Review of the state of development of clusters in EaP countries

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This report makes the review of the state of development of clusters in EaP countries – including existing and emerging innovative cluster initiatives. It notably provides quantitative knowledge of existing clusters or emerging cluster initiatives in EaP countries, as well as qualitative knowledge of current strengths and weaknesses of cluster development in EaP countries, and the needs of clusters (existing and emerging). In addition, it aims at pre-exploring and recommending different paths to enhance EU-EaP cluster cooperation, based on the analysis.

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List of Abbreviations

EaP PLUS	STI International Cooperation Network for Eastern Partnership Countries - PLUS
DoA	Description of Action
WP	Work Package

Executive Summary

The objective of this deliverable is to review the state of development of clusters in EaP countries, and to help strengthen clusters in EaP countries by transferring the EU's good practices, and facilitating susbtainable inter-cluster cooperation between EU and EaP countries' existing or emerging clusters.

The deliverable includes a quantitative and qualitative knowledge review of existing clusters or emerging cluster initiatives in EaP countries, a knowledge review of current strengths and weaknesses of cluster policies and cluster organizations in these countries, the identification of the needs of the existing and emerging clusters in EaP countries, and general recommendations for the development of clusters and cluster-emerging initiatives in EaP countries.

The target group of this deliverable are policy makers, cluster organisations, research and innovation centers and SME's in EaP countries, European and national policy makers in the EU, as well as cluster organisations in EU Member States looking to develop partnerships in the region.

The review allows for a better understanding of the cluster climate in EaP countries and identifies actual or potential cluster organisations in EaP countries that will contribute to the organization of the cluster grant scheme activity. The review has permitted to identify a number of organisations with strong potential in EaP countries, namely the Association for the Advancement of Clustering in Georgia.

1 Introduction

The project "STI International Cooperation Network for Eastern Partnership Countries – PLUS" (EaP Plus) notably aims at **strengthening clusters in EaP countries**, transferring EU's good practices in terms of cluster policy and cluster management, and facilitating sustainable inter-cluster cooperation between EU's and EaP countries' existing and emerging clusters. The first step towards accomplishing those objectives is the review of the state of development of clusters in EaP – including existing and emerging innovative cluster iniatives.

The EaP Plus project will implement complementary activities following this review:

- Establishment of a cluster grant scheme to finance EU-EaP cluster collaboration;
- Organisation of a workshop for sharing good practices of cluster management and cluster activities dedicated to RDI cooperation for EaP and EU cluster organisations;
- At the end of the activities, the EaP Plus project will release a comprehensive report on the cluster potential in EaP and recommendations, enriched with the feedback from the supported EaP clusters and the outcomes of the activities. Emphasis will be put on recommendations for cluster development in EaP and their collaboration with similar structures and networks in the EU.

Several definitions of clusters are given in Europe and in the world. The European Commission (on the EU Cluster Portal) defines clusters as: "[…] *groups of specialised enterprises – often SMEs – and other related supporting actors that cooperate closely together in a particular location. In working together SMEs can be more innovative, create more jobs and register more international trademarks and patents than they would alone*."[1]

The Organisation for Economic Co-operation and Development (OECD) defines clusters as: […] *geographic concentration of firms, higher education and research institutions, and other public and private entities that facilitates collaboration on complementary economic activities. While some of the world's leading clusters specialise in high-technology industries (e.g. Silicon Valley, Bangalore) they are also found in sectors ranging from wine making to automobiles to biotechnology*."[2]

In this document, clusters in EaP countries should be understood as emerging cluster-type organizations, that include some of the criterias' of the European definition, but not all. In some cases, the cluster organization in a EaP country has not officially been formed, and does not yet have a name (eg: all the industry and research actors have gathered, but they are missing a formal cluster structure and strategy). In other cases, although there is a clear objective among actors in a common field for innovation and the internationalization of projects, SME's or research organizations are missing from the regrouping for the time being (eg: a trade organization gathering wine producers in Georgia who want to develop wine technology in the country, but who currently do not possess any laboratories or research institutes in the organisation). Among these emerging cluster organisations, it common to find actors that cooperate around a large thematic focus (eg: agricultural development), and others that have regrouped at different points of the value chain (farmers and traders in innovative food processing).

