas and knowledge, the creative industries exhibit strong positive external effects on other innovating firms, such that a blind focus on their own innovative output is likely to underestimate the importance of the creative industries for the greater innovation system.

As prime producers of intellectual property, the creative industries are expected to be a particularly attractive source of external knowledge for innovating firms. They offer a diverse bundle of creative products and services, ranging from ideas for innovations to R&D support and product design (Müller et al., 2009). The design sector provides an especially good example of the supply-side effects. This sector has gained significant importance over the past years and has earned itself a steady place in contemporary production. Figures 5.9 and A.7 in the Appendix show the extent to which other industries make use of inputs from the design sector. The descriptive statistics are calculated using the CIS 2006 micro data for a sample of 15 EU Member States.

Figure 5.9 shows the proportion of firms that used industrial design registration as a protection method in a sample of 15 EU countries (largely from the new Member States). A design registration offers the opportunity to protect intellectual property rights against others who subsequently produce articles with the same or similar appearance.

Figure 5.9: Proportion of firms with industrial design registration across EU industries, 2004–2006
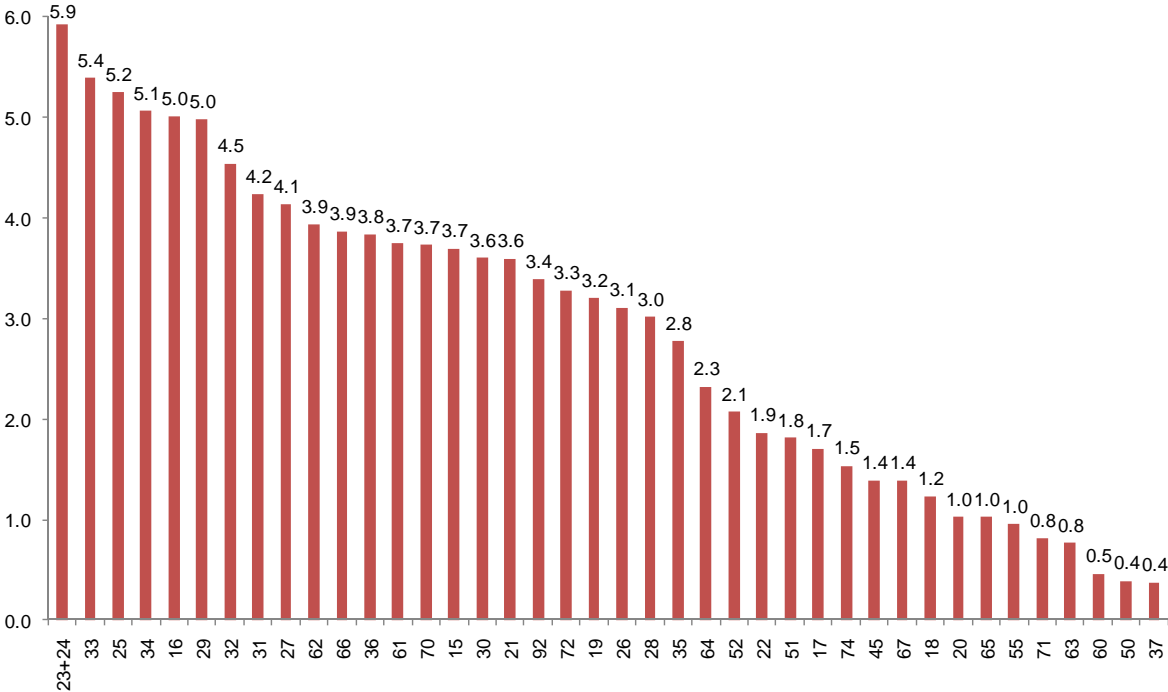
Note: The x axis labels the NACE Rev 1.1 codes. The sample includes Bulgaria, Cyprus, Czech Republic, Estonia, Spain, Hungary, Ireland, Lithuania, Luxembourg, Latvia, Malta, Norway, Portugal, Romania and Slovakia. All numbers are weighted to reflect the population of firms.

Source: Community Innovation survey 2006, WIFO calculations based on Eurostat data

Clearly, most industrial design registrations are found in manufacturing industries such as chemicals and pharmaceuticals, minerals, glass and ceramics, motor vehicles, tobacco, and machinery. This shows that some forms of creativity, such as design, can be found in all industries; they are not restricted to a limited group of creative industry firms.

Another way to ascertain how and to what extent designers affect innovations in the greater economy is to look at the proportion of enterprises that introduce significant changes to the design of goods and services. Based on CIS 2006 data for four EU countries, Figure A.8 in the Appendix shows that product design innovations can be found in all industries. In the chemical and pharmaceuticals sector, one-fourth of the firms introduced product design innovations during the period 2004–2006. A higher than average proportion of design innovators can be found in tobacco, banking, insurance, food, and software. As expected, design innovations are less frequently reported in non-manufacturing industries such as transport and energy and water supply.

Descriptive evidence based on 14 EU countries shows that different knowledge sources are more frequently used in both software and architecture firms than in the non-creative (services) industries. For instance, 73 per cent of software firms answered that clients and customers are an important source of innovation (to a medium or high extent) compared to 39 per cent in the non-creative service industries. Another example refers to knowledge sourcing from universities: about a quarter of software and architecture firms regard university research as an important source of information for the innovation process, compared to 10 per cent in non-creative service industries. In addition, three of the remaining knowledge sources (i.e. government or public research institutes, scientific journals, trade/technical publications and consultants, commercial labs, and private R&D institutes) are regarded as much more important by both software and architecture firms than firms outside of the creative industries. However, in advertising and publishing, the degree of importance of these information sources does not differ much from the non-creative service firms.

Descriptive evidence based on CIS 2006 shows that in the western[15] and eastern[16] EU countries for which data are available, about one-third of software and architecture firms are actually working together to innovate. In the western EU countries this proportion is twice as high as that of firms in the non-creative services sector; in the eastern EU countries it is 13 and 8 percentage points higher, respectively, than in the remaining service sectors. When it comes to choosing cooperation partners, software firms most commonly choose to work with their customers. Customers are involved in the innovation activities of about 28 per cent of firms in EU West and 40 per cent in EU East. In architecture and advertising, suppliers are the most important cooperation partners. It is interesting to note that in the EU West countries, universities are the second most important cooperation partners for software firms (19 per cent of firms) and the third most important partners for architecture firms (also 19 per cent). For firms in non-creative industries, universities come only sixth. In the EU East countries, universities are also much more relevant for software and architecture firms than for the rest of the economy. Overall this suggests that the importance of interaction between science and industry is most pronounced in software and architecture. It appears that these industries rely to a larger extent on new knowledge developed by universities.

As already mentioned, enterprises in the creative industry tend to be heavily involved in business-to-business activities. They produce creative intermediate goods that are used as inputs in non-creative industry sectors, thereby contributing to innovations in the wider

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[15] EU-West includes Spain, Sweden, Denmark, Italy, Ireland, Luxembourg and Portugal.
[16] EU-East includes Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Cyprus, Malta, Romania, Slovenia and Slovakia.

economy. Bakhshi et al. (2008) show that, for a wide range of innovation measures, firms with stronger links to the creative industries have stronger innovation performance. The underlying data consist of input-output tables for the UK at the three-digit level, combined with the fourth UK Community Innovation Survey. For example, Figure A.10 in the Appendix shows that firms in industries that exhibit above-median B2B spending on creative industry products — expressed as a percentage of their gross output — have stronger innovation performance than firms in industries with below-median B2B spending. Overall this indicates that the creative industries play a significant role in the transfer of knowledge, ideas, and innovation in business-to-business transactions. This transfer becomes especially important in the flow of tacit knowledge in the sense of Polanyi (1977), who finds that the transfer hinges on personal communication in a creative environment.

This finding is consistent with more formal cross-section statistical analysis. In particular, econometric models explaining variations in innovative behaviour between firms suggest that firms in industries with stronger B2B linkages to creative industries are, all other things being equal, significantly more likely to introduce product innovations. The estimates suggest that firms that spend double the average amount on creative products — 6 per cent compared to 3 per cent of their gross output — are 25 per cent more likely to introduce product innovations new either to the firm or to the market. To put this result into perspective, according to the model these creative linkage impacts are similar in magnitude to the effect that access to government support has on innovation.

The direction of causality between spending on creative inputs and innovation cannot be established using these cross-sectional data alone. It is also difficult to be certain whether innovation is being driven directly by creative products (as inputs to the innovation process) or indirectly by knowledge transfer — possibly unremunerated — from the creative industries. Bakhshi et al. (2008), based on evidence drawn from the UK Innovation Survey, find some evidence that knowledge transfer from creative suppliers leads to improvements in product range and quality.

5.5. The policy dimension: summary & conclusions

5.5.1. Policy rationales

Irrespective of the general agreement as to the value of creative industries' policy, there remains substantial disagreement about the best objectives and forms of intervention. Answers vary according to the views held regarding the intended roles of such policies.

The economic rationale for government intervention in favour of the creative industries starts from the notion that this sector constitutes a significant locus of economic dynamism in the post-industrial world. This view evaluates cultural events, institutions, and creative activities according to their significance for, or their positive contribution to, the aggregate economy. A survey among creative industries' policymakers in EU Member States indicates their increased awareness of the creative industries, including diverse definitions of these industries and consciousness that they stimulate growth and innovation in various ways. There is a substantial amount of empirical evidence on the primary and secondary economic impacts of the creative industries that would support this view. However, taken by itself this evidence establishes no particular role for sector-specific policies, but rather calls in the first place for horizontal policies to set up proper framework conditions and (re-)establish competitive markets and environments. In this spirit, a recent Green Paper launched by the European Commission (EC 2010) emphasises the importance of fair market access and the role of

competition policy in 'creating and maintaining the level playing field which ensures that there are no unjustified barriers to entry' (EC 2010, p. 7). Accordingly, a policy agenda in support of the creative industries would have to include issues such as ensuring fair access to market and to finance, in particular for innovative SME, the promotion of cultural exchanges and trade in cultural/creative goods and services within the framework of international agreements (WTO, UNESCO convention on the protection of cultural diversity), the reduction of regulatory burdens on creative entrepreneurs and the protection of intellectual property rights.

Apart from establishing first-best framework conditions, the existence of market failure increases the acceptance of further policy intervention. The general support for policy intervention in the area of creative industries points to the overall consensus that the creative industries do indeed constitute a case of market failure in the sense that they give rise to externalities, information failures (Frey, 2003), or structural, institutional, and regulatory deficiencies which affect creative industries' activities. These policy rationales apply more strongly to the cultural than to the more market-oriented segments of the creative industries; however, the role of policy would still be to correct these failures should the occasion arise.

Market Failures

Producers of creative industries' goods and services face considerable uncertainties in demand. Since the returns are highly speculative, creative industry activities are hard to predict. Not having complete information on the pay-offs of their activities, creative industries' firms are unable to make rational profit-maximising decisions — one of the core assumptions in the neoclassical benchmark model.

Information failures apply especially to the financing of creative industry activities. Even if creative entrepreneurs demonstrate perfect foresight with respect to their future pay-offs, they still face severe difficulties in credibly proving the value of their projects to potential investors, because this would involve revealing information about the originality of the project. However, the creative industry business model is based on the notion of uniqueness and exploiting first-mover advantages; imitation at an early stage would thus be a substantial threat to setting up a new undertaking.

Neoclassical thinking oscillates between the ideas of competitive markets and a well-functioning price mechanism. In principle, entrepreneurial and financial risks could be traded away in markets, especially in insurance. However, the production of creative industries' goods involves a whole range of unknowns and contingencies, and there are few if any markets to underwrite all of these. Furthermore, since both the outcome value and probability distribution of a creative industries' venture are *ex ante* uncertain, there is no reason to believe that competitive markets price such risks appropriately and allocate resources for creative industries' activities efficiently.

In this perspective, demand uncertainties are not the prime problem — these could be met with smartly designed public procurement programmes — but rather the non-existence of proper markets and the lack of a properly functioning price mechanism. A prime policy task would therefore be to remove the barriers faced by creative industries' firms, in particular small businesses (SMEs), in accessing finance, especially start-up capital. Related policy measures involve improving access to (public) finance, taking initiatives to further develop venture funds, and improving venture market regulation, or reducing regulatory burdens.

The distinguishing feature of creative products is that their value arises mainly in the social sphere, and this introduces another source of market failure: strong externalities, both in the production and consumption of creative industries' products. This means that prices — if they exist — lose their signalling function and fail in their coordinating role of matching production and consumption plans. Where creative industries' activities do link production and consumption — and manufacturing and services in the greater economy — the core policy objective would be to upgrade creative industries' linkages so as to stimulate the emergence of vibrant clusters (Pratt, 2008). Besides addressing the specific market failures that hamper the activities of the creative industries, policies should therefore be particularly aware of (cross-) sectoral linkages and promote clustering.

This view has considerable implications for, for example, the protection of intellectual property rights (IPRs). Clearly, if IPRs are handled a too rigidly this raises the transaction costs of knowledge spillovers. For this reason, open access policies and a stronger use of Creative Commons licences for intellectual copyrights may do more to foster the technological and legal basis of the creative industry business model. Yet the principles of openness and participation may sometimes be hard to put into practice. Apparently, the use of Creative Commons challenges business models based on originality and uniqueness, and the unconditional enforcement of cooperation among competitors, would be contested by the very group that such policies target.

