

Eco-innovation in cluster organisations in the chemical and textile- clothing-leather sectors

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European Cluster Observatory

Executive summary

The qualitative study “Eco-innovation in cluster organisations in the chemical and textiles-clothing-leather sectors” aims to understand if and how cluster organisations are using eco-innovation to foster competitiveness and growth.

The information for the study was gathered through interviews with representatives of cluster organisations and other relevant bodies in 12 regions located in Belgium, France, Germany, Italy, the Netherlands, Poland, Portugal and Romania where a particularly high concentration of these industries can be observed. In addition, extensive desk research has been carried out to complete and complement the information received through the interviews with figures, case studies and interesting links.

For each sector, the study results are presented in regional case studies comprising profiles of the cluster organisation(s) in that region and a synthesis of the main findings.

Notwithstanding the conclusions of this qualitative survey, it appears that the chemical cluster organisations are further advanced in addressing environmental challenges and implementing eco-innovative activities when compared to the textiles-clothing-leather sector. This might be explained by the strong economic and legislative pressure that these clusters perceive. All cluster organisations are making strong efforts to support their companies in addressing environmental challenges and have started to involve a wide range of external actors and partners in their search for eco-innovative solutions. However, eco-innovation is only exceptionally seen as a driver for competitiveness and the industry focuses more on compliance. In comparison, the textiles-clothing-leather cluster organisations seem to feel less legislative pressure but are strongly driven by the wish to overcome the negative public image of the sector which is currently developing. Eco-innovation activities are just starting and focus strongly on understanding the related issues, on providing knowledge and promoting existing technologies.

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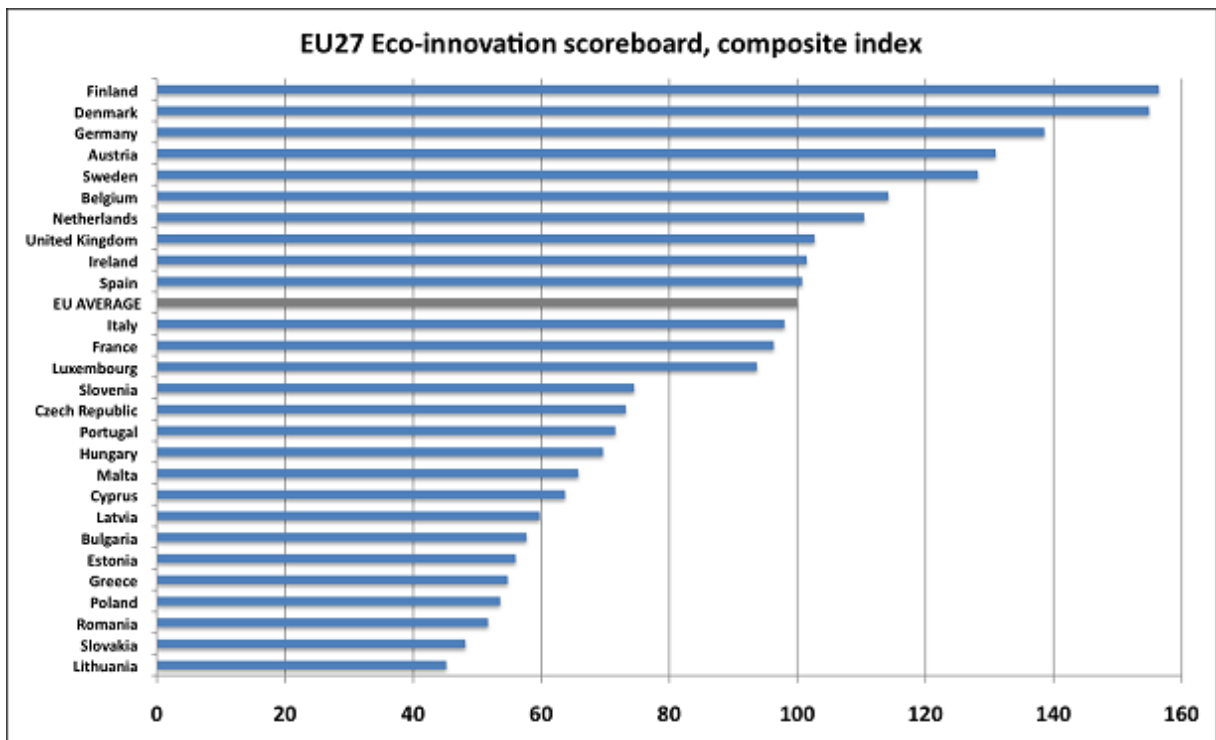
1 Cluster organisations and eco-innovation

Eco-innovation is a concept that is gaining momentum at the EU level, and climbing up the political agenda in the context of the Europe 2020 Strategy: with the Innovation Union Flagship initiative (The Innovation Union 2011) and Resource efficient Europe Flagship initiative (A resource-efficient Europe 2011)

There are numerous initiatives undertaken by the EU: to promote eco-innovation (Green Week), to measure eco-innovation (Eco-Innovation Observatory), to finance eco-innovation (CIP Eco-Innovation Programme) and to translate the somewhat complex understanding of eco-innovation into actions all across the EU.

Member state activities in eco-innovation vary greatly across Europe. Finland, Denmark, Germany, Austria and Sweden are leading the way, with established eco-innovation policies and practices that have rendered their industries more eco-competitive, while other member states are catching up.

In a recent report produced by the Eco-Innovation Observatory (EIO), EU member states are ranked according to their eco-innovation performance. The graph below summarises the performance of the EU27.



1-1EU27 Eco-innovation scoreboard (Eco-Innovation Observatory 2011)

While performance currently differs across member states, a number of barriers and drivers related to eco-innovation have been identified in industries across the EU.

ASPECTS	BARRIERS	DRIVERS
Legislative and policy	Too lax or too strict policy measures may hinder eco-innovation; either by not providing enough incentives to eco-innovate or by hindering it because of too high demands which might be too difficult to meet.	Performance standards where policy dictates the level of environmental performance improvement or Environmental taxes, choice to either comply or pay taxes. Levels can vary. It often drives eco-innovation, since the polluter pays principle dictates rising costs.
Financial	Lack of monetary flow, lack of capital for upfront investments, lack of market demand	Rising costs of raw materials and resources, cost-differentiation in the market based on eco-competitiveness, strong market demand
Information	Lack of knowledge flow, informational asymmetries, scattered supply chains	Education and career mobility opportunities, integrated supply chains
Behavioural	Cultural social norms that do not reinforce positive environmental behaviour	Cultural and social norms that reinforce positive environmental behaviour

1-2 Barriers and drivers of eco-innovation- (Adapted from (OECD 2009) & (Policy Department Economic and Scientific Policy 2008))

How do cluster organisations fit into the discussion of eco-innovation?

Clusters are geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions in particular fields that complete but also cooperate (Michael Porter definition 1998). Market and competition form clusters naturally. **Cluster organisations** on the other hand, are formalised clusters, which usually have a management body, an office, and an address. The secretariat is in charge of running the everyday business of the cluster, and as such there is a central focal point of reference for all members of the cluster.

Some of the key benefits of cluster formation are that it enables information asymmetries to be overcome by establishing better linkages in supply chains, enabling the sharing of resources, cutting costs and allowing healthy competition and cooperation to emerge. Given the barriers that eco-innovation faces (see table above), cluster organisations do indeed present an interesting means to overcome some of these barriers. Closer collaboration and supply chains translate into improved knowledge flow; sharing of infrastructure and resources would alleviate some financial issues, and collective action at industry level may even contribute to improving social and cultural norms and reinforcing better environmental performance.

The chemical industry is a relevant example for this study of how cluster organisations are using their network structure to eco-innovate. As reported by the High Level Group on Competitiveness of the European Chemical industry, the clustering activity and the related cluster organisations that are prominent in the chemical industry in Europe, have allowed the industry to develop highly integrated

supply chains. This in turn has helped the industry remain globally competitive. Its competitiveness depends on costs reduction by means of sharing key assets such as infrastructure and services, including environmental services, access to major transport modes and proximity to market and customers. In addition, the clustering activity has had other positive environmental effects, such as the reduction of energy use, a lower carbon footprint due to transportation activities, and higher efficiency in general
(DG ENTR 2009)

Eco-innovation in cluster organisations can be approached in two different ways.

In countries which have a prominent cleantech industry, we find cluster policies that target the establishment of cleantech clusters to further contribute to the economic competitiveness of the eco-innovation sector.

Another way of approaching eco-innovation in cluster organisations is by horizontally integrating eco-innovation goals (or environmental performance goals) in cluster organisation activities in a variety of sectors. This is usually a bottom up approach, as illustrated by the chemical industry cluster organisations example above, for which eco-innovation had become an economic competitiveness factor. The issue has become a priority to be tackled, and clustering approaches have contributed toward this trend.

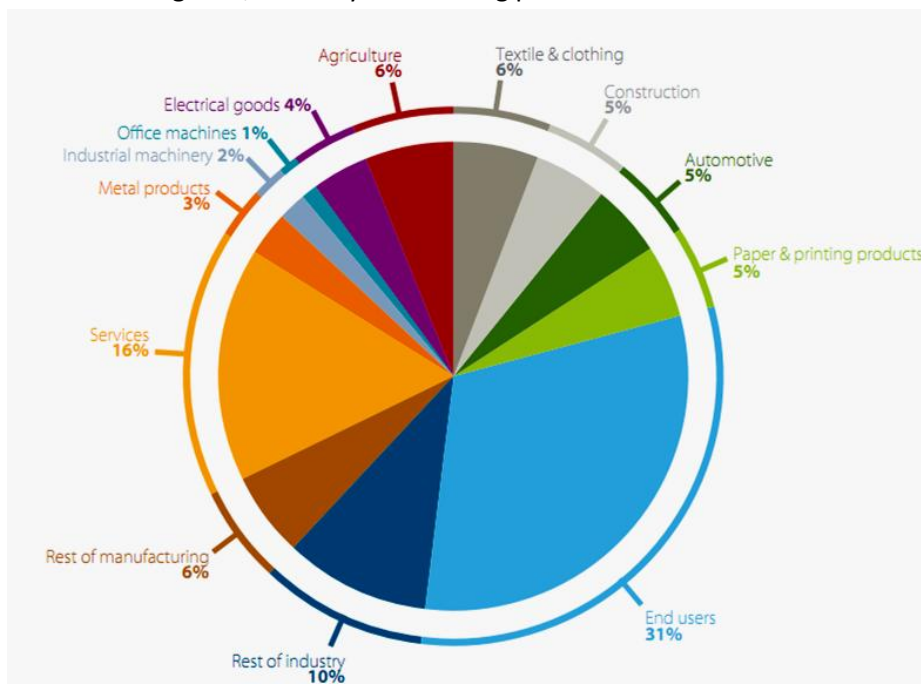
With stringent climate change targets, energy efficiency performance, rising costs of fuels and resources, as well as pollution taxes, eco-innovation is becoming a cross sectoral priority in many industries, and as such, an increasing number of cluster organisations are incorporating eco-innovation aspects into their activities. However, this is often being done either implicitly, or without measurable targets.

The study provides a qualitative overview of cluster organisation activities and of the role of eco-innovation in two sectors of cluster organisations: the chemical sector, and the textiles-clothing-leather sectors. The selection of these two sectors allows for an in-depth insight of the behaviour of eco-innovation within traditional industrial sectors. By studying the trends and existing elements of eco-innovation within these cluster organisations, the study aims to shed light on the implication of current and “traditional” practices, and identify whether eco-innovation is being leveraged through cluster structures.

2 Eco-innovation in chemical cluster organisations

2.1 Overview of the chemical industry and its environmental performance

The chemicals industry is one of the biggest industrial sectors in Europe. In 2007, it had a workforce of 1.2 million and sales of 537 billion EUR. While the workforce was reduced since the year 2000, the production has constantly increased by 22% (2000-2007), which illustrates an improved productivity rate of the sector. There is a strong concentration of chemical industry in Germany, France, Italy and the UK where two thirds (in 2008) of the EU's chemical production is generated. Together with Spain, the Netherlands, Belgium and Ireland these countries cover almost 90% of chemical production. The 12 new Member States are also increasing their production volume with Poland making the highest contribution. The European chemicals industry has a high share on the world market. EU chemicals production, imports and exports were estimated at EUR 530 billion, EUR 119 billion and EUR 175 billion in 2007, respectively. Other nations such as China, India and Russia are now following closely and also show strong growth rates in the chemical industry (EUROSTAT 2010). In the EU-27, the majority of the industry works in the production of pharmaceutical and base chemicals. Over 100,000 chemical substances are used for the manufacturing of a wide range of products including adhesives, fertilizers, plastic, paints, pharmaceuticals, synthetic fibres, and pesticides. Chemicals are basically everywhere: they can be found in most manufactured products (cars, textiles, computers, machines) and consumer goods, from toys to washing powder.

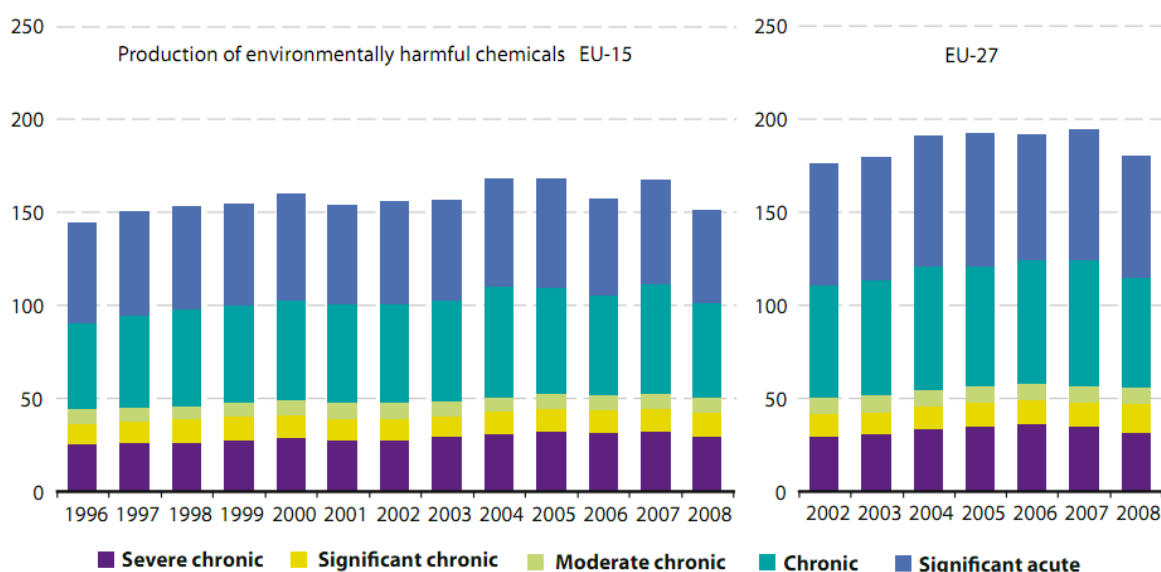


2-1 Customer sectors of the chemicals industry (DG ENTR 2009)

Environmental challenges

The chemical industry is one of the main emitters of greenhouse gases releasing (mainly) CO₂, methane and NO_x through the combustion of fossil fuels to generate power. With regard to climate change, the industry has already undertaken measures and introduced comprehensive climate change strategies to counteract this trend. This has shown its first positive effects: whilst the European production of chemicals increased from 1995 to 2006, the emissions of greenhouse gases decreased by 28%. In addition, the industry succeeded in reducing the emission of acidifying pollutants and of pollutants responsible for ozone formation each by 47% over the same period. The industry has also invested in cogeneration but further improvements need to be made through energy and resource efficiency in production (OEKOM 2009).

The industry generates about 40 million tons of waste (2006) of which 8 million tons or 20% is hazardous waste. Significant progress has been made in the reduction of emissions and energy use, however, toxic chemicals that enter into the air, water or soil are harmful for the environment and for the health of human beings. The potential effects of leakage of toxic substances are described in the 2010 edition of Eurostat's 'Environmental Statistics and Accounts'. *“Chemical fertiliser and nutrient run-off from farms and gardens cause the build-up of toxic algae in rivers.... Some toxic chemicals find their way from landfill waste sites into our groundwater, rivers and oceans and induce genetic changes that compromise the ability of life to reproduce and survive. Organochlorine compounds such as polychlorinated biphenyls (PCBs) were developed originally for use in electrical equipment as cooling agents... During the manufacture and disposal of products containing PCBs, and as a result of accidents, millions of tonnes of PCB oil have leaked out... They accumulate in the food chain and significant levels of them have been found in marine species, particularly mammals and sea birds, decades after their production was discontinued. PCBs are carcinogenic and capable of damaging the liver, nervous system and the reproductive system in adults...”*



Source: Eurostat Prodcom statistics

2-2 Indicator on the production in physical volume of environmental harmful chemicals (EUROSTAT 2010)

The main regulatory challenges for the industry are the implementation of REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) and CLP (Regulation on Classification, Labelling and Packaging of substances and mixtures). REACH entered into force in June 2007 and aims to protect human health and the environment from the risks that can be posed by chemicals. It makes industry responsible for assessing and managing the risks posed by chemicals and providing appropriate safety information to its users. The CLP Regulation entered into force in January 2009 and streamlines European legislation on classification, labelling and packaging of chemicals. Its main objectives are to facilitate international trade in chemicals and to maintain the existing level of protection of human health and environment (DG ENTR 2 2011).