[1] European Commission, DG Growth, EU Cluster Portal. http://ec.europa.eu/growth/smes/cluster/

[2] OECD. http://www.oecd.org/sti/outlook/e-outlook/stipolicyprofiles/interactionsforinnovation/clusterpolicyandsmartspecialisation.htm

Today, most of the EU 28 Member States have initiated cluster policies as a part of innovation and growth strategy. Cluster policies are also initiated elsewhere in the world (USA, Canada, Latin America in Colombia or Brazil for example, in Japan, South Korea…) to enhance economic growth and foster technological development. “

The present report intends to review the background and the state of affairs of the cluster policies in the six EaP countries and the cluster development in these countries. The report builds on this basis to provide an analysis of the current strenghts and weaknesses of clusters in EaP and identify the needs towards cluster development in EaP countries. Finally, preliminary recommendations are provided by the authors aiming to strenghten the EU-EaP cluster cooperation in the next years. Emerging clusters will need the support at a national level for the development of their cluster activites, which includes notably a greater cooperation between EU and EaP innovation agencies.

2 Methodology

The present report is composed of six chapters.

Chapter 3 of the report was developed by EU experts based on desk research. It intends to provide some background, beforehand, on cluster policies in the EU, in order to draw some elements of comparison in the state of cluster policy development between EU Member States and EaP countries.

Chapter 4 "Cluster policies in EaP countries and **chapter 5 "Analysis of cluster development per country"** constitute the core parts of the report. In these chapters, analysis is provided per country and written by a local EaP expert. Each part combines empirical data analyses and desk research approaches, as well as the results of discussions and interviewsof specialists with policy makers, cluster managers and other actors. A tandem of experts from the EU and EaP countries have made a critical review of each of the contribution from local experts. Local experts have developed their contribution based on a **common framework** provided by the deliverable leader (inno TSD, France), which is an expert in cluster policy and economic analysis. The framerwork was notably made of key questions to address in the analysis of cluster policies and cluster development. An extract from the framerwork is provided in Annex of the report. The framerwork for cluster analysis in the six countries proposes a **multi-criteria evaluation** that encompasses different components of cluster policies and their prerequisites, as well as of the cluster concept.

The authors have chosen to not only to concentrate on the cluster development in EaP counties but go beyond this. In effect, suitable **framework conditions** for cluster development and international cooperation are key to assess the potential and opportunities for cluster development. Indicators to assess these are the existence of regional cluster policies and funding, and regional specialisation strategies. The *Regional Ecosystem Scoreboard*[3], which analyses specific framework conditions in the regional ecosystem that can foster or hinder innovation and entrepreneurship, was used to define the framerwork for analysis in this report.

Analysing the cluster development in EaP also required a country-specific framerwork for analysis based on a common definition of clusters. In this report, clusters are first broadly understood as a **regional agglomeration of actors from science, education and business**. Indicators for assessing their existence and relative strength are:

- the degree of their specialisation,
- the critical mass of their employment and organisations, as well as,
- the level of interactions between the involved actors.

Cluster observatories, such as the European Cluster Observatory[4] have been elaborated based on this definition of clusters, which has provided policy makers with data and analysis on clusters in Europe.

Moreover, beyond agglomerations of actors, clusters can also be **an organised structure that provides services and opportunities for cooperation** to the science, education and business ecosystem. In such cases, indicators for **cluster management excellence** were defined within the framework of the *European Cluster Excellence Initiative (see section 3 of this report)*. A well-functioning cluster

[3] Regional Ecosystem Scoreboard : https://ec.europa.eu/growth/smes/cluster/observatory/regional-ecosystem-scoreboard_nl
[4] European Cluster Observatory: http://ec.europa.eu/growth/smes/cluster/observatory_en

management is an important factor and basement for the positive development of a cluster initiative. The cluster management is responsible for the decisions regarding strategic orientation, marketing and financing of the cluster, like a company manager. In addition, the cluster management is also concerned with the specific needs of its ecosystem actors, and its challenge is to manage to combine and merge the different interests of its members, especially about collaborations between science and business. The communication, knowledge sharing and the collaboration of the members within a cluster can be improved with appropriate services and measures, to facilitate the common path to new products, marketing and patents, and increasing the efficiency of a cluster initiative. By shortcut, one also designates by cluster the structure in charge of the operation of the network.

