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1 Executive Summary

1.1 Objective of the deliverable

The objective of this deliverable is to report on the regional economic fabric of the 7 regions. The report uses a common template for the 7 regions so each partner can develop regional reports with the same structure and information, including a detailed SWOT analysis. This first report on the targeted regions will provide a baseline to support the development of the following reports on the regions later on:

- A contextual analysis of regional innovation policies and strategies in terms of Innovation-led growth paths (Deliverable 1.5).
- List of selected measures for good practice case studies (Deliverable 1.6)
- An inventory of R&D&I support measures and an impact analysis on regional SMEs, using primary and secondary data (Deliverable 1.7).
- Innovation pathways of SMEs in traditional sectors (Deliverable 1.8)

These reports will be complemented by a global analysis at EU level of R&D&I support measures and their impact on the transition of regions from traditional to knowledge based economies on WP2.

Resulting from this research study, a set of recommendations regarding more efficient R&D&I measures will be produced and validated at European level, while the participating regions will serve as a test bed for their implementation by including them in the Local Action Plans to be developed and implemented by the UNIC project.

1.2 Identifying a “traditional sector”

Our concern is with “traditional manufacturing sectors”. We do not define “traditional” only - or even mainly - according to the standard OECD classification of industries as “high”, “medium” or “low-tech”.¹ This approach does not capture the complexities of traditional industries nor does it show the dynamic nature of the firms. For instance, some traditional industries may be low-tech but others are not (e.g., automotive). Indeed, once we define industry at a level meaningful to practitioners - say, at the SIC 4-digit level - characterization of whole industrial sectors as “high”, “medium” or “low-tech” may be misleading.

For example, pottery/ceramic products in SIC 262 includes sectors that may operate at different levels of R&D intensity (e.g., SIC 2621 – manufacture of ceramic household and ornamental articles - and SIC 2624 – manufacture of technical ceramics).² Moreover, even

¹ These categories are defined by research and development ‘intensities’ – that is, OECD average shares of research and development expenditure in sales revenue – of, respectively, more than 10 per cent, between 0.9 and 10 per cent, and less than 0.9 per cent.

² In the British Standard Industrial Classification (SIC), which follows the same classification principles as the EU NACE classification, the principal pottery/ceramic products in SIC 262 comprise SIC 2621 – manufacture of ceramic household and ornamental articles, including table ware, kitchen ware, ornamental articles and toilet articles (excluding large sanitary fixtures); SIC 2622 – manufacture of ceramic sanitary fixtures; SIC 2623 and 2624 – manufacture of technical ceramics; and SIC 2626 –

the same 4-digit industry may include substantially different intensities with respect to R&D and other types of innovation activity (e.g., commodity earthenware producers and specialists in hotel ware).

Our preferred approach to defining “traditional industry” is multi-dimensional, reflecting not only measurable characteristics but also a range of concerns or anxieties.

We define as “traditional” those manufacturing industries with at least the majority of the following characteristics.

Long established. Traditional implies history. One interpretation would be that the industry should have been established at least during the inter-war years (1918-1939) if not before. This is sufficiently broad to include, say, the motor industry but to exclude, say, computing. Most of the industries in which we are interested have been established for much longer, such as leather.

Strictly speaking, age is both a necessary and sufficient condition for an industry to be classed as “traditional”, which suggests the major theme of longstanding processes or products. However, we are also interested in industries with at least some of the following characteristics:

Once a - even the - main source of employment at the sub-regional level (possibly even the regional level in certain cases).

In the mature or declining phase of the industry life-cycle, with recent decline typically associated with globalisation. Because these industries are long established, knowledge has diffused and enabled production to develop in and/or be relocated to new locations with lower costs. This applies to at least some of our industries (e.g., ceramics) although not necessarily to all (maybe food processing?).

Labour intensive, so that relocation of production to low-wage economies has particularly serious consequences for manual employment in the (sub) regional context. Of course not all aspects of production may be out-sourced to low-wage economies such as design and marketing. However, a key element of the traditional nature of the industries is that some or most of the repetitive, low-skilled, manual work is indeed out-sourced from EU countries.

Major sources of wealth creation and employment in regional (or, at least, sub-regional) economies. In spite of recent decline, the traditional industries in which we are interested continue to be important to regional or, at least, sub-regional economies.

Retain capacity for innovation, hence the potential to continue as important sources of wealth creation and employment. This issue can be linked to the core competencies where firms will retain what can add value (make strategy) and out-source what the market can produce more cheaply and/or efficiently (buy strategy). Conversely, traditional industries may be ones in which “conditions of low

manufacture of refractory ceramic products (CSO, 1993). Related industries, but outside SIC 262, include the manufacture of ceramic tiles and flags (SIC 2630) as well as bricks, tiles, and construction products (SIC 2640).

technological opportunities limit innovative entry and restrict the innovative growth of successful established firms” (Breschi et al., 2000, p.393).

Recent and often dramatic decline is why we are especially concerned with traditional industries because traditional industries often remain important sources of wealth creation and employment in regional (or, at least, sub-regional) economies they are of concern to public policy; and capacity for innovation is likely to be both a feature of any industry that survives long enough to be classified as traditional and a necessary condition for a positive return on public sector support for these industries.

This potential for innovation may be more associated with particular industry groups (at the NACE/SIC 3-digit and/or 4-digit levels) firms than with the industry as a whole and, possibly, with SMEs rather than with larger and established industry leaders. Accordingly, we should also be careful to distinguish high-tech and dynamic industries or even firms within broadly defined traditional sectors.

Evidence of significant capacity to diversify from within a traditional industry towards new, high-growth activities: i.e., the possibility of high-tech and dynamic industry groups emerging within broadly defined traditional sectors. Sectors defined at the NACE/SIC 2-, 3- or even 4-digit level may be sufficiently heterogeneous to give rise to industry groups able to diversify into new technologies and products.