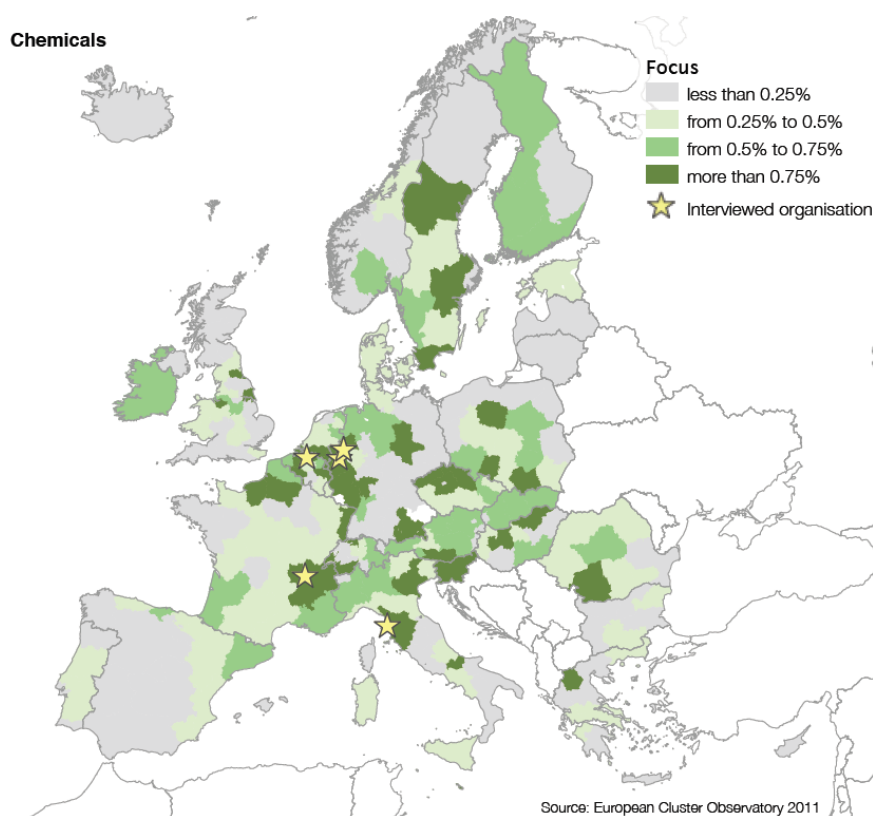
2.2 Regional case studies

This section provides an overview of the eco-innovative activities undertaken by cluster organisation within the chemical industry. Based on the requirements of the study, primary and secondary research was carried out to collect data and analyse respective activity within six regions:

1. BE21 Antwerp, Belgium
2. DEA1 Düsseldorf & DEA2 Köln, Germany
3. ITE1 Tuscany, Italy
4. RO41 South-West, Romania
5. NL Noord-Brabant, Netherlands
6. FR71 Rhone-Alpes, France

For each region, cluster organisations for chemical industries were identified and analysed. Through a questionnaire and phone interview, a qualitative understanding of the cluster organisation's key environmental challenges, environmental initiatives, and barriers and incentives to eco-innovate were attained.

The map below indicates the organisations interviewed and their spread across regions with chemical industrial activity.



2-3 Chemical cluster organisation interviewed for the study

Through initial data collection it was identified that some of the regions had no clear cluster organisation. In such cases prominent chemical industry players, companies offering support services to the chemical industries and national or regional government institutes were targeted. This extended research was particularly relevant to Tuscany, where formal cluster initiatives or cluster organisations had not been established or defined as 'clustering' activity.

In the case of Noord Brabant and South-West Romania, no evidence was found of chemical clustering activity. Consequently, leads were actively pursued to identify prominent chemical industry advances, particularly in relation to eco-innovation solutions. However, due to reluctant participation or confidentiality matters, all concrete leads (5 for South-West Romania and 6 for Noord Brabant) provided no concrete findings. The case studies for these two regions are therefore not based on questionnaire data but findings through communication efforts with potential interviewees and extended desk research.

Furthermore, initially the study objectives proposed DEA1 Düsseldorf and DEA2 Köln to be analysed as two separate regions. However, based on initial research it was found that combining the regions would provide a clearer picture of qualitative findings. This was largely due to the close proximity of the two regions within the state of North Rhine Westphalia.

The following sections provide key findings for each of the six regions through six organisation case studies. Each case study aims to provide a qualitative overview of the drivers for eco-innovative activity within chemical cluster organisations as well as identifying eco-trends and shared environmental challenges.

2.2.1 Antwerp, Belgium (BE21)

The cluster; the Port of Antwerp, is considered a world-scale refinery and the largest chemical refinery in Europe. The port has historically and organically grown rather than emerged from a direct clustering initiative, therefore it is not considered a typical plug and play environment. The Port of Antwerp functions through an open market concept where companies are not governed or spurred on by associations. There is a high degree of integration between business processes within the port; however each company is ultimately driven individually.

During research, the Port Authority was found to be the main governing support system for the chemical and petro-chemical activity. Though not defined as a classic cluster organisation, the Port Authority fulfils a similar function as it supports logistical activity throughout the cluster and is in charge of the leasing the land to the various industrial players. Furthermore, during interviews, the Port Authority explained its various support initiatives and projects to drive the economic development of the region. The chemical cluster of Antwerp was found to be substantially more developed than most chemical cluster initiatives identified in other regions. With regard to eco-innovation, the cluster excelled in environmental performance on a European level. Further efforts to interview Essencia - the umbrella organisation for chemical industries in Belgium, were redirected to the Port Authority (www.essencia.be).

The table and subsection below provide an overview of the eco-innovation activities and challenges for the cluster organisation: The Port Authority for the chemical and petrochemical cluster: The Port of Antwerp.

Port Authority – Port of Antwerp	Year of Establishment	1990 (Approx)
<p>Activities</p> <p>The Port Authority manages the land within the chemical cluster, which is leased to the companies. Furthermore, it has everything to do with nautical logistics and processes surrounding the ports activities and general management. The Port Authority is not directly involved in setting up initiatives, but requires individual companies to take care of their own utilities and waste. The Port of Antwerp was established in the 16th century and has grown organically since then. The port has been autonomous for the past 20 years though the government does hold shares in it.</p>		
<p>Members</p> <p>The cluster consists of companies along every step of the petrochemical value chain – ranging from base chemistry companies to fine chemical companies, specialised chemical companies, refineries, suppliers, waste management and water process companies. In total the Port of Antwerp contains 3,000-5,000 companies depending on how much of the value chain is considered.</p>		
<p>Key Figures</p> <p>Executive team – 8 Management – 30-40</p>		
Website	www.portofantwerp.com	

Key Environmental Challenges as identified by the Cluster Organisation

The Port Authority identified various environmental challenges including CO₂ recuperation, waste and water treatment. To counter the effects of their industrial activity the organisation works to preserve and develop nature reserves, bio mass and wind energy. Due to the scale of the cluster's activities, and its high energy consumption and outputs, the Port Authority has taken a holistic viewpoint toward environmental targets and feels strongly that its members need to have a stake in a varied number of eco-innovative initiatives.

Environmental challenges identified by the Port Authority are aggressively tackled and are clearly highlighted within their cluster strategy. When an environmental challenge or solution emerges, the organisation either looks for the appropriate external partner or sets up the necessary framework for internal initiatives. The Port Authority has an internal environmental department consisting of approximately 40 employees who carry out various studies and collaborative research projects with industries to identify and implement eco-innovative solutions for the industry. The incentives which drive eco-innovation differ largely across the value chain. In general, legislation, market incentives and European competitiveness are the primary drivers to eco-innovation uptake.

Eco-Innovation activity undertaken

The Port Authority is increasing its promotion activity toward eco-innovation constantly. It promotes practices in two core focus areas: calculating the clusters overall carbon footprint (which is also part of its social responsibility targets), and increasing energy diversity to reduce the industry's high dependency on oil. The petrol chemical industry relies heavily on oil prices. As oil is a rather fluctuant and volatile product, it needs to stabilize this overall cost using independent energy source which are more stable by nature (in terms of pricing).

The Port Authority promotes initiatives to tackle the cluster's key environmental areas (the carbon footprint and energy diversity) in a two-pronged approach. The organisation approaches companies individually to promote such initiatives - since the Port Authority is an independent entity, it is not perceived as a competitor - and they are able to collaborate effectively using a one-on-one approach. Alternatively, the Port Authority channels its promotion activities through various sector federations who have specific petrochemical company members. An example of this is a recent project to increase wind energy by setting up a special purpose vehicle to establish various needs and thus source specialist companies for each required action. The tender for the project was submitted worldwide as well as internally to source the best companies (See Mini case study below, p.13).

Within the European context, the cluster organisation collaborates with other ports on various eco-innovative projects and environmental standard setting. An example of this is a project setup to initiate CO₂ recuperation through the European Shipping Index.

The Port Authority identifies themselves more as a facilitator organisation rather than a management company. Its goals are not concretely stated since its focus concerns the smooth flow of operations and labour and the generic well being of the clusters economy. Therefore, eco-innovation challenges are tackled in light of current industrial needs to meet environmental

standards as set by the European petrochemical industry. The organisation's core targets for the coming five years clearly place emphasis on increasing efficiency and research into optimization, targets include:

1. *Mobility* – Large-scale redevelopment of infrastructural work is planned to gain efficiency and reduce logistics;
2. *Expansion* – The cluster needs to constantly develop itself to remain competitive. Expansion possibilities focus on land procurement or optimization of existing land;
3. *Environment* – The main focus is to tackle the carbon footprint of the industry as a whole by increasing sustainability. This is a generic goal which entails widespread research and a diverse approach toward eco-innovation solutions.

Mini case study - Wind Farm to be established by Port Authority

In early 2010, the Antwerp Port Authority in collaboration with the Left Bank Corporation unveiled their plans to develop a large wind farm in the port area in collaboration with private internal and external partners. The port was identified by the Flemish Wind Energy Association (VWEA) and the Flemish Minister of Energy, Freya Van den Bossche as being a suitable location for wind farming.

The initiative along with a current plan to develop a bio-mass power plant, are concrete steps taken by the Port Authority to maximise on the potential for renewable energy development within the port. ([Port of Antwerp, Antwerp Port Authority – Left Bank Corporation, 2010](#))

In February 2011, the projects was further developed and unveiled to be a 200 million EUR wind farm. Five groups are in the running to construct the project. In principle, the first wind turbines within the projects will be launched in 2012. ([Flanders House, Port of Antwerp Selects Green Energy Partners, 2011](#))

Competitiveness and Eco-Innovation

The cluster scores high on global environmental standards for petrochemical clusters. Almost every company within the cluster is in the top 10% in terms of efficiency. This position definitely increases the clusters competitive edge as they are able to set the bar for industry standards. However, having reached this 'best in class' position, the Port Authority feels it should not push the upper ceiling aggressively as the cost factor would make such activity counterproductive in terms of competitiveness.

Relevant links and documents

[Waste management plan for the Port of Antwerp: 1 July 2009 – 30 June 2012](#)

[Antwerp Port Authority eases permit conditions for solar panels in the port area, 2011](#)

2.2.2 Düsseldorf & Köln, Germany (DEA1& DEA2)

The chemical activity in North Rhine Westphalia forms the backbone of the chemical industry in Germany. For the purpose of the study objectives, chemical activity analysis for this region was focused around Düsseldorf & Köln. The region is characterized by a mix of chemical activity within SMEs (80% of the sector), large companies, chemical parks and research institutions (Exzellenz 2011). The two chemical clusters identified were ChemCologne and ChemSite.

Chemical activity in the region is fragmented across a number of sites and chemical parks which collaborate directly or via service providers or cluster organisation initiatives. For this reason, research identified a number of organisations which functioned as cluster organisations or provided similar support services to the chemical industry. Research also led to interviews with service providers such as ThyssenKrupp Xervon to identify further data concerning eco-innovation activities. The organisations approached include:

ChemSite – The organisation provides a range of services at seven high-tech sites in the Ruhr region for potential investors. Research recommendation led to an interview with ChemSite, but proved to provide little data relevant to the study outcomes. However, all findings have been included in the cases below.

Chemie.NRW – A cluster organisation initiated by the state of North Rhine Westphalia. Chemie.NRW is the most significant case for this study. A brief interview was successfully completed.

ChemCologne – A collaborative initiative between industry, universities and various governing bodies include the state of North Rhine Westphalia and the Köln regional government. Various attempts to communicate with ChemCologne were unsuccessful – this was due to the relatively small size of the organisation and the consequent lack of availability.

CURRENTA – Specialises in waste management, and chemical park management. The company manages and operates CHEMPARK Leverkusen, Dormagen and Krefeld-Uerdingen, which are all located in close proximity to Düsseldorf and Köln. Various attempts to communicate with different CHEMPARK management teams proved unsuccessful due to non availability.

ThyssenKrupp Xervon – Service provider for various chemical parks in North Rhine Westphalia. Though their focus is mainly on maintenance and facility management, the company has engaged in various eco-innovative initiatives. The interview provides additional details concerning environmental performance in the region.

VCI – The National Association of Chemical industry represents the economic interests of some 1,650 chemical companies in Germany. Various attempts to communicate proved unsuccessful.

The tables and subsections below provide an overview of the eco-innovation activities and challenges for the cluster organisations or service providers for the chemical parks and chemical clusters surrounding Düsseldorf and Köln.

ChemSite	Year of Establishment	NA
Activities		
ChemSite focuses solely on improving the environment/conditions of the chemical industry in the Ruhr region (a large urbanised area in North Rhine Westphalia). Their main target is job creation which they aim to achieve by attracting new businesses to the industry, by creating collaboration between its members to bring about innovation, by bringing together science and business and by training its existing workforce. ChemSite is purely economically driven and does not promote environmental performance in a significant way. Environmental aspects are only considered to comply with existing regulation or if they directly concern the core objectives of the organisation.		
Members		
ChemSite has 18 industrial partners (Evonik, BP Refining & Petrochem, INFRACOR, RÜTGERS Germany, etc) and various public partners with whom they collaborate and provide joint services. Due to the nature of the company, they do not have 'members' as such.		
Key Figures		
240 hectares of vacant industrial sites		
Website	www.chemsite.de	

Key Environmental Challenges as identified by Cluster Organisations

The main environmental challenge identified by ChemSite is CO₂ emissions. Germany has high standards of practice and regulations regarding environmental targets. These are above the EU average and higher than those set within the Kyoto protocol. Closely linked to CO₂ emissions is the challenge of energy efficiency which concerns all processes along the chemical value chain.

Eco-Innovation activity undertaken

ChemSite's objectives focus on catering to its member's growth and economic development. Eco-innovative solutions and environmental challenge are perceived as momentary issues or problems, which need to be dealt with swiftly in order to allow the industry to develop. However, if environmental targets are identified to directly improve the region economically speaking, then the organisation will take them into account.

Due to the objectives of the organisation, it does not actively promote eco-initiatives or place pressure on members to thrive in environmental performance. If eco-innovative activities are initiated, they are handheld by the members themselves. On the other hand, ChemSite is aware of the growing need for energy resources, which may inevitably lead to the increased promotion of eco-innovative initiatives. Furthermore, the organisation identified legislation (high) and societal pressure (lower) as key incentives which could stimulate measures towards increased environmental performance.

Competitiveness and Eco-Innovation

As environmental quality standards for the chemical industry are relatively high in Germany, ChemSite aims to support its members in meeting these requirements where necessary but does not actively pursue additional eco-initiatives. Though the organisation does link increased

environmental performance to competitiveness, they feel that the costs involved in establishing environmental initiatives does not have an overall positive effect on economic growth of the chemical cluster or industry as whole.

Chemie.NRW	Year of Establishment	NA
Activities The aim of the clustering initiative of Chemie.NRW is to connect chemical companies located in North Rhine-Westphalia along the entire value chain. The NRW Cluster Agency acts on behalf of the state of North Rhine-Westphalia and supports the 16 NRW state clusters. Furthermore the cluster organisation aims to develop and strengthen collaborative efforts and the sharing of knowledge between the processing industries, universities and other scientific entities. The organisation's efforts are reflected in three core objectives: <ol style="list-style-type: none"> 1. To promote the common economic and environmental interests of members; 2. To lobby the concerns of members to authorities, organisations and institutions; 3. To advise members on economic and environmental matters. 		
Members Over 465 member companies, with approximately 110,000 employees in total.		
Key Figures The cluster consists of 50+ companies at 6 sites.		
Website	www.nrwchemie.de	

Key Environmental Challenges as identified by the Cluster Organisation

For the past 20 years, the core environmental focus for the chemical industry in North Rhine Westphalia has been the reduction of emissions. This challenge calls for increased efforts and research regarding energy efficiency measures, identifying future energy sources and managing the environment surrounding chemical plants.

Eco-Innovation activity undertaken

The core objectives of cluster organisations within North Rhine-Westphalia concerns supportive actions to attract and manage investors. Due to the rigorous nature of environmental legislation, cluster organisations place little focus on further environmental targets. Eco-innovation is therefore (generally) not viewed as a strategy but rather a legislative prerequisite which has become an integral and ongoing initiative to meet set standards.

Current trends within the chemical industry of Germany place stronger value on the link between the environment and chemicals. This trend has been catalysed by the emergence of the green chemistry industry as well as societal and political pressure on the industry. Eco-innovative practices implemented individually by members are largely due to market incentives and to increase their own competitiveness.

Competitiveness and Eco-Innovation

Though eco-innovation is not strongly driven further than legislative requirements, the chemical industry does recognize increased eco-initiatives as having a positive effect on competitiveness. If a company or cluster is unable to meet set emission standards, they will be penalized accordingly. Furthermore, resource efficiency, as a sub-objective of reducing emissions, is seen as a pivotal area for future competitive gain and is largely driven by implementing eco-innovative practices.

ThyssenKrupp Xervon	Year of Establishment	2005
Activities		
<p>ThyssenKrupp Xervon provides local companies producing Vinnolit and Air Products Polymers with a wide spectrum of services including maintenance of all production facilities, works security, canteen catering, material and inventories management, facility management to building and conversion projects. Though ThyssenKrupp Xervon is not a cluster organisation but rather a service company, they cater to various chemical parks and chemical clusters within North Rhine-Westphalia and other large scale chemical industries in Europe. The service company has been included within this study due to its sound knowledge of the environmental performance and needs of the industry.</p> <p>The small chemical park is located Köln-Merkenich a suburb of Cologne and consists of only two (large) companies. Nevertheless, it collaborates closely with other chemical initiatives across the region such as the Chemical Park Knapsack (also located in North Rhine Westphalia) to which Thyssen Krupp also caters.</p>		
Members		
2 companies – 80 other members, also caters to other chemical parks and clusters		
Key Figures		
<p>ThyssenKrupp Xervon was formed from the merger of ThyssenKrupp Plant Services GmbH and the PeinigerRöRo Group. The company has a workforce of some 9,000 employees and ranks among the leading international services providers for the chemical and petrochemical processing industries.</p>		
Website	http://www.thyssenkruppxervon.de/	

Key Environmental Challenges as identified by the Cluster Organisation

ThyssenKrupp Xervon identified electricity consumption and waste water management as the key environmental challenges for the chemical industry in Köln-Merkenich. The proximity to the river Rhine makes waste water an important issue. Water consumed during the manufacturing processes flows back into the Rhine and therefore needs to adhere to strict quality controls and purification processes. It was also found that PVC manufacturing is a prominent form of production in the region. The PVC production process requires maximum levels of electricity thus energy efficiency initiatives are a key priority for the sector.