Integrating creative industries in innovation systems

Section 5.4 strongly argues that the creative industries fit in well with the systemic and evolutionary concept of innovation. This perspective locates the bottlenecks of innovation not so much in the primary generation of knowledge but in a more fundamental problem. In the first place, firms are said to suffer from 'bounded vision' (Fransman, 1990). When faced with high-pressure deadlines, managers tend to disregard the value of new knowledge, unless it emerges from areas in which their firm is currently active. If they are aware of the importance of new knowledge, their firm's ability to transfer, assimilate, and ultimately apply that knowledge to commercial ends often requires a (much too) high level of absorptive capacity. Modern approaches to innovation policy therefore focus on the acquisition of learning capabilities and problem-solving skills. On this view, the contribution of the creative industries to the economy would not be argued in terms of their impact on economic value but rather of their specific mindset. When the creative industries are seen as a 'higher-order system that operates on the economic system' (Potts and Cunningham, 2008, p. 10), then supporting them would promote a distinct way of thinking and social interaction that is conducive to the whole functioning of the innovation system. Hence, policy rationales based on tertiary economic impact would be eager to build on the original problem-solving skills of the creatives. They would try to establish the creative industries as a kind of 'role model' for the more traditional parts of the economy, since creative industries show how to successfully master (or at least experience) the unknown, how to deal with the complexities and unforeseen aspects of daily business life, and how to escape from lock-ins — in short, how to be creative (Potts and Morrison, 2009).

Some related and encouraging best-practice examples can be found in the area of social innovation. Actors simulate mental disorders (borderline personality disorders, depression, schizophrenia, etc.) to help medical students develop their communication skills with future patients. Artists rehearse musical and theatrical performances with prisoners and at-risk youth, thereby teaching them things such as team spirit, discipline, reliability and shared responsibility for the success of a joint project — indispensable social skills and prerequisites for later employability. Creative sector activities that are of practical value for society give rise to quaternary economic effects.

5.5.2.   Policy approaches

5.5.2.1. The superposition of policy levels

Creative industries' policies needs are identified and dealt with at various levels. As a result, opportunities and challenges arise in the superposition and coordination of these policy levels. The main ones are the following.

Interdisciplinarity. Creative industries are the archetypal cross-cutting policy field. In addition to cultural and economic policies (including established sub-fields such as competition, industry, enterprise and SMEs), they span regional policy, technology and innovation policy, employment and social affairs, education and the information society. While far from exhaustive, this list shows that creative industries' policies significantly overlap with other policy areas. In designing and implementing a coherent creative industry policy agenda, it is of the utmost importance to recognise these inter-linkages and to create interfaces among the various fields of action. Setting proper framework conditions, as outlined in the previous section, is a good place to start.

Horizontal versus sector-specific. Designing creative industry policy measures fluctuates between creating new sector-specific instruments and absorbing creative industries into existing support measures. Before reinventing the wheel once more, it seems wise to screen the usefulness and applicability of existing measures and to consider redesigning them if necessary. For instance, many of the challenges the creative industries face are the same as for service firms, simply because most of them fall into the service sector. Similarly, many creative industries face the same structural barriers to growth and innovation as SMEs, simply because most of them operate on a (very) small scale. Measures to help creative industries become more competitive and innovative should, as far as possible, be integrated into the overall support structures for service firms, SMEs, and non-technical innovation.

Heterogeneity between the sub-sectors. At the same time, the subsectors of the creative industries are quite heterogeneous in terms of their business models, organisational modes, cooperation structures, and economic performance. There is no policy that fits them all. Acknowledging (sub-) sectoral specificities, differences in the targeted size of the firms and even differences in the characteristics and types of creative industry entrepreneurs leads one to quite different conclusions regarding policy support, support structures, and policy initiatives.

From local to supra-national levels. The diversity among the creative industries is a very good reason for aligning specific policies to local or regional circumstances. On the other hand, supportive horizontal policies are also essential and call for policy intervention at a national or even supra-national level. From a beneficiary point of view, a multiplicity of policies at different levels can be useful but also a source of complication. Coordination is crucial to help organisations reach out simultaneously to local, regional, national and supra-national support programmes. The following section illustrates how creative-industry policies are viewed at national and EU levels.

5.5.2.2. Policies at national and EU level

As the research is concentrated on creative industries in EU member states, it is essential to get an overview of the priorities at national level before taking an interest in EU policies. A survey conducted in the context of this study was carried out in which 32 ministries and 17

agencies and organisations took part. It found that 90 % of ministries have used the term 'creative industries' and it confirms that the governance structure is split between ministries of the economy and ministries of culture. Ministries of economy are typically in charge of design and software, games and the internet (more than 70 % of those surveyed claim so), while the ministries of culture cover the 'traditional' areas of cultural policy.

It is worth noting that, in the context of creative industries, institutions concentrate their efforts on 'art and entertainment' and 'information services' activities (see part 5.2.1 on classification), while activities of the professional services tend to be neglected. The audiovisual sector, design and music are in the portfolio of about 40 per cent of the responding institutions. Architecture, fashion and advertising get only half as much attention, while the other industries and areas are somewhere in between. None of the included sectors — with the exception of advertising — could be excluded on this strictly empirical basis.

In practice, creative industries are expected to help achieve economic and non-economic goals, with a substantial bias towards economic objectives. The prime motivation is to support innovative activities (72 per cent of respondents claim that this motive is very important), followed by stimulating economic growth (63 per cent), and creating new jobs (53 per cent). These objectives are in line with the analytical findings of this study.

The first non-economic goal — securing cultural diversity — is 'very important' for 51 per cent of respondents and thus about average in this ranking. The least important motive is the replacement of declining industries. Only 14 per cent see this as a 'very important' objective while 36 per cent claim that this is 'not important'. This goal may, in fact, be far more important at regional or city level than at national level. Indeed, there are plenty of examples, such as the Ruhr district or Barcelona, where creative industries helped revive declining areas.

**Table 5.10: What are the main motives for your interventions
in these sectors and areas**

	Very important in %	Important in %	Not important in %	Rating	Responses
Supporting innovative activities	71,8	28,2	0,0	1,7	39
Encouraging economic growth	62,5	35,0	2,5	1,6	40
Creating new jobs	52,5	45,0	2,5	1,5	40
Increased international visibility of national products and services	54,1	37,8	8,1	1,5	37
Improving networking within the industry	47,4	50,0	2,6	1,5	38
Attracting creative professionals	45,9	48,6	5,4	1,4	37
Securing cultural diversity	51,3	30,8	17,9	1,3	39
Increasing the attractiveness of the country for tourists	48,6	34,3	17,1	1,3	35
Stimulating innovation in downstream industries	35,1	54,1	10,8	1,2	37
Improving the quality of live	39,5	44,7	15,8	1,2	38
Internationalisation of firms	35,1	43,2	21,6	1,1	37
Promoting start-up activities	34,2	44,7	21,1	1,1	38
Improving the attractiveness of the business location	21,6	62,2	16,2	1,1	37
Replacing declining industries	13,9	50,0	36,1	0,8	36

Source: Leoon Consulting.

Moving on from motives to more concrete implementation, the survey revealed trends in the instruments that are most used. 'Networking events' are the preferred means of intervention in Europe's creative economy. Some 70 per cent of the new Member States (EU-12) use networking events to support the players in this sector. In the EU-15 states too, networking events are the most widely used form of intervention (57 per cent). 'Networking events' is a particularly fuzzy notion for a policy measure: it may cover conferences, workshops, websites, attempts to create interaction between distinct groups or within a group, etc. Networking activities seem to be low key activities in most countries, where no explicit networking measures were observed. The most likely explanation is that a number of policy measures in the surveyed institutions do have networking components that stimulate interaction within the field rather than a large number of initiatives which aim at networking as such. Grants as a means of intervention rank number two in this regard (48 per cent within the EU-27), followed by the provision of management training (44 per cent within the entire EU). In certain cases, there are significant differences between practices in the new Member States and the EU-15: marketing and PR support is almost twice as important in the EU-12 states as in the EU-15. The same is true for intellectual property rights (IPR) support: 35 per cent of the support institutions in the new Member States offer IPR support, whereas only 18 per cent in the EU-15 focus on this aspect. In general, the 12 new Member States rank each single intervention category relatively higher than the EU-15 members — except for insurance and access to external capital.

Table 5.11: Instruments used to intervene in creative industries at national level (in % of respondents)

	EU-15	EU-12	EU-27
Networking events	57	70	63
Grants	39	60	48
Management training	36	55	44
Cluster support	25	40	31
Marketing and PR support	21	40	29
Access to external capital	25	25	25
IPR support	18	35	25
Business consultancy	18	30	23
Access to public institutions as potential clients	18	30	23
Loans	14	20	17
Office resources	11	20	15
Voucher schemes	4	5	4
Insurance	4	0	2

Source: Leoon Consulting.

While intervention at national level is justified as a complement to local and regional policies, the same can be said of EU policies with regard to national and sub-national policies.

5.5.2.3. The role of the EU

The EU's place, as far as creative industries' policies are concerned, is defined by its exclusive or shared powers and responsibilities.

The Lisbon Treaty (2009) defines who is responsible for what in European governance, based on the principles of conferral, subsidiarity, and proportionality. These principles ensure that action is taken as close as possible to the citizens. Powers and responsibilities are given to higher levels of governance only to the extent that lower levels cannot come up with sustainable solutions for the problem in hand.

The EU enjoys very few exclusive competencies. The EU's exclusive mandate is to legislate in the areas of international trade and customs and in setting the (competition) rules that shape the internal market. This is being both stressed and challenged, for instance, by the emergence of China as a powerful exporter of creative industries' products and the globalising market power of some strong players who provide ICT products.

Single Market policies constitute a powerful tool for the following purposes.

1) Supporting the mobility of the creative class across Europe.

2) Enforcing the implementation of the Services Directive[17] and thereby dismantling discrete barriers to creative entrepreneurship in Europe. Professional services, which are the most neglected element in creative industries' policies at national level, are directly concerned by the Services Directive.

3) Establishing 'a true single market for online content and services (borderless and safe EU web services and digital content markets), with high levels of trust and confidence, a balanced regulatory framework governing the management of intellectual property rights, measures to facilitate cross-border online content services, the fostering of multi-territorial licences, adequate protection and remuneration for rights holders, and active support for the digitisation of Europe's rich cultural heritage' (EC, 2010, p.8, Digital agenda for Europe, p.7 and seq.).

4) Standardisation, which increases market size through complementarities and provides economies of scale on the producer side as well as network externalities on the consumer side. To achieve this, Single Market that effect they promote the dynamic aspects of competition and may generate momentum. At the same time, consumers have a vital interest in maintaining the 'infinite variety of creative industries' products' and related infrastructures. This especially concerns cases where an old (technological) infrastructure is preserved, although a superior one exists.

The EU may support, coordinate, or supplement action by the Member States in areas such as industry (including innovation), culture, tourism, and education relevant for creative industries. For the most part, policy intervention that helps promote industries 'at the crossroads of arts, culture, business, and technology' falls into this category.

It is very important to encourage in particular, supportive action that helps set the agenda. In the first place, the failure to come up with an unequivocal sectoral labelling system is one main reason why there is a lack of appropriate creative industry policy agendas at national or regional level. The lack of a common (statistical) definition of creative industries makes for a

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[17] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:376:0036:0068:EN:PDF

poor database, and this severely affects evidence-based policy making. Economic insight based on hard facts is of key importance, and one important role for creative industries' policy is simply to gather these facts. The UK provides a good example of how the strong conceptual foundation for a policy field is accompanied by the availability of data which is then exploited for (re-)drafting policies. Since policymakers expect so many things of the creative industries, it is particularly regrettable that there is no systematic analysis and evaluation of the added value of intervention at different levels.

The EU is well placed to take on a coordinating role and to further develop and integrate expert knowledge on the common, as well as the distinct, patterns among the creative industries. For example, under the European Commission Seventh Framework Programme for Research, Technological Development and Demonstration Activities, it is anticipated that two pilot actions will be funded in 2011 to promote networking between the Science and Technology (S&T) base and the creative sector, in order to stimulate innovation. It is believed that this type of support — in essence, policy learning — would greatly help shape creative industries' policy at national, regional and local levels. The Amsterdam declaration of February 2010, calling for the creation of a 'European Creative Industry Alliance' (ECIA), aims to create 'a favourable environment for the further development of this sector'. The early 2010 Green Paper on 'Unlocking the potential of cultural and creative industries' is another initiative designed to consult stakeholders on how to better tailor policies to the needs of creative industries. The Green Paper draws on meetings of experts and on recent initiatives taken in the Nordic countries, the UK, the Netherlands and Estonia[18].

Finally, this report shows that creative industries develop mainly within the context of knowledge-driven economies. Knowledge as a driver gains in importance as countries approach the technological frontier and are forced to invest strongly in their own technology development to further improve their competitive position. At the same time, knowledge dissemination is an important instrument in catching-up strategies.

Innovation and the emergence of creative industries have a strong local dimension and in many countries, regions have gained more control over innovation policy with the objective to fully exploit the local interactions that affect the innovation process and tailor interventions to the local landscape. Knowledge, which is key in the development of creative industries, includes an important tacit component that cannot be easily codified and therefore requires direct interaction, on-the-job learning and workers' mobility to circulate. As recent experiences by both national and regional authorities have shown, there is scope for developing regional innovation policies to capture positive local externalities. Improving the efficiency with which partners interact and share knowledge and systematising their relationships are concrete possible actions.