An example is the textile industry that as well as the “rag trade” has also witnessed the growth of technical textiles. The general point is to note significant diversification from within traditional industries towards new, high-growth activities.

Additional characteristics, although not necessary conditions, of traditional manufacturing industries might also be:

Substantial contribution to regional (or, at least, sub-regional) **exports**, even if the industry has recorded a deteriorating trade balance as part of overall decline associated with growing competition from imports.

Geographically concentrated; traditional industries may or may not be geographically concentrated and so constitute a “cluster”. This characteristic can vary between industries where economies of agglomeration are useful for some industries, such as ceramics, but not others.

2 Emilia Romagna

2.2 ECONOMIC CONTEXT OF THE REGION

History

Emilia–Romagna was part of the Etruscan world and subsequently was passed on to the Gauls and then the Romans. The Romans built the Aemilian Way after which the region was named. The coastal area of Emilia, which was ruled by the Byzantines from 540 to 751, became known as the separate region of Romagna.

During the Middle Ages, trading activities, culture and religion flourished thanks to the region's monasteries and the University of Bologna - the oldest university in Europe. In the Renaissance, it became the seat for refined lordships such as the House of Este of Ferrara and the Malatesta of Rimini. In the centuries that followed, the region was divided between the rule of the Papal State, the Farnese Duchy of Parma and Piacenza, and the Duchy of Modena and Reggio. In the 16th century, most of these were included into the Papal States, but the territory of Parma, Piacenza, and Modena remained independent until Emilia–Romagna was included into the Italian kingdom in 1859–1861.

The economy was based essentially on agriculture up to 1950, than the increase of agricultural and food production brought to the transfer from agriculture workforce to the cities and to the industries.

Size

The region of Emilia–Romagna covers an area of 22,124 km². Nearly half of the region (50%) consists of plains while 25% is hilly and 25% mountainous. (Italy: 303,336 Km² ; EU27: 4,456,101 Km²)



Figure 1 – Location of Emilia Romagna in Italy



Figure 2 – Emilia Romagna

Emilia Romagna consists of nine provinces: Bologna, Ferrara, Forlì-Cesena, Modena, Parma, Piacenza, Ravenna, Reggio Emilia, and Rimini.



Figure 3 – Provinces of Emilia Romagna

Emilia-Romagna is located in one of the most developed parts of Italy and one of the first areas to become industrialised; the process of industrialisation started in the 1950s using capital from farming, and developed throughout the region.

Demography

The population density, which was equal to 195 inhabitants per km², is just below the national average. The population of this region is traditionally well distributed, so there is no main city but several medium sized cities along the Via Emilia, where most of the regional industrial production is concentrated.

	Population 2009	%	%	Variation 2000-2009	Incidence % of foreigners 2000-2009
Emilia-Romagna	4,337,979	7.2		9.55	9.72
Italy	60,045,068	100	12.0	5.47	6.48
EU27	499,695,154		100	3.51	6.16

Table 1 – Resident population and incidence of foreigners

% of population divided into ages	0-14 years	15-24 years	25-48 years	50-64 years	65-79 years	80 and more
Emilia Romagna	12,21	8,19	35,68	18,87	15,42	9,62
Italy	14.1	10.2	37	18.7	14.5	5.5
EU27	15.7	12.5	36.2	18.6	12.7	4,3

Table 2 - Age composition

	low	medium	high	total
Emilia-Romagna	12,9	53,2	33,9	100
Italy	16,1	39,3	40,5	100
EU27	28	25	47	100

Table 3 - Degree of urbanization

Economic

The income per head (EUR 30,906) is one of the highest in Europe.

The capacity to achieve such a high level of well being and quality of life with strong social cohesion is one of the distinctive characteristics of the regional economy.

The workforce (15-64 years old) and the relative number of working women have already achieved the competitive objectives for 2010 stated by the European Union (in the Lisbon Strategy). At the same time, Emilia-Romagna shows an elevated level of work productivity.

Emilia Romagna brief indicators	Value 2009
GDP	EUR 133,111.4 million
GDP per capita	EUR 30,906
Grow rate of income	-4,6%
Unemployment rate	6.2%

Table 4 – Emilia Romagna indicators

Skills or level of education

In Emilia Romagna, 42.2% of the population of 25 – 64 year-olds has obtained a “middle school” leaving-certificate, 41.9% has obtained a high school leaving-certificate and 15.9% has an university degree.

Unemployment rate	Emilia-Romagna (a)	Italy (a)	Mean value UE 27 (d)
Male	5.0	8.1	9.0
Female	7.7	10.5	8.8
Total	6.2	9.1	8.9

Table 5 – Emilia Romagna unemployment rate

Regional competitiveness

The Emilia-Romagna productive model bases its competitiveness on a system of businesses that are capable of creating a network even at an infra-sectorial level, and in close collaboration with research and innovation organisations. Entrepreneurs in the region can count on the support of an efficient institutional network, an advanced IT infrastructure and a well developed and leading transport system.

Main industries, Sectoral composition

The regional productive system consists principally of small and medium-sized enterprises (SMEs) on which the Emilia-Romagna model is based.

A large number of these enterprises are organised according to sector in well structured supply chains and industrial districts. The most important are mechanics, agro-food, the motor industry, construction, bio-medicine, fashion and ceramic.

The mechanics industry in Emilia-Romagna has a leading role and goes right across all the other supply chains in the region. It has an important role in attracting investment from abroad. The Hi-Mech district, which acts as a support to the innovation processes, has the goal of creating a critical mass of research in the High Technology sector and is also capable of competing at an international level. It involves more than 130 regional companies, mainly in the following three macro-areas:

- The study and design of intelligent mechanical systems
- Innovative methods for mechanical engineering
- Materials, surfaces and nanotechnologies for advanced mechanics

Amongst the sub sectors of the mechanical industry, the car and motorcycle industry is particularly important with its world famous brands such as Ferrari, Ducati, Maserati, Malaguti, Magneti Marelli etc.