Eco-Innovation activity undertaken

ThyssenKrupp Xervon has an integrated management system which consists of a three-fold strategy featuring environmental practices, economic development and adhering to regulations. Environmental developments are considered a core aspect of the companies overarching strategy.

One key objective is the potential for research to market uptake of various research results. During this transfer process translating theoretical proposals into practical solutions, various impact assessments regarding the environment and the efficiency of a proposed initiative are carried out. Efficiency in water and electricity management is indeed crucial for the environmental and economic development of the sector.

ThyssenKrupp Xervon collaborates and promotes eco-innovation initiatives actively when applicable for economic development. The service provider has internal and external workgroups which stimulate cooperation within the cluster or with other clusters/industries. Internally, the service provider organises regular initiatives to present and debate new technologies. It then submits the findings to the National Chemical Industry Association (VCI) who in turn lobbies initiatives to politicians and policy makers.

Within the chemical industry in North Rhine-Westphalia, five key incentives have been identified which further stimulate eco-innovation in the region.

1. Legislation – Ensuring that fundamental environmental standards are met;
2. European competitiveness – Implementing QSEH (Quality Safety Environment & Health) satellite offices in clusters to assess environmental performance for large companies;
3. Global competitiveness – Ranking high in eco-innovative solutions and efficiency measures to set an example worldwide;
4. Voluntary programmes – Fostering private eco-innovative solutions and initiatives to gain efficiency and increase competitiveness;
5. Societal pressure – Improving the less than positive image of the chemical industry. The cluster faces regular scrutiny and pressure from societal groups and politicians.

Competitiveness and Eco-Innovation

The service provider links competitiveness to eco-innovation mainly in terms of resource efficiency. However, large petro-chemical companies such as Bayer, British Petroleum and Total are continuously increasing the environmental standards for tenders which require chemical industries to perform above the bar. In every quotation or tender submitted to such larger companies, a chemical production company competing for the tender must first qualify by demonstrating high environmental standards. This suggests a growing correlation between environmental competitiveness and potential customers.

Relevant links and documents

[Website for the environmental cluster Umwelttechnologien.NRW in North-Rhine Westphalia](#)

[The European Chemical Regions Networks](#)

[SusChem - European initiative seeking to boost chemistry, biotechnology and chemical engineering research, development and innovation.](#)

[VCI initiative which highlights chemical parks and chemical activity in North-Rhine Westphalia](#)

2.2.3 Tuscany, Italy (ITE1)

The chemical industry in Tuscany has not been officially recognized as a cluster. Based on interview research it was found that the defining of clusters in Italy is still very much at an infancy stage. Concentrated industries are labelled ‘Distretto Industriale’ which refers to territorial and sectoral entities with no managing body – this is mainly how industrial categorization and definition differs from the traditional understanding of the term ‘cluster’. The chemical industry is fragmented (geographically) across Tuscany and consists mainly of large industry players with limited SMEs in the sector. Within the region of Tuscany different ‘groups’ (concentrations) of chemical industries exist, mainly in Grosseto, Massa, Siena, Livorno and Firenze.

During research efforts, five potential organisations were approached for interviews. These consisted mainly of regional development agency and associations which provide support services to the regional industries. A common finding during this research was that organisations did not identify a chemical cluster as such within the region of Tuscany. This is mainly due to the manner in which industry concentrations are defined within the Italian economy. Finally, an interview was completed with one of the leads; Confindustria Livorno.

The table and subsection below provide an overview of the eco-innovation activities and challenges for the ‘cluster organisation’: Confindustria Livorno for the chemical and petrochemical industry activity in Livorno.

Confindustria Livorno	Year of Establishment	1944
Activities Livorno Confindustria is a point of reference for the socio-economic development of the entire province of Livorno, Tuscany. The organisation functions similarly to a cluster organisation as it supports its members in various economic developments. Livorno Confindustria lobbies the regions interests to political and social forces, development institutions and the media, and promotes knowledge sharing and collaborative initiatives. Livorno Confindustria does not dedicate its objectives solely to the chemical industry in Livorno but to all economic activities. Due to the classification systems utilized in Italy, Livorno Confindustria is not an official cluster organisation but seen as a service provider for the region.		
Members Livorno Confindustria represents over 400 companies. The organisation stimulates and supports companies in a range of sectors including shipbuilding, petrochemicals and chemicals, construction and infrastructure, ecology and environment, and logistics and transport.		
Key Figures Employment number: 1300, Satellite chemical industries: 800 Sustainable Report - Bilancio Sociale - since 1999		
Website	www.confindustriallivorno.it	

Key Environmental Challenges as identified by the Cluster Organisation

Livorno Confindustria emphasizes environmental challenges throughout its initiatives both on a theoretical and practical (implementation) level. The key environmental challenges for Livorno are outlined in a sustainability report “Bilancio Sociale” (Confindustria Livorno 2011) which is published annually for the chemical and petrochemical industry of the region. The report prioritises increased energy efficiency and diversification of energy sources to tackle both the high energy consumption and CO2 emission within the sector. Livorno Confindustria also identified waste management (research and implementation) as a key target for the future years, to be tackled particularly through recycling initiatives.

Eco-Innovation activity undertaken

The annual sustainability report is the key driver to eco-innovation activities initiated by Livorno Confindustria. The report is developed by 12 large companies in the region and is a voluntary initiative. It tackles three main issues for analysis and future strategy considerations; economic, social and environmental findings.

The report outlines the strengths and weaknesses of the region, particularly in the chemical and petrochemical industry. To tackle environmental challenges identified in the annual report, the organisation has placed a strong focus on environmental performance through the environmental management systems ISO14001 and EMAS, which 10 out of the 12 large players have implemented. Furthermore the organisation hopes to stimulate increased research in the area of waste management using the findings of the report.

The Bilancio Sociale report, which was established with guidance and support from Livorno Confindustria in 1999, is the core stepping stone toward increased eco-innovation measures and impact assessment. The twelve companies involved are major players in the regional industry and strongly influence the uptake of environmental practices by other companies. The companies have explicitly stated environmental targets as areas of improvement in their objectives and use the report to benchmark and monitor their activities. The report assesses the impact in four key areas: energy consumption, water consumption, waste water, air emissions.

Beside its support and contribution to the Bilancio Sociale report, Livorno Confindustria links its members with external environmental services and knowledge providers and is actively involved in an on-going initiative to implement a system to reutilize civil domestic waste water throughout the industry (see Mini case study below). Furthermore, the organisation provides its members with regular opportunities to collaborate and network with same sector industry players and clusters in Tuscany to stimulate knowledge transfer and research initiatives.

Mini case study - Consortium Arethusa reuse of municipal waste water in industry

The Consortium Arethusa plans on further expanding a current waste water treatment system which taps into municipal waste water in the area Rosignano Cecina (Livorno) and reutilises it within chemical and construction related industrial processes. The initiative currently consists of two water treatment plants that significantly reduce the consumption of freshwater for industrial purposes (on average 4 million cubic meters of fresh water will be saved per year). The initiative has improved the quality and levels of water available for urban consumption. In light of past droughts and increased tourism in the region, water demand has increased over the years and this initiative has had significant impact on the population's ability to tap into freshwater reserves.

<http://www.premioinnovazione.legambiente.org/edizioni/2006/moduli/scheda.php?id=108>

The project, led by the Consortium Arethusa, is an effective example of eco-innovation to reutilise waste within the industry whilst collaborating with external stakeholders; in this case the neighbouring society. One of the key and steadily emerging incentives for clusters to increase eco-innovation uptake lies in societal pressures. Incentives such as these improve the image of chemical industries and stimulate increased collaboration rather than separation between industries and society.

Competitiveness and Eco-Innovation

Livorno Confindustria identified global competitiveness as the strongest incentives and as a driver toward increased eco-innovation. It hopes to increase competitiveness through the annual Bilancio Sociale report and collaborative initiatives with external industries. The organisation has developed a network of investors interested in environmental projects (mainly regarding energy diversity) for the region and is actively lobbying for tax reductions for companies that implement environmental initiatives surpassing legislative requirements. The industry of Livorno aims not only to reduce costs through eco-innovative efforts, but also aims to utilize such efforts to develop its corporate image. This perception of environmental performance being related to both costs and image has evolved largely within the past decade. The organisation feels that the regular (annual) impact assessment carried out through the Bilancio Sociale report and the active involvement of large players in the industry has catalysed the uptake of environmental practices throughout the region.

Relevant links and documents

[Database of sustainability report - Bilancio Sociale from 2004 till present](#)

2.2.4 South-West, Romania (RO41)

Also known as South-West Oltenia, the South-West region of Romania is economically diverse; containing agricultural, textile, automotive, gas and coal, tourism and heavy industries (South-West Oltenia Development Agency 2010). The largest sector within the region is agricultural production, which covers over 60% of the land (South-West Romania Regional Development Agency 2011). Furthermore, the economy is highly dependent on mass exploitation of pre-existing natural resources (in the counties Gorj, Valcea and Mehedinti).

Research findings suggest that chemical activity is a result of a small concentration of firms with an industry-led approach rather than real clustering activity. To gain further insights into clustering initiatives two companies, 3 associations, 1 research institute and the Chamber of Commerce and Industry, Valcea were approached. However, when engaged in discussion the organisations were unable to provide any substantial evidence of chemical clustering activity in the region or any sizeable chemical activity. The chemical sector is however fundamental to the region's economy and revolves primarily around the activities of two players Ferrostaal Oil & Gas and Oltchim, both of which maintain large factories in the region (South-West Oltenia Development Agency 2010).

Eco-innovative advancements

Little evidence has been found to suggest a strong uptake of eco-innovative practices within the chemical industries of South-West Oltenia. Environmental performance is generally targeted to adhere to quality and legislative standards. However, a recent presentation provided by the Ministry of Economy Trade and Business Development outlined plans to develop increased innovation practices through national policy planning within clusters and firm concentrations. Such initiatives may lead to the increased uptake of eco-innovative practices. An important economic development in the region lies within the energy sector, with two hydroelectric plants along the Danube River which together produce 72% of the total hydro-electrical energy in Romania (Dumitrascu 2010)

The South-West Oltenia Development Agency has placed a strong emphasis on economic advancements through the industrial parks established in the region. This strategy has evolved into the Research-Development-Innovation Infrastructure (DII), which aims to stimulate research and innovation activities within the parks through cooperation with 26 research institution. Though not specific to chemical activities, chemical and petrochemical have been highlighted as key industries for research (Dumitrascu 2010).

Companies approached for interview:

Oltchim – The largest identified chemical player in the region; Oltchim's chemical product portfolio includes PVC, Caustic Soda, Propylene Oxide, Propylene Glycol and Polyether Polyols. They have a strong network of 300 partner, 5000 members, and customers in over 80 countries. Environmental initiatives are mainly aimed at increased quality standards and purification processes. Oltchim has setup two laboratories for Air-Soil control and Water control to monitor the company's

environmental impact. The laboratories are setup in collaboration with various research bodies and national institutes. www.oltchim.ro

Chamber of Commerce and Industry, Valcea – As no cluster organisations were identified specific to the chemical industry in South-West Oltenia, the regional chamber of commerce and industry for Valcea was approach. However, the chamber felt it was not well suited to provide supportive inputs for the study and redirected us to five potential contributors.

Ferrostaal Oil & Gas – A global provider of industrial services in plant construction and engineering, trading and assembly solutions, Ferrostaal is a pertinent player in the petro chemical, oil and gas, automotive and power industry. One of their key contributions to the South-West Oltenia's economy is the establishment of a gas network through a compressor station. www.ferrostaal.com

ICSI Valcea - National Institute for Research and Technology Development for Cryogenic and Isotopic. ICSI Valcea was approached based on recommendation by the Chamber of Commerce and Industry, Valcea but there was no interest in further communication. www.icsi.ro/index.html

FEPACHIM - The Employment Federation of the Chemical and Petrochemical Industry brings together 116 companies and 52,763 employees, which represents 54% of the total workforce in the chemical and petrochemical sectors. The organisation was approached based on recommendation by the Chamber of Commerce and Industry, Valcea but there was no interest in further communication. www.fepachim.ro

ASPAPLAST – The Romanian Plastics Processor Employers' Association has 60 members, that process over 60% of all plastic materials in Romania. Members are mainly private companies. ASPAPLAST was approached based on recommendation by the Chamber of Commerce and Industry, Valcea but there was no interest in further communication. www.aspaplast.ro

AIVR - The Employers' Association of paints and Coatings Industry was founded in 2000 by a group of companies with direct involvement in industry for paints and varnishes. By 2010 the association had gained 19 members who produced 80% of national paints and varnishes. AIVR was approached based on recommendation by the Chamber of Commerce and Industry, Valcea but there was no interest in further communication. www.aivr.ro

Additional key player:

Petrom - Romania's largest integrated oil and gas group. Petrom's activities include exploration, refinery, and natural gas and chemical production. It is the leading Romanian retail company, with a network of approximately 500 filling stations ([S&T, Service-oriented view of IT Infrastructure 2007](#)). www.petrom.com

Interesting links

[Comprehensive cluster mapping study by GTZ, February 2010](#)

[The Role of Clusters in the Chemical Industry, Harvard Business School:](#)

2.2.5 Noord-Brabant, The Netherlands (NL)

Noord-Brabant is a province in the Netherlands located in the south of the country and positioned between Rotterdam (port city), Antwerp and the German Ruhr area. The province's key economic sectors are agriculture, industry and the service sector. Noord-Brabant is one of the Netherlands' key economic regions and encompasses Europe's third leading technological region¹.

The region was selected within the objectives of the study, however, despite extensive research, it was found that Noord-Brabant neither contains a chemical cluster organisation nor a high concentration of chemical activity. Chemical companies were fragmented geographically across the province with industries identified in the cities of Eindhoven, Moerdijk, Bergen op Zoom and Tilburg. The closest (geographical) chemical cluster found was Chemelot – The Chemical Innovation Community (<http://chemelot.nl>), which is located in the bordering province of Limburg.

The following organisations were approached to understand the structure of the chemical industry in the region and to identify cluster organisations:

- **VNCI - Association of the Dutch Chemical Industry** – A national association which promotes the collective interests of the chemical industry on a national level by means of consultations, information meetings and recommendations. The VNCI mediates on behalf of the entire chemical sector and aims to develop a positive image of the chemical industry. www.vnci.nl
- **BrabantStad** – A regional steering committee responsible for strengthening the economy and policy planning. The organisation is also involved in lobbying prospective economic policy planning to national institutes, the European Union and local industries. Interests in discussing the study were minimal and withdrawn prematurely. www.brabantstad.nl
- **BOM – Noord-Brabant Development Agency** – An organisation setup and financed by the Dutch State in 1983. It focuses on creating, maintaining and developing the industrial structure of Noord-Brabant by offering professional services to potential investors and local industries. Brief discussions with BOM identified that no core chemical or eco-innovation in light of chemical industries was present or well defined for Noord-Brabant. Further interests to carry out discussions were withdrawn. www.bom.nl
- **Brainport Development** – Brainport is a technological region in Eindhoven which has displayed major economic advances. Though not related to chemical or petrochemical industries, Brainport Development, the cluster organisation for the region, is highly knowledgeable of economic advances and collaborative initiatives across industries and could possibly aid in identifying relevant stakeholders or cluster initiatives. www.brainport.nl
- **Nalco** – A global provider of integrated water treatment processes as well as chemical and equipment programs for industrial application. Nalco has an office located in Noord-Brabant

¹ <http://www.brabant.nl/subsites/english/portfolio/economy-and-work.aspx>

(Tilburg) and was approached due to its core business practices and knowledge of the local industry. The company felt the area of research was neither directly relevant to their business practices nor the region. www.nalco.com

Discussions with the Association of the Dutch Chemical Industry (VNCI) led to the conclusion that there are no chemical cluster organisations in Noord-Brabant. The organisation emphasised that chemical industry support, policy making and research is organised at a national level. This is largely due to the size of the country and the existence of strong support systems mainstreamed through an overarching national support system. Two cases of eco-innovative initiatives with regard to chemical processes were identified for the region (see Mini case studies below).

Mini case study – Moerdijk Port

Moerdijk Port is an industrial platform with 400 companies spread over 2600 hectares of industrial terrain. The platform provides a hub of B2B networks and prospective relationship building. The business community, which is organised and managed by BIM (Moerdijk Complex Business Association), counts approximately 10 chemical companies within the port. The port is managed by the Port Authority which advises and provides services to the BIM members in order to increase developments in the construction, management and exploitation of the port (www.portofmoerdijk.nl).

Shell Nederland Chemie B.V. (SNC); an operating company of the Royal Dutch Shell Group, established plant for ethylene and propylene production within Moerdijk Port in the 1970's. As one of the larger chemical players in the Port, SNC has engaged in eco-innovative solutions through a co-generation plant which produces a large proportion of the electricity required by their activities. SNC also raises steam through the co-generation and other processing plants which is redistributed to meet energy needs. ([Shell Nederland Chemie B.V. 2003](#))

Mini case Study - Centre for Open Chemical Innovation

The province of Noord-Brabant is planning the establishment of a **Centre for Open Chemical Innovation** as a collaborative initiative between Sabic, Cargill, Avans University of Applied Sciences, Rewin, BOM - Noord Brabant Development Agency and BrabantStad. The campus aims to combine research efforts in the chemical and agro-food industries to create a bio-based economic research platform ([Koncerna, 2010](#)). The platform aims to be a hub of sustainable innovation and develop new eco-innovative solutions to business processes particularly with regard to recycling, waste management and resource efficiency in the chemical and agro-food industries. The organisations behind the initiative hope to steer increased collaboration between two significant industries to increase the scope for knowledge transfer and the development of complimentary business solutions. A potential location for the platform is the town Bergen op Zoom ([Ons Brabant, 2010](#))

2.2.6 Rhone-Alpes, France (FR71)

The Rhône-Alpes region is located in South-east France. With a GDP of 187.9 billion EUR in 2008 Rhône-Alpes is the seventh largest European region in terms of GDP. It is also the second most dynamic economic region in France, after Ile de France, with 10% of the national GDP.