Chapter 6 as well as **Chapter 7** are the results of the cross-analysis of chapters 4 and 5 operated by EU experts followed by discussions with the experts in EaP countries who contributed to the report. These chapters cover the strengths and weaknesses of current cluster organisations in EaP countries, as well as a list of recommendations directed towards policy makers and cluster organisations to develop clusters in EaP countries.

Chapter 8 was written by EU experts involved in cluster initiatives such as the European Cluster Collaboration Platform or the European Cluster Observatory, and who, thus, know very well those initiatives and their potential and opportunities for EaP countries. This chapter summarises opportunities for future cooperation between clusters in EaP countries and EU Member States, such as Featuring cluster profiles via the ECCP, taking part in the ESCP-4i projects which helps internationalise cluster activities, or taking part in the Black Sea Horizon project which increases the understanding of cluster policies and cluster management in Black Sea Countries.

3 Cluster policies in the EU

3.1 National and regional experiences in the EU Member States

Most of the EU 28 Member States have initiated cluster policies and there are clusters in all member states. The European Cluster Collaboration Platform intends to map cluster organisations in Europe (and beyond) and provides a good overview of the European coverage in terms of cluster organisations. In total, 460 cluster organisations (as of January 2017) have profiled on the platform, from all EU Member States (and beyond).