Patenting innovations

Emilia-Romagna is a very active region in the registration of trademarks and patents and is far above the Italian average as it is national leader of the registration of patents based on per million of the workforce.

Emilia Romagna	417.4
Italy	198.1
France	327.0
Spain	66.6
Germany	618.4

Table 6 - Patents (EPO) per million of the workforce

2.2 SME profiling in the region

2.2.1 SME situation in the region

a. Importance of SMEs on the regional economy

The distribution of productive and directional activities in the territory is tied to the infrastructural network, and to the development of production chains which reflect the main vocations in Emilia-Romagna.

Productive activities are concentrated:

- In the first and second rings of the largest urban centres,
- Along the axis of Via Emilia, which goes across the whole regional territory (see figure 4) and along the other main infrastructural axes
- Corresponding to the productive districts and other specialisation sectors.

The process of urbanisation is mainly concentrated in the Po Valley, but development of the mountainous areas has been under way for several years.

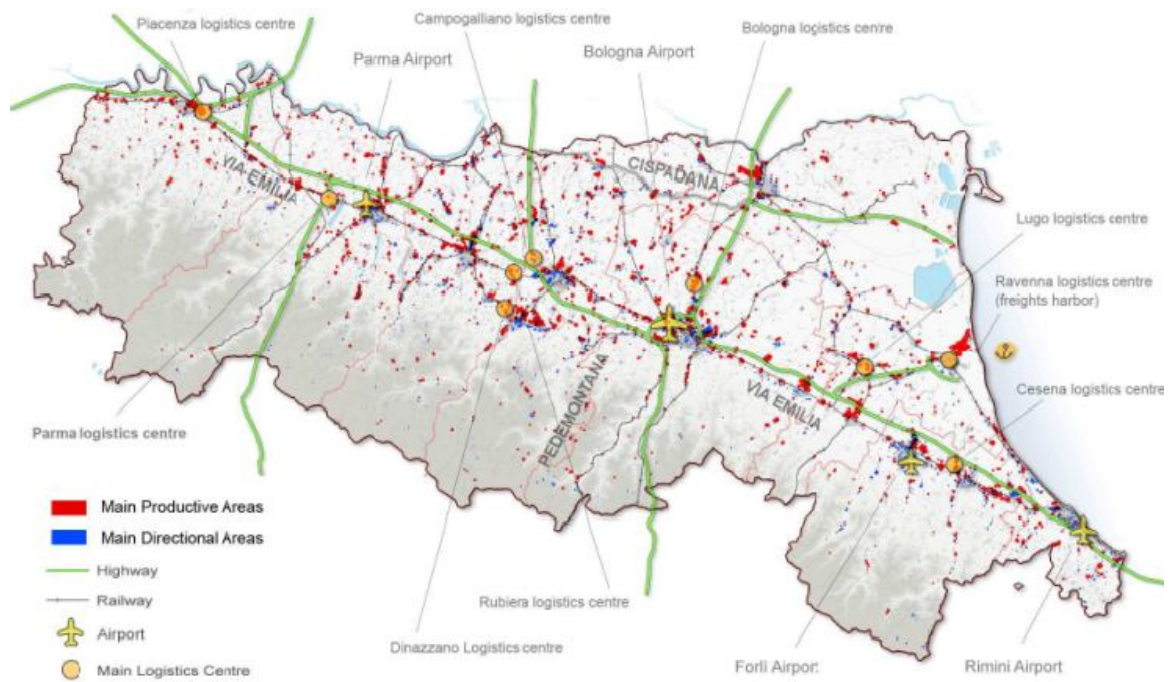


Figure 4 - Distribution of productive and directional areas in the regional territory

Manufacturing activities are the driving force behind the region's economy and are spread throughout the territory, concentrated along the main infrastructural axes (see figure 4). In 2007, a total of 386,906 enterprises existed, with a total of 1,676,327 employees.

	Enterprises	Employees
INDUSTRY	49,120	542,880
Mineral extraction	197	1,961
Manufacturing activities	48,749	533,811
Electric power, gas and water	174	7,107
CONSTRUCTION	59,586	166,049
COMMERCE AND HOTELS	115,411	428,307
Commerce	92,441	305,003
Hotels and Restaurants	22,970	123,303
OTHER SERVICES	162,789	539,091
Transport and communication	17,081	81,415
Financial services	6,063	70,013
Services for enterprises	98,307	254,390
Education, health and other services	41,338	133,274
TOTAL	386,906	1,676,327

Table 7 - Economic activity of Emilia Romagna

	1 – 9 employees	10 – 49 employees	50 – 249 employees	250 and more employees	total employees
Emilia Romagna					
Enterprises	94.2	5.1	0.6	0.1	100
Employees	43.1	21.3	14.1	21.5	100
Italy					
Enterprises	94.8	4.6	0.5	0.1	100
Employees	46.4	21.0	12.6	20.1	100

Table 8 - Enterprises and employees divided into categories

The area of central Emilia made up of the provinces of Bologna, Modena and Reggio-Emilia and Parma is the main manufacturing hub of the region (metallurgic products and mechanics, the food and beverage industry and the textile and clothing industry).

The ceramics industry, leader at an international level, is concentrated in an area around the provinces of Modena and Reggio-Emilia. Completing the picture are other significant areas of specialisation, such as the biomedical, automobile, upholstered furniture and footwear sectors.

The productive economic system of Emilia-Romagna consists of activities in several industrial districts. Their businesses have contributed to the socio-economic development of the region in terms of widespread wealth and employment and the ability to compete at an international level.

Emilia-Romagna now boasts strong industrial specialization throughout the production chain, in many cases located in specific areas which also overlap between one province and another.

Some of these companies now operate throughout the entire region with some of their activities being decentralized (to other parts of Italy and/or abroad).