Because it targets regions and is based on a policy approach which integrates sectoral interventions into a coherent framework tailored to the local context, the EU Cohesion Policy has been a key instrument for developing the economic and innovation potential of the creative industries. Its role likely to grow in the future as in many countries, regions have gained more control over policy and innovation agendas have been developed at the sub-national level, focusing notably on regional clusters and capability building among knowledge producers. In particular, the Cohesion Policy will foster the design of innovation governance systems which reinforce horizontal (i.e. between local actors) and vertical (i.e. between local, regional, national and EU levels) coordination.

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[18]   A Creative Economy Green Paper for the Nordic Region (Nordic Council, 2007), Creative Britain — New Talents for the New Economy (UK, 2008), Creative Value — Culture and Economy Policy Paper (Netherlands, 2009) and Potential of Creative Industries in Estonia (2009).

5.6. Conclusions

The EU-27's creative industries employ about 6.7 million people, which represented 3.0 per cent of total employment in 2008. In the EU-27, creative industries accounted for 3.3 per cent of total GDP in 2006. The creative industries' employment share is lower in the EU than in the US (3.0 versus 3.9 per cent). The creative industries have been one of the fastest growing parts of the EU economy, with an average employment growth of 3.5 per cent per year between 2000 and 2007, compared to 1 per cent for the total economy. In the current recession, employment decreased by 2.5 per cent in 2009 after an increase of 2.4 per cent in 2008. The majority of the growth during this period came in software consulting and supply, which represents the largest creative industry segment (37 per cent of total employment in the creative industries in EU-27). It is important to note that the strong growth in the creative industries is not limited to software consulting and supply, or to a specific creative occupation. In addition to software consulting and supply, there is strong growth in motion pictures, video and television programme production, sound recording and music publishing activities, which averaged an employment growth rate of 2 cent per year between 2000 and 2008. Employment in advertising and architecture is also rising faster than average in the creative industries.

Similarly, an increasing percentage of people are being employed in creative occupations in the economy. In the EU-15, employment in creative occupations grew at around 3 per cent per year on average between 2002 and 2008; the highest growth was recorded for artistic entertainment occupations (5.7 per cent), followed by social science and related professionals (5.0 per cent) and architects, engineers and computing professionals (each 3.3 per cent). Creative occupations are increasing both within and outside of the creative industries, indicating that creative professions spread to other industries.

A number of demand and supply factors are contributing to the rise of the creative industries. Key drivers of the creative economy include innovation, information and communication technologies (e.g. digital technologies), talent and skills. Other factors include wealth (i.e. GDP per capita), leisure time and disposable household income, macroeconomic performance and the initial level of the creative industries in the economy. In a group of eight EU member states, spending on cultural services increased from 1.0 to 1.3 per cent of GDP between 1999 and 2005.

What the creative industries share is a particular kind of skilled labour force and a high share of very small businesses and sole entrepreneurs with no employees. In a group of 22 EU member states, 95 per cent of creative industry firms have less than 10 employees, and 58 per cent of these businesses are sole entrepreneurs. Another important common characteristic of the creative industries is their strong inter-industry linkages, in particular between advertising and publishing but also among advertising, audiovisual, arts, and entertainment businesses. In addition, creative industry firms are more innovative, cooperate more often with external partners, and engage more frequently in innovation-related training activities. Furthermore, they use external sources of information and knowledge (e.g. consumers, universities) more often and more intensively than non-creative industry firms. An important aspect is that different creative industry segments are geographically concentrated in a few large city regions. Creative occupations also have similar spatial patterns, including strong urban concentration. This rural-urban gap in the share of creative industries and/or creative occupations is highly persistent over time. Among urban areas in the EU, human capital and population size are the main factors in the concentration of creative industries. In particular, the location quotient (i.e. the local concentration of employment in the creative industries relative to the nation as a whole) rises proportionally with local human capital, but less

proportionally with population size and GDP per capita. Past population growth and foreign citizenship do not play a role. The creative industries share many common characteristics, but there are also important differences. Forms of non-standard work such as part-time work, temporary contracts, and holding multiple jobs are much more common among writers, creative/performing artists, and artistic entertainment professionals than for other creative professionals. There are also wide differences in the level of productivity and employment performance. Finally, some creative industries are undergoing a process of restructuring. Print and television advertising is being partly replaced by digital advertising, while physical media such as CDs and DVDs are being replaced by digital distribution (subscriptions, pay per view, advertisement-based etc...).

Besides the direct effect on value added and employment, creative industries have a broader impact on the economy. Evidence based on input-output tables for two EU countries (the United Kingdom and Denmark) shows that industry purchases of creative products account for a significant proportion of total intermediate purchases. In particular, firms in all industries rely on software supply and advertising to operate efficiently and successfully. Publishing and audiovisual activities are important input factors in the education sector. There is some evidence that firms with stronger supply-chain linkages are more innovative. Another aspect of the wider role of creativity is that product design innovations, as well as design registrations, can be found in all industries. This clearly shows that some forms of creativity are not restricted to a limited group of creative industry firms.

Another key result is that the creative industries' initial share of the economy had a positive and significant effect on the growth rate of GDP per capita at regional (NUTS 2) level in 10 EU countries during 2002–2007. The positive effect of the creative industries on economic growth remains robust even when general human capital. This positive effect could be related to the fact that the resulting increased concentration of creative industry firms within a region facilitates knowledge spillovers. This is consistent with studies comparing one country to another that show technology-led and skill-intensive industries having a significant positive impact on the growth of GDP per capita.

Interdisciplinarity is to play a key role in pushing forward research and policymaking in the area of creative industries. Policies combining different fields (such as economics and culture) are set to become even more prominent. Indeed, creative industries can benefit from several policies already in place in the field of culture (such as promoting diversity, promoting the cultural heritage, etc.) or in the area of economics (innovation policies, access to finance etc.). At the same time, more tailored approaches that further bring together the various perspectives can complement the existing policies. As far as the EU is concerned, the 'European Creative Industry Alliance' and the consultation to unlock 'the potential of cultural and creative industries' are two cases in point. The former takes into account the artistic and creativity potential of these sectors and focuses on business-related policies research and innovation, clusters and access to finance. The latter wants to tap the full potential of the EU's cultural and creative industries. It has a broad scope and ranges from innovation and education to economic development. By casting their net wide, these recent initiatives exemplify a new way of reconciling economic and cultural objectives.

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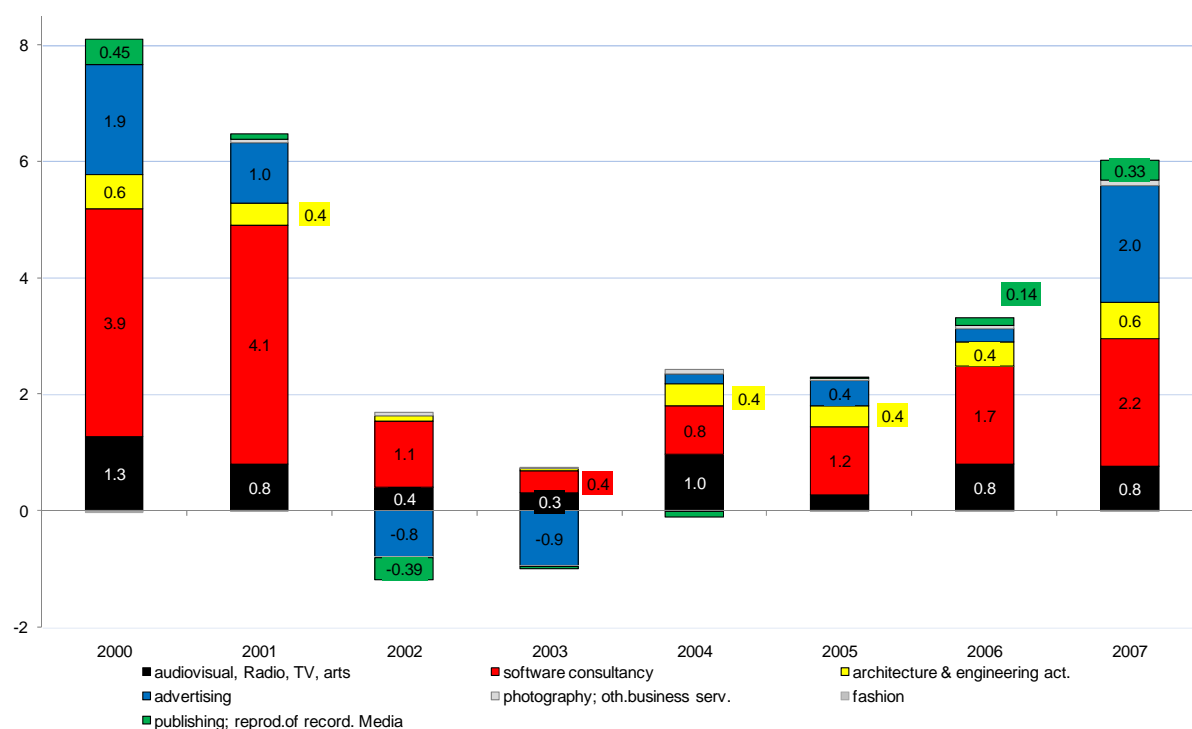Wilkinson, A., (2007), *An assessment of productivity indicators for the creative industries*, DCMS, London.

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Table A.1: Definition of the creative industries

Mapping Document Chapter	Sector	NACE Rev. 1.1	Description	Proportion of code taken
		Based on Nace Rev. 1.1		
1	Advertising	74.4	Advertising	1.00
2	Architecture	74.2	Architecture and engineering activities and related technical consultancy	0.25
3	Art &	52.48	Other retail sale in specialised stores	0.05
	Antiques	52.5	Retail sale of second-hand goods in stores	0.05
4	Crafts	Majority of businesses too small to be picked up in business surveys		
5	Design	No codes match this sector		
6	Designer	17.7	Manufacture of knitted and crocheted articles	0.005
		18	Wearing apparel; dressing and dyeing of fur	0.005
	Fashion	19.3	Manufacture of footwear	0.005
		74.87	Other Business activities n.e.c.	0.025
7	Video,	22.32	Reproduction of video recording	0.25
	Film, &	74.81	Photographic activities	0.25
	Photography	92.1	Motion picture and video activities	1.00
9 & 10	Music	22.14	Publishing of sound recordings	1.00
	and	22.31	Reproduction of sound recording	0.25
	the	92.31	Artistic and literary creation and interpretation	1.00
	Visual &	92.32	Operation of arts facilities	1.00
	Performing	92.34	Other entertainment activities n.e.c.	0.50
	Arts	92.72	Other recreational activities n.e.c.	0.25
11	Publishing	22.11	Publishing of books	1.00
		22.12	Publishing of newspapers	1.00
		22.13	Publishing of journals and periodicals	1.00
		22.15	Other publishing	0.50
		92.4	News agency activities	1.00
8 & 12	Software, Computer Games	22.33	Reproduction of computer media	0.25
	& Electronic Publishing	72.2	Software consultancy and supply	1.00
13	Radio & TV	92.2	Radio and television activities	1.00

Figure A.1: Contribution of growth in employment in creative industries by subgroup in EU-27 in percent

- ■ audiovisual, Radio, TV, arts
- ■ software consultancy
- ■ architecture & engineering act.
- ■ advertising
- ▨ photography; oth.business serv.
- ▨ fashion
- ■ publishing; reprod.of record. Media

Source: SBS, AMADEUS database and WIFO calculations.

Table A.2: Employment in the creative industries in the EU by sub-industry (in percent)

		Persons employed in 1000s			Percentages		
		EU-26	EU-15	EU-11	EU-26	EU-15	EU-11
Creative industries related to information services					*61.6*	*62.2*	*58.2*
Publishing activities	J58	999 557	845 396	154 161	14.8	14.6	16.5
Motion picture, video & television programme prod. sound recording & music publishing activities.	J59	415 376	371 096	44 280	6.2	6.4	4.7
Programming and broadcasting activities	J60	222 737	166 272	56 466	3.3	2.9	6.0
Computer programming, consultancy & related activities	J62	2 510 230	2 221 344	288 886	37.3	38.3	30.9
Creative industries in professional services					*28.7*	*28.2*	*31.8*
Architectural & engineering act. & rel. techl consult.	M711	2 499 147	2 147 128	352 019			
Architectural & eng. act. & rel. tech cons (weighted)		624 787	536 782	88 005	9.3	9.3	9.4
Advertising	M731	1 004 955	854 277	150 678	14.9	14.7	16.1
Specialised design activities	M741	165 704	150 002	15 702	2.5	2.6	1.7
Photographic activities	M742	171 430	147 360	24 070			
Photographic activities(weighted)		42 858	36 840	6018	0.6	0.6	0.6
Translation and interpretation activities	M743	95 081	58 539	36 542	1.4	1.0	3.9
Creative, arts and entertainment activities	R90	650 768	557 303	93 465	9.7	9.6	10.0
Total creative industries employment (weighted)		**6 732 052**	**5 797 850**	**934 202**	**100.0**	**100.0**	**100.0**
Total creative industries employment (unweighted)		8 734 985	7 518 716	1 216 268			
Employment share of the creative industries (weighted)		3.0	3.2	2.1			
Employment share of the creative industries (weighted)		3.9	4.2	2.7			

Note: EU-26 refers to EU 27 excluding Malta. For Netherlands, Denmark, Ireland and Czech Republic, employment data for J 59 and J 60 are calculated based on AMADEUS database.

Source: SBS, National statistical office, For R90: AMADEUS database.

Table A.3: Annual change in turnover in France, 2008 and 2009 (in per cent)

|	Performing arts	Support activities to performing arts	Artistic creation	Operation of arts facilities
Change in turnover in current prices (in percent)				
2008	0.1	1.5	-0.9	0.8
2009	-3.7	-1.6	-5.0	3.5
Change in turnover in constant prices (in percent)				
2008	1.9	3.3	0.8	1.7
2009	-1.4	0.8	-2.7	6.6

Source: INSEE.