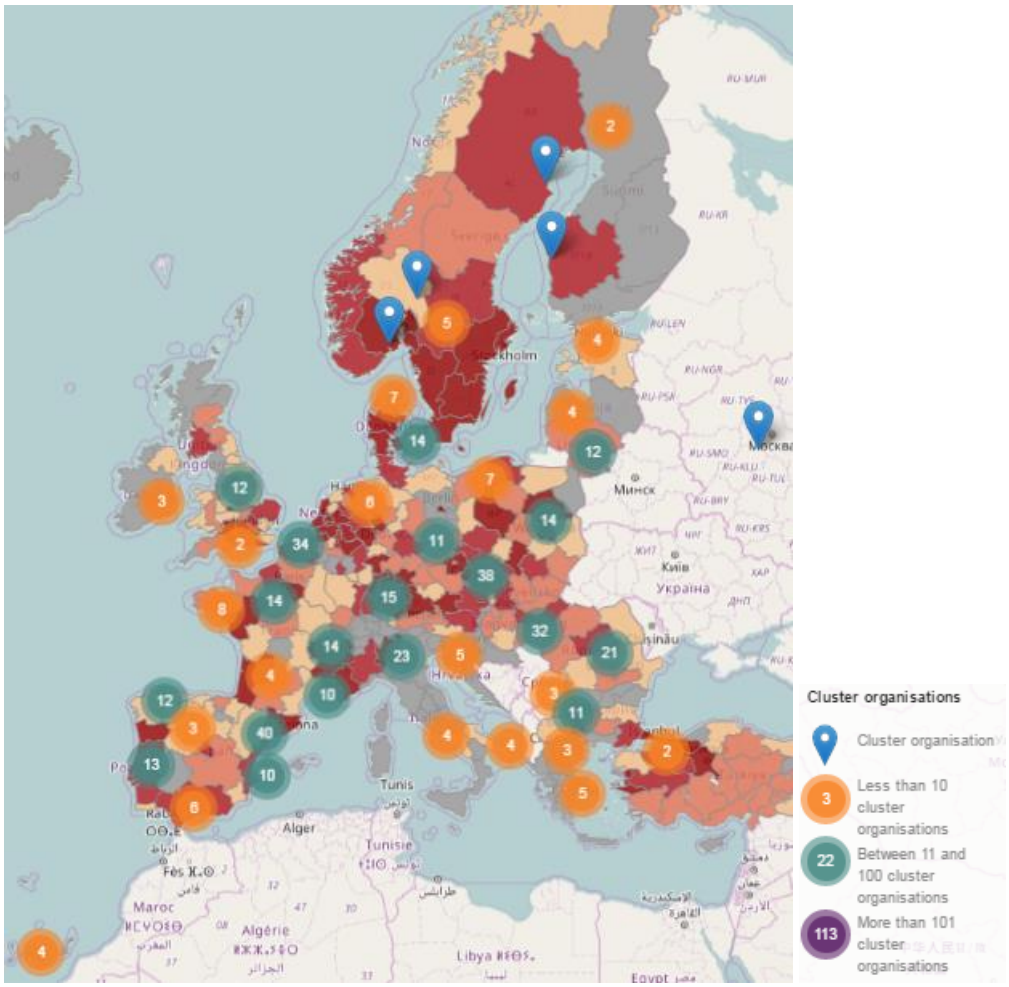

Figure 1 - Screenshot extracted from the European Cluster Collaboration Platform (www.clustercollaboration.eu)

The present section intends to provide an overview of the **cluster policies implemented in five EU Member States**, their aim, results and the state of the art of cluster development in those countries – to share good practices in terms of cluster policies and cluster development. France and Germany, two of the founding EU Member States, Poland and Hungary, two EU Member States that joined the union with the 2004 enlargement, and Romania, one of the newest members of the EU since 2009 will be used as examples.

3.1.1 A brief overview on the cluster policy and cluster development in France

There are several policies and labels in France dedicated to promote and support clusters, implemented at different levels: the State level, as well as the regional level (regional authorities also have their own cluster programmes).

Focus on the "poles de compétitivité" in France

Launched in 2004 by the French Government, the national policy of the so-called "pôle de compétitivité" (literally "competitiveness cluster") aims to strengthen the competitiveness of companies, develop employment in promising markets and strengthen territories. The pôle de compétitivité marked the birth of a new industrial policy tool to strengthen the competitiveness of the French industry.

Pôles de compétitivité bring together **large and small firms, research bodies and educational establishments,** all working together in a specific region to develop synergies and cooperative efforts around a shared theme. The goal of such clusters is to build on synergies and **collaborative innovation projects** in order to give partner firms the chance to become first in their markets, both in France and abroad. Thus, the core activity of the clusters is to develop collaborative innovation projects, while integrating the potential economic benefits as early as possible. Such clusters meet two priorities:

- **reinforcing the economic benefits of R&D projects.** The clusters become "factories" for tomorrow's products. They transform collaborative R&D efforts into innovative products, processes and services released onto the market;
- supporting the growth of SMEs and mid-tier companies (ETIs) by **offering collective and individual services** in the following areas: access to financing, international development, the forecasting of companies' needs in terms of skills and individual assistance with the development of SMEs, including advice and tutoring.

After a positive evaluation of the first phase (2005-2008) of the cluster policy, the State decided to allocate € 1.5 billion to launch a second phase (2009-2012) known as "Cluster 2.0 ", and the policy was again renewed in 2015. There are today 71 pôles de compétitivité in France.

In terms of support for R&D projects, between 2005 and 2013, 1,313 collaborative R&D projects have emerged from the pôles de compétitivité – which received public financing of €2.37 billion, including more than €1.45 billion granted by the French State through the dedicated fund (FUI). These projects, amounting to nearly €6 billion in R&D expenditure, involved close to 15,000 researchers.[5]

- ***What is the profile of the "pôles"?***

The pôles de compétitivité concern most sectors of activity: emerging technological fields (nanotechnologies, biotechnologies, environmental technologies, etc.) or more mature fields (automobile, aeronautics, etc.). A pôle comprises on average 200 members, although there is a large disparity in the number of members in each cluster. Members range from 100 to more than 1,000 members, in major groups, ETI, SMEs, research laboratories and training institutes. Their average budget is about 1.5M €. They are run by a small team (9 FTE on average).

[5] Information on the competitiveness clusters and the policy is extracted from the dedicated website: http://competitivite.gouv.fr/

Regional clusters in France

Besides the 71 pôles de compétitivité, the network of French clusters continues to grow. Approximately 30 000 companies and 800 000 jobs are affected by the cluster phenomenon in France. As was indicated previously, there are regional programmes in France which encourage this cluster development.

Clusters are networks of companies made up mainly of SMEs and TPE, strongly anchored locally, often in the same niche of production and in the same sector. The primary objective of the cluster is to increase the turnover and economic efficiency of its business, and then to detect in its environment the factors favoring its growth.