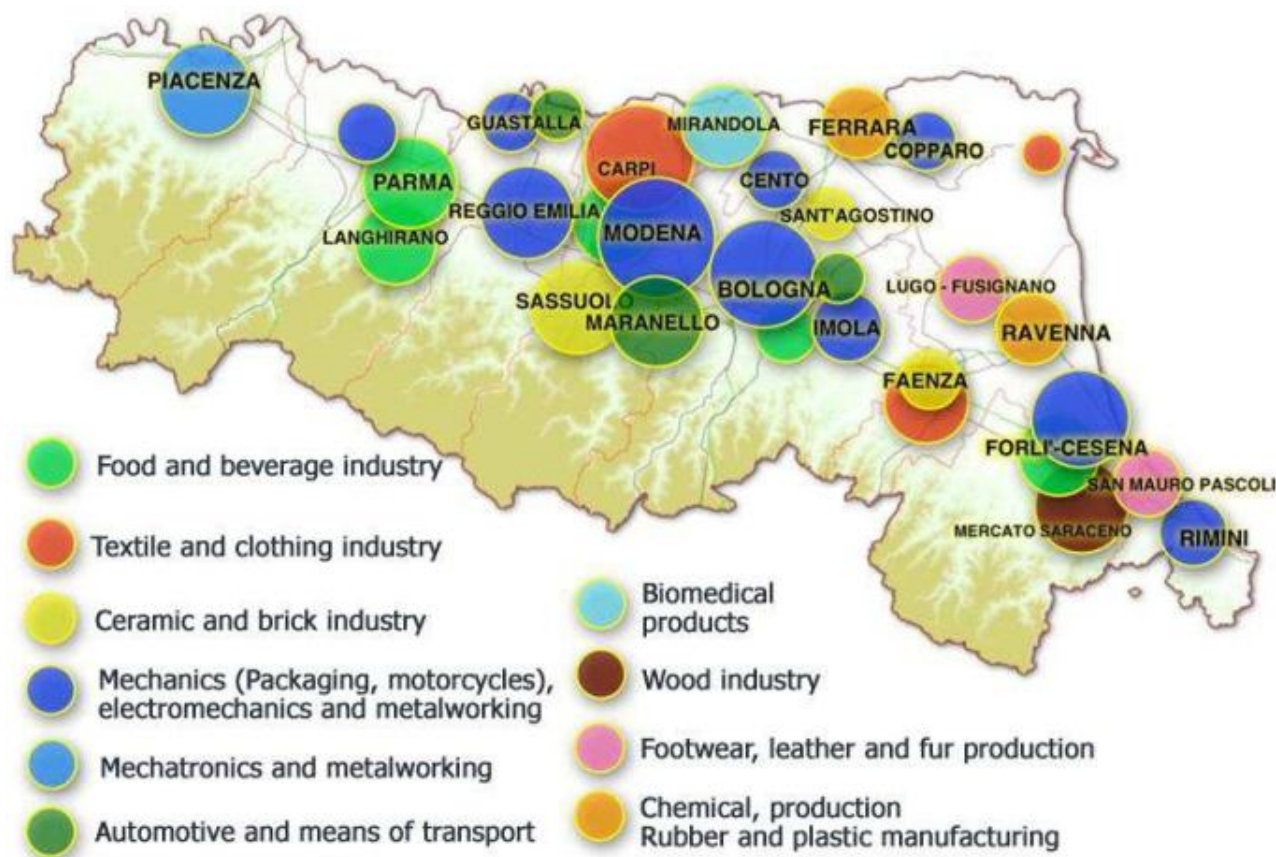


Figure 5 - Territorial specialisations of the manufacturing industry in Emilia Romagna

The industrial system and the main productive clusters

The manufacturing sector in Emilia Romagna employs 28.2% of the total workforce. This percentage is significantly higher than Italy (23.6%) and Europe as a whole (20.9%). Moreover, the GDP in the period from 1997-2006 is +9.1% in Emilia Romagna and +2.3% in Italy.

The manufacturers are grouped into several large regional clusters. The traditional sectors are at the centre of each cluster and they are connected to the various complementary sectors which include technology producers.

Services activities are present in each cluster, both in traditional sectors and in innovative ones of a high knowledge content.

The main regional clusters are:

- the mechanical cluster
- the agro industry cluster
- the construction cluster
- the fashion cluster

These clusters employ 89.7% of the workforce in the manufacturing industry and have a strategic role at a national and international level.

	Mechanic	Agro industry	Construction	Fashion	TOTAL
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Base industries	92,462	78,890	218,966	62,736	453,054
Technology production	169,561	39,466	17,127	2,222	228,376
Traditional tertiary	55,247	28,355	15,395	9,489	108,486
Advanced tertiary for enterprises	22,240	6,821	14,971	1,062	45,094
TOTAL	339,510	153,532	266,459	75,509	835,010

Table 9 – Employment in the clusters

Regional production is becoming increasingly more structured and organized into production supply chains using various means to coordinate the relationships between customers and suppliers. As well as acting as suppliers, relations between businesses can take the form of actual networks. When companies form part of a single group with a controlling interest, they are known as internal networks. Alternatively, external networks can be established by setting up partnership agreements or through joint acquisitions, creating entities such as consortiums and joint ventures. A new piece of national legislation, the network contract (Act/2009), offers another method of coordination.

The innovation sector is also grouped into networks. The European Regional Development Fund (ROP – Axis 1 and 2) is funding collaborative research and projects for the creation of business networks in the region for the technological and organizational innovation of SMEs. The 10 technopolises planned for the region, which consist of 46 laboratories and 7 centres of innovation, will be specializing in the main regional supply-chain sectors. The latest R2B (Research to Business) fair, which took place in November, continued to highlight the work of numerous regional laboratories and research institutes that work together to form networks with systems of production.

R2B also included “IS Bologna”, which consists of small and medium-sized enterprises linked to the mechanics supply chain, promoted by UNINDUSTRIA business association. However, the ability of SMEs to work well together is a key strength of each regional supply chain.