Figure A.2: Supply chain linkages between different creative industries
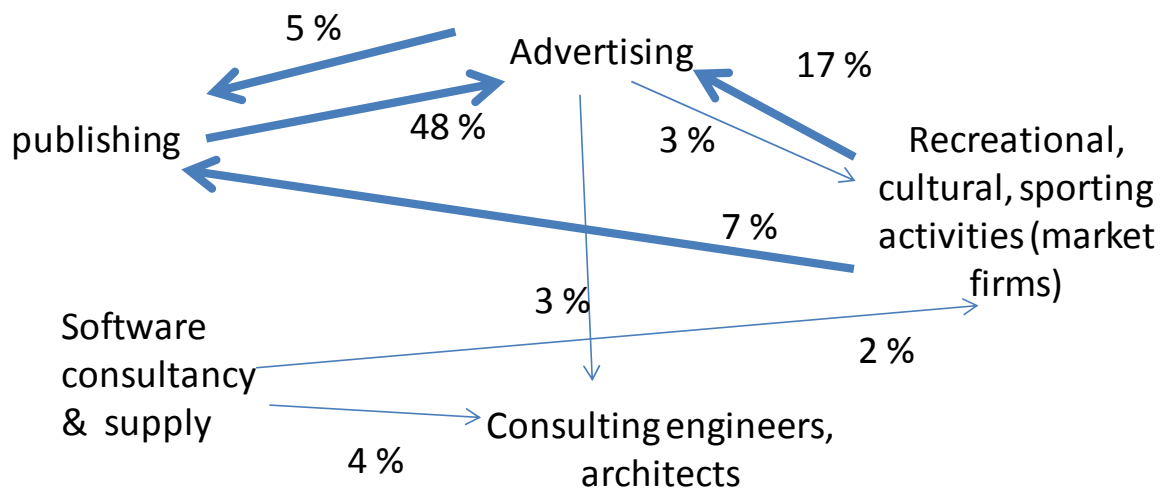
Note: The numbers represent the share of intermediate production in total production. Only higher-than-average supplier chain linkages are shown.

Source: Danish Input-output table by price unit, supply, use, supplying industries.

Figure A.3: EU-27 Revealed Comparative Advantage 2005 and change therein since 2000
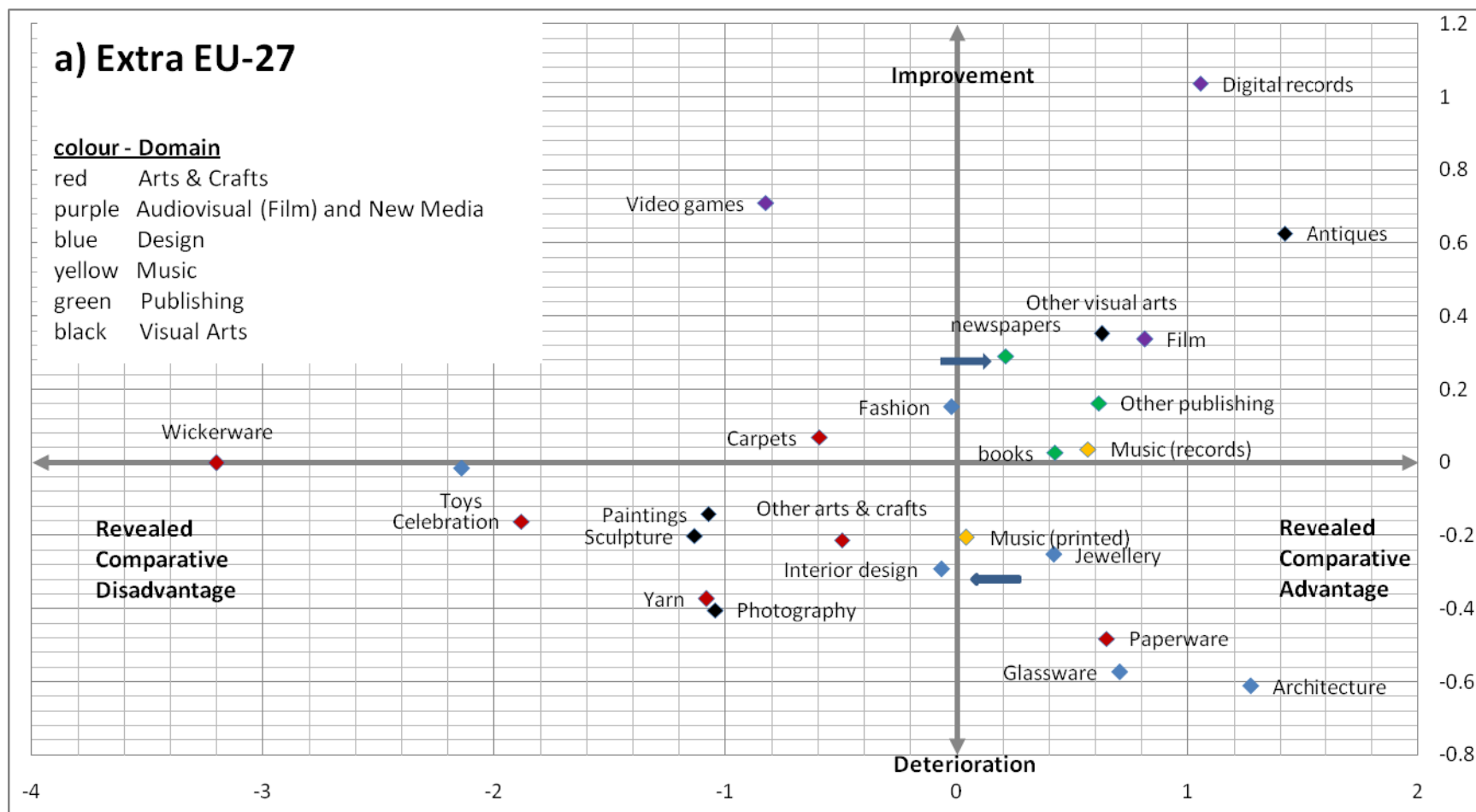
Note: Intra-regional trade is not accounted for.

Source: UNCTAD Global Databank on world trade in creative products — WIFO calculations, Balassa (1965).

Table A.4: Barriers to international trade, in per cent

	Very important	Fairly important	Some importance	Not important	Unknown / not applic.
Cross-border trade not relevant (products not exportable)					
Software consultancy and supply	15	8	7	30	39
Architectural & engineering activities	18	6	6	21	49
Advertising	18	12	10	19	41
All NACE branches — Total	19	7	6	21	46
Difficulties in identifying potential clients abroad					
Software consultancy and supply	12	16	14	16	42
Architectural & engineering activities	17	9	7	10	56
Advertising	12	15	11	16	46
All NACE branches — Total	14	10	8	14	54
Establishing a commercial presence abroad					
Software consultancy and supply	17	15	10	19	40
Architectural & engineering activities	18	10	5	12	55
Advertising	14	11	12	19	44
All NACE branches — Total	16	9	6	16	53
Insurance, guarantee systems, etc. issues					
Software consultancy and supply	9	11	12	21	46
Architectural & engineering activities	11	8	8	11	62
Advertising	8	6	14	19	52
All NACE branches — Total	9	7	8	17	58
Lack of international standards for services					
Software consultancy and supply	18	16	12	15	39
Architectural & engineering activities	14	10	8	9	58
Advertising	8	13	13	17	50
All NACE branches — Total	15	9	7	15	54
Language and cultural barriers					
Software consultancy and supply	13	16	14	18	40
Architectural & engineering activities	10	13	10	12	55
Advertising	17	9	14	18	43
All NACE branches — Total	12	10	10	16	51
Movement of personnel on a temporary basis					
Software consultancy and supply	14	9	10	23	43
Architectural & engineering activities	15	9	7	15	55
Advertising	14	8	9	24	45
All NACE branches — Total	13	7	7	19	54
Taxation issues					
Software consultancy and supply	12	8	11	23	46
Architectural & engineering activities	9	7	10	12	62
Advertising	11	9	12	20	48
All NACE branches — Total	10	7	8	18	57
Other barriers					
Software consultancy and supply	8	1	1	16	73
Architectural & engineering activities	8	1	1	14	75
Advertising	10	1	4	16	69
All NACE branches — Total	7	1	2	15	75

Source: Eurostat SBS- WIFO calculations.

Figure A.4: Location quotient of the creative industries in capital cities and semi-capitals, 2006
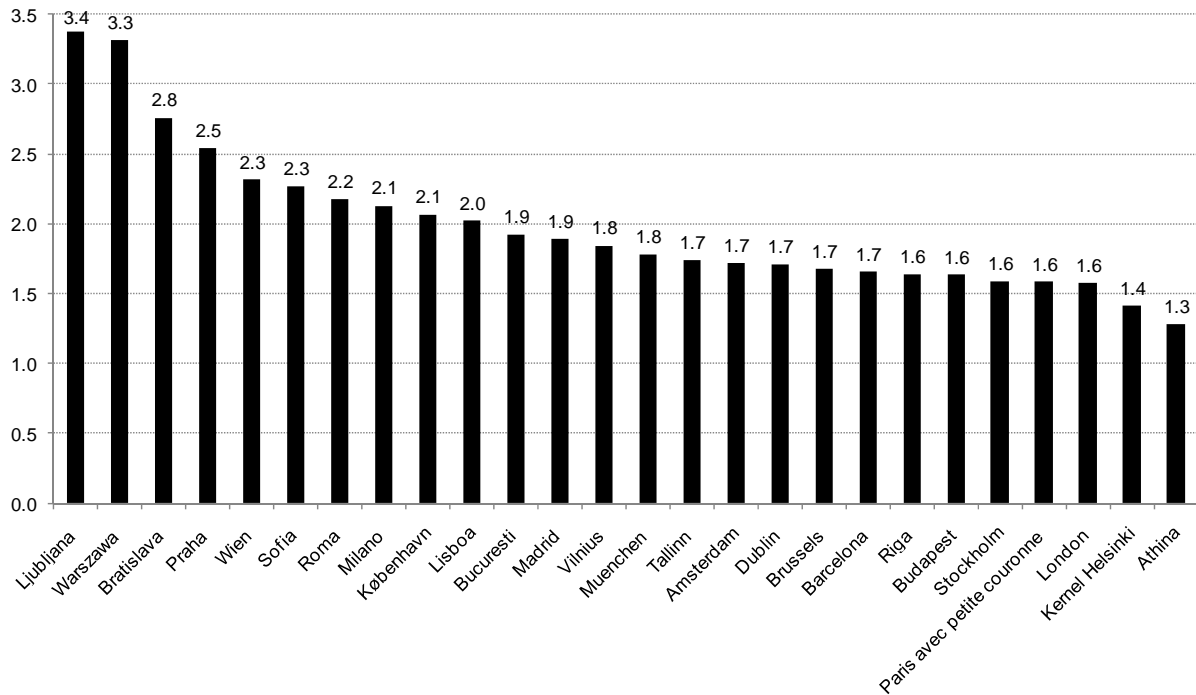
Note: The data refer to the LQ based on (weighted) employment in the creative industries as percentage of total employment of the enterprise sector (excluding non agricultural and public sector) and finance and insurance. The definition of the creative industries is based on the DCMS. A location quotient higher than 1 indicates higher than average national concentration.

Source: AMADEUS database, WIFO calculations.

Table A.5: Impact of the employment share of the creative industries on regional GDP growth

Dep. Var.: average annual change in GDP per capita in PPS between 2002-2007	(i)			(ii)			(iii)		
	Coef.		t	Coef.		t	Coef.		t
Log GDP per capita in PPS, 2002	-0.012	**	-2.56	-0.010	*	-1.71	-0.010	**	-2.04
Investment ratio, 2002				0.076	***	3.14	0.078	***	3.71
Share of working age population with tertiary education, 2002							0.085	***	4.50
Employment share of the creative industries, 2002	0.154	***	2.80	0.201	***	3.12	0.111	*	1.68
Dummy variable for capital city region	-0.006		-1.59	-0.011	***	-3.05	-0.014	***	-3.76
Constant	0.156	***	3.24	0.111	**	1.98	0.103	**	2.14
# of obs	178			143			140		
R-squared	0.080			0.165			0.282		
Wald test of joint significance of tertiary education share and share of creative industry employment, p-value							0.00		

Dep. Var.: Real growth rate of regional GDP at market prices 2002-2006									
	Coef.		t	Coef.		t	Coef.		t
Log GDP in million EUR current prices, 2002	-0.002	*	-1.89	-0.002		-1.51	-0.001		-0.90
Investment ratio, 2002				0.047	***	2.72	0.085	***	4.56
Share of working age population with tertiary education, 2002							0.103	***	7.40
Employment share of the creative industries, 2002	0.142	*	1.91	0.203	**	2.30	0.064		0.79
Dummy variable for capital city region	0.000		-0.07	-0.002	*	-0.37	-0.006		-1.07
Constant	0.036	***	3.14	0.020	*	1.68	-0.010		-0.81
# of obs	117			117			111		
R-squared	0.065			0.120			0.421		
Wald test of joint significance of tertiary education share and share of creative industry employment, p-value							0.00		

Note: * significant at 10 %; ** significant at 5 %; *** significant at 1 %. The regression is based on NUTS 2 data for 10 EU countries (i.e. Austria, Belgium, Germany, Spain, Finland, France, Italy, the Netherlands, Sweden and the United Kingdom).

Source: Eurostat Structural Business Statistics, AMADEUS database and WIFO calculations.