Industrial sectors that are active in the region are manufacturing, chemical, commercial services, tourism and some agriculture. Rhône-Alpes ranks first in French energy production and second in chemicals, mechanical construction and the electrical industry. Innovation is high on the industrial agenda of the region. The approach in the region is one that integrates research and market oriented activities, across supply chains. There are direct support programs which support the establishment of research clusters as well as competitiveness through cluster organisations. The national innovation agency OSEO estimated that more than 13 percent of French innovative companies are concentrated in the Rhône-Alpes region (Lyon Finance 2011).

The chemical industry in France is a large industrial player. It is ranked as being the fifth largest in the world after the US, Japan, Germany and China, with the Rhône-Alpes region being the top chemical region in the country. It is reported that the region contains 20% of chemical researchers and 25% of chemical research expenditure out of the whole country. Major international groups such as Rhodia, Arkema, Total or Institut Français du Pétrole have located their R&D centres in the Lyon area, close to their industrial facilities. The environmental chemistry sector in Rhône-Alpes provides 48,000 direct jobs and has a turnover of 12.3 billion EUR (US Embassy 2009).

Environmental sustainability and eco-industries are priority sectors identified for the region, and as such there is a market for these types of products and services across the supply chains. Relevant supply chains for the chemical industry, which are also present in the region, are textiles and garments, electrical and electronic construction, as well as the pharmaceutical and health industries (Lyon Finance 2011).

AXELERA is the only chemical cluster organisations in the region and is prominent regionally and internationally. The cluster organisation is highly organised and structured, with private chemical companies being part of the establishment of the cluster in 2005, and also being actively involved in the work that the cluster organisation undertakes.

It is interesting to note, that in all the regions interviewed for the chemical industry, it is the only chemical cluster that explicitly has an environmental aspect integrated in its mission. It is one of the few green chemical cluster organisations in Europe, and its activities are heavily influenced by eco-innovation.

AXELERA	Year of Establishment	2005
<p>Activities</p> <p>AXELERA is a competitive cluster organisation for two chemical clusters situated in Lyon and Rhône-Alpes. The cluster organisation was setup by Arkema, CNRS, GDF SUEZ, IFP New Energies and Rhodia. The core objective of this “Chemistry & Environment” cluster organisation is to accelerate the development and technological advancement of the industry on a global scale. The cluster aims to be the industrial and scientific leader in chemistry and the environment in the country by 2012.</p> <p>AXELERA’s development strategy is focused on five key areas:</p> <ol style="list-style-type: none"> 1. Chemistry for society (durable building, renewable energies, automotive, electronic); 2. Protection of natural areas (water, air, soil, agro-chemistry); 3. Materials recyclability (waste, recycling and materials); 4. Green Chemistry (bio-resources); 5. The factory of the Future (clean processes). <p>Its mission statement is “to accelerate the shift towards a cutting-edge chemicals sector that integrates environmental management through eco-design”</p>		
<p>Members</p> <p>AXELERA has more than 200 members of which approximately 40% are SMEs. This division has catalysed innovation within the cluster. The members are mostly generic (traditional) chemical companies who are transitioning toward green chemistry.</p>		
<p>Key Figures</p> <p>More than 400 people involved in the cluster through the members 12 people working in the cluster organisation management team 122 programs of R & D approved by the cluster and funded for a total of 409 million EUR, 150 million EUR earmarked for the implementation of projects and leasing of equipment.</p>		
Website	www.axelera.org	

Key Environmental Challenges as identified by the Cluster Organisation

AXELERA has identified a number of high priority environmental challenges for the chemical cluster in Rhône-Alpes. These challenges are reflected in the cluster organizations five key strategies as outlined above and include energy control; air and water quality; risk prevention and waste reduction. Since AXELERA’s fundamental strategy is geared towards environmental impact and research advances. Notably, due to this emphasis on environmental research the cluster organisation’s members are already geared toward eco-innovation uptake and further external incentives have limited impact. Further notable push factors identified by the cluster organisation which increase the uptake of eco-innovation include legislation (fundamental), market incentives and price, and voluntary programmes. Due to the recent establishment of the cluster organisation (2005) it has not carried out holistic impact assessment to analyse its overall environmental impact or the opportunity for eco-innovation.

Eco-Innovation activity undertaken

AXELERA has been able to promote eco-innovative technologies and services to and through its members. Many members are already developing and selling environmental technologies particularly in the French industrial markets but also internationally and various SME members are providing eco-innovative engineering services. AXELERA's further initiatives include a partnership with the eco-cluster Green Business Norway and EnviroNment in Italy; as well as other chemical clusters such as Chemie Cluster Bayern, and Nepic in the UK. The partnership functions somewhat as a memorandum of understanding till date with an exchange of information, however the initiative has not proven to be highly productive till now.

The cluster organisation has a holistic approach in terms of how it deals with eco-innovation. The multifaceted aspect of the supply chains that the chemical industry is related to is taken into account. The cluster organisation has organised itself in thematic "eco-systems": renewable energies and electronics, material waste and recycling, transportation, sustainable buildings, cleaner production and bio-resources. In practical terms, working groups have been set up for each of the themes (or groups of themes) and as such a holistic approach is taken when conducting work on greening chemical activities.

Competitiveness and Eco-Innovation

The correlation between chemical-industry advancements integrated with environmental initiatives is a strong indicator of AXELERA's understanding of the link between competitiveness and eco-innovation. The organisation aims to promote this message constantly to its members through its core targets for the coming years. Not only do such practices help members meet standards set by REACH, but they also aid in changing the overtly negative public opinion of the chemical industry.

It is also interesting to note that the cluster organisation was founded and has the support of major chemical companies, which regards green chemistry as a core part of their business plans, and value the potential that it offers in markets internationally. It is the only cluster organisation identified that is not a cleantech cluster, but rather a traditional industry cluster, that explicitly integrates environmental aspects in all their activities. It is interesting to note that the wider policy framework in the region is highly favourable for the emergence of eco-innovation. Policies targeting eco-industries and the greening of industries are identified as a top priority by the regional government.

(See Mini case study below)

Mini case study – Inter-cluster network formation for eco-innovation

To catalyse research outputs and broaden the knowledge pools, AXELERA is heavily involved in developing inter-cluster collaborations. AXELERA current has a two pronged approach toward inter-cluster activity

Approach 1 - Theme specific collaboration

AXELERA collaborates with specific clusters to increase research in selected themes relevant to targeted markets. Currently, AXELERA collaborates with seven French clusters/cluster organisations using this approach; [AdvanCity](#), [IAR – Association industries in Agro-resources](#), [Lyon Urban Truck & Bus](#), [Pôle Innovations Constructives](#), [Plastipolis](#), [Techtera](#) and [Tennerdis](#).

Approach 2 – Generic R&D development collaboration

Together with Lyon Urban Truck & Bus, Minalogic and Tenerrdis, AXELERA has founded the inter-pole EcoTech Rhône-Alpes. This is an inter-cluster initiative aimed at developing programs within R&D centres with a generic focus on energy efficiency and material management. The initiative received state recognition in May 2010 and was formally established at the Pollutec Lyon in December 2010.

Through these two approaches, AXELERA aims to further catalyse the uptake of eco-innovative research in the Rhône-Alpes. The region is a leader in the field of environmental technologies counting 2500 eco-companies in early 2010 ([Economie, 2010](#)). The two approaches highlight AXELERA's strong understanding of the link between collaborative knowledge exchange between industries and increased research to further develop eco-innovative solutions. Such initiatives may be considered sound and progressive benchmarking practices to increase eco-innovation. Furthermore, it may be concluded that cluster organisation who strategically label themselves as catering to eco-innovation activity have a higher success rate of research to market transfer of eco-innovative solutions.

In addition to the above mentioned initiatives, the cluster organisation also participates in partnerships with European added value. AXELERA is a member of the EcoCluP consortium, along with 12 other leading European eco-clusters. "EcoCluP: Eco-Innovation Cluster Partnership for Internationalisation and Growth" is a 3 year Europe Innova project co-financed by the CIP programme of the EC, which aims to strengthen the partnership between eco innovation clusters across Europe, foster the internationalisation of innovative SMEs, for pan-European R&D partnerships between SMEs support internationalisation and provide trainings to cluster managers to create more effective cluster coordinators. More information about the project may be found here: www.europe-innova.eu/ecoclup

2.3 Synthesis: Eco-innovation activity in chemical cluster organisations

Challenges in environmental performance

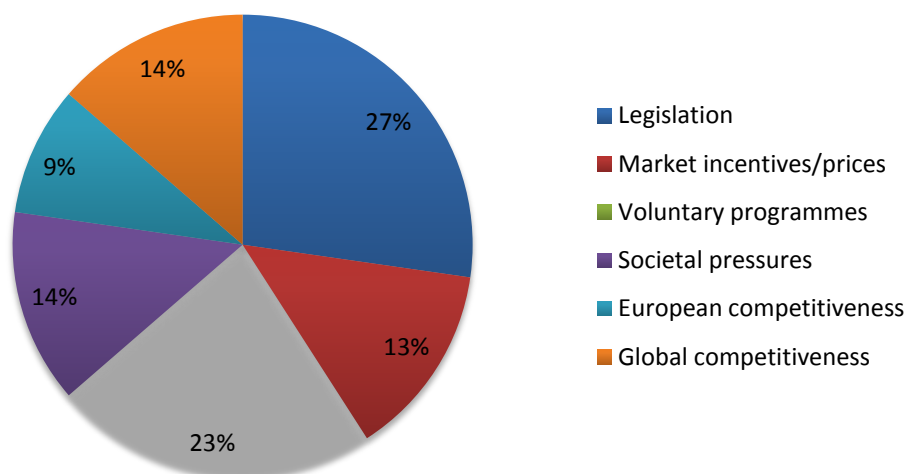
The chemical industry is very energy-intensive and it comes as no surprise that the six cluster organisations (and other organisations) interviewed for this study all pointed out the energy efficiency challenge and efforts to diversify the energy mix. The organisations perceive a strong need to reduce fossil fuel dependency to secure energy supply and to mitigate the emission of greenhouse gases. In this context, the reduction of CO₂ has also been mentioned as a key issue for the industry.

The energy challenge is closely followed by waste water and waste management challenges. Approaches to these challenges vary. While the main focus remains on end-of-pipe technologies i.e. on treating waste and waste water, strong trends for greater resource efficiency are observed. Nature-reserve preservation and air quality are also considered by some cluster organisations

Barriers and drivers for eco-innovation

In most cases, it can be said that generally eco-innovation or environmental targets do not form part of the cluster organisation's main strategies and objectives. Currently, the strategic focus is clearly set on the competitiveness of the industry and on compliance with existing legislation and standards. The interviewees perceived that the legal and regulatory requirements on environmental issues are already very stringent and this seemingly represents a major barrier for "more" eco-innovation. The motivation to do more eco-innovation is low unless it has positive implications on costs, such as energy and resource efficiency. However, voluntary environmental schemes and initiatives do exist, though not at the level of the cluster organisation but at individual company level.

Key eco-innovation drivers in chemical cluster organisations



2-4 Key eco-innovation drivers in chemical cluster organisations

Data gathered through qualitative research required participating member of cluster organisation or service providers to select the key external incentive which drive eco-innovation within their cluster. As can be seen from figure 2-3, legislation is the most dominant driver followed by voluntary programmes. The third most significant drivers are societal pressures and global competitiveness (both rank equally). These findings validate conclusions drawn concerning the pivotal role of strict legislative standards placed on the chemical sector across member states. The fact that voluntary programmes rank as the second highest driver again confirms the opinion of cluster organisations that eco-innovation is not driven by competitiveness but mainly legislation as any additional initiatives are therefore purely based on voluntary actions rather than economic development

Eco-innovation activities

There is a wide range of eco-innovation activity on-going in the chemical clusters that have been contacted.

In Livorno a project is planned that aims at the use of municipal waste water in the chemical industry. Also in Tuscany, a yearly Sustainability Report is being produced to help the industry benchmark and monitor its environmental performance. In Köln, the industry carries out impact assessments to establish its environmental performance and the efficiency of its industrial initiatives.

AXELERA has established an Eco-tech cluster with other cluster organisations in the region to increase R&D collaboration. The Port of Antwerp has a dedicated team of 40 employees working on environmental issues. The organisation plans to calculate the overall carbon footprint of the cluster and increase energy diversity through projects such as the wind farm that is scheduled to be established in the Port area in late 2012. Furthermore, the Port is addressing the possibility of establishing a major biomass power plant in the port area. In Noord-Brabant, a cogeneration plant has been established in the Moerdijk Port and produces a large proportion of the electricity required by their industrial activities.

A clear trend can be observed that several cluster organisations have established or are in the process of establishing external collaboration on eco-innovative measures. In Noord-Brabant, the creation of a Centre for Open Chemical Innovation is planned. It should focus on new eco-innovative solutions particularly in recycling, waste management and resource efficiency. The Port of Antwerp collaborates with other ports on eco-innovative projects and setting environmental standards. In Rhône-Alpes, AXELERA cooperates with other French cluster organisations from sectors that need chemical products in their value chain and works with them on relevant environmental aspects. In Tuscany, a network of investors with an interest in eco-innovative business solutions has been developed and collaborates with the cluster organisation. Moreover, the cluster organisation links its members with external environmental services and knowledge providers. A lot of the cooperation activities are focussing on research and development and the subsequent business of eco-innovative solutions.

Eco-innovation and competitiveness

For the chemical cluster organisations, the link between eco-innovation and competitiveness is clearly established through resource efficiency and therefore a potential reduction of costs, as well as through improved compliance with environmental regulations and standards. Some feel that a better public image of the industry would also positively contribute to its competitiveness.

In Antwerp, the chemical companies already score high in terms of efficiency and perceive that this has increased the clusters' competitive edge. Tuscany sees the global competition as the strongest incentive to use eco-innovation in order to reduce costs but also believes that a better corporate image will contribute to greater competitiveness.

The German chemical clusters link competitiveness to resource efficiency and cost reduction. In addition, big private procurers in the chemicals industry are raising the environmental standards in their procurement processes and suppliers that can meet these expectations have a far better chance of winning contracts. Some have raised concerns about the costs of environmental technologies and see a negative impact on competitiveness. On the other hand, it is also understood that companies that do not comply with the environmental standards may face expensive penalties which also have a negative impact on competitiveness.

The link between competitiveness and eco-innovation is at the heart of the business model that has been created by the French cluster organisation. It helps the chemicals companies of the region meet standards, comply with legislation and address the negative public image of the industry.

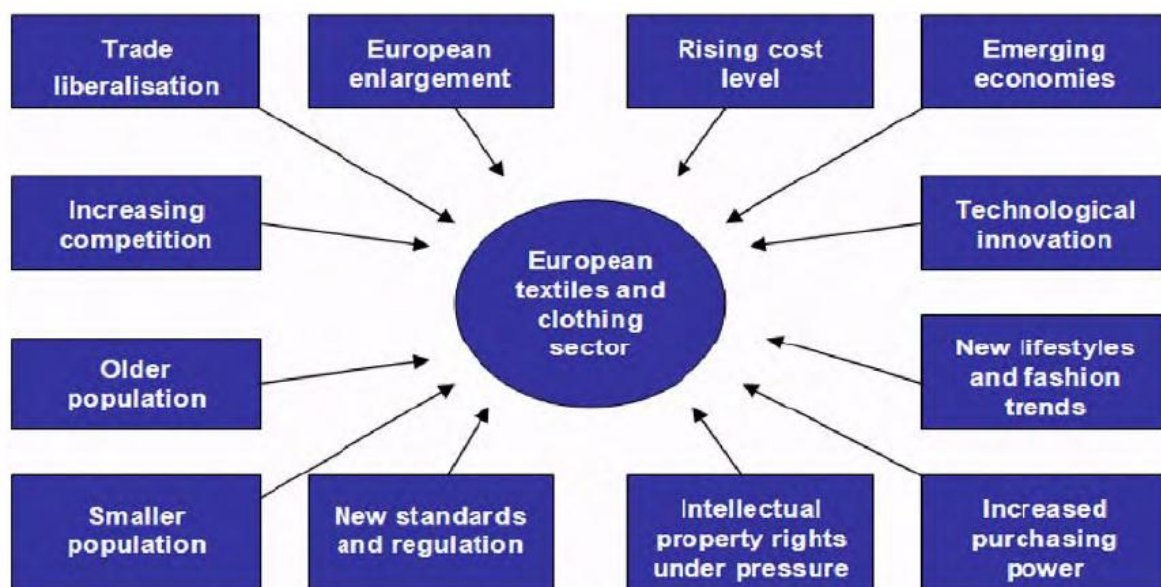
3 Eco-innovation in textile-clothing-leather cluster organisations

3.1 Overview of the textiles-clothing-leather industry and its environmental performance

The European textile and clothing industry represents a highly diverse industry that manufactures a multitude of products including hi-tech synthetic yarns, wool and cotton fabrics, industrial filters, prêt-à-porter and high fashion. To date, textiles and clothing range among the main European manufacturing sectors and plays a crucial role in the growth and competitiveness of many European regions. It is dominated by small and medium-sized enterprises (SMEs) and employs a high proportion of female workers.

For over 30 years, the Multi Fibre Arrangement (MFA) governed the world trade in textiles & clothing and imposed quotas on the amount developing countries could export to developed countries. The MFA expired in January 2005, causing the sector to undergo significant changes. In 2004, 235,000 **textile and clothing** companies employed 2.8 million workers. The industry had a turnover of 197 billion EUR (DG ENTR 3 2011). In 2010, the textile & clothing industry had a turnover of 172 billion EUR and a mere 127.000 companies employed over 1.9 million workers (EURATEX 2011).

In only five years, the industry lost over 100,000 companies and 900,000 jobs. Despite this development and the financial crisis, in 2010, the European industry exports products for 34,000 billion EUR comparing to 30,000 billion EUR in 2004. The trade balance has, however, deteriorated from -36,000 billion EUR in 2004 to -50,000 billion EUR in 2010. In order to remain competitive, the industry has had to restructure and modernise itself and relocated production to lower wage countries within and outside the EU. Today the competitive advantage of the European textiles and clothing sector lies in its focus on quality and design, innovation and technology, and high value-added products (EUROFOUND 2008).



3-1 Trends and key drivers of change in the European textiles and clothing sector, (Danish Technology Institute, 2007)

European **leather and leather goods** manufacturers are employing 564,000 works or 1.6% of the European workforce (Eurostat, 2005). The European leather tanning industry is still the world's largest supplier of leather in the international market place even if, in general, the share of the EU on world markets is tending to shrink with the development of the leather industry in other regions of the world such as Asia and the Americas.