In order to cope with real or potential competition in the short and medium term, companies must develop their competitiveness. The clusters gather stakeholders who create and maintain a relational system enabling them to increase their business and growth opportunities. The creation and maintenance of this effective relational system is favored by proximity and cultural homogeneity, which generally corresponds to a regional entity.

3.1.2 A brief overview on the cluster policy and cluster development in Germany

A number of cluster policy measures have been initiated and implemented at national and federal state level since the mid-1990s in Germany, with the aim to support cluster initiatives and networks, their business activities and innovation.

At national level, to the support of clusters is particularly provided by the **Federal Ministry of Economics and Technology** with its "***go-cluster" programme*** as well as by the **Federal Ministry of Education and Research (BMBF)** organising the ***Leading-Edge Cluster Competition*** under the Federal Government's Hightech Strategy, aiming to promote the development of efficient cluster structures. Additionally, the "Unternehmen Region - Die BMBF-Innovationsinitiative für die Neuen Länder" (Entrepreneurial Regions - The BMBF Innovation Initiative for the New German Federal States) is a measure that focuses on establishing and developing particular technology, science and business skills in former East German regions. The initiative aims to lay the foundations for the development of regional business clusters[6].

An information portal on cluster policies exist in Germany, the **Cluster Platform Germany**[7]. This platform is meant to address all interested parties within the country and abroad wishing to learn more on cluster-related issues, notably stakeholders from cluster policy at national, federal state and regional level as well as cluster managers, cluster participants and diverse actors from economy, science, related policy fields, business promotion or regional development. The platform provides a mapping of 102 German clusters. It moreover aims to initiate an intensive exchange of experiences on the introduced measures, their further development and possibilities of impact assessment through a joint effort. In addition, the Cluster Platform Germany is used to regularly present German cluster success stories.

[6] http://www.clusterplattform.de/CLUSTER/Navigation/EN/NationalLevel/UnternehmenRegion/unternehmen-region.html;jsessionid=9FDD18100E3D5325A17D0DF621AEC224

[7] The Cluster Platform Germany can be accessed at: http://www.clusterplattform.de/CLUSTER/Navigation/EN/Home/home.html

In addition, Germany's 16 federal states have launched numerous measures to support the development of efficient clusters, which take into account the individual strengths of the regions – across technology, business or innovation – and are also designed around present structures and other features specific to the region.

Focus on the "go-cluster" programme

The "go-cluster" programme is the cluster political excellence activity of The Federal Ministry for Economic Affairs and Energy. The programme supports cluster management organisations with the development of their innovation cluster. Clusters participating in the "go-cluster" programme should be vanguards of innovation and demonstrate their high industrial and technology competence in a particular sector. Currently around 100 clusters make use of the various offers of the program. A "go-cluster" membership offers many advantages to innovation clusters and their players: in terms of cluster management excellence (certificate on the quality and efficiency of cluster management, support for accessing European labels on cluster excellence, use of the label Go cluster to promote its own excellence, individual counselling), national and international visibility, including toward decision-makers, promotion and networking, as well as entitlement to apply for funds… Any German innovation cluster can apply for admission to this programme.

Given Germany's federal structures, cluster policy measures are also implemented under the initiative of the 16 state governments with the aim of supporting the development of efficient clusters. Hereby, the individual strengths of the respective regions with regard to specific technology, economy and innovation competencies as well as existing structures and particularities are taken into account. The individual programs at federal state level include, for example, the financial support of cluster management organisations, the funding of innovation projects, training activities or and joint public relations.

3.1.3 A brief overview on the cluster policy and cluster development in Poland

The Polish government considers cluster support measures to be an important element of economic policy.

Cluster policy measures are implemented at the national level by the **Polish Agency for Enterprise Development (PARP)** and are co-financed by the European Regional Development Fund (ERDF) and the European Social Fund (ESF). PARP is a governmental organization and supports the Polish clusters holistically. Its key ongoing activities to support clusters are:

- Exploring the potential of regional clusters to become "**Key National Clusters**": the main objective is to demonstrate the potential of clusters operating in the Polish regions with regard to their ability to successfully follow the development path leading to the status of a Key National Cluster.
- Dissemination and promotion of cluster management standards: organisation of a series of dedicated workshops for cluster coordinators to disseminate knowledge on cluster management and promote management standards, as well as providing guidelines.
- Requirements and technical specification for a **cluster monitoring platform**: PARP intends to build a platform for collecting data on the whole community of Polish clusters. PARP and other government departments/agencies will be able to make informed decisions on new support measures for clusters based on the data, and this will also encourage cluster cooperation.