**Figure A.5: Intermediate inputs in total UK demand for UK
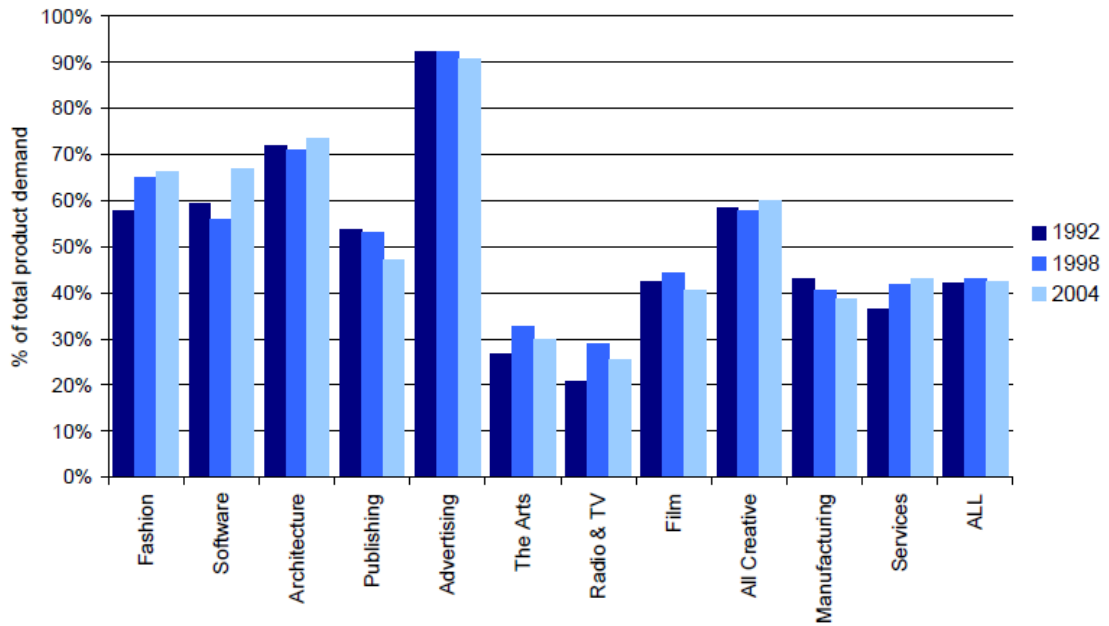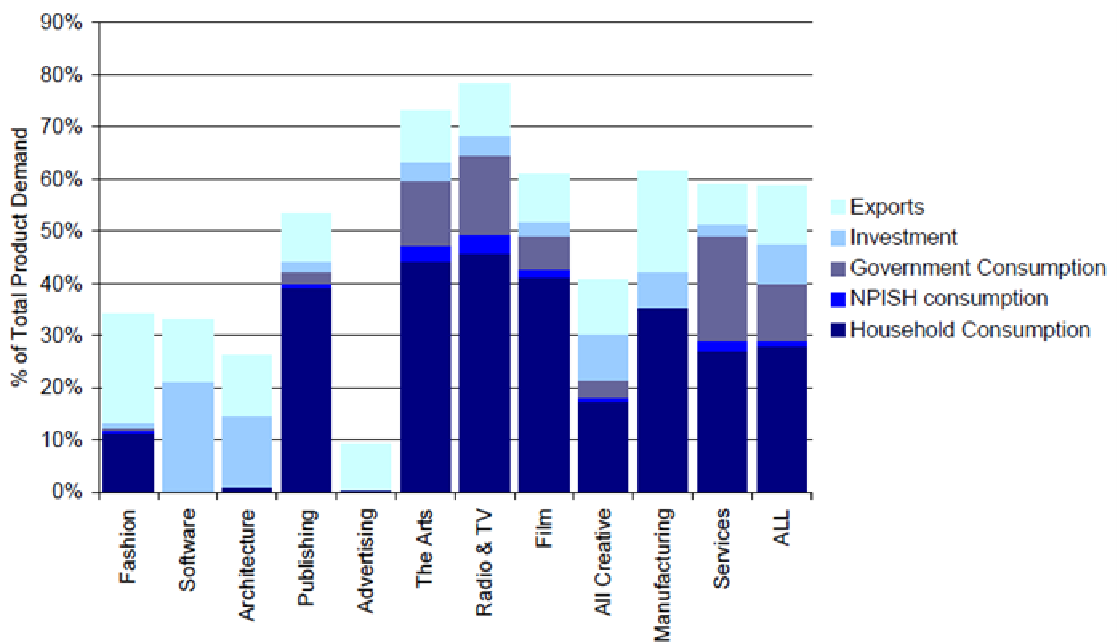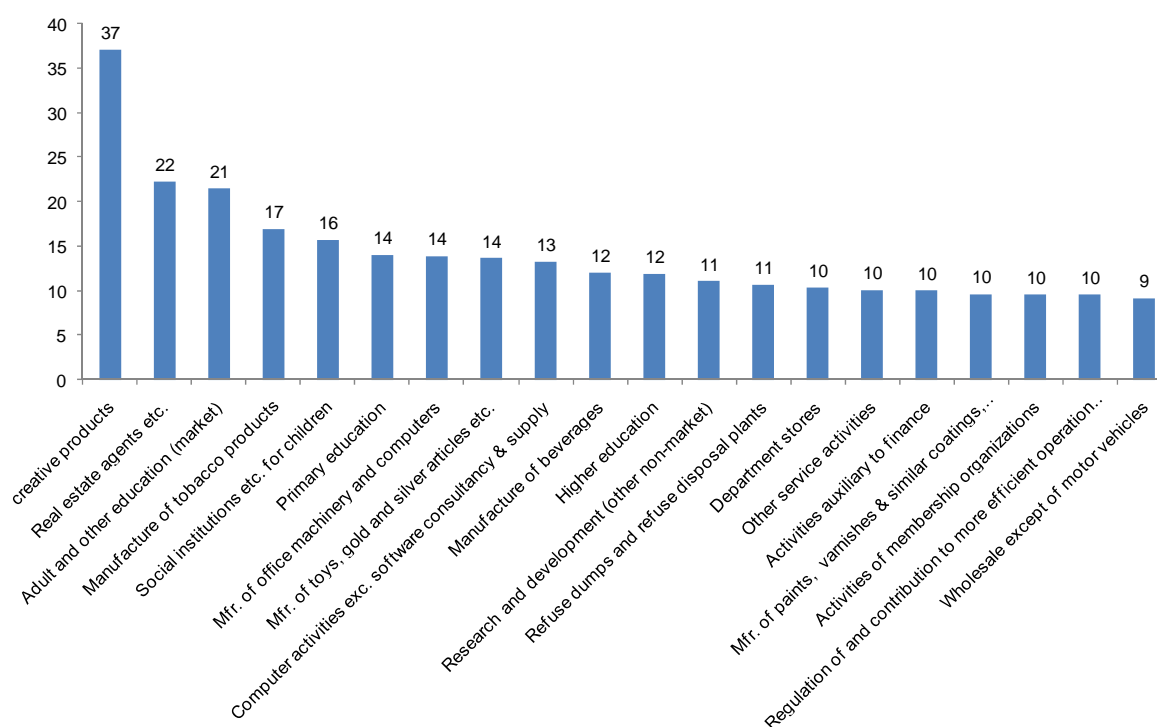creative products, 1992-2004**

Figure A.6: Final demand for UK creative products, 2004

*Source*: ONS UK Input-Output Supply and Use Tables, used in Experian (2007).

Figure A.7: Creative inputs used by other industries (in percent)

Note: This figure shows the twenty industries which receive the largest share of intermediate inputs from the creative industries in relation to the total industries' intermediate input.

Source: Danish Input-output supply and use table 2005.

Figure A.8: Proportion of enterprises that made significant changes to the product design of goods and services, 2004–2006
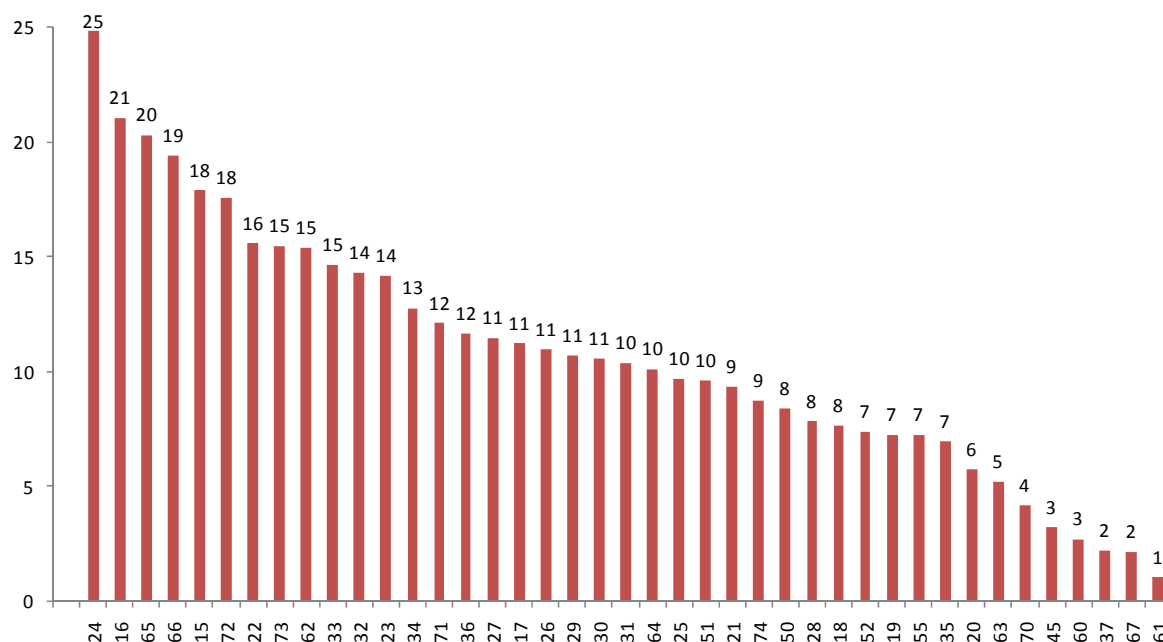
Note: The x axis contains the NACE codes. The sample includes Bulgaria, Cyprus, Czech Republic and Romania. All numbers are weighted to reflect the population of firms.
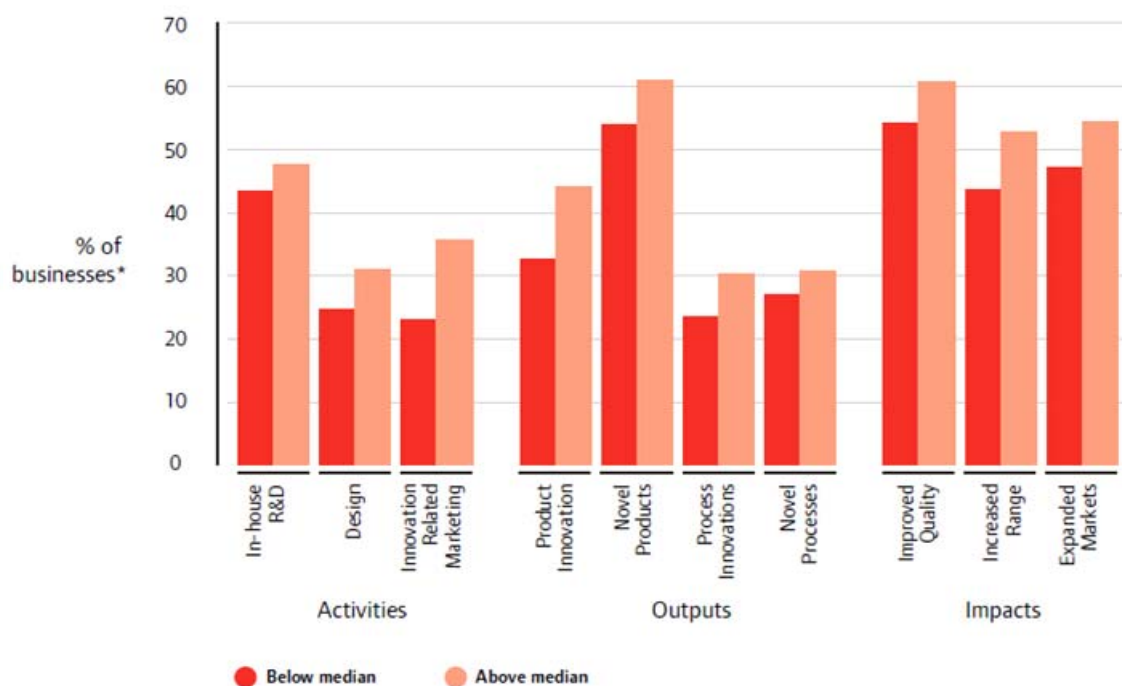
Source: Community Innovation survey 2006, WIFO calculations based on Eurostat data.