The leather tanning industry is a global industry, and EU tanners depend highly on access to raw materials and to export markets. This is, however, often hampered by tariff and non-tariff barriers hindering the export of finished leather and restricting access to raw materials. Since access to European raw materials has become more difficult (slaughter rate and beef production have dropped in recent years), access to raw materials outside Europe is crucial. Many third countries, however, maintain export bans and restrictions for raw hides and skins. Market access improvements are expected first and foremost in the context of the WTO where the European Commission supports the overall withdrawal of all export restrictions by different WTO members (China, Argentina, Brazil, Indonesia, Pakistan, India, etc.).

EU tanners are exposed to increasing competition from a large number of non-EU countries, notably low-labour cost ones. In this context, fair and reciprocal market access is essential in allowing EU tanners to find markets in which to sell their products. At present, the European market is open to virtually unrestricted imports from all over the world. EU import duties are very low and non-tariff barriers do not exist. At the same time, European operators are still faced with numerous barriers to trade (such as high import duties and tariff and non-tariff measures such as excessive labelling or certification requirements).

The environmental challenges for textiles, clothing and leather

The textiles, clothing and leather tanning industries aim to achieve a wide range of environmental protection objectives such as waste water reduction, recycling and recuperation of secondary raw materials.

For the tanning industry, the implementation of these measures also contributes to greater resource efficiency and competitiveness of the sector. European leather producers must exploit their raw materials more efficiently and avoid wasting collagenous material (hides and skins) that constitute valuable raw materials for other industries and agriculture.

A key piece of environmental legislation for the textile and leather sector is the **Integrated Pollution Prevention and Control (IPPC) Directive** which aims at minimising pollution from various industrial sources throughout the European Union. In the textiles sector, plants for pre-treatment (operations such as washing, bleaching, mercerisation) or dyeing of fibres or textiles where the treatment capacity exceeds 10 tonnes per day are subject to the IPPC Directive. In the leather tanning industry, the IPPC Directive covers plants where the treatment capacity for the tanning of hides and skins exceeds 12 tonnes of finished products per day.

Both sectors are important users of a large variety of chemical preparations and are therefore also affected by the **Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals**

(REACH). Textile companies are furthermore impacted by the **European Emission Trading System (ETS Directive)** if they have combustion installations with a total rate of thermal input exceeding 20MW and they have to comply with the provision of the **Biocides Directive** whenever Biocidal products are added to textile products to confer them with specific properties (e.g. repel fleas, mites and mosquitoes or avoid allergens).

*Moreover, leather tanning companies are obliged under the river basin management plans (**Water Framework Directive 2000/60/EC**) to take measures to reduce water pollution if the discharge from a plant contributes towards the pollution of a body of water, preventing compliance with the "good status" criteria. (REACH 2011)*

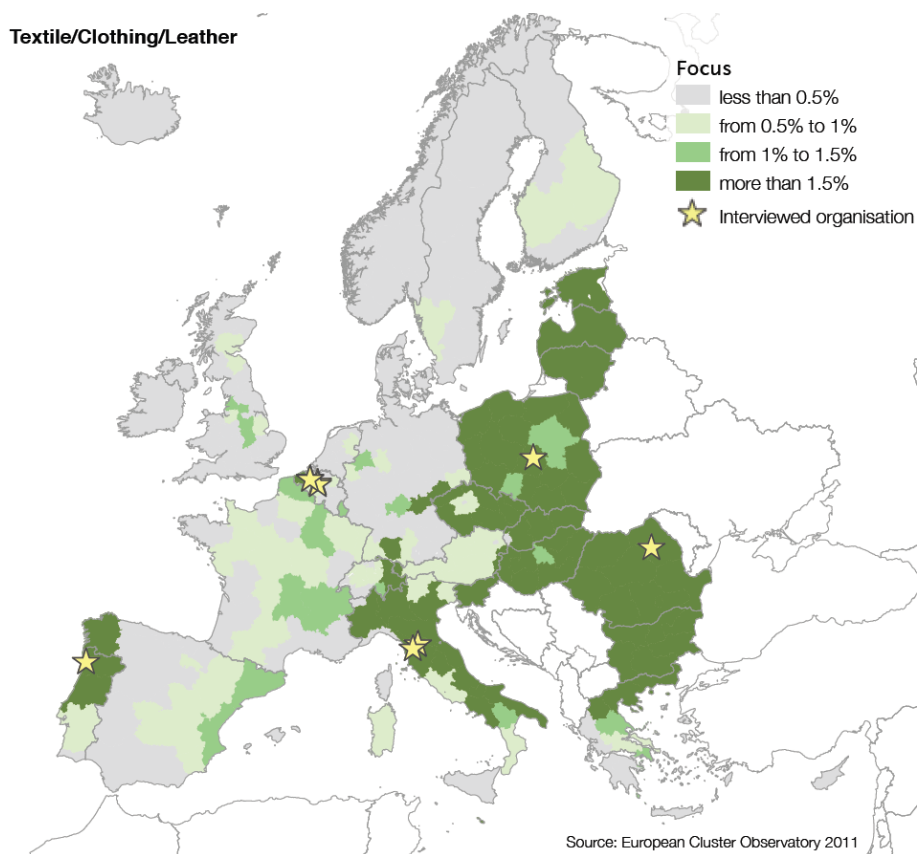
3.2 Regional case studies

This section provides an overview of the eco-innovative activities undertaken by cluster organisation within the textile-clothing-leather industry. Based on the requirements of the study, primary and secondary research was carried out to collect data and analyse the respective activity within five regions:

1. BE25 West-Flanders, Belgium
2. PL11 Łódzkie, Poland
3. PT Norte, Portugal
4. ITE1 Tuscany, Italy
5. RO21 North-East, Romania

For each region, cluster organisations for textile-clothing-leather industries as well as eco-clusters were sourced and analysed. Through a questionnaire and phone interviews, a qualitative understanding of the organisations key environmental challenges, environmental initiatives, and barriers and incentives were attained.

The map below indicates the organisations interviewed and their spread across regions with textile/clothing/leather industrial activity.



3-2 Textile/clothing/leather cluster organisations interviewed for study

Based on the outcomes of initial data collection, it was identified that some of the regions had no clear cluster organisation. In such cases prominent textile industry players, companies offering support services to the textile industries and national or regional government institutes or associations were targeted. This extended research was particularly relevant to Norte Portugal where formal cluster initiatives or cluster organisations were not identified. Communication efforts with various associations and prominent industry leaders proved strenuous. The organisation that did agree to an interview; The Textile and Apparel Association of Portugal, provided a completed questionnaire but was unavailable for discussions.

In comparison to research findings obtained for the chemical industry, the textile-clothing-leather industry provided more extensive results. Particularly in the case of West Flanders where 5 cluster organisations/service providers/research platforms across the textile value chain were interviewed. The case of West Flanders provided extensive examples of (collaborative) initiatives to promote and stimulate eco-innovation within the industry. Tuscany, Italy was another example of a well defined textile cluster with clear cluster organisations. The three organisations interviewed seemed to have a concrete understanding of the environmental challenges faced by the cluster and were involved in various promotion activities to develop existing and novel eco-innovative practices.

In the case of North-East, Romania and Łódzkie, Poland clear clustering activities were identified. Through primary desk research it was found that the textiles clusters in these regions were officially recognized as clusters on national level and that various initiatives and support services had been setup for the clusters. However, efforts to initiate discussions with organisations proved unfruitful. In the case of Łódzkie eight organisations were approached out of which one agreed to an interview – PIOT Foundation of Fashion Industry – which was established in early 2011 under new management and was unable to provide a developed understanding of the environmental performance within the cluster. In the case of Romania, two organisations were identified but were reluctant to enter into discussions. Consequently one questionnaire was filled out by the North-East Astrico Association with no further discussions.

The following section provides key findings for each of the five regions through eleven organisation case studies. Each case study aims to provide a qualitative overview of the drivers for eco-innovative activity within textile-clothing-leather cluster organisations as well as identifying eco-trends and mutual environmental challenges.

3.2.1 West-Flanders, Belgium (BE25)

West-Flanders has significantly higher concentration of textile and textile related industries than other provinces of Belgium. Survey research suggests that 95% of textile related industries are located within Flanders, from which the majority is located in the western region. The case of West-Flanders is an interesting one as various cluster organisations have been identified in the region. In general, each cluster organisation caters to a different type of firm along the textile value chain and therefore a strong collaborative bond has been formed between the different organisations. This has led to increased innovation management and research to market uptake as cluster organisations

are able to engage in joint initiatives. The industry consists of 95% SMEs and employs a large labour force respectively (based on data gathered from qualitative interviews).

With regard to eco-innovative initiatives, all cluster organisations identify sustainability, resource efficiency and waste management as competitive strategies. Various collaborative research initiatives have been established and cluster organisations tend to promote environmental performance to their members to exceed mere legislative requirements. The outlook and approach to environmental issues differs to some extent since each cluster organisation caters to a different part of the textile and apparel manufacturing value chain. Nevertheless, there is a general consensus amongst cluster organisation in West-Flanders that water management in terms of efficiency and waste water treatment is the key environmental challenge for its varying (but interrelated) members.

In West-Flanders, six cluster organisations in the textile and clothing sector have been identified and interviewed. The following tables summarize the information obtained.

Creamoda	Year of Establishment	NA
Activities		
Creamoda advises its members on new social, environmental, legal technological and international services. Within their objectives they encourage their members to be 'sustainable friendly'. The cluster works closely with MOTIV (Belgian research-oriented cluster organisation) on various technology advancements and eco-innovative strategies for the industry. They are also a member of Euratex. www.euratex.org		
Members		
Approximately 200 members consisting of manufacturers, designers, wholesalers and agencies active in the Belgian fashion industry and ready-to-wear garments as well as housing textiles. The majority of members are SMEs and carry out their manufacturing needs abroad.		
Key Figures		
Management team – 8 people The sector is labour intensive and has 85% female employees		
Website	www.belgianfashion.be	

Key Environmental Challenges as identified by the Cluster Organisation

Creamoda's members consist primarily of designers, fashion houses and wholesalers (end of the value chain) who focus more on business-to-consumer relationships when considering environmental performance. Due to trends, Creamoda has initiated a strong push towards the use of eco-clothing and recycling on a customer level. This trend however is still at an infancy stage and market uptake has proven to be expensive for SMEs with limited resources. Many of their members are currently engaged in general sustainability practices but within this particular branch of the industry it is difficult to define such activity for both the members and their customers. Members themselves have not been proactive in the implementation of innovative technologies to gain efficiency. The main sustainable practices attained are thus pushed onto members through legislation and market standards.

Eco-Innovation activity undertaken

Eco-innovation is not a direct target for Creamoda but is a subpart of the socially responsible business targets for their members. Though Creamoda initiates various sustainable business practices, their surveys have found that the response rate to such initiatives is low. This may be largely due to the fact that their members are mainly SMEs and often struggle with increased workload or costs necessary for the implementation of eco-innovation concepts. Clearly, environmental issues are not yet on the top of the agenda of textiles companies. An example of this is a lack in industry interest into REACH which manufacturers still feel is not relevant for them. Creamoda therefore prioritises activities that are leading to a change in this perception.

To date, no assessment impact has been carried out by Creamoda which can be directly related to eco-innovative practices or uptake. The organisation is however exploring the possibility of creating a "socially responsible business scan" to allow members to individually assess their progress and identify areas of improvement. Eco-innovation will be a concrete aspect of increasing efficiency management should such a scan be developed.

External collaboration efforts

Creamoda is not aware of and does not cooperate with eco-clusters or with eco-related industries. They do however, have a strong collaborative relationship with MOTIV who broaden their reach into the industry as well as carry out eco-related research for the industry. MOTIV's objectives seem to indirectly influence the direction and path taken by cluster organisations such as Creamoda. Since much of their research is aimed at efficiency matters, eco-innovation can be said to be catalysed through them within the entire industry's value chain.

Competitiveness and Eco-Innovation

No impact assessment or analysis into the potential for eco-innovation in terms of increased competitiveness for their members has been carried out by Creamoda. The organisation does however feel that as legislation becomes stricter and as customer trends change, the industry will develop closer links between eco-innovation and competitiveness. So far, environmental efforts

undertaken by members have required strenuous promotion from cluster organisations. Main environmental efforts remain connected solely to legislation which provides the fundamentals for environmental business practices. For the majority of members (SMEs) meeting such legislative requirements is often as far as they are willing to go in term of eco-practices. Further pressures to implement increased eco-innovative practices include societal pressure to sustainably procure and outsource their products and manufacturing as well as growing EU competitiveness. The organisation has identified increased concern and interest by their members into eco-innovation practices and considers the concept of eco-innovation to be in its exploration stage. These concerns are reflected in the organisations future targets and plans for the coming five years which include:

- Focus on socially responsible business practices within the industry;
- Support members in implementing ISO 2600 standards;
- Increase awareness of specific environmental processes such as recycling and bio cotton;
- Promote the use of REACH standards of practice especially since much of the manufacturing is currently outsourced.

MOTIV - Flemish Innovation Platform for Fashion Technology, University of Ghent	Year of Establishment	2006
<p>Activities MOTIV does not consider itself a cluster organisation but rather a “support platform” established by the university for the fashion industry. However, many of its support services aid the textile industry in a similar manner as a cluster organisation would and are therefore pertinent to this study.</p>		
<p>Members MOTIV is managed by the University of Gent and is known as the “Flemish Innovation Platform for Fashion Technology”. It is mainly a networking platform. Though it cannot speak of formal membership, MOTIV caters to 1500-200 entities including fashion and textile companies, cluster organisations such as Fedustria, Creamoda, FBT, Centexbel and other support services such as IVOC, EROV (Economic Council of East-Flanders) and DEVAN</p>		
<p>Key Figures MOTIV functions primarily through collaborative power with its members, its management team therefore consists of one individual who draws in from an abundance of resources within the</p>		

university and its textile networks.

Website

www.knowings.be / www.motivflanders.be

Key Environmental Challenges as identified by the Cluster Organisation

While Creamoda primarily targets the end users of the industry, MOTIV is involved with a wider range of members along the value chain. Their key objective is to act as a platform for awareness, to initiate research within the textile industry and to bring members closer to new technologies and service providers. MOTIV identified that along the value chain water management was the most pivotal environmental challenge identified (waste water, water consumption and water quality in the dyeing process). MOTIV also raised awareness for energy efficiency requirements particularly in the fashion sector of the textile industry, though this is not comparable to the challenge of water management.

In terms of the eco-foot print of textiles, the biggest problem identified is not during production but rather during the washing and disposal of garments by the consumer. Yet little or no real focus or studies have been carried out to measure the true effects of this final step along the value chain. As consumers are becoming more aware of the necessity of sustainable practices, initiatives striving toward the recycling of used garments may emerge in the near future. Most of the regulations and initiatives are toward production and nothing is done after purchase. This means that the environmental impact of the products life span is not fully covered in research or in practice.

Mini case study – MOTIV external collaboration

It has been identified that many collaborative cluster initiative or cluster organisation initiatives toward eco-innovation solutions are tackled using an inward approach; initiatives look to their members or cooperative cluster to develop collaborative projects. MOTIV as a research organisation focuses mainly on research collaboration to contribute to the textile industry and has displayed increased efforts to develop means of external collaboration.

External Collaboration 1 – Ecolife

Ecolife is a Flanders based social environment organisation which strives to aid companies in developing sustainable practices through various tools and coaching sessions. MOTIV has invited Ecolife to regular member events to discuss various topics and themes. As Ecolife keeps up with latest sustainable practices and technologies they are able to promote a wider range of eco-innovative solutions and consideration to members than they would otherwise be exposed to. At present, MOTIV is working on developing further collaborative initiatives with Ecolife, particularly research proposals which may involve members from the textile industry. www.ecolife.be

External Collaboration 2 – The Fair Wear Foundation

Fairwear Foundation (FWF) is an international initiative catering to textile production companies who aim to take responsibility for their entire value chain to ensure socially sound and sustainable practices. As identified through research a core problem of measuring impact (social or environmental) is the inability to analyse the practices of subcontracted work (which is often itself subcontracted). MOTIV is currently collaborating with the FWF on a project concerning the lifecycle of jeans. Furthermore, FWF is able to disseminate and promote its work through the MOTIV platform. www.fairwear.org

External Collaboration 3 – The Copenhagen School of Design and Technology (KEA)

KEA has developed a summer program for students to train in sustainable fashion and design through its Knowledge Centre for Responsible Design. In 2010, MOTIV joined KEA in various elements of the program to develop modules and increase the scope for further collaboration. As MOTIV is an organisation spearheaded by the University of Ghent, it hopes to increase knowledge transfer and research opportunities through the initiative. The strategic objectives of the course are likely to spur the exploration of eco-innovation practices. en.kea.dk

Eco-Innovation activity undertaken

MOTIV organizes two or three large scale annual events for its members. They aim to disseminate new technology findings in research, to develop new calls for research and generally to promote efficient business practices to their members. Within their research projects and information dissemination during annual events, MOTIV actively promotes and pursues developments in eco-innovation oriented technologies, services and provides access to respective service providers.

Research initiatives are often undertaken in close collaboration with Centexbel and the University's own resources. One of MOTIV's core methodologies to promote eco-innovative best practices tools is to provide their members with local examples of positive, proven initiatives. An example of such an initiative is a project which aids SMEs in setting up and configuring mass customisation strategies and

actual processes which place resource efficiency at a high level of priority. MOTIV also aids SMEs in the textile industry in efforts to source grants, partners, and other forms of support to carry out R&D in manufacturing processes to incorporate new technologies, and to implement more efficient practices along the entire industry. As MOTIV is a neutral player, SMEs are not hesitant to collaborate closely with the cluster organisation, thus providing them with quick insights into relevant new practices which can then be disseminated across the industry. Moreover, the course curricula of the fashion courses offered at the university as well as the mission statement both enforce sustainability. Such initiatives are reflected in the organisations future targets and plans for the coming five years which include:

- The creation of a more holistic approach for the industry to drive innovation, efficiency and optimisation along the entire value chain.
- Eco-innovation will make out a large chunk of their resource work, but will not be a direct target.