- Support for internationalization of Key National Clusters: clusters having the status of a Key National Cluster are eligible to apply for funding of their projects related to international activities.

One of the main objectives of the cluster policy is to further develop regional clusters to so-called "**key national clusters**". The idea of appointing key clusters results from the strategy of economic specialization to dedicate national and regional resources to strong and innovative entities (prioritization). Key National Clusters are characterized by their significance to Polish economy and international competitiveness. To obtain the status, a cluster has to fulfil certain criteria related to critical mass, development potential, innovation capacity, internal and external cooperation and cluster coordinator's experiences and achievements. The criteria were defined by the Polish Agency for Enterprise Development (PARP), in collaboration with the Ministry of Economy and external experts. Currently, seven cluster organizations are counted among these "key national clusters" in Poland[8]. Financial support is given to the Polish "Key National Clusters" through the "Smart Growth 2014-2020" program for internationalisation as well as in projects and receive targeted support through cluster-related analysis and consulting.

The "Polish Innovation Portal" (Portal Innowacji)[9] provides an overview of the Polish cluster landscape. At the moment, 134 regional cluster organizations have been identified, gathering 6,000 members with approx. 4,600 companies in the clusters.

Polish clusters have already been involved in various European-wide projects for the professionalisation and networking of European clusters. In the "TACTICS" (Transnational Alliance for Clusters Towards Improved Cooperation Support) project from 2009 to 2011 and the "NGPExcellence clusters" project, Polish clusters have, for example, cooperated with European clusters.

3.1.4 A brief overview on the cluster policy and cluster development in Romania

The Romanian "Competitiveness Operational Program" (COP) started in 2015 with a term of five years. The program is implemented by the Romanian Agency for Research and Innovation and the Romanian Ministry of Education. The funds come from national funding sources and the ERDF. The programme fundamentally promotes research, development and knowledge transfer in order to build a high-quality, modern research landscape. In this context, clusters and cluster-relevant activities are financially supported. Its main focus is bioeconomy, ICT, energy, safety, health and nanotechnology.

Concerning clusters the following activities are promoted:

- Creation and development of R&D facilities and their shared use in the cluster,
- Innovation promotion activities in the cluster and
- Cooperation support measures, business services and measures to improve the information exchange in the cluster.

The measures supported are intended to complement the "European strategy for the Danube region". In addition, they are closely linked to the national and regional innovation strategies for intelligent specialization (RIS3).

[8] The list of the seven Key national clusters is provided on the webpage « Key National Clusters » of the Polish Innovation Portal : http://www.pi.gov.pl/eng/chapter_95931.asp
[9] Polish Innovation Portal (Portal Innowacji): http://www.pi.gov.pl/eng/chapter_95918.asp

As a platform for cooperation, exchange of information and support for the development of Romanian clusters, **Clustero (Romanian Cluster Association)** was founded in 2011. Clustero regularly provides information on the legal requirements for cluster work, funding opportunities, events as well as support and advice for the creation, development and collaboration within and between the clusters through network formation. In addition, the Association supports the interests of members at national and international level (Romanian government, European Union, etc.), monitors and evaluates cluster performance, and organizes training courses.

Clustero is currently focusing on three main challenges:

- **Promoting innovation and internationalization of cluster members**: Clustero supports its members through the organization of business assessments and innovation audits at the SME level, as well as the organisation of business events/ missions in Romania and abroad in cooperation with the Enterprise Europe Network.
- **Support to the excellence of cluster management** through specific training in collaboration with well-known international organizations such as France Clusters, Business Upper Austria, etc.
- **Encourage international exchange of experience** and participate in joint initiatives and projects: Clustero organizes an international annual conference as well as other regional and international events. As part of the "Vukovar Agreement" in 2013, cluster organizations from Croatia, Serbia, Bulgaria, Slovakia and Romania decided to intensify cooperation.