Figure A.9: The percentage of firms engaged in various innovation-related activities, UK, 2005–2007
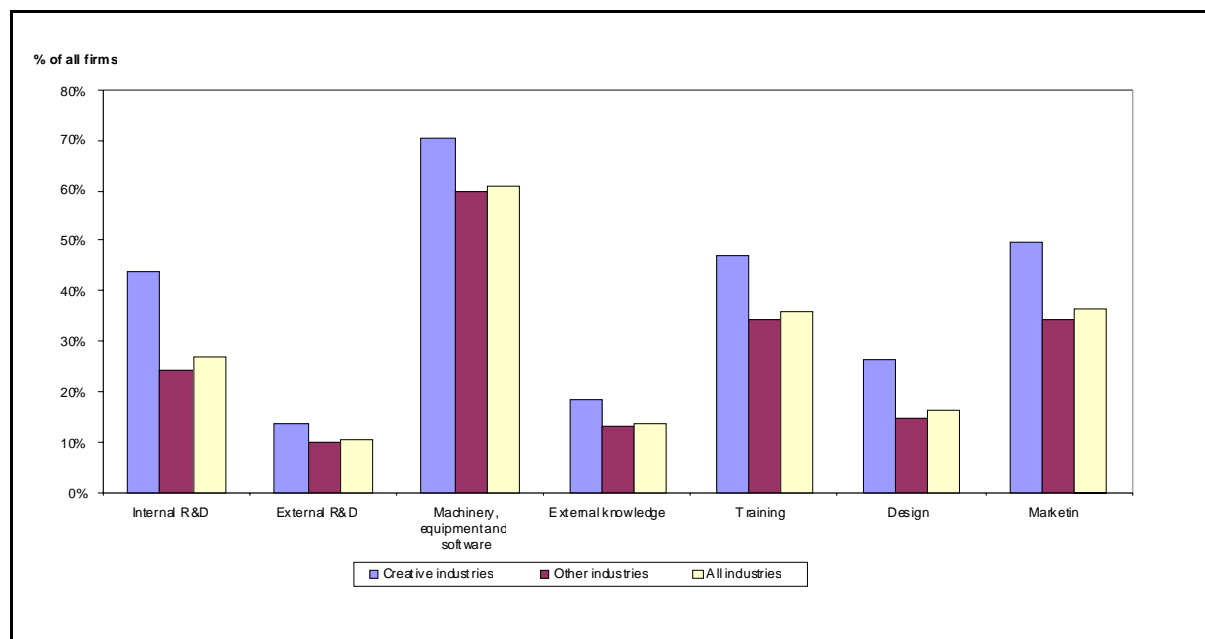
Figure A.10: Innovation performance of industries with strongest and weakest creative sector linkages (purchases of creative products), UK, 2002-2004

Sectoral Competitiveness Indicators

Explanatory notes

Geographical coverage: all indicators refer to EU-27

Production index[19]: The production index is actually an index of final production in volume terms.

Labour productivity: this indicator is calculated by combining the indexes of production and number of persons employed or number of hours worked[20]. Therefore, this indicator measures final production per person of final production per hour worked.

Unit Labour Cost: it is calculated from the production index and the index of wages and salaries and measures labour cost per unit of production. "Wages and salaries" is defined (Eurostat) as "the total remuneration, in cash or in kind, payable to all persons counted on the payroll (including homeworkers), in return for work done during the accounting period, regardless of whether it is paid on the basis of working time, output or piecework and whether it is paid regularly wages and salaries do not include social contributions payable by the employer".

Relative Trade Balance: it is calculated, for sector "i", as (Xi-Mi)/(Xi+Mi), where Xi and Mi are EU-27 exports and imports of products of sector "i" to and from the rest of the World.

Revealed Comparative Advantage (RCA):

The RCA indicator for product "i" is defined as follows:

$$RCA_i = \frac{\dfrac{X_{EU,i}}{\sum_i X_{EU,i}}}{\dfrac{X_{W,i}}{\sum_i X_{W,i}}}$$

where: X=value of exports; the reference group ('W') is the EU-25 plus 38 other countries (see list below); the source used is the UN COMTRADE database. In the calculation of RCA, X_{EU} stands for exports to the rest of the world (excluding intra-EU trade) and X_W measures exports to the rest of the world by the countries in the reference group. The latter consists of the EU-25 plus the following countries: Afghanistan, Albania, Algeria, Angola, Argentina, Armenia, Australia, Azerbaijan, Bahamas, Bahrain, Bangladesh, Belarus, Belize, Benin, Bhutan, Bolivia, Bosnia Herzegovina, Botswana, Brazil, Brunei, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, Central African Rep., Chad, Chile, China, China, Hong Kong SAR, China, Macao SAR, Colombia, Comoros, Congo, Costa Rica, Côte d'Ivoire, Croatia, Cuba, Dem. People's Rep. of Korea, Dem. Rep. of the Congo, Djibouti, Dominican

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[19] The data are working-day adjusted for production.
[20] The data are working-day adjusted for hours worked.

Rep., Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Georgia, Ghana, Guatemala, Guinea, Guinea-Bissau, Haiti, Honduras, Iceland, India, Indonesia, Iran, Iraq, Israel, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Lao People's Dem. Rep., Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Maldives, Mali, Mauritania, Mauritius, Mexico, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Neth. Antilles, New Zealand, Nicaragua, Niger, Nigeria, Norway, Occ. Palestinian Terr., Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Qatar, Rep. of Korea, Rep. of Moldova, Russian Federation, Rwanda, Saudi Arabia, Senegal, Serbia, Sierra Leone, Singapore, Somalia,, South Africa, Sri Lanka, Sudan, Suriname, Swaziland, Switzerland, Syria, Tajikistan, TFYR of Macedonia, Thailand, Timor-Leste, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Rep. of Tanzania, Uruguay, USA, Uzbekistan, Venezuela, Viet Nam, Yemen, Zambia, Zimbabwe

Statistical nomenclatures: the indicators in tables 6.1 to 6.6 are presented at the level of divisions of the statistical classification of economic activities in the European Community (NACE Rev.2[21]), while those in tables 6.7 and 6.8 are presented in terms of divisions of the statistical classification of products by activity (CPA).

Data sources: tables 6.1 to 6.6 are based on Eurostat's short-term indicators data. Tables 6.7 and 6.8 are based on United Nations' COMTRADE.

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[21] Compared to the statistical annexes of the previous publications, the new activity classification is used: NACE REV 2. The correspondance tables from NACE Rev. 2 – NACE Rev. 1.1 and from NACE Rev. 1.1 to NACE Rev. 2, are available on Eurostat:
http://epp.eurostat.ec.europa.eu/portal/page/portal/nace_rev2/introduction

Table 6.1.1: EU-27 - Industry production index, annual growth rate (%)

Code (NACE Rev. 2)	Sector	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 2004-2009
B	MINING AND QUARRYING	-1.1	1.9	-2.3	-3.1	0.5	-3.2	-2.1	-6.4	-4.3	0.4	-3.6	-11.1	-5.1
C	MANUFACTURING	3.9	1.2	5.4	0.1	-0.7	0.3	2.6	1.5	4.9	4.1	-1.9	-14.9	-1.5
C10	Manufacture of food products	1.8	1.1	1.1	1.2	2.1	0.1	2.1	2.3	1.4	1.9	-0.7	-0.7	0.8
C11	Manufacture of beverages	-0.6	6.1	-1.3	2.7	2.7	2.0	-2.3	1.2	4.3	1.6	-2.0	-2.7	0.5
C12	Manufacture of tobacco products	0.6	-3.2	-7.0	-2.9	-2.5	-6.9	-6.4	-4.2	-5.1	1.2	-16.7	-2.0	-5.5
C13	Manufacture of textiles	-0.4	-5.6	2.1	-3.2	-4.7	-3.3	-4.4	-5.7	-0.4	-1.3	-9.8	-17.2	-7.1
C14	Manufacture of wearing apparel	-3.6	-9.2	-4.7	-4.4	-10.8	-6.4	-5.0	-9.0	2.4	2.3	-3.3	-11.5	-4.0
C15	Manufacture of leather and related products	-4.5	-4.0	-2.3	-5.3	-7.6	-7.1	-11.5	-8.8	-1.7	-1.5	-7.6	-13.0	-6.6
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	7.9	3.2	7.0	-3.9	0.5	2.1	3.2	0.0	4.3	1.0	-8.6	-14.5	-3.8
C17	Manufacture of paper and paper products	0.3	3.1	3.4	-2.3	3.5	1.7	3.3	-0.4	3.3	2.6	-3.4	-9.2	-1.5
C18	Printing and reproduction of recorded media	8.8	2.6	1.9	-2.5	-0.5	-1.5	1.2	2.1	0.4	0.5	-2.6	-7.6	-1.5
C19	Manufacture of coke and refined petroleum products	0.9	-4.8	6.1	0.1	-3.6	2.3	5.7	-0.1	2.0	-0.3	3.1	-7.9	-0.7
C20	Manufacture of chemicals and chemical products	1.2	2.3	4.9	-1.7	2.4	-0.4	3.1	1.3	3.6	3.2	-3.4	-11.4	-1.5
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	8.4	8.3	5.0	10.1	6.3	5.8	-0.6	4.5	7.2	1.6	1.6	2.8	3.5
C22	Manufacture of rubber and plastic products	4.7	2.1	4.8	-0.5	-0.1	2.0	1.8	0.8	4.2	4.5	-4.5	-13.8	-2.0
C23	Manufacture of other non-metallic mineral products	2.6	2.3	3.9	-0.6	-1.7	0.5	1.8	0.6	4.3	2.0	-6.6	-18.8	-4.1
C24	Manufacture of basic metals	1.6	-3.8	7.1	-1.8	-0.1	-0.3	3.9	-1.6	5.5	1.3	-2.8	-26.7	-5.6
C25	Manufacture of fabricated metal products, except machinery and equipment	4.6	0.5	6.5	0.3	-0.3	0.8	2.6	1.6	5.0	6.0	-2.4	-22.2	-3.0
C26	Manufacture of computer, electronic and optical products	5.3	5.2	16.4	-5.5	-9.0	1.6	7.4	4.7	10.0	8.8	2.2	-17.7	1.0
C27	Manufacture of electrical equipment	0.0	2.4	9.4	-0.1	-3.0	-2.3	3.1	1.2	8.5	4.9	-0.1	-20.6	-1.8
C28	Manufacture of machinery and equipment n.e.c.	3.0	-1.9	6.0	1.4	-2.0	-0.8	4.1	3.9	8.3	8.4	1.3	-25.9	-1.8
C29	Manufacture of motor vehicles, trailers and semi-trailers	11.3	3.7	7.2	2.3	0.8	2.0	5.0	1.7	3.1	6.0	-6.0	-24.3	-4.6
C30	Manufacture of other transport equipment	3.3	-0.2	1.2	0.8	-4.1	1.1	0.8	2.7	9.0	3.9	4.3	-6.1	2.6
C31	Manufacture of furniture	6.1	3.2	1.7	-1.7	-4.3	-2.4	0.5	0.4	3.3	3.1	-4.9	-16.8	-3.3
C32	Other manufacturing	3.7	1.7	5.0	3.6	2.4	-1.1	1.4	1.3	5.0	1.8	-0.9	-5.7	0.2
C33	Repair and installation of machinery and equipment	1.3	0.4	4.9	0.4	-3.8	-0.7	4.9	1.6	9.2	3.8	5.3	-8.5	2.1
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	-1.9	2.4	3.4	2.2	0.3	3.1	2.3	1.6	1.3	-0.7	-0.1	-5.0	-0.6
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
F	CONSTRUCTION	2.4	4.2	4.1	0.4	1.2	1.8	0.7	1.7	3.6	2.2	-3.7	-8.9	-1.1

N/A: Data not available
Source: Eurostat

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Table 6.1.2: EU-27 - Number of persons employed, annual growth rate (%)