2.2.2 SMES IN TRADITIONAL SECTORS

Sectors (NACE V2 / V1) ² (excludes retail, services, design)

Leather (shoes, handbags/gloves) - NACE 19

This sector is of marginal importance at a regional level and represents 2.6% of the total manufacturing workforce at a regional level.

Activity is concentrated in the industrial areas of Forlì and Ravenna.

Areas where the workforce is concentrated are set out in the table below:

Provinces	% employed
Forlì-Cesena	30.3%
Bologna	24.5%
Ravenna	14.2%

Table 10 - Leather – Leading provinces operating in the sector and percentage of employees - Emilia-Romagna=100

It consists of 564 enterprises and 6,590 employees.
This sector is in the fashion cluster

The region includes four of the fifteen leading global enterprises operating in the women's footwear sector:

Sergio Rossi
Vittorio e Alberto Pollini
Gimmi Baldinini
Quinto Casadei

Representative organisms and district governance

Cercal (Centro Emiliano Romagnolo Calzature): The Emilia Romagna footwear centre trains professionals across all sector specialisations and offers business services.

Associazione Culturale Sammauroindustria: The cultural association Sammauroindustria aims to promote the culture and identity of San Mauro Pascoli, the main regional industrial district of footwear.

The speed and development of the design together with the capacity to produce diverse products is fundamental to remaining competitive in a complex market. The unfavourable economic situation and the decreasing demand for high quality footwear has led enterprises to become more flexible, limit their costs and optimize their production processes.

The leather district has tried to meet these challenges by focusing on informal relationships with clients and other manufacturers, a continuous exchange of information and joint development of products in order to ensure quality of production, flexibility and rapid manufacturing of products.

Innovation strategies can be summarized as follows:

- production flexibility in order to meet the need to diversify products
- training activities
- support from trade unions for the development of enterprises
- respect for the environment through the realisation of eco-compatible products

Ceramics – C23 / 26.2

The sector represents 9.4% of the total manufacturing workforce at a regional level. The ceramics industry shows a concentration of tile production in the area of Sassuolo and in lesser measures in the Bologna and Ravenna areas.

Provinces	% employed
Modena	43.6%
Reggio-Emilia	20.7%
Parma	11.5%

Table 11 - Non-metallic mineral products – Leading provinces operating in the sector and percentage of employees - Emilia-Romagna=100

It consists of 452 enterprises and 24,647 employees.

Below are the successful companies in Emilia Romagna:

Ceramiche Ragno – one of the key players in the development and world-wide success of the Italian ceramic tile industry

Ceramiche Richetti – currently one of the world's leading manufacturers of ceramic tiles

Iris ceramica – parent company of a multinational, world-wide leading manufacturer of ceramic floor and wall tiles for residential, commercial and industrial projects.

Marca corona – produces dry pressed tiles, mosaics, and wall and floor tiles which are currently distributed world-wide.

SACMI Group – specialises in providing customers worldwide with complete engineering solutions for tiles, sanitary ware, tableware and heavy clay production plants.

SYSTEM Ceramics – international leader in ceramics automation and decoration.

Representative organisms:

Confindustria Ceramica

Centro Ceramico – university consortium based in Bologna and Sassuolo which carries out applied research in the sector

Cerform - training institution

ProMo – sales promoter for the sector

Consortium:

Cerarte – a consortium of ceramic decorators

The main development strategies employed involve interaction between specific sectors in order to promote innovation and product diversification so as to enter international markets.

The innovative power of the district is related to the presence of a high number of key players (big industrial groups, specialized suppliers, complementary manufacturers, trade unions and service centres) and their interaction between one another.

Textiles – C13

The sector represents 10.9% of the total manufacturing workforce at a regional level. The textile and clothing sector is spread out through northern areas in the provinces of Modena and Reggio-Emilia and also in the main towns east of Via Emilia going as far as Rimini.

Provinces	% employed
Modena	38.8%
Reggio-Emilia	15.8%
Bologna	14.7%

Table 10 - Textiles & clothing – Leading provinces operating in the sector and percentage of employees - Emilia-Romagna=100

It consists of 2,174 enterprises and 14,010 employees.

This sector is in the fashion cluster

Below are the successful companies in the region:

Gruppo Dondi – leading company in the design and production of creative knitted fabrics.

Silanco – major European manufacturer of knitted fabrics

Some of regional brands include the following:

Blumarine

Liu.Jo

Avirex

Max Mara

Mariella Burani e Maska

Les Copains

La Perla

Representative organisms

CERCAL – Research centre and international footwear school which has approximately 80 associate footwear companies and acts as an information centre for the footwear sector.

Design Centre Bologna – created by the Art and Design Academy of Bologna, it aims to promote design in the Emilia Romagna production system. It has at its disposal the design skills of the teaching staff and graduates of the Academy and was founded by the Emilia Romagna regional government and the Fondazione Carisbo.

CITER1 – a limited liability consortium whose members belong to ervet2 and a group of manufacturer associations and which also consists of almost 500 enterprises that operate in the textile sector (55% of which are micro-sized and 45% of which are small or medium-sized).

CNA-Federmoda – provides support and assistance to companies in the cluster, including trade links with foreign companies.

The fashion sector, which is mainly divided between textiles, clothing, footwear and accessories relies on the presence of a large network of micro-businesses which are dedicated to third-party contracting and niche production and which boast high quality manual and technical skills, together with well-known stylists of worldwide acclaim who have set up their centres of creation and design and also their production facilities in Emilia-Romagna.

This sector is symbolized by the district of Carpi which is specialized in knitwear and garments. On the other hand, the footwear industry boasts a specialization centre in Romagna and in particular in the district of Fusignano, which is in the province of Ravenna, where there are over 200 companies and 3,000 employees.

The ability of several leading companies to expand and increase their exports has developed the local area considerably and stands as an example which has gradually been imitated by other new small dynamic businesses.