Currently, 33 of the most active Romanian clusters are active in sectors such as textiles, renewable energies, electronics and software, mechanical engineering, wood and furniture as well as agricultural and food products.

3.1.5 A brief overview on the cluster policy and cluster development in Hungary

The first cluster structures were established in Hungary in 2000. The first and probably still the most well-known cluster internationally is **PANAC**, a cluster in the automotive sector, comprising the biggest car producers in Hungary, such as Audi and Suzuki and more than 50 SMEs. The establishment of PANAC was strongly pushed for by the Ministry of Economy.

The National Development Plan (2004-2006) was the first National Strategic Reference Framework in Hungary and was partly financed by the European Union. This was followed by the second, the New Hungary Development Plan between 2007-2013, providing much larger source of financing than the previous framework. In 2010 the programme was slightly changed and renamed to New Széchenyi Plan. The operative programmes of these development plans (co-financed by the EU) provide financial source of cluster supporting measures in Hungary. These measures are non-refundable grants provided through call for proposals. As a result of the cluster support programmes approxemitaly 50 clusters or cluster initiatives existed in Hungary by 2007.

The **Hungarian Pole Programme** (2008-2010) included increased resources for the development of clusters and cluster members compared to the previous programmes. It introduced an accreditation process for selecting and qualifying clusters, and a special unit dedicated to the programme implementation was set up as well. Four phases of cluster-development were defined in the Programme: start-up clusters, developing clusters, accredited clusters and pole innovation clusters.

The **New Széchenyi Plan** is the program for the promotion of cluster initiatives in Hungary between 2011 and 2013 based on the Pole Program. The cluster programme aims to support clusters with a high potential for innovation and export in the development of international markets. In Hungary, the Ministry of Trade and International Affairs is responsible for the national cluster policy. The New Széchenyi Plan is implemented by the MAG Cluster Development Bureau and co-financed by ERDF funds. Cluster Development Office performs several tasks in relation to clusters: cluter policy; communication, cooperation, coordination; international activities; complex management of cluster calls; cluster analysis. An evaluation of the cluster developments in Hungary in 2013[10] contains facts and lessons in Hungarian. Between 2007 and 2013 there were 177 granted start-up initiatives, 41 granted developing co-operations, 34 accredited clusters.

In **Széchenyi 2020**, in the new programming period **(2014-2020)** grants for clusters are available in the Economic Development and Innovation Operational Programme. Currently (as of January 2017) 25 Accredited Clusters[11] operate in Hungary. These clusters have undergone an excessively strict accreditation process to obtain their certification. The majority of these clusters simultaneously host universities, research institutions, large enterprises, as well as micro and small enterprises with strong innovation and high growth potential. Clusters are active in the sectors of information and communication technology, mechanical engineering and automotive, construction and energy, environmental technology, health care, packaging and plastics industry, wood and furniture industry as well as in the food industry. **Klaszterfejlesztes**[12] is a central cluster platform, which provides information about current developments, analyses, publications and international projects, as well as providing an overview of the Hungarian cluster landscape.

The goal of the **Accredited Cluster** tender is to select network co-operations which have a decisive employment impact, exhibit intensive export and innovation performance and are able to implement development projects, as well as to reach outstanding performance in a regional scenario.The ACE-Achieving Cluster Excellence project[13] was launched in January 2014 with the aim to increase the level of excellence in cluster management in the member countries, regions of the project consortium and to shape a pool of experts coming from local policy-making organizations. ACE is co-funded by the European Commission under the CIP Programme (Competitiveness and Innovation Framework Programme). The project makes use of methodologies and tools developed by the European Cluster Excellence Initiative (ECEI), which is instrumental in promoting cluster management as a key element of the EU strategy aimed at developing more world-class clusters in the EU. Today, more than 650 cluster organisations from 36 countries have benchmarked their cluster management performance using the ECEI methodology and at the same time about 40 cluster instructors have been trained on how to improve the management skills of cluster managers.EU policies for supporting cluster organisations.