Code (NACE Rev. 2)	Sector	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 2004-2009
B	MINING AND QUARRYING	N/A	-8.1	-8.2	-3.2	-4.7	-4.5	-4.7	-3.3	-3.9	-3.5	-1.6	-4.0	-3.3
C	MANUFACTURING	0.6	-1.8	-0.6	0.0	-2.0	-2.0	-1.9	-1.4	-0.8	0.5	-0.3	-7.3	-1.9
C10	Manufacture of food products	0.8	-0.7	-0.7	-0.6	-0.9	-0.5	-1.2	0.1	-0.1	0.1	-0.1	-2.1	-0.4
C11	Manufacture of beverages	N/A	N/A	N/A	-1.8	-1.1	-1.8	-1.2	-1.6	-1.2	-0.1	-1.3	-6.9	-2.3
C12	Manufacture of tobacco products	N/A	-9.2	-3.6	-3.3	-0.4	-5.7	-5.6	-2.7	-1.6	-9.6	-7.8	-4.4	-5.3
C13	Manufacture of textiles	-2.3	-6.9	-3.8	-3.3	-5.1	-7.1	-6.4	-4.5	-5.9	-5.3	-6.5	-13.7	-7.3
C14	Manufacture of wearing apparel	N/A	-3.9	-5.4	-3.3	-3.6	-3.9	-6.3	-7.8	-5.8	-5.8	-6.5	-13.0	-7.8
C15	Manufacture of leather and related products	-3.1	-6.5	-3.2	-1.0	-0.8	-4.3	-6.8	-5.7	-2.8	-3.2	-5.7	-12.0	-5.9
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1.2	-0.3	-1.3	-1.1	-1.7	-1.2	-1.4	-0.8	-1.1	0.8	-2.3	-12.5	-3.3
C17	Manufacture of paper and paper products	1.2	-3.4	-1.5	-1.6	-0.8	-2.9	-1.6	-2.6	-2.5	-2.6	-2.0	-4.6	-2.9
C18	Printing and reproduction of recorded media	-0.7	-0.9	-0.8	-0.4	-2.3	-4.0	-2.0	-3.3	-1.6	0.0	-2.3	-7.2	-2.9
C19	Manufacture of coke and refined petroleum products	N/A	-2.2	-1.5	-2.6	-3.2	-3.5	-2.5	-2.8	-3.9	1.2	-0.8	-3.5	-2.0
C20	Manufacture of chemicals and chemical products	-1.3	-2.8	-2.8	-0.8	-1.7	-2.6	-3.2	-2.1	-1.2	-0.6	-2.0	-5.0	-2.2
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	-0.2	0.4	1.5	1.9	2.3	-0.3	-2.6	-1.2	1.8	0.9	-2.2	-3.0	-0.8
C22	Manufacture of rubber and plastic products	3.8	-0.9	2.4	1.0	-0.9	0.3	-0.1	-0.7	-0.8	1.5	0.6	-6.5	-1.2
C23	Manufacture of other non-metallic mineral products	0.6	-2.1	-0.6	-0.7	-2.4	-2.6	-2.1	-1.0	-0.6	1.3	-2.1	-10.8	-2.8
C24	Manufacture of basic metals	0.3	-3.6	-4.3	-0.3	-4.1	-3.2	-3.9	-1.2	-1.0	-0.4	-0.5	-7.9	-2.2
C25	Manufacture of fabricated metal products, except machinery and equipment	2.1	0.0	0.8	0.8	-1.1	-1.2	0.1	-0.3	1.4	3.3	2.6	-8.5	-0.4
C26	Manufacture of computer, electronic and optical products	0.7	-2.1	4.1	2.0	-5.7	-4.3	-2.8	-1.1	-0.7	1.1	-2.0	-8.3	-2.3
C27	Manufacture of electrical equipment	2.4	-1.7	1.8	0.1	-3.9	-4.1	-1.3	-0.5	1.0	2.6	1.2	-7.2	-0.7
C28	Manufacture of machinery and equipment n.e.c.	1.0	-2.7	-2.2	1.1	-1.5	-2.2	-2.5	-0.9	0.8	2.9	2.2	-5.1	-0.1
C29	Manufacture of motor vehicles, trailers and semi-trailers	3.2	0.2	2.0	1.8	-1.0	-0.4	0.1	-0.8	-1.0	-0.2	0.8	-9.4	-2.2
C30	Manufacture of other transport equipment	-1.4	-2.0	-2.4	-0.1	-1.4	-2.7	-1.6	0.6	0.6	2.9	2.0	-3.6	0.5
C31	Manufacture of furniture	N/A	N/A	N/A	0.5	-3.4	0.1	-2.5	-2.5	-1.3	0.2	-2.3	-9.9	-3.2
C32	Other manufacturing	-1.0	-2.0	-5.3	1.0	-1.6	-0.3	-1.1	-1.7	-0.5	0.2	0.3	-3.5	-1.1
C33	Repair and installation of machinery and equipment	1.6	-1.9	-5.0	0.0	-2.8	-2.4	-1.0	-0.7	0.4	0.4	3.6	-2.5	0.2
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	N/A	-3.3	-4.0	-2.8	-4.3	-4.4	-3.8	-2.4	-1.2	-1.4	-1.0	-0.2	-1.2
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	N/A	-0.7	0.9	-1.5	-0.7	0.0	-0.9	-1.6	1.4	0.0	-0.9	0.9	0.0
F	CONSTRUCTION	1.5	1.1	0.1	0.2	-0.5	0.7	1.4	2.5	4.0	4.8	-1.0	-7.9	0.4

N/A: Data not available
Source: Eurostat

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Table 6.1.3: EU-27 - Number of hours worked, annual growth rate (%)

Code (NACE Rev. 2)	Sector	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 2004-2009
B	MINING AND QUARRYING	N/A	N/A	N/A	-3.0	-8.3	-2.7	-4.2	-3.3	-4.1	-2.9	-1.5	-4.8	-3.3
C	MANUFACTURING	N/A	N/A	N/A	-1.2	-2.5	-2.3	-1.2	-1.6	-0.3	0.3	-0.8	-8.5	-2.2
C10	Manufacture of food products	N/A	N/A	N/A	-1.0	-2.3	-1.8	-0.4	-0.6	0.0	-0.3	0.1	-2.6	-0.7
C11	Manufacture of beverages	N/A	N/A	N/A	-0.8	-3.9	-0.7	0.2	-3.0	-3.8	-0.4	-1.9	-5.5	-3.0
C12	Manufacture of tobacco products	N/A	N/A	N/A	2.6	-2.8	-8.5	-6.2	-4.2	-6.0	-3.0	-9.1	-6.1	-5.7
C13	Manufacture of textiles	N/A	N/A	N/A	-3.3	-4.8	-6.3	-5.3	-5.8	-5.5	-2.4	-5.4	-13.4	-6.6
C14	Manufacture of wearing apparel	N/A	N/A	N/A	-4.0	-3.5	-3.8	-3.7	-4.1	-4.4	-5.1	-6.1	-13.8	-6.8
C15	Manufacture of leather and related products	N/A	N/A	N/A	-3.2	-1.3	-2.0	-2.3	-4.7	-0.9	-4.9	-5.3	-9.9	-5.2
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	N/A	N/A	N/A	-3.7	-2.0	-1.8	-0.4	-1.4	-0.2	-0.1	-3.4	-13.4	-3.8
C17	Manufacture of paper and paper products	N/A	N/A	N/A	-2.1	-2.3	-1.0	-1.9	-2.2	-1.5	-1.5	-3.5	-5.8	-2.9
C18	Printing and reproduction of recorded media	N/A	N/A	N/A	-0.3	-3.7	-3.7	-3.0	-3.4	-0.7	0.5	-2.0	-5.9	-2.3
C19	Manufacture of coke and refined petroleum products	N/A	N/A	N/A	-2.4	-4.3	-1.4	-0.1	-1.0	-3.3	0.8	2.5	-8.7	-2.0
C20	Manufacture of chemicals and chemical products	N/A	N/A	N/A	-2.2	-2.6	-2.4	-1.7	-2.9	-1.4	-1.3	-1.5	-4.9	-2.4
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	N/A	N/A	N/A	0.3	2.0	-0.1	-1.3	-1.7	-0.4	0.2	-0.7	-3.0	-1.1
C22	Manufacture of rubber and plastic products	N/A	N/A	N/A	0.0	-1.5	-1.4	0.0	-1.6	1.3	1.1	-0.7	-7.7	-1.6
C23	Manufacture of other non-metallic mineral products	N/A	N/A	N/A	-2.5	-3.2	-3.1	-1.2	-1.2	-0.3	0.8	-2.5	-11.7	-3.1
C24	Manufacture of basic metals	N/A	N/A	N/A	-2.2	-3.6	-5.0	-2.4	-2.4	-0.4	-0.2	-1.4	-11.1	-3.2
C25	Manufacture of fabricated metal products, except machinery and equipment	N/A	N/A	N/A	-0.6	-1.4	-1.8	-0.4	-0.8	1.2	2.5	3.3	-10.3	-1.0
C26	Manufacture of computer, electronic and optical products	N/A	N/A	-2.1	0.4	-4.9	-3.6	-2.5	-1.7	-0.4	1.3	-1.4	-10.5	-2.6
C27	Manufacture of electrical equipment	N/A	N/A	N/A	-1.1	-2.6	-3.9	-1.5	-2.0	2.1	1.9	1.0	-10.9	-1.7
C28	Manufacture of machinery and equipment n.e.c.	N/A	N/A	N/A	-0.6	-2.4	-2.2	-1.2	-1.4	1.4	2.9	1.1	-8.9	-1.1
C29	Manufacture of motor vehicles, trailers and semi-trailers	N/A	N/A	-0.9	0.4	-1.2	-0.7	0.5	-0.7	-1.4	0.7	-1.3	-13.0	-3.3
C30	Manufacture of other transport equipment	N/A	N/A	N/A	-1.2	-2.6	-2.1	-2.1	0.1	1.2	2.1	0.8	-3.9	0.0
C31	Manufacture of furniture	N/A	N/A	N/A	0.3	-4.3	-3.1	-1.1	-3.6	0.4	0.8	-3.3	-10.8	-3.4
C32	Other manufacturing	N/A	N/A	N/A	-0.5	-2.4	-2.1	0.3	-2.6	-0.2	0.3	0.3	-4.7	-1.4
C33	Repair and installation of machinery and equipment	N/A	N/A	N/A	-2.4	-3.4	-3.8	-2.5	-0.9	1.3	-0.4	1.4	3.5	1.0
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	N/A	N/A	N/A	-1.5	-4.9	-4.8	-2.8	-1.2	-2.1	-0.9	-0.7	-0.8	-1.1
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	N/A	N/A	N/A	-1.5	-1.4	-0.2	0.4	-3.6	-0.4	0.2	0.6	-1.2	-0.9
F	CONSTRUCTION	0.4	1.5	1.9	-1.1	-2.3	-0.5	0.2	5.9	4.0	3.8	-1.8	-9.6	0.3

N/A: Data not available
Source: Eurostat

Table 6.1.4: EU-27 - Labour productivity per person employed, annual growth rate (%)

Code (NACE Rev. 2)	Sector	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 2004-2009
B	MINING AND QUARRYING	N/A	10.8	6.4	0.1	5.5	1.4	2.8	-3.2	-0.4	4.1	-2.0	-7.3	-1.8
C	MANUFACTURING	3.2	3.1	6.0	0.1	1.3	2.4	4.7	3.0	5.7	3.6	-1.6	-8.2	0.4
C10	Manufacture of food products	1.0	1.8	1.8	1.8	3.0	0.6	3.3	2.2	1.5	1.8	-0.6	1.4	1.2
C11	Manufacture of beverages	N/A	N/A	N/A	4.6	3.8	3.8	-1.2	2.8	5.6	1.7	-0.7	4.5	2.8
C12	Manufacture of tobacco products	N/A	6.7	-3.5	0.4	-2.1	-1.2	-0.9	-1.5	-3.5	11.9	-9.6	2.5	-0.3
C13	Manufacture of textiles	1.9	1.3	6.0	0.1	0.4	4.2	2.1	-1.3	5.9	4.3	-3.6	-4.1	0.2
C14	Manufacture of wearing apparel	N/A	-5.6	0.8	-1.2	-7.5	-2.5	1.4	-1.3	8.7	8.5	3.4	1.8	4.1
C15	Manufacture of leather and related products	-1.5	2.6	0.9	-4.3	-6.8	-2.9	-5.0	-3.2	1.1	1.8	-2.0	-1.1	-0.7
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	6.6	3.4	8.4	-2.8	2.2	3.4	4.7	0.8	5.4	0.1	-6.5	-2.3	-0.6
C17	Manufacture of paper and paper products	-0.9	6.7	5.0	-0.8	4.4	4.7	5.0	2.3	5.9	5.3	-1.4	-4.8	1.4
C18	Printing and reproduction of recorded media	9.6	3.5	2.7	-2.1	1.8	2.6	3.2	5.6	2.0	0.5	-0.4	-0.3	1.5
C19	Manufacture of coke and refined petroleum products	N/A	-2.6	7.7	2.8	-0.4	6.0	8.4	2.8	6.2	-1.5	3.9	-4.5	1.3
C20	Manufacture of chemicals and chemical products	2.4	5.3	7.9	-0.8	4.1	2.3	6.5	3.5	4.8	3.8	-1.3	-6.7	0.7
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	8.5	7.8	3.4	8.0	3.8	6.1	2.0	5.8	5.3	0.7	3.8	6.0	4.3
C22	Manufacture of rubber and plastic products	0.9	3.1	2.3	-1.5	0.8	1.7	2.0	1.6	5.0	2.9	-5.0	-7.9	-0.8
C23	Manufacture of other non-metallic mineral products	2.0	4.5	4.5	0.1	0.7	3.2	4.0	1.7	4.9	0.7	-4.6	-8.9	-1.4
C24	Manufacture of basic metals	1.3	-0.2	11.9	-1.5	4.2	3.0	8.1	-0.4	6.5	1.7	-2.3	-20.4	-3.4
C25	Manufacture of fabricated metal products, except machinery and equipment	2.4	0.5	5.6	-0.5	0.8	2.0	2.5	1.9	3.6	2.6	-4.9	-14.9	-2.6
C26	Manufacture of computer, electronic and optical products	4.6	7.4	11.8	-7.3	-3.4	6.1	10.6	5.9	10.7	7.6	4.3	-10.3	3.4
C27	Manufacture of electrical equipment	-2.3	4.1	7.5	-0.2	0.9	1.8	4.5	1.7	7.4	2.2	-1.3	-14.4	-1.1
C28	Manufacture of machinery and equipment n.e.c.	2.0	0.8	8.4	0.3	-0.5	1.4	6.8	4.8	7.5	5.4	-0.9	-21.9	-1.7
C29	Manufacture of motor vehicles, trailers and semi-trailers	7.8	3.6	5.2	0.5	1.9	2.3	4.9	2.5	4.1	6.2	-6.8	-16.5	-2.5
C30	Manufacture of other transport equipment	4.8	1.8	3.7	0.8	-2.7	3.8	2.4	2.1	8.4	1.0	2.3	-2.7	2.2
C31	Manufacture of furniture	N/A	N/A	N/A	-2.2	-0.9	-2.5	3.1	2.9	4.6	2.9	-2.7	-7.7	-0.1
C32	Other manufacturing	4.8	3.7	10.9	2.6	4.1	-0.7	2.5	3.1	5.5	1.5	-1.2	-2.2	1.3
C33	Repair and installation of machinery and equipment	-0.3	2.3	10.3	0.4	-1.0	1.8	6.0	2.3	8.7	3.4	1.6	-6.1	1.9
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	N/A	5.9	7.8	5.2	4.9	7.8	6.3	4.1	2.5	0.7	0.9	-4.9	0.6
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
F	CONSTRUCTION	0.9	3.0	3.9	0.2	1.6	1.1	-0.6	-0.7	-0.3	-2.5	-2.7	-1.0	-1.5