Competitiveness and Eco-Innovation

MOTIV has a coherent understanding on how eco-innovative solutions can increase the industry's competitiveness and ability to internationalise. However, the environmental impact of the Flemish textile industry is rather low and the impact of the fashion industry is even lower. The core challenge maybe identified when one looks at the eco-foot print of the holistic value chain; as the textile and fashion industry rely heavily on subcontracting from developing countries. Here it is hard to keep track of the true eco-impact of their products.

Once the value chain starts in Belgium, legislation ensures that a fundamental bottom line in sustainable and eco-practices is met. Though MOTIV admitted that such legislation was rather unambitious (though higher in Flanders than in other Belgian regions), they explained that eco-innovative practices within West-Flanders were largely implemented through self-imposed initiatives. They aim to improve the public image of the industry on a long term. To catalyse such efforts, MOTIV places future emphasis on the identification of more knowledge providers to cater to the industry and to evolve the concept of environmental competitiveness to boost the industry in the European textile arena.

MOTIVs collaborative efforts have focussed on new innovation. Until now, no impact assessment has been carried out to measure environmental performance but for the garments manufacture industry assessment plans are in the pipeline. As many SMEs currently subcontract to Eastern Europe and Africa (only for small quantities), MOTIV's future targets include research into the holistic value chain to increase supply chain management. This will allow for a better understanding of the potential for improved environmental performance from start to finish.

Fedustria	Year of Establishment	2006
Activities		
<p>Fedustria is the federation of the textile, wood & furniture industries. The organisation is a merger between The Belgian Federation of the Textile Industry (Fébeltex) and the Belgian Federation of the Woodworking and Furniture Industries (Fébelbois). Fedustria represents Belgium textile companies toward the government. They also lobby concerning their members problems and legal barriers. Furthermore they inform their members regarding new legislation and act as service providers.</p>		
Members		
<p>Nearly all textile producing companies such as weaving and spinning companies, carpet manufacturing, technical textiles and finishing companies. The only niche sector they don't cater too is the actual clothing makers (this does not include the manufactures of materials) – these are handled by Creamoda. Fedustria has around 400 members who cumulatively make up 85% of the economic value of the Belgian textile industry.</p>		
Key Figures		
<p>Size of management team: 45-50 people 24,224 employees within their member circle Due to the financial crisis, the Belgian textile industry lost more than a quarter (26.2%) of its production volume in 2008 and 2010. The industry was able to partially compensate for losses through a recovery of 5% in 2010 (Ministry of Economy, 2011)</p>		
Website	www.fedustria.be	

Key Environmental Challenges as identified by the Cluster Organisation

Fedustria sees its core environmental challenge in all composite forms of water management. Many companies within the textile sector along the entire value chain use large quantities of fresh water. Water is heavily used in the dyeing and finishing application. There is currently a growing demand for fresh water within Belgium and because of this scarcity, companies are gaining less licences for pumping groundwater. Furthermore, waste water at the end of processes is a challenge in terms of legislation – the water directive and legislation at EU level is becoming stricter toward the quality of waste water. New legislation focuses much more on micro pollutants which are difficult to remove and substitute. As there is little support for companies in this matter, they are required to find a solution to the problem themselves. Fedustria helps in this initiative via Centexbel's technological centre to carry out research into alternative chemical substitutes.

Eco-Innovation activity undertaken

Fedustria acts as a link between government and members, and lobbies for various causes for the industry. For this reason many of its initiatives and targets are spurred by the industry's needs rather than its own objectives. Environmental performance or eco-innovation uptake is therefore not a direct target or objective for the cluster organisation. Fedustria is more involved in disseminating

environmental targets as set by government to their members. To this end they alert their members concerning relevant development in legislation and policy making.

Eco-innovative activity managed by Fedustria is carried out through various projects and platforms including [SUSPRO³](#) - an initiative to increase sustainability management - and [VLARIP](#) - an initiative in collaboration with [Essencia](#) and Centexbel to implement REACH. Fedustria also welcomes pitches or workshops from new technology providers. Currently, they are implementing a program in the carpet industry tackling post-consumer carpet waste, with the aim of closing the entire recycling loop. A growing trend toward dealing with consumer waste within the textile industry has emerged. The concept is to produce carpets using relative waste from old existing carpets. Waste treatment companies have been involved in this initiative.

Competitiveness and Eco-Innovation

One of the key objectives behind the launch of [SUSPRO³](#) is to improve the competitiveness of members through increased environmental performance. Through SUSPRO³, Fedustria also aims to increase the rate of uptake of sustainable practices. All in all, the cluster organisation places a strong emphasis on eco-innovation as a competitive tool.

As the industry's consumers are becoming more and more environmentally conscious and are demanding that certain standards of practice be implemented, the industry itself is waking up to the competitive angle which a strong uptake in environmental practices will give them when competing on a European or even a global level. A further stimulant identified by the industry to incorporate increased eco-practices lies in the aim of reducing total costs from production to logistics. Environmental initiatives and energy will definitely become more important in the industry and in legislation and Fedustria is sure that this will be reflected more and more in their general activities. The trend toward the importance of climate change and in light of the EU 2020 further stimulates the organisation to get ahead of competing industries.

FBT – Belgium Association of Textile Care	Year of Establishment	1992/1993
Activities		
FBT is a traditional association that lobbies for their niche members		
Members		
FBT has 350 members throughout the country (not divided regionally) including textile care companies; textile rental services, automated laundry mats , ironing services, dry cleaners, laundries (B2B, industrial laundries, B2C), and also companies that do B2B rental of dust control mats and wash room equipment (self rent) companies.		
Key Figures		
Size of management team - 6		
The industry consists of approximately 800 labourers		
Website	www.fbt-online.be	

Key Environmental Challenges as identified by the Cluster Organisation

FBT has its own environmental committee dedicated solely to environmental targets and identified waste water as a pivotal environmental challenge. As water is becoming increasingly expensive and legislation is stricter concerning the quality of waste water, more efficient means of water consumption are necessary. However, two years (2009) ago the organisation carried out a large scale study into waste water, for which they cooperated with the government, MOTIV, members and additional partners. The study found that on the whole the industry was doing comparatively well though further improvements would have a positive effect on competitiveness. Another key environmental challenge is found in energy consumption within the logistical aspects of production. It is believed that more energy is consumed within the logistical procedures of the industry than in all other business processes combined.

Eco-Innovation activity undertaken

In their environmental initiatives FBT is one of the few cluster organisations to cooperate directly with eco-industries though initiatives are always internally managed. The eco-innovative undertakings of FBT are highlighted by their project involvement as outlined in the case studies below.

In the coming five years, FBT aims to target specific research areas and establish project initiatives to increase eco-innovation activity. These include the following:

- [SMILES](#) - Sustainable Measures for Industrial Laundry Expansion Strategies: Smart Laundry-2015
- [FBT – HORECA](#) - An initiative to produce sustainable linen in collaboration with the catering industry
- Identify best available technologies in collaboration with [VITO](#) – Organisation focussing on researching new sustainable technologies
- Analyse the suitability of the chemical K4 to replace current (highly toxic) chemicals used in dry cleaning machinery. This is an initiative in collaboration with [VITO](#)

Competitiveness and Eco-Innovation

According to FBT, legislation and regulation are the main drivers toward implementing eco-innovative practices in the sector. The organisation feels that as legislation pushes environmental performance up the agenda, the industry will slowly begin to link eco-practices to increased competitiveness. More efforts are required to raise awareness about useful practices particularly in waste water management. The green hype on a B2B level is hitting the industry hard as well. A primary B2B relationship is with hotels that require external laundrettes; more and more hotels require their laundrettes to tick an 'environmentally friendly' box.

FBT perceives an imbalance between their members concerning innovation performance (and thus indirectly eco-innovation performance). The fragmentation of legislation across Europe is also reflected in the three Belgian regions that have different legislation even regarding environment

efficiency and outputs. Sometimes companies close to the border of a region who have customer in another region face difficulty in legislation as it may be more lenient for a competitor across the border.

Centexbel - Belgian Textile Research Centre	Year of Establishment	1950
Activities		
Centexbel's main objective is to streamline innovation to the sector; in terms of products, management of processes and skills. Centexbel is a collective centre founded in 1950 at the initiative of Fedustria, the Belgian professional organisation of textile, wood and furniture industry to reinforce the competitive position of the Belgian textile companies. To fulfil this mission, Centexbel offers an extensive range of activities and services to the textile industry, including testing, certification, consultancy and research & development while guaranteeing independent and objective advice; the expertise of over 100 highly educated collaborators; trans-sectoral and international networking; focus on sustainable development; practice-oriented support and partnership.		
Members		
About 800 textile companies and other companies along the value chain, in total about 1,200 Belgium textile producing companies that are obligated to join. In general this does not include clothing textiles which are handled by Creamoda.		
Key Figures		
Management team - 10 Employees – 140 Industry Turnover approx 12 million		
Website	www.centexbel.be	

Key Environmental Challenges as identified by the Cluster Organisation

Centexbel has identified a number of core environmental challenges for the textile industry. The most significant are waste water and water consumption. The disposal of chemicals is also a pertinent issue along with the energy consumed during the drying and oven applications in the manufacturing processes.

Eco-Innovation activity undertaken

Centexbel includes 'innovation' in its objective, which contains eco-innovation as a sub-objective. It is one of the few textile cluster organisations in the region which reflects environmental targets directly in their strategy. However, such objectives are always measured in terms of overall economic impact and monetary value for their members. For this reason Centexbel does not actively pursue the promotion of new technologies to its members without true value addition.

Centexbel arranges monthly meetings with their members to discuss trends and issues. These events (nearly) always cover elements of environmental or sustainable practices. An example of a

'newer' technology they are currently promoting concerns textile recycling. They are also working on an initiative to promote solar power to members.

Centexbel involves companies and external industries on environmental concepts but does not collaborate with any eco-clusters. Across the board they collaborate with other textile-oriented cluster organisations such as MOTIV, Creamoda and Fedustria on various research initiatives. Currently, no direct impact assessment has been carried out in light of environmental performance. However, the organisation does analyse the energy consumption of its members through monthly data collection. These findings are likely to lead to energy-efficient initiatives in the future.

Mini case study – SUSPRO³ – Sustainable development for competitive advantage

SUSPRO³ stands for SUSTainable PROducts, PROCesses & PROfit and will run until the end of February 2012. It is a joint initiative between the cluster organisations Fedustria, Centexbel and the Technical Centre of the Wood Industry to support the textile and wood industries in becoming the leading industrial players within the field of sustainable management by 2015. The programme specifically aims to aid 200 companies in developing sustainable company policy and in implementing systems to measure the sustainability of products. Furthermore, 60 companies have been targets to implement eco-innovative solutions to manufacturing processes and eco-innovation systems at management level to monitor environmental performance. Progresses in sustainable management will be monitored using a sector specific scorecard for a selected number of products. SUSPRO³ aims to develop long-term economic benefits for the companies and aid them in distinguishing themselves from competition. The initiative is financed by the European Fund for Regional Development (40%), the Flanders in Action Pact 2020 (45%), and the project partners (15%). ([Centexbel, SUSPRO for sustainable development, 2010](#))

SUSPRO³ takes on a cradle-to-cradle approach to be more eco-effective within the selected industries. The SUSPRO³ initiative is unique in its objectives, which clearly relate eco-innovation to long-term competitive gain. Through research, it was found that incentives to develop eco-innovation solutions within clusters have typically tackled immediate or short-term needs. The strong correlation between competitiveness, long-term economic gain and sustainable practices, set SUSPRO³ apart as a forward thinking and advanced initiative toward eco-innovation developments within clusters.

Campaign video for SUSPRO³ – including two project examples. [Video sample](#).

Competitiveness and Eco-Innovation

Eco-innovation and sustainable practices are becoming more prominent in the cluster organisations approach and its members are realizing the added value. Legislation is only the bottom line according to the organisation, which means that most initiatives are carried out independently by members.

For the future, Centexbel aims to increase industry competitiveness. They intend to closely relate such initiatives to eco-practices. Their project SUSPRO³ (see Mini case study) will also be an ongoing environmental initiative until 2015 and is likely to open doors to further collaborative projects of a similar nature.

Relevant links and documents

[Centexbel activities](#)

[Creamoda and Fedustria are members of The European Apparel and Textile Confederation](#)

[MOTIV, Essencia and VITO collaborate on ECO2CHEM – an initiative which promotes sustainable chemicals in various industries](#)

[SUSPRO³ - an initiative to increase sustainability management \(Centexbel & Fedustria\)](#)

[Environmental report for Belgium](#)

[VLARIP - an initiative in collaboration with Essencia and Centexbel to implement REACH](#)

[VITO – provides technology solutions for sustainable development \(they cooperate with the textile industry\)](#)

[FBT has a waste water programme called SMILES \(Sustainable Measures for Industrial Laundry Expansion Strategies: Smart Laundry-2015\)](#)

[VLABOTEX - this initiative helps members decontaminate soil. It is run through a 50/50 arrangement between government support and industry investment](#)

3.2.2 Łódzkie, Poland (PL11)

The province of Łódzkie has been dependent on its textiles industry for more than 150 years. However, when the Soviet Union collapsed, the sector was suddenly exposed to international competition, which caused the industry to face major challenges. Many (SMEs in particular) were unable to survive the economic turbulence and as a result many went bankrupt and unemployment shot up drastically (EMCC case studies: [Textiles and clothing sector: Farbolux Biliński, Poland](#), 2008). At present efforts are actively being pursued on a national level to revitalize the textile region of Łódzkie.

The textile cluster identified is located in Łódź, which is the third largest city in Poland. The cluster organisation responsible for the textile cluster was referred to as the Cluster of Advanced Technologies of the Textile and Apparel Industry until 2011 and has recently been reorganized and modified under the name; PIOT Foundation of Fashion Industry. The key focus of the cluster organization which was setup by the National Textile & Fashion Association is to catalyse the uptake of new technology and to create 40,000 new jobs by 2015 (objective established in 2008). Through a focus on innovation through new technologies, the cluster organisation hopes to transform the crippled industry to a research-intensive industry. The Cluster organisation interviewed; PIOT Foundation of Fashion Industry, cooperates with the Łódź Technical University to stimulate collaborative research projects with local industry players.

During research initiatives, seven potential cluster organisations, service providers and governing bodies were approached for interviews regarding the cluster of Łódź. Due to unavailability and language barriers, the only successful interview completed was with the PIOT Foundation of Fashion Industry. Further research and email communication led to the assumption that this was indeed the only real cluster organisation in the region.

The table and subsection below provide an overview of the eco-innovation activities and challenges for the cluster organisation: PIOT Foundation of Fashion Industry for the textile and clothing industry activity in the textile cluster of Łódź.

PIOT Foundation of Fashion Industry	Year of Establishment	2011
Activities The PIOT Foundation of Fashion Industry has been setup by the National Textile & Fashion Association for the Cluster for Innovative Fashion Industries Łódź. The organisation was strategically established to stimulate new product innovation in the area of clothing and textiles through research to market collaboration with universities, research institutes and existing industry. Furthermore, the organisation places emphasis on education and skilled labour for the region. The National Textile and Fashion Association works on a strategic policy level and created the PIOT Foundation of Fashion Industry as a practical platform for specific activities.		
Members A total of 10 Members, mainly; producers of clothing and textiles, media and press, technical universities.		
Key Figures Values of sale: 4454,10 MLN PLN Total employment in sector 47 380 people (Lodz Regional Development Agency, 2007)		
Website	www.przemyslmody.pl (under-construction)	

Key Environmental Challenges as identified by the Cluster Organisation

Though environmental practices are not actively pursued within the cluster, a number of textile companies have started to utilize organic fibres and bio-cotton within their manufacturing processes. Such efforts have been primarily induced by fashion trends anticipated by the customers. The organisation feels that European competitiveness and legislative requirements may be a stronger driver toward stimulating eco-innovative practices.

Eco-Innovation activity undertaken

The PIOT Foundation of Fashion Industry is a young organisation which has been formally established in the beginning of 2011. For this reason, solid steps toward tackling environmental challenges have not come to light. As the organisations core objectives do not include a high focus on environmental impact or eco-innovative solutions, there is little evidence to suggest that such initiatives will become a prominent aspect of its core strategy until fundamental industrial processes and advancements of the cluster as a whole have reach a higher stage of maturity. The PIOT Foundation of Fashion Industry felt that the mind state of local industry and the infancy stage of the cluster were not conducive to eco-innovation uptake. The organisation identified that the uptake of eco-innovative solutions within business processes was not actively supported or promoted by governing bodies as a means of doing business.

The PIOT Foundation of Fashion Industry does not state environmental targets; they are not involved in any direct promotional activity to increase the uptake of eco-innovative practices. However, as their focus is largely on research and new technology development for the textile industry and as eco-innovation often takes place as a subset of innovation, the organisation feels that their current

focus may indirectly increase the future uptake of eco-innovation initiatives and environmental technologies.

The organisation has not included environmental practices within its future targets or indirect strategies. As the organisation was only established early this year, their focus will remain on technical innovation and increasing the skills attained by the industry through building a strong link between industrial practices and research.

Competitiveness and Eco-Innovation

As the uptake of environmental practices is still solely stimulated by legislation and EU level incentives, the industry's understanding of the role of eco-innovation especially in relation to competitiveness is still very much in a stage of infancy. Though the PIOT Foundation of Fashion Industry identifies the global trend toward correlating eco-innovation practices as being conducive to competitiveness, the organisation feels that this trend has still not entered Poland.