The fashion industry is spread out throughout the region, organized according to a local system of cluster production: this means that the businesses involved tend to cover all the phases of production from start to finish (manufacture, services and the commercial aspect) by creating a successful operating system amongst them. Within the fashion system we can single out three main sub-clusters: textile and clothing, footwear and accessories.

The textile and clothing sub-cluster lists more businesses and also more employed in its sector than the two other sub-sectors (i.e. footwear and fashion accessories).

The districts and areas with a higher concentration of employees are:

the Carpi district in the province of Modena (about one third of the sub-cluster) characterized by small and medium-sized companies, the areas of Bologna and Reggio Emilia. Large and medium-sized companies are spread out in smaller numbers throughout the other provinces.

Mechanical/Metallurgy - C24**Mechanics**

The mechanics industry represents the main regional specialisation in terms of employees (19.5%) of the total workforce in manufacturing. The sector cuts across the whole manufacturing system in terms of plant supply, means of production and components, and represents their supporting axis.

All the provinces are involved in this sector, which is concentrated chiefly along the Via Emilia axis.

Provinces	% employed
Bologna	28.6%
Modena	21.6%
Reggio-Emilia	17.4%
Parma	8.9%

Table 11 - Mechanics – Leading provinces operating in the sector and percentage of employees - Emilia-Romagna=100

It consists of 19,376 enterprises and 192,973 employees.

This sector is in the mechanical cluster.

Metallurgy

Metallurgy represents the second regional specialisation in terms of the percentage of employees in the sector (15.9%). It is linked to mechanics since it is a supplier of components and materials.

This sector is significantly widespread through the surrounding areas of the main towns along the Via Emilia axis.

Provinces	% employed
Bologna	27.9%
Reggio-Emilia	17.4%
Modena	17.1%
Parma	8.4%

Table 12 - Metallurgy Leading provinces operating in the sector and percentage of employees - Emilia-Romagna=100.

It consists of 424 enterprises and 9,126 employees.

This sector is in the mechanical cluster.

Below are the successful companies operating in mechanical sector in the region :

Aetna Group – produces and sells wrapping machines for fully automatic stretch film packaging, shrink wrappers, shrink wrapping machines with film thrusting systems, wrap around case packaging and taping machines all over the world.

Belco – operates worldwide and offers therapies and systems for the treatment of renal failure, multiple organ failure, sepsis and congestive heart failure. Its objective is to provide scientific and medical communities with know-how, reliability and innovation.

Berco SpA – a large manufacturer specializing in the production of undercarriage components for tracked vehicles, equipment for overhauling the undercarriages of earthmoving machinery and the manufacture of machine tools for the reconditioning of internal combustion engines.

Bonfiglioli – a top brand in the power transmission industry, industrial automation sector, and power transmission industry.

Cefla – has four operating divisions: civil and industrial technological installations, retail outlets for the modern distribution sector, systems for coating and curing paints on wood, and the dental sector.

G.D – world leader in the design and manufacturing of the fastest and most efficient cigarette making and packing lines. Thanks to the extensive range of machines available, it is the only manufacturer capable of supplying **complete high-speed** lines which include both production and packaging.

IMA – world leader in the design and manufacture of automatic machines for the processing and packaging of pharmaceuticals, cosmetics, tea and coffee.

IMMERGAS – leader in Italy in the design and manufacture of gas boilers for domestic use in sectors of both traditional and condensing boilers.

Lombardini engines – offers a wide range of engines for various applications such as agriculture and the automotive and marine sectors.

Magneti Marelli – a company committed to the design and production of hi-tech systems and components for the automotive sector.

Mandelli – an example of excellence in the machine tool sector

Marchesini Group – produces machines for cosmetic labelling, phial labelling flacons, thermoformers, wallets, cartoners, vertical type cartoners, wrapping & overwrapping, case packing & palletizing.

OCME – specializes in the beverage industry. It supplies complete production lines for beer, mineral water, soft drinks, wine and liquors. It is also focuses on FTC (Food, Toiletries and Chemicals) for which it supplies filling systems for viscous liquid packaging and palletizing systems.

ROSSI GEARMOTORS Rossi Group from Modena – one of Europe's largest industrial groups for the production and sale of gear reducers, gearmotors, electronic speed variation and electrical brake motors.

SACMI – produces a complete range of automatic machinery for labelling glass, plastic and metal containers for the beverage, food, detergent, pharmaceutical and packaging sectors; packaging and palletizing for the ceramic industry; refilling machinery

SCM Group – world leader in the production of woodworking machinery and systems.

SIDEL – produces tooling (blow molds and personalization parts for blowers), dry perform decontamination, blowers, coating, fillers, rinsers, closing units, bottle washers, labellers.

SIR Soluzioni Industriali robotizzate – robot automation for loading/unloading and handling systems through to large assembly and processing plants.

Tetra Pak – produces containers, treatment systems (for milk and dairy products, beverages, cheese, ice cream, convenience foods), refilling machines, and distribution systems.

VM Motori – specialises in the design and production of diesel engines for a variety of uses.

Representative organisms
for Research and Innovation:

Advanced Technology Laboratory Network

AERTECH-LAB – automation, electronic and bioengineering (University of Bologna)

INTERMECH mechanics: design and development of new products and industrial process (University of Modena, Reggio Emilia and Ferrara)

MATMEC laboratory of materials for mechanical design and engineering (University of Bologna, ENEA, CNR and University of Parma)

MUSP Machine tools technology

PROMINER micro and nano-technology for industrial and civil applications.

CICLOPE Experimental laboratory for measuring turbulence (University of Bologna)

Innovation centres

ISML innovation and development of materials and light metal alloys.

DEMOCENTER SIPE Centre for innovation and technology transfer.