N/A: Data not available
Source: Eurostat

Table 6.1.5: EU-27 - Labour productivity per hour worked, annual growth rate (%)

Code (NACE Rev. 2)	Sector	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 2004-2009
B	MINING AND QUARRYING	N/A	N/A	N/A	0.0	9.5	-0.5	2.2	-3.2	-0.2	3.5	-2.2	-6.6	-1.8
C	MANUFACTURING	N/A	N/A	N/A	1.2	1.9	2.7	3.9	3.2	5.1	3.7	-1.1	-7.0	0.7
C10	Manufacture of food products	N/A	N/A	N/A	2.2	4.5	1.9	2.5	2.9	1.3	2.2	-0.8	1.9	1.5
C11	Manufacture of beverages	N/A	N/A	N/A	3.5	6.9	2.7	-2.6	4.4	8.5	2.0	0.0	3.0	3.5
C12	Manufacture of tobacco products	N/A	N/A	N/A	-5.3	0.3	1.9	-0.2	0.0	1.0	4.3	-8.3	4.5	0.2
C13	Manufacture of textiles	N/A	N/A	N/A	0.2	0.1	3.3	0.9	0.1	5.4	1.2	-4.6	-4.4	-0.5
C14	Manufacture of wearing apparel	N/A	N/A	N/A	-0.4	-7.6	-2.7	-1.3	-5.1	7.1	7.7	3.0	2.7	3.0
C15	Manufacture of leather and related products	N/A	N/A	N/A	-2.1	-6.4	-5.2	-9.5	-4.3	-0.8	3.6	-2.4	-3.4	-1.5
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	N/A	N/A	N/A	-0.2	2.5	4.0	3.7	1.3	4.6	1.1	-5.4	-1.3	0.0
C17	Manufacture of paper and paper products	N/A	N/A	N/A	-0.2	5.9	2.7	5.3	1.9	4.9	4.2	0.1	-3.6	1.4
C18	Printing and reproduction of recorded media	N/A	N/A	N/A	-2.2	3.3	2.3	4.3	5.8	1.1	0.1	-0.6	-1.8	0.9
C19	Manufacture of coke and refined petroleum products	N/A	N/A	N/A	2.6	0.7	3.7	5.8	0.9	5.4	-1.1	0.6	0.9	1.3
C20	Manufacture of chemicals and chemical products	N/A	N/A	N/A	0.5	5.1	2.1	4.9	4.4	5.1	4.5	-1.9	-6.8	0.9
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	N/A	N/A	N/A	9.8	4.2	6.0	0.7	6.4	7.6	1.4	2.2	6.0	4.7
C22	Manufacture of rubber and plastic products	N/A	N/A	N/A	-0.5	1.4	3.4	1.8	2.4	2.9	3.4	-3.8	-6.6	-0.4
C23	Manufacture of other non-metallic mineral products	N/A	N/A	N/A	2.0	1.6	3.7	3.1	1.8	4.6	1.2	-4.2	-8.0	-1.0
C24	Manufacture of basic metals	N/A	N/A	N/A	0.4	3.7	5.0	6.4	0.8	5.9	1.5	-1.4	-17.5	-2.5
C25	Manufacture of fabricated metal products, except machinery and equipment	N/A	N/A	N/A	0.9	1.1	2.6	3.0	2.4	3.8	3.5	-5.5	-13.2	-2.0
C26	Manufacture of computer, electronic and optical products	N/A	6.4	12.3	-5.9	-4.3	5.4	10.2	6.5	10.4	7.4	3.6	-8.1	3.8
C27	Manufacture of electrical equipment	N/A	N/A	N/A	1.1	-0.4	1.6	4.6	3.2	6.2	2.9	-1.0	-10.9	-0.1
C28	Manufacture of machinery and equipment n.e.c.	N/A	N/A	N/A	2.0	0.4	1.4	5.3	5.3	6.8	5.4	0.2	-18.7	-0.7
C29	Manufacture of motor vehicles, trailers and semi-trailers	N/A	5.5	5.0	1.9	2.0	2.7	4.5	2.4	4.6	5.3	-4.7	-13.0	-1.3
C30	Manufacture of other transport equipment	N/A	N/A	N/A	1.9	-1.6	3.3	2.9	2.6	7.7	1.8	3.5	-2.3	2.6
C31	Manufacture of furniture	N/A	N/A	N/A	-2.0	0.0	0.7	1.6	4.1	2.8	2.3	-1.7	-6.7	0.1
C32	Other manufacturing	N/A	N/A	N/A	4.1	4.9	1.1	1.1	3.9	5.2	1.4	-1.2	-1.0	1.6
C33	Repair and installation of machinery and equipment	N/A	N/A	N/A	2.9	-0.4	3.3	7.6	2.5	7.8	4.2	3.8	-11.5	1.1
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	N/A	N/A	N/A	3.8	5.5	8.3	5.2	2.8	3.4	0.2	0.6	-4.2	0.5
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
F	CONSTRUCTION	2.0	2.7	2.1	1.6	3.6	2.3	0.5	-3.9	-0.4	-1.5	-1.9	0.9	-1.4

N/A: Data not available
Source: Eurostat

Table 6.1.6: EU-27 - Unit labour cost, annual growth rate (%)

Code (NACE Rev. 2)	Sector	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 2004-2009
B	MINING AND QUARRYING	-2.3	-4.2	-2.6	8.2	-0.7	7.1	4.0	1.4	8.9	4.9	10.8	11.7	7.5
C	MANUFACTURING	-0.9	1.4	-0.8	2.9	1.6	0.2	-1.3	-0.4	-2.3	-0.1	5.9	10.0	2.5
C10	Manufacture of food products	0.5	1.5	-0.2	2.4	0.8	2.8	-0.6	-0.7	0.3	1.5	5.1	0.9	1.4
C11	Manufacture of beverages	N/A	N/A	N/A	0.7	-1.8	2.0	3.7	-1.6	-4.2	0.8	5.0	1.0	0.2
C12	Manufacture of tobacco products	2.3	5.0	8.6	5.8	2.6	8.1	8.3	5.9	6.7	-2.3	16.3	2.9	5.7
C13	Manufacture of textiles	2.4	6.7	7.7	2.0	3.1	0.5	0.4	2.9	-2.8	0.6	9.1	5.3	3.0
C14	Manufacture of wearing apparel	4.1	10.1	14.9	1.2	9.5	2.6	1.8	4.3	-3.6	-0.4	3.2	2.6	1.2
C15	Manufacture of leather and related products	6.3	4.6	15.6	9.3	7.5	4.1	9.4	5.5	4.6	4.7	10.2	4.9	6.0
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	-4.6	-0.8	-5.3	5.3	-0.7	-1.7	-0.5	1.1	-0.4	4.8	11.8	5.3	4.4
C17	Manufacture of paper and paper products	1.5	-0.5	-0.1	5.1	-2.6	-1.9	-1.8	1.3	-2.9	-1.2	3.9	4.2	1.0
C18	Printing and reproduction of recorded media	-6.1	0.1	2.9	5.6	0.7	-1.2	-1.0	-1.6	-0.6	0.9	4.9	1.9	1.1
C19	Manufacture of coke and refined petroleum products	-2.1	7.7	6.2	0.0	8.7	-5.5	-2.2	3.1	1.2	2.2	5.6	7.5	3.9
C20	Manufacture of chemicals and chemical products	-0.5	-1.0	-0.1	3.4	-1.3	1.9	-3.1	-0.3	-3.5	-0.3	5.3	9.9	2.1
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	N/A	N/A	N/A	-5.7	-1.1	-1.1	1.3	-2.9	-4.3	4.3	-0.5	-2.6	-1.2
C22	Manufacture of rubber and plastic products	-0.7	1.3	0.3	3.4	1.5	-0.3	0.5	0.1	-3.0	-0.9	7.9	8.3	2.4
C23	Manufacture of other non-metallic mineral products	-0.5	0.0	-2.3	2.1	2.8	0.2	-1.0	0.7	-1.5	2.4	9.1	12.4	4.5
C24	Manufacture of basic metals	1.3	4.1	-5.4	-1.9	-1.4	0.3	-2.5	4.1	-2.0	3.0	6.0	23.5	6.6
C25	Manufacture of fabricated metal products, except machinery and equipment	-1.2	2.2	-4.4	4.0	1.5	-0.1	0.1	-0.1	-1.0	0.8	10.2	15.1	4.8
C26	Manufacture of computer, electronic and optical products	-2.6	-2.4	-3.2	11.9	6.0	-5.8	-7.2	-4.3	-8.2	-5.7	0.1	11.9	-1.5
C27	Manufacture of electrical equipment	2.8	-0.5	-4.3	2.6	2.1	0.1	-1.4	-0.7	-4.2	0.5	5.0	13.1	2.6
C28	Manufacture of machinery and equipment n.e.c.	0.3	3.9	-2.9	2.9	2.9	1.7	-1.9	-2.4	-3.6	-1.6	4.7	27.1	4.2
C29	Manufacture of motor vehicles, trailers and semi-trailers	-5.7	1.2	0.5	0.9	0.8	0.4	-2.6	-0.3	0.0	-5.3	9.2	16.2	3.7
C30	Manufacture of other transport equipment	-0.9	3.5	0.8	3.9	8.2	0.6	-1.3	0.6	-4.7	1.3	2.0	9.8	1.7
C31	Manufacture of furniture	N/A	N/A	N/A	5.3	4.4	-0.5	-1.3	-0.2	-0.4	0.6	7.3	11.4	3.6
C32	Other manufacturing	-2.1	0.2	-11.3	1.1	-0.5	1.2	0.8	-1.1	-2.2	3.2	3.7	2.5	1.2
C33	Repair and installation of machinery and equipment	2.0	2.2	-1.1	3.9	4.8	0.6	-3.2	0.5	-5.8	0.7	1.6	10.0	1.3
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	-0.2	-1.4	-1.3	-0.9	2.3	-1.8	-1.3	0.6	3.9	5.1	4.7	9.5	4.7
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
F	CONSTRUCTION	-0.7	-0.2	-3.5	4.6	3.1	0.7	2.0	7.1	3.1	7.3	7.0	2.1	5.3

N/A: Data not available
Source: Eurostat

Table 6.1.7: EU-27 Revealed comparative advantage index

NACE code	Product	2007	2008
C10	Manufacture of food products	1.25	1.18
C11	Manufacture of beverages	1.67	1.67
C12	Manufacture of tobacco products	1.58	1.64
C13	Manufacture of textiles	0.85	0.80
C14	Manufacture of wearing apparel	0.79	0.81
C15	Manufacture of leather and related products	1.00	0.96
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1.20	1.24
C17	Manufacture of paper and paper products	1.33	1.37
C18	Printing and reproduction of recorded media	1.24	1.70
C19	Manufacture of coke and refined petroleum products	0.87	0.89
C20	Manufacture of chemicals and chemical products	1.18	1.19
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	1.53	1.62
C22	Manufacture of rubber and plastic products	1.23	1.27
C23	Manufacture of other non-metallic mineral products	1.27	1.25
C24	Manufacture of basic metals	0.96	0.92
C25	Manufacture of fabricated metal products, except machinery and equipment	1.23	1.25
C26	Manufacture of computer, electronic and optical products	0.62	0.63
C27	Manufacture of electrical equipment	1.02	1.04
C28	Manufacture of machinery and equipment n.e.c.	1.19	1.24
C29	Manufacture of motor vehicles, trailers and semi-trailers	1.27	1.29
C30	Manufacture of other transport equipment	0.89	0.92
C31	Manufacture of furniture	1.32	1.30
C32	Other manufacturing	0.83	0.82

Note: there was a transition from NACE REV 1 to NACE REV 2, therefore the data are not completely comparable with the previous edition and are only available from 2007

Source: own calculations using Comtrade data

Table 6.1.8: EU-27 Relative trade balance (X-M)/(X+M)

NACE code	Product	2007	2008
C10	Manufacture of food products	-0.03	-0.03
C11	Manufacture of beverages	0.21	0.20
C12	Manufacture of tobacco products	0.03	0.07
C13	Manufacture of textiles	-0.01	-0.01
C14	Manufacture of wearing apparel	-0.19	-0.19
C15	Manufacture of leather and related products	-0.07	-0.08
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	0.00	0.02
C17	Manufacture of paper and paper products	0.04	0.04
C18	Printing and reproduction of recorded media	0.08	0.05
C19	Manufacture of coke and refined petroleum products	-0.03	-0.02
C20	Manufacture of chemicals and chemical products	0.03	0.03
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	0.07	0.08
C22	Manufacture of rubber and plastic products	0.04	0.04
C23	Manufacture of other non-metallic mineral products	0.08	0.08
C24	Manufacture of basic metals	-0.06	-0.03
C25	Manufacture of fabricated metal products, except machinery and equipment	0.09	0.09
C26	Manufacture of computer, electronic and optical products	-0.11	-0.11
C27	Manufacture of electrical equipment	0.07	0.08
C28	Manufacture of machineryand equipment n.e.c.	0.16	0.17
C29	Manufacture of motor vehicles, trailers and semi-trailers	0.06	0.08
C30	Manufacture of other transport equipment	0.13	0.12
C31	Manufacture of furniture	0.04	0.04
C32	Other manufacturing	-0.04	-0.04

Note: there was a transition from NACE REV 1 to NACE REV 2, therefore the data are not completely comparable with the previous edition and are only available from 2007

Source: own calculations using Comtrade data