Relevant links and documents

[Textiles and clothing sector: Farbolux Biliński, Poland, EMCC case studies, European Foundation for the Improvement of Living and Working Conditions, 2008](#)

[The Lodz Textile Cluster -Transformation of the tradition towards science-based industry, Lodz Regional Development Agency, 2007](#)

3.2.3 Norte, Portugal (PT Norte)

The textile and clothing industry is a significant sector of the Portuguese economy. It provides almost 22% of employment in the manufacturing industry and 3,448 million EUR of exports ([ATP,2011](#)). The textile industry in Norte, Portugal is governed and supported by a number of associations, research platforms and cluster organisations. The most significant players identified include:

ANIVEC - The National Association of Apparel and Clothing Industry represents the Portuguese clothing industry and lobbies for its interests at national and international level (IAF Euratex, IFTF, GINETEX). ANIVEC provides its members with a wide range of technical, economic, legal and commercial services. www.anivec.com

CITEVE - Technological Centre of Textile and Clothing Industries of Portugal aims to promote innovation and technological development of textile and clothing. www.citeve.pt

APICCAPS - Portuguese Association of Footwear Manufacturers, Accessories & Leather Goods is a national trade association based in Porto. APICCAPS aids its members in internationalisation, collective bargaining, quality and environment innovation and various other services. www.apiccaps.pt

ATP - Textile and Clothing Association of Portugal is an employers' association that groups around 600 member companies from the Portuguese textile and clothing sector. www.atp.pt

In understanding the framework within which textile clustering activities are governed in Norte, it is important to highlight the organisations above. They work in close collaboration with each other, policy makers and governing bodies to stimulate economic development in the textile cluster optimally. During research, it was found that in terms of environmental performance the textile cluster is doing well in the eyes of policy makers and regulatory standards have been relaxed in light of this. Though efforts were made to engage in discussion with all the above entities, the organisations were reluctant to participate due to confidentiality reasons and the strong level of collaboration existing between organisations. ATP agreed to the interview by submitting a filled out questionnaire but was unavailable for further discussions.

The table and subsection below provide an overview of the eco-innovation activities and challenges for: ATP - Textile and Apparel Association of Portugal for the textile, clothing and leather industry activity in the cluster of North Portugal.

ATP - Textile and Apparel Association of Portugal	Year of Establishment	2003
Activities ATP is a merger between the two former associations APIM (Portuguese Association of Industry and Apparel mesh) and APT (Portuguese Association of Textile and Clothing). Through its strategy, the organisation aims to concentrate and strengthen associations within the sector, thus ensuring representation of all industrial activities, upstream and downstream services, with special emphasis on textile and clothing distribution. It does so by: <ul style="list-style-type: none"> • joining the textile, clothing and fashion companies by supporting and lobbying their interests; • defending businesses by creating an environment conducive to competitiveness and development; • providing useful services and advise to its members; • ensuring the clusters future by monitoring and stimulating industry activity. 		
Members 600 Textile and Clothing companies (NACE 13 & 14)		
Key Figures Management team: 12 Members account for more than 45,000 jobs and almost 3,000 million EUR in turnover, with two thirds of this intended for export markets		
Website	www.atp.pt/home.php	

Key Environmental Challenges as identified by the Cluster Organisation

The main environmental issue in the North region of Portugal is an on-going challenge regarding the water quality of the rivers Ave and Cavado. The objective of the industry is to develop an improved ecological balance with current industrial activity.

Recently, industrial pressure to conform to and increase environmental performance has decreased as the industry has had lower levels of water consumption and outputs of waste. This is partly due to the implementation of more effective water and waste management systems, which have allowed for a better balance of resources. It is also due to the fact that the industry is not highly resource intensive. Some companies within the cluster currently produce their energy requirements through co-generation.

Eco-Innovation activity undertaken

Though eco-innovative practices are not explicitly stated within the organisations strategy, indirect initiatives and projects are in line with the Portuguese Environmental Agency, which serves as an intergovernmental panel to debate climate change. ATP does not tackle eco-innovation uptake in a structured manner and any such initiatives are generally the result of market incentives, or changes in legislation.

Competitiveness and Eco-Innovation

ATP is a member of the Competitive Fashion Pole, which has launched various eco-innovative projects through the Technological Centre for Textile and Clothing (CITEVE, www.citeve.pt). The level to which competitiveness is related to eco-innovation practices is largely dependent on the costs imposed by such practices in relation to potential market benefit. Globally, textile industries vary in their environmental standards and goals, which in turn has a fluctuant effect on competitiveness. ATP aims to focus its efforts and eco-initiatives not in light of competitor's standards for quality but rather on market demand. There is a clear trend that customers are demanding stricter levels of environmental performance in the textile sector, thus, the cluster organisation feels that increased investments in long-term eco-innovation technologies may be burdensome for the economy of the cluster in the short-term but will aid the cluster in sourcing future potential customers. For this reason, ATP pushes for the efficient management of energy resources through the use of alternative energy within its future targets. A core focus is placed on future efficient water management.

Relevant links and documents

[EUROclusTEX - A collaborative initiative to develop cooperative trade between the two textile regions; Norte, Portugal and Galicia, Spain](#)

3.2.4 Tuscany, Italy (ITE1)

The industrial cluster of Tuscany (or distretto industriale) is an agglomeration of SME's based in the same geographical area, historically determined and specialized in one or more manufacturing phases, and integrated through a complex net of economic and social interrelations.

In Tuscany, the textile-clothing-leather sector has various governing and public support systems. The textile sector in Tuscany may be considered as a distretto industriale, which is defined as a concentration of territorial and sectoral entities with no managing body – this is mainly how industrial categorization and definition differs from the traditional understanding of the term 'cluster'. It can be imagined as a huge network of different members. Inside this network, groups of actors establish different levels of cooperation among themselves. The textile and leather distretto industriale located in Tuscany is considered the largest textile industry in Italy's economy and aims to complete the entire value chain of production from start to finish without international sub-contracting.

The table and subsection below provide an overview of the eco-innovation activities and challenges for the organisation: The Pratese Industrial Union for the textile distretto industriale (cluster) in the Tuscan region.

The Pratese Industrial Union - Unione Industriale Prato	Year of Establishment	1912
Activities		
The Pratese Industrial Union was established in 1912 to work closely alongside local industry. The organisation's core objective is to promote and safeguard the interests of the industry as a whole as well as the interests of single enterprises. The organisation has close ties with the Italian Manufacturers Association – Confindustria. The Organisation holds members and has a representative in several bodies, companies and foundations. http://www.projectimagine.eu/info		
Members		
The organisation has approximately 800 members, mainly SMEs, who collectively make up 80% of the entire Prato textile industry.		
Key Figures		
Members employment (total): 29.700		
Website	www.ui.prato.it/unionedigitale/v2/english/default.asp	

Key Environmental Challenges as identified by the Cluster Organisation

The Pratese Industrial Union has identified four key environmental challenges within the cluster. Water consumption and increased procurement are the most significant challenge. Efficient energy consumption is the next most pivotal challenge followed by waste management. Additionally, the organisation feels it may need to increase its efforts in the challenge of reducing industrial emissions.

Though challenges have been clearly identified, they have not been included in future strategies or targets. However, the organisation was involved in establishing waste water purification plants within a 60 kilometre industrial aqueduct which collected and redistributes water across the cluster. This initiative has increased dumped waste water recycling and re-use of water by 25%, which is the largest increase in waste water efficiency measured throughout similar clusters in Italy.

The core incentives that stimulate eco-innovation uptake identified by the Pratese Industrial Union are current legislation, strong market incentives and growing European competitiveness.

Eco-Innovation activity undertaken

The Pratese Industrial Union collaborates with research centres to increase environmental performance. In 1997, the Pratese Industrial Union promoted a study on the IPPC directive². The study contains a number of best practice tools which manufacturers utilize as benchmarks to improve their environmental performance. The organisation also supports cooperation with same sector clusters to build up best practice within and outside the region – an example of such collaboration is found with the industries of the region in Piemonte. Collaboration is usually of a commercial nature though there has been a high level of cluster collaboration regarding the effective implementation of the REACH directive. The organisation aims to focus future targets on waste water infrastructure.

Competitiveness and Eco-Innovation

The Pratese Industrial Union does not recognize a fundamental correlation between eco-innovation uptake and competitive gain. The organisation feels that competitiveness is largely influenced by the market and the industry's core customers are more concerned with other parameters. Even though the textile industry's current market is showing increased interest and awareness of environmental performance, in reality, such trends are ranked lower than overall market performance.

The implementation of eco-innovative solutions is considered costly and the effects of implementation are often only felt in the long term. However, as the trend toward environmental performance increases, the organisation feels that due to the economies of scale attainable as a cluster, it will be easier to implement eco-innovation practices across the industry rather than focussing on specific solutions for individual companies.

The organisation places a stronger link between innovation and competitiveness and feels that environmental performance or eco-innovation does not lie in the industry's core innovation and new technology targets. However, specific members within the cluster have increased their interests in environmental performance, which may catalyse the future uptake of eco-innovation within the industry as a whole.

² <http://www.itistulliobuzzi.it/buzziwebsite/biblioteca/biblioteca.asp>

Confartigianato Prato	Year of Establishment	NA
Activities		
Confartigianato Prato is a public organisation set up to promote regional industry through support services to SMEs. The organisation represents and lobbies the interests of artisanal manufacturers and stimulates collaboration along the production value chain.		
Members		
5000 associated members,		
Key Figures		
2000 SMEs utilise the organisations accountability services		
Website	http://asp.prato.confartigianato.it/dnnconfpo/	

Key Environmental Challenges as identified by the Cluster Organisation

Confartigianato Prato identified waste water dumping as the key environmental challenge faced by the local textile industry. This challenge is closely linked with water quality management and water supply issues. The second most prominent challenge concerns new sources of energy followed closely by a need to efficiently recycle waste during production. Since the 70's, the industry has placed a strong emphasis on reusing waste within their manufacturing processes.

Eco-Innovation activity undertaken

Though the Confartigianato Prato does not identify environmental challenges or eco-innovative practices within its objectives or targets, the organisation is aware of its growing significance. At this point, no fundamental plans to tackle these issues have been developed but the organisation hopes to implement more solid plans in the future. Despite this lack in clear targets, the organisation is actively involved in various eco-innovation related projects. Confartigianato Prato is currently discussing plans with local industry to develop waste refineries and energy plants through close collaboration with municipalities and environmental knowledge providers. Furthermore, the organisation had a high stake in efforts to tap into new energy sources - members installed PVC panels on their roofs as part of a collaborative initiative across the industry. The organisation also actively promotes the use of eco-labels due to recent B2B trends; various purchasing houses, particularly in Germany require such eco-labels as a standard practice (OEKOM 2009).

Confartigianato Prato further addresses innovation and to some extent eco-innovation developments through various collaborative efforts. They have developed ties with fashion clusters, the leather district of Santa Croce (based in Tuscany), the textile district of Piemonte and various universities and research centres. Collaborative efforts include developments in chemical utilization (in the region of Piemonte) and water quality management (Santa Croce). Though no impact assessment has been carried out specifically to verify eco-innovation uptake, various macro-level analyses have been conducted by research organisations, industry and cluster organisations such as Confindustria Italia, which monitor water and energy consumption as well as waste production. Such quantitative findings have identified a further need to gain efficiency through eco-innovation and may catalyse the uptake of environmental practices within the industry.

According to the Confartigianato Prato, the key drivers to eco-innovation are legislation, particularly concerning the REACH initiative and voluntary incentives, which are typically undertaken independently by companies. The final incentive identified was societal pressure, though this was very much still at an infancy stage. The organisation places the establishment of water and energy plants within the district as one of their key future priorities. Furthermore it has increased its focus on innovation research, which the organisation feels will inevitably lead to increased environmental performance in the long run.

Competitiveness and Eco-Innovation

Within the textile-clothing-leather cluster of Tuscany, a high correlation between cost and competitiveness was identified. Consumers primarily look at the price of products and secondly at the quality. Italian consumers in particular consider quality as an important factor. Based on these findings, it may be suggested that cost and quality in manufacturing exceed environmental performance as factors attributed to competitiveness by the cluster organisation and its member.

The cost of implementing environmental practices is inevitably redirected onto the consumer. As eco-innovative technologies often require relatively high investments, and the return on investment is only realised in the long-term, such practices are not considered by the organisation as being conducive to increased competitiveness. However, a trend toward sustainable practices and their affiliation with eco-innovation uptake is growing within the clusters members. It is likely that such trends will only increase over time and will allow members to draw a stronger link between competitiveness and eco-innovation; particularly energy efficiency. Such perceptions are still very much in a development stage.

Consortium of Tanneries - Consorzio Conciatori	Year of Establishment	1967
Activities		
<p>The Consortium of Tanneries manages the localisation, urbanisation and allotment of land for the transfer of tanning activities into modern industrial zones. The organisation acts as a representative body for such efforts and lobbies its member's interests to national labour organisations, economic institutions and manufacturing grants. Furthermore, the organisation supports its members in the promotion of products, setting of environmental standards and quality control in the industry.</p> <p>The textile-clothing-leather cluster of Tuscany is one of the largest leather and apparel districts in Italy and consists mainly of a high concentration of small manufacturers. The cluster produces 98% of insoles for shoes and 35% of leather for shoes within the country.</p>		
Members		
Approximately 400 members, most of which are SMEs		
Key Figures		
<p>35% of the national leather production</p> <p>10.000 Employees within members</p> <p>Export impact on the turnover: 40%</p>		
Website	www.consorziocinciatori.it	

Key Environmental Challenges as identified by the Cluster Organisation

Within the region, the cluster organisation identified waste water dumping and water quality management as key environmental challenges. Further challenges of less importance include air emissions, overall water consumption, the efficient use of waste, chemical quality control and substitution within manufacturing processes. The Consortium of Tanneries did not recognize energy consumption and alternative energy needs as a core challenge or objective.

Eco-Innovation activity undertaken

Eco-innovative activity has been largely a result of collaborative projects. The Consortium of Tanneries together with various associations in the district developed improved water quality techniques within manufacturing. Further collaborative initiatives include knowledge and technology exchange with other leather and apparel clusters; specifically regarding efforts to tackle quality control. Such cooperative actions are being promoted throughout the industry.

The organisation provides members with multiple environmental performance support services. The cluster itself has implemented environmental targets through environmental service providers which have been established locally. According to the Consortium of Tanneries, the cluster's approach and uptake of environmental practices is increasingly positive. The industry is gaining efficiency in its key environmental challenges. The organisation identifies (in order of priority) legislation, voluntary efforts and societal pressures to be the main drivers for eco-innovation amongst its members.

Competitiveness and Eco-Innovation

Competitiveness amongst the cluster members is largely viewed on a global level as the industry competes with various non European players (China and India being the main ones). Standards for environmental performance are not equal across the global industry. In terms of cost in relation to competitiveness, SME members in particular do not place a high value on environmental targets as these hinder them to be competitive on a global playing field. Though the industry does value the importance of eco-innovation as a long-term competitive drivers, SMEs are unable to invest heavily in such initiatives.

Relevant links and documents

[The IMAGINE project - Four Tuscan clusters cooperate to increase eco-innovative solutions](#)

[Eco-innovation and Economic Performance in Industrial Clusters: Evidence from Italy, 2010](#)

[Environmental Policy paper of the industrial cluster Consorzio Conciatori \(Document in Italian\)](#)

[The statute of the Promotore Committee –initiative to promote the implementation of EMAS by Consorzio Conciatori Conciatori \(Document in Italian\)](#)

3.2.5 North-East, Romania (RO21)

In the North-East of Romania, the ASTRICO Textiles Cluster was identified. The Textile cluster consists mainly of knitwear manufacturers and related specialised processes (such as ironing, assembling, and washing knits). The cluster employs more than 1700 personnel and had an accumulative turnover of 60 Million EUR in 2010 of which 80% is dedicated to European exports. The cluster organisation which manages and supports the ASTRICO Textiles Cluster is known as the North-East Astrico Cluster Association or the North East Astrico group. The cluster organisation is chaired by a Managerial Board which is appointed by the General Assembly.

The cluster organisation collaborates with research institutions, development institutions and consultants to stimulate the economic development of the region. These include: InnoConsult, ADR Nord Est – regional government programme to stimulate the North-East economy, INCDTP – The National Research and Development Institute for Textile and Leather, and the Technical University „Gheorghe Asachi”.

During research, it was quickly established that the North-East Astrico Cluster Association is the only organisation which may be defined as a cluster organisation in the region. North-East Astrico Cluster Association was labelled as one of the new innovative clusters in Romania by the Ministry Of Economy Trade And Business Environment (based on brief discussions with the Ministry).

The table and subsection below provide an overview of the eco-innovation activities and challenges for the cluster organisation: ATP - North-East Astrico Cluster Association within the ASTRICO Textiles Cluster.

North-East Astrico Cluster Association	Year of Establishment	2010
Activities		
North-East Astrico Cluster Association is a group of members of the industrial yarn and knitwear manufactures in the North East development region of Romania. The organisation is run on private capital attained through its members. The organisation’s primary goal is to strengthen pre-service and in-service training for graduates and specialists as well as to identify opportunities to increase added value of products through technological advances and applied research. Furthermore the organisation actively promotes the cluster to potential customers.		
Members		
The organisation consists of 5 direct members and is chaired by a managerial board appointed by the general assembly. Further stakeholders and networks of collaboration relevant to the cluster organisation include industry, educational institutes, producers, consultants, and local authorities.		
Key Figures		
Management team: 5, Turnover-is approximately 80 million EUR, Employment number – approximately 3000 (including all labourers and skilled workers)		
Website	www.astricone.eu	

Key Environmental Challenges as identified by the Cluster Organisation

The cluster as a whole implements various eco-innovative solutions to tackle its environmental challenges which include energy consumption optimisation, waste recovery and waste water treatment. The main concern is the optimum management and reduction of waste along the entire production line. This includes the processing of solid waste and the packaging of all waste. The cluster aims to increase its sustainable development principles and hopes to encourage clean tech technologies to reutilise materials through the recovery and recycling of waste.

Eco-Innovation activity undertaken

The North-East Astrico Cluster Association promotes the use of research tools to its members to drive advances in eco-innovation. The cluster has improved its water consumption rate, has installed energy efficiency measures and processes for the recovery and disposal of waste through specialised companies.

The cluster organisation is part of the European Cradle to Cradle Network, a program which aims to reduce the utilisation of raw materials and to generate less waste and environmental pollution as well as enhancing innovation and economic development by bringing new environmental solutions to cluster members. It also encourages cooperation with other clusters and cluster organisations to exchange knowledge and experiences in closing the recycling loop. Furthermore, the cluster organisation promotes research into the optimum use of material and material composition. This includes laboratory research, testing and recycling initiatives with members and external stakeholders.

In Romania, clusters and cluster organisations are relatively new concepts. The organisation hopes that an association for cluster organisations will be established to increase collaboration and the uptake of environmental practices. The North East Astrico Cluster Association intends to establish a platform for identification, measurement and exchange of material and solid wastes based on the model of EASTEX in UK (www.eastex.org.uk)

The fundamental incentives which have driven the cluster organisation to concern their members with environmental practices and research is largely due to amendments in national legislation to meet European legislation and to cater to a changing market which focuses more and more on environmental and sustainable practices. Legislation in Romania has become stringent regarding carbon emissions and quality standards for the fibres used in clothing.