REGGIOEMILIA INNOVAZIONE Centre for innovation and technology transfer

The Mechanical cluster: its structure and its sectors

Considered to be a leader at an international level, the mechanical cluster in Emilia Romagna is highly competitive and divided into a number of sectors and sub-sectors which are well-known for their prototypes and numerous small and medium-sized enterprises. The latter are all highly specialized and are leaders in their respective niches.

The most important sectors are: mechanics and industrial equipment, motor industry, transport vehicles, agricultural machinery, hydraulics, turbines and pumps. Automation, biomedical and precision machining.

In all these sectors, particularly outstanding niches are: sports cars and motorbikes, robots and machine tools, machinery for packaging, the food industry, ceramics, construction, wood, energy production, electro medical as well as measuring, checking and surveying instruments.

The region hosts 13 international trade fairs with specific focus on mechanics, however there are many others which involve companies from the cluster in specific sectors.

The mechanical cluster is divided in three main sectors: metal transformation, production and manufacturing and a sector that offers various services.

The mechanical cluster, unlike the other cluster in Emilia Romagna production system, goes across the board into other sectors and is consequently spread all over the region. An analysis of the sub-divisions shows high density production areas for some these sectors.

The metal transformation sector is not considered particularly important in this cluster, the number of employees is not so substantial and therefore the sector is not so widespread in the region.

Manufacturing is considerably interlinked with other regional production clusters. It incorporates some particularly important sectors such as metal products, automation and industrial mechanics and is spread all over the region.

Mechanical companies in sectors such as **biomedicine** are concentrated in corresponding production districts. In this case, the most extensive is in Mirandola (MO).

The **pumps, engines, hydraulics and refrigeration systems** sector has important production activities concentrated in the provinces of Bologna and Modena but the sector can be seen all over the region.

The **precision mechanics** sector has a sizeable concentration of people employed in the provinces of Bologna, Parma, Reggio Emilia and Modena.

The **transport vehicles** sector is linked to the motor industry and is particularly present in the mechanical sector (10% of local business) and has a high concentration of people employed in the provinces of Modena e Bologna.

The **packaging** division is an important production specialization in the regional mechanical cluster and consists of 488 local business which employ a total of 14,288 employees. The production area around Bologna is called "Packaging Valley" and is the worldwide leading district for the production of automatic packaging machines.

This benchmark sector is composed of design, manufacturing and the trade of machinery, equipment, general packaging devices and fittings as well as packing and refilling. It also includes design services and labelling.

The highest concentration of employees is in the provinces of Bologna, Parma and Modena. Other districts in the sector are also in Reggio Emilia and Rimini.

Automotive

All the provinces of Emilia Romagna are involved in this sector, which is concentrated chiefly along the Via Emilia axis.

It consists of 1,308 enterprises and 32,606 employees.

In the mechanical cluster the automotive sector is considerably important.

The fame of the automotive sector is undoubtedly linked to its major brands of world-wide acclaim, such as Ferrari, Maserati, Ducati, Malaguti and Magneti Marelli. However, the success of this sector is also due to a myriad of small and medium high technology companies which are supported by a universe of specialist suppliers in the design of mechanical and electronic components.

Known for their quality and reliability, these companies produce high performance motor cars, agricultural machinery, motorbikes, buses and bulldozers. Overall there are 1,300 companies which are mainly concentrated in the triangle between Bologna, Modena and Reggio Emilia and employ around 30,000 people.

Below are the successful companies operating in automotive sector in the region :

Ducati - produces racing bikes.

Goldoni - produces agricultural machinery and gardening equipment.

Lamborghini - is an Italian car manufacturer.

Landini trattori – is an Italian tractors manufacturer

Malaguti - offers a large line up of models **from 50cc to 500cc scooters**, a range of **50cc motorcycles (endure, supermotard and naked)** as well as some models of **children's bikes**.

Maserati - an Italian car manufacturer.

New Holland Italia - produces a wide range of farming and construction equipment such as excavators, loaders (backhoe, wheel, skid steer), crawler dozers, and motor graders.

Food products

This sector represents 12.6% of the total manufacturing workforce at a regional level. The food and beverage sector is spread throughout the region with a slight concentration in various hubs of local importance.

Provinces	% employed
Parma	24%
Modena	17.5%
Bologna	12.9%
Reggio-Emilia	11.5%
Forlì-Cesena	10%

Table 13 - Food – Leading provinces operating in the sector and percentage of employees - Emilia-Romagna=100.

It consists of 9,513 enterprises and 68,300 employees.

The food sector produces local high quality products still tied to tradition; its industrial fabric is specialized in large-scale consumer production and food processing machinery. This is the Emilia-Romagna of PGI and PDO products (over 20) such as *culatello di Zibello*, balsamic vinegar of Modena and Parmigiano Reggiano. It also boasts specialist skills in food system engineering; the highest concentration of agricultural machinery production in Italy is between Reggio and Modena, while the production of industrial and food product packaging machinery between Bologna and Parma is well-known throughout the world.

The manufacturing of machinery naturally supports the rest of the region's production such as the dairy products industry, that of preserves and sauces (particularly in Parma) and also poultry farming in the Forlì area and the production of fruit in Romagna.

The agro-food sector consists of the highest variety of businesses and is characterized by a spirit of cooperation which is typical of the region. The central role of the cooperative businesses is worth noting; it is still dominant in several stages of the processing and sales of agricultural products and is also evident in numerous forms of associations amongst small businesses. There are also many institutional initiatives for collaboration between the public and private sectors for product promotion and improvement.

On a national level, Emilia-Romagna represents 15% of the sector.

Below are the successful companies operating in food sector in the region :

Consorzio del prosciutto di Parma – is an organization constituted by the producers of the ham of Parma

Consorzio del Parmigiano Reggiano – is an organization constituted by the producers of the Parmigiano Reggiano

VALSOIA – is a producer of soya foods

Barilla - is a producer of foods

Cirio - is a producer of foods

Industries for production and refining of sugar

The main agro-food clusters are:

Milk – cheese (the most famous is Parmigiano Reggiano)

Tomatoes for industry

Domestic pig – cold cuts and ham (the most famous Parma ham)

Grain – sugar

Grapes - wine

Forest – wood

The agro-food sector plays a central role in cooperative businesses together with the large companies and numerous associations of small companies, and employs 150,000 people.

Research within this sector concerns all stages in the production chain, namely: raw materials, processes and products, industrial waste and non-food items, the quality and safety of food as well as its organisational and economic aspects. Amongst the innovative organisations, the TECAL laboratory (part of the Hi-Mech district) is of particular importance and specializes in agro-food plant engineering.

Main technological requirements in the food industry:

Improve the foodstuffs' safety

Improve health and functional qualities

Improve the nutritional quality

Improve the quality of taste

Ensure the quality of the offer through certification

Reduce energy and water consumption.

2.3 SWOT Analysis

2.3.1 Strengths, Weaknesses, Opportunities and Threats

1.2 SWOT Analysis – Emilia-Romagna Regional	
Strengths	Weaknesses
<ol style="list-style-type: none"> 1. High entrepreneurial dynamism 2. High work productivity 3. High employment rate 4. Low unemployment rate 5. Well constructed and innovative productive clusters 6. High presence in the sectors of technology specialization 7. Good placement at International competition level 8. Substantial resources of knowledge 9. Grow rate of R&D expenditures 10. Substantial and increasing patenting activity 11. Presence of a structured network for industrial research 12. Increasing of the spin-off number 13. Access to the broadband 14. Regional policymaking role oriented towards Lisbon-Göteborg objectives 15 Widespread cultural and environmental heritage 	<ol style="list-style-type: none"> 1. Low managerial level of the small enterprises 2. Insufficient availability of innovative financial instruments 3. Low level of business capitalization. 4. Deficiency of innovative services 5. Spread presence of productive areas with a potential logistic impact due to the spread out the territory 6. Insufficient availability of workforce, in particular skilled workforce 7. Insufficient availability of unman resources with and high degree of education 8. Limited flow of direct external investment 9. High energetic dependence on traditional sources 10. High impact of the development on the environment
Opportunities	Threats
<ol style="list-style-type: none"> 1. Opening towards new International markets 2. Increasing opportunities for the actuation of research and innovation activities by the enterprises 3. New technological paths 4. Development of high innovation sectors 5. Widening of EU (wide availability of human resources linked to the growth of new work field) 6. Larger accessibility thanks to the new trans-European transport network 	<ol style="list-style-type: none"> 1. International competitive pressure 2. Tendency to the outsourcing of the enterprises 3. Presence of elements of environmental pressure 4. Speed of technological changes 5. Widespread presence of the development with potential negative impacts in environmental and logistic terms

2.3.2 FINAL CONSIDERATIONS

The traditional enterprises in manufacturer field are generally characterized by labour-intensive activities, so they have to face the competition of countries with a low labour costs.

Moreover it still remains some difficulties between universities and research centers on one hand and enterprises on the other hand. This is due mainly to a limited mutual knowledge and different approach to the applied research.

Some regional initiatives are in progress to win these difficulties and to go toward a knowledge economy.

Start up of Regional Network for industrial research and technology transfer

Technical know-how, research and innovation are amongst the key factors on which the Emilia-Romagna productive system bases its real competitiveness. The region encourages investment in innovation through a network of laboratories and innovation centres and parks, which are expanding all the time, and through a system of credit facilities and specific incentives.

The research and innovation Network

The network, which consists of Universities, laboratories and research centres contributes, in a significant way, towards creating an environment which is favourable for businesses to invest in innovation.

Universities and businesses

The University system is made up of the Universities of Bologna, Modena, Reggio Emilia, Ferrara and Parma together with their respective branches. There are 249 laboratories in the region used for technological transfer that are recognised by the Ministry for Universities and Research. There are more than 8,000 people working in the field and they form an important part of the public system for research, to which must be added the laboratories that operate internally within companies bringing the total up to 17,514 people working in R&D in the region.

The High Technology Network

The "High Technology Network" connects the laboratories set up thanks to regional incentives with other research and development centres, both public and private, that are active in the region. There are 57 organisations equipped for research, innovation and technological transfer: 25 laboratories, 26 innovation centres and 6 innovation parks aimed at establishing new laboratories and businesses.

Local bodies involved in the High Technology Network

The local bodies that work within the high technology network are: ASTER (Regional Agency for industrial research, technological transfer and innovation), Universities, the Regional Union of Chambers of Commerce and regional entrepreneurial associations and national research institutes such as CNR, ENEA, INAF, INFN and INFN.

Specialised research sectors

The research system is connected to that of the industrial clusters and support businesses interested in innovation processes through various types of synergies. The key sectors which characterise the research network are:

- Mechanics
- Building and ceramics
- Agro industry
- Fashion
- Information and communication technology (IT)
- Life Sciences and Health

CLUSTERS	MECHANICS	CUNSTRUCTION AND CERAMIC	AGROINDUSTRY	FASHION	MULTIMIDIA	HEALTH
REGIONAL TECHNOLOGY PLATFORMS						
High mechanical technology (11 labs, 5 centers)	XXX	X	X	X		X
Environment, sustainable development, energy (5 labs, 1 center)	X	XX				
Agrofood (2 labs, 3 centers)	X		XXX			
Construction and construction materials (2 labs, 4 centers)	X	XXX	X	X		X
Sciences of life and health (5 labs, 1 canter)			X	X	X	XXX
Information and communication technologies (2 labs, 2 centres)	X	X		X	XXX	XX

Table 14 - Intensity of inter relationship among the technology platforms and the main productive clusters

Table 14 shows the inter relationship among the technology platforms and the main productive clusters, which are interested to the application of research results. The regional politics are oriented to increase the public and private commitment in industrial research and innovation. The aim is to create in the middle term the condition so that the supply and demand of industrial research, technology transfer and innovation combine to bring about the Lisbon objectives.