Though eco-innovation practices are largely implemented through collaborative initiatives, the individual increase in environmental performance by members has been no less significant. Each member of the cluster organisation is individually involved in solving problems regarding waste management and the reduction of energy consumption. The cluster organisation hopes to develop a common core strategy in the future to guide members and create strong links and platforms to tackle environmental challenges and support such independent efforts.

Within future targets, the cluster organisation aims to utilise internal and external collaboration opportunities to a greater extent. These collaborative initiatives are aimed at kick-starting research projects, to gain efficiency in production and recycling. Furthermore the cluster organisation hopes to introduce natural technologies to regional stakeholders and to purchase equipment specific to waste recovery.

Further economic targets for the cluster organisation include the following:

- Development of the textile cluster North-East and consolidation of the leader position in the processing regional industry by promoting competitive and clean technologies;
- Valorisation of the R&D results available at regional national and international level;
- Development of the clusters' human resources;
- Improvement of public perception and attractiveness for textile industry in North-East Region.

Competitiveness and Eco-Innovation

The North-East Astrico Cluster Association draws a strong correlation between the active promotion of eco-innovation and competitiveness as drivers for the future of the cluster. Not only will such initiatives optimise processes in the long term, but they will also open the doors to new markets for members who require high standards of environmental performance. The key barriers to the speedy uptake of such initiatives lie mainly in cost and capacity. The cluster organisation places attention on the future scarcity of material resources and feels that recycling and the efficient use of material is key to lowering costs and creating a sustainable business model attractive to potential markets.

Relevant links and documents

[Thesis concerning the Romania's Apparel Cluster, 2010](#)

[Province of Prato - Support offerings provided to clusters member](#)

[Clusters and potential clusters in Romania – A mapping exercise by GTZ](#)

3.3 Synthesis: Eco-innovation activity in textiles-clothing-leather cluster organisations

Challenges in environmental performance

The cluster organisations within the textiles-clothing-leather sector all highlighted waste water dumping and water consumption as the single most important environmental challenges for the sector. The majority of organisations also highlighted a growing need for better recycling and re-use methods.

Moreover, in the light of growing customer demand trends, the industry pinpoints the production of “eco-clothing” for example through the use of organic fibres, recycled materials, and natural colours as an environmental challenge for the sector. Other challenges that have been mentioned include the reduction of industrial emissions, energy efficiency, the reduction of waste along the entire production line and a greater use alternative energy sources. The industry wants to address these challenges through increased resource efficiency, optimised production processes, as well as innovative end-of-pipe technologies i.e. waste water treatment and recycling.

Barriers and drivers for eco-innovation

Eco-innovation and environmental targets are included in the strategies of most of the clusters. From the interviews it appears that the lack of information and knowledge is one of the key barriers for eco-innovation in the textiles sector.

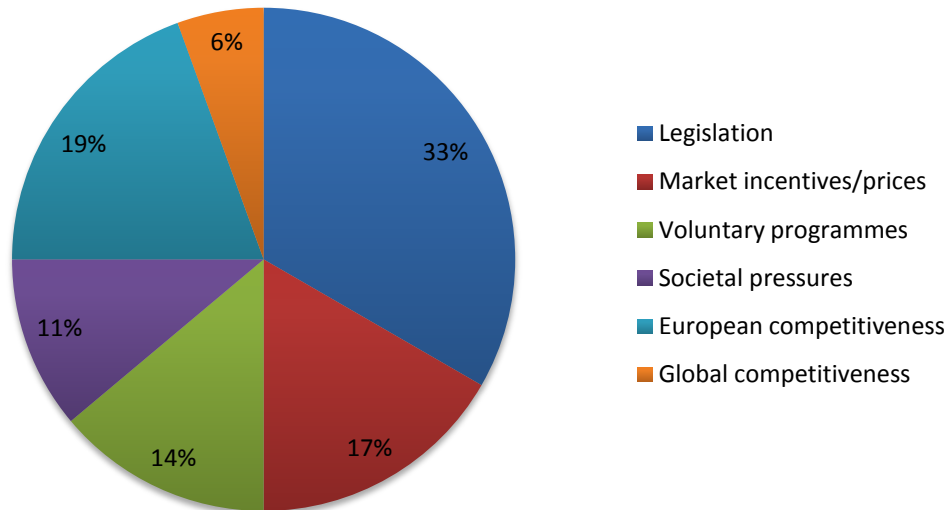
In certain regions, interview findings suggest that legislative standards and societal pressure to include increased environmental standards and performance have been low. It may be suggested that the industry is somewhat overlooked by policy makers and societies (in terms of environmental impact) due to relatively low levels of emissions when compared to more polluting and economically significant industries (such as the chemical industry).

Furthermore, another barrier is found in the inability of accurately measuring environmental performance for the entire production value chain of textile manufacturing. The textile industry relies heavily on outsourcing to key textile and garments industries (often in developing countries) where quality standards are less regulated. Sub-contracted production is often further sub-contracted, which makes it increasingly difficult to identify holistic value chains. This barrier was found to be particularly hindering the environmental initiative of the textile cluster organisation in West Flanders, Belgium.

The main drivers for eco-innovation in the sector are increased competitiveness, image and legal requirements. Clearly the organisations and the companies are embedded in their local communities and feel the need to implement corporate social responsibility programmes.

Key drivers for eco-innovation

Key eco-innovation drivers in textile-clothing-leather clusters organisations



3-3 Key eco-innovation drivers in textile-clothing-leather cluster organisations

Data gathered through qualitative research required participating member of cluster organisation or service providers to select the key external incentive which drive eco-innovation within their cluster. As can be seen from figure 3-2, Legislation is the most dominant driver followed by Market incentives/price and Voluntary programmes. These findings are validated by the fact that cluster organisation sin general felt they were performing well in terms of eco-innovation and may therefore not feel strong pressure from society or further voluntary incentives. Furthermore, the findings suggest that cluster organisations perceive legislation as being significant, even though legislative standards were in general also found to be less stringent compared to those placed on other significant industries (for example the chemical industry).

Eco-innovation activities

Although many organisations aim for better environmental performance in their strategies, the implementation of eco-innovation activities seems to have started just recently. Many cluster organisations are busy closing the knowledge gap through regular events and promotional activities. A Flemish cluster organisation envisages the development of a “socially responsible business scan”; an Italian cluster works on Best Available Techniques and the Romanian cluster has joined the European Cradle-to-Cradle network.

Most of the cluster organisations interviewed focus on a faster uptake of existing eco-innovative (and less innovative) technologies by the industry. Many interviewees underlined that there is a lot of room for improvement in this area since many of the necessary technologies for example in waste water management already exist but are not yet used by the industry on a large scale. This may be due to relatively low levels of pressure within legislative actions and by customers to implement high

environmental standards. However, the organisations interviewed anticipate this trend to change rapidly in the coming years.

Furthermore, individual initiatives have been mentioned such as energy production through co-generation and solar panels, textiles recycling, the re-use of carpet waste, and collaboration with research institutes.

Eco-innovation and competitiveness

Stricter environmental legislation, consumer trends, societal pressure, and the ability to internationalise clearly impact the competitiveness of the sector and represent growing trends.

The Belgian organisation Fedustria emphasises eco-innovation as a tool for competitiveness due to the reduction of costs from production to logistics. To this end, several Belgian cluster organisations collaborate in the SUSPRO project (Sustainable Production, Processes and Profit). The Romanian cluster also sees a strong correlation between eco-innovation and competitiveness since eco-innovation leads to greater resource efficiency and potentially opens new markets.

The Portuguese cluster organisation feels that in addition to potential cost reductions, the consumers are asking for improved environmental performance of the sector. Italy recognises these trends as well but does not believe these consumer trends have a major impact on competitiveness. The Italian leather cluster believes that heavy investments would be necessary to “green” the sector. In the short to medium term, this might even hamper the competitiveness of the sector due to strong competition from China and India.

4 Conclusion

The qualitative study “Eco-innovation in cluster organisations in chemical and textiles-clothing-leather” aimed to understand if and how these cluster organisations are using eco-innovation to foster competitiveness and growth. Cluster organisations have been interviewed in twelve regions located in Belgium, France, Germany, Italy, the Netherlands, Poland, Portugal and Romania, where a particularly high concentration of both industries can be observed.

The cluster organisations interviewed during this study understand the concept of eco-innovation in a similar way as suggested by the definition of the Eco-innovation Observatory: “*Eco-innovation is innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle*”. (Eco-Innovation Observatory, 2011). Nevertheless, it has to be noted that the interviewees seldom used the generic term ‘eco-innovation’ and rather described the concept through its various components such as resource efficiency, environmental technologies, renewable energy, waste water and air pollution.

In regard to pertinent environmental issues, the chemical cluster organisations feel strongly challenged by the dependency on fossil fuels, security of energy supply, and to some extent the emission of greenhouse gases. Energy is vital for the sector and looks for solutions through energy efficiency and diversification of the energy mix. Other challenges perceived by the cluster organisations are waste water, waste and in some cases air quality, as well as the preservation of nature reserves. These issues are typically driven by legislative and societal pressure.

For the textiles-clothing-leather sector, the main environmental challenge is clearly related to waste water dumping and water consumption including the procurement of water. Recycling, the use of organic fibres and “eco”- materials were also emphasised. Other environmental issues such as energy efficiency, waste or industrial emissions have been mentioned less systematically.

Both industries attempt to address their respective challenges through increased resource efficiency, the use of alternative (ecologic) raw materials, optimised production processes, as well as innovative end-of-pipe technologies such as waste, water treatment and recycling.

Legislation, voluntary programmes, competitiveness, standards and a bad environmental image are seen as the main drivers for eco-innovation in both sectors.

The chemical organisations interviewed all perceive strong pressure to comply with environmental legislation and standards. In this context, eco-innovation is often seen as a burden and therefore limited to compliance “by the book”. In the textiles sector, less legislative pressure is felt, but growing negative public image caused by environmental damages is perceived as a key driver of eco-innovation for the industries’ future.

Naturally, the cluster organisations aim to increase the competitiveness of their members. If eco-innovation leads to this end i.e. through resource efficiency or better compliance with environmental standards, it is covered implicitly by the competitiveness objective. In some cases, this lack of strategic focus on eco-innovation acts as a barrier to more and faster uptake of green technologies and services. However, a clear trend can be observed in so far that a number of clusters in both

sectors have included eco-innovation explicitly as a strategic objective for the cluster organization. These clusters mostly aspire to improve the public image and the competitiveness of the sector through a pro-active eco-innovative approach as a long-term objective.

It appears that the lack of information and knowledge is one of the key barriers for eco-innovation in the textiles sector. Many interviewees also emphasised the inability of accurately measuring the environmental performance along the textile value chain (on a global level) as a barrier.

With regard to eco-innovation activities, the textiles clusters seem to have started only recently with their implementation. A lot of these activities are focussed on closing the knowledge gap and on accelerating the uptake of existing technologies. The chemicals clusters on the other hand have reported a wide range of ongoing eco-innovation activities. Moreover, several cluster organisations have established or are in the process of establishing collaboration with external experts, clusters from other sectors, investors interested in eco-innovative technologies, and research organisations through open innovation processes. The clusters are clearly supporting their companies in obtaining the expertise that the sector needs to comply with legislation and to address their public image.

Both chemical and textile cluster organisations established the link between eco-innovation and competitiveness through increased resource efficiency and improved compliance with environmental regulations and standards. The cluster organisations also felt that a better public perception would contribute to greater competitiveness.

The qualitative surveys lead us to the following conclusions:

Chemical cluster organisations in the regions covered by this study seem to be further advanced when it comes to addressing environmental challenges and implementing eco-innovative activities, when compared to the textiles-clothing-leather sector. This might be explained by the fact that the chemicals sector is significantly larger, depends rather strongly on fossil fuels and pollutes more. The cluster organisations therefore perceive a strong economic and legislative pressure to address the environmental challenges of the sector. Generally, the chemical industry complies with the requirements but is reluctant to carry out additional eco-innovation beyond compliance. Only exceptionally eco-innovation is seen as a driver for competitiveness. Nevertheless, all cluster organisations are making strong efforts to support their companies in addressing their environmental challenges and have started to involve a wide range of external actors and partners in their search for eco-innovative solutions.

In comparison, the textiles-clothing-leather sector is smaller, pollutes less and does not suffer from an acute energy problem. The cluster organisations also feel less legislative pressure, but are strongly driven by the wish to overcome the negative public image of the sector. Eco-innovation activities are just starting and focus strongly on understanding the issues at stake, providing knowledge and promoting existing eco-technologies. The textiles-clothing-leather cluster organisations were interested in the use of eco-innovation to raise their competitiveness and to improve their image.

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Annex

Methodology for study

Aim and scope of study

The aim of the study is to identify cluster organisations in the chemical and textiles-clothing-leather sectors in 12 European regions and to understand if and how these cluster organisations are using eco-innovation to foster competitiveness and growth.

Chemical regions	Textiles-clothing-leather regions
BE21 Antwerp	BE25 West-Flanders
DEA2 Köln	PL11 Lodzkie
DEA1 Düsseldorf	PT Norte
ITE1 Toscana	ITE1 Toscana
RO 41 South West	RO21 North East
NL Noord-Braabant	
FR71 Rhone-Alpes	

The scope of the study is limited to the above-mentioned regions. The study is also limited by the existence of cluster organisations in the sectors at regional level as well as the availability and willingness of the cluster organisations to participate in the survey and provide information.

Research questions

1. What are the key environmental challenges identified by cluster organisations within the respective chemical/textile-clothing-leather cluster?
2. What eco-innovative activities has the cluster organisation undertaken in the past and what are its future aims? How do cluster organisations promote these initiatives within and outside the respective chemical/textile-clothing-leather cluster?
3. How do cluster organisation and their member perceive the link between eco-innovation practices and competitive advantage within the respective chemical/textile-clothing-leather cluster?

Limitations

A variety of limitations have been set and identified based on the scope of the study.

Firstly, due to the qualitative nature of the study, the data collected often lacked comparability and substance. Therefore the validation of outcomes required additional desk research to ensure that qualitative findings matched existing quantitative data.

It was found that terminology pertinent to the study with regard to 'clusters' and 'cluster organisation' was not always well defined or fine-tuned in the respective regions. This led to various

interviews being redirected to irrelevant organisation. It may have also affected the receptiveness of 'cluster organisations', who did not define themselves as such. Furthermore, various industries did not define themselves as clusters and thus were unable to relate to pertinent questions posed.

Within a number of regions, efforts to communicate with relevant officials from cluster organisations proved strenuous. Furthermore the language barrier may have reduced the receptiveness of cluster organisation, particularly in regions addressed in Poland and Romania. Further hindrances in communication were due to unavailability, disinterest and confidentiality.

Questions posed in light of the study aims were subject to various degrees of interpretation by participants. Particularly in regard to the term 'eco-innovation' participants were found to interchange the term with 'sustainability' or their 'carbon foot print'. In some cases a clear explanation of the term was provided to increase the potential outcomes of interviews held.

Data gathering

Types and sources of data

A literature review collated through desk research provides the content of the study, particularly with regard to the introductory sections and the sector overviews. Focus was emphasised on using up-to-date and reputed sources for data collection. Furthermore the desk research data collected is used to pave the way for the case studies in subsequent sections. Qualitative data was collected by sourcing potential candidates for interviews through existing networks, recommendations and exhaustive searches carried out for each individual region. Where possible cluster organisations were identified and interviews held. Where this was possible, further potential leads for interviews were withdrawn due to the study aim and scope. When cluster organisations were not found in the region, interviews were held with support institutions, service providers and key industrial players. The sample size was undefined and therefore as many possible interviews were attained per region. In total approximately 60 leads were established which translated into 17 completed interviews.

Interviews were held on the phone, upon the prior agreement of the participant. Questionnaires were also sent in advance in order to stress the focus of the study on cluster organisations and eco-innovative practices. The questionnaire also ensured coherence in the data collection process, allowing for the comparison of the input received from different sources. All interviews were conducted in English and four in Italian.

Definitions

Cluster: Clusters are geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions in particular fields that complete but also cooperate (Michael Porter definition 1998). Market and competition form clusters.

Cluster organisation: a cluster organisation is a more formalised institutional set-up, generally having the responsibility for leading cluster initiatives. A cluster organisation often has an office/address, a cluster facilitator/manager, a budget, a website.

Eco-innovation is the introduction of any new or significantly improved product (good or service), process, organisational change or marketing solution that reduces the use of natural resources (including materials, energy, water and land) and decreases the release of harmful substances across the whole life-cycle." (Eco-innovation observatory 2010)

Improving resource productivity focuses on the whole life-cycle, spanning resource inputs and outputs, and encompasses a broad spectrum of types of eco-innovation. While trade-offs between material security and energy security do exist, the full extent of decisions favouring one aspect at the expense of others will not be understood until these trade-offs are assessed in a holistic way.

Cluster Policies can be defined as specific governmental efforts aimed to support clusters. These governmental efforts can be sorted into categories: facilitating policies, traditional framework policies and development policies.

Facilitating policies are directed towards creating a favourable microeconomic business environment for growth and innovation. Support from the public sector tries to enhance the specific conditions that could improve a cluster's performance.

Traditional framework policies, such as industry and SMEs policies, research and innovation policies, and regional policy often use the cluster approach to increase the efficiency of a specific instrument. Development policies aim at creating, mobilising or strengthening business strategies and co-operation between organisations and people through knowledge-sharing at a regional or cluster level (Oxford Research 2008).

For the purposes of this report, cluster policies are defined as national or regional policies aiming at facilitating the emergence and development of clusters in specific related industries and geographical areas. Targeting cluster development is explicitly set out as strategic intention in the respective policy documents and development strategies.

The organisation of cluster programmes differs across the EU Member States. The ministries frequently in charge of cluster policies are the ministry of industry, the ministry of finance/economy and the ministry of science and research. While in some countries cluster policies exist at national level, there are several others where cluster development is decentralized to the regional level.

The term cluster initiative is used to denote a cluster development project or cluster organisation. Cluster initiatives are organized efforts to increase the growth and competitiveness of clusters within a region, involving cluster firms, government and academic and research institutions.

Eco-innovative cluster policies:

Are cluster policies as defined above that aim to support the emergence and operation of clusters with a focus on eco-innovation, or having eco-innovation as one of their main working priorities.