[10] HORVATH Marianna, KEREKES Ildikó – dr. PATIK Réka, Elemzés a magyar klaszterfejlesztés elmúlt 4 évéről (tények és tanulságok) – EN Analysis of the last 4 years of the Hungarian cluster development (Facts and lessons) - Available at : http://klaszterfejlesztes.hu/content.php?cid=cont_5007fe14d8ba95.44814012

[11] List of accredited clusters: http://www.klaszterfejlesztes.hu/content.php?cid=cont_50f56fcf145001.04047159

[12] Accessible at: http://klaszterfejlesztes.hu/

[13] http://www.klaszterfejlesztes.hu/content/cont_5368a8dfaff163.22831319/aik_kiadvany_vegl.pdf

3.2 EU policies for supporting cluster organisations

At the European Union level, since the early 1980s, the first cohesion policy instruments have been developed to support innovation and regional strategies. Explicit **cluster policy programmes** have existed since the end of the 1990s (notably with the European Cluster Observatory). The main public institutions responsible for cluster policies at the EU level are the Directorate General for Growth of the European Commission, the Executive Agency for SMEs of the European Commission (EASME), the Directorate General for Regions and the Directorate General for Research and Innovation. In the EU? luster policies and cluster organisations are generally percevied as means to support the economic competitiveness of Small and Medium-sized Enterprises (SMEs), the regional development and smart specialisation in Europe, and to enhance research and innovation in the EU[14].

The European Cluster Observatory is a key tool for accessing information on clusters from DG Growth of the European Commission. DG Growth of the European Commission notably focuses on selected aspects of cluster development, such as **cluster management excellence**, as well as **cluster cooperation**, both international and cross-sectoral. It also focuses on supporting the *European Strategic Cluster Partnerships – Going International (ESCP-4i)* program. This program encompassesvarious interclustering projects aimed at cooperating on internationalisation activities in selected industrial sectors[15], as well as on the European Cluster Collaboration Platform, which is the European hub for cluster organisations to cooperate with counterparts in Europe and beyond. Cluster organisations and cluster management are also seen as important means to identify and support innovation and technological developments: this approach is promoted through the six *Model Demonstrator Regions* in which cluster initiatives support the development of emerging industries. DG Growth also supports the cluster management through a quality label concept, with the *European Cluster Excellence Initiative (ECEI)*[16]. The COSME (Competitiveness of SME) programme managed by DG Growth and EASME DG GROWTH notably funds those activities.

At the same time, this policy is closely interlinked with the European Union's Framework Programme for funding Research and Innovation **Horizon 2020** (2014-2020), in which clusters and cluster management also play an important role. Whereas COSME focuses on providing growth finance for relatively mature SMEs, the development of better framework conditions for SME growth in the context of industrial change through clusters and in sectors of strategic interest, and access to markets, Horizon 2020 offers a series of integrated measures aimed at **supporting SMEs throughout the innovation cycle**, in view of promoting their growth and development. Horizon 2020 notably allows SMEs to engage in transnational collaborative Research, development and innovation projects and to be supported through a new dedicated SME instrument designed specifically for highly innovative smaller companies. A series of measures also specifically involve and support cluster organisations in H2020, such as the INNOSUP initiatives ("Cluster facilitated projects for new industrial value chains")[17]

[14] DG Growth, „Smart Guide to Cluster policy"

[15] For a full list of ESCP-4i projects and more information: http://www.clustercollaboration.eu/eu-cluster-partnerships

[16] Visit the European Cluster Analysis Secretariat website for more information about the ECEI labels and the lists of labelled cluster organisations in Europe and beyond : http://www.cluster-analysis.org/gold-label-new

[17] European Commission, Horizon 2020 Work Programme 2016 – 2017 - 7. Innovation in SMEs, for more information on the INNOSUP initiatives

aimed to develop new cross-sectoral industrial value chains across the EU, through interclustering activities, and theCluster Go international under EASME[18].

Other EU level policies designed to help innovation and regional business development include, among others, the EU Regional Smart Specialisation Strategy[19], which support clusters through their economic transformation tools, the Entrepreuneurial Discovery process (EDP) which is an inclusive and interactive bottom-up process which helps organisations from different environments (policy, business, academia, etc) discover and produce information about potential new activities, and the Interreg VB (ERDF) which is a European territorial program and also a support for cluster collaboration[20].

[18] https://ec.europa.eu/easme/en/cos-cluster-2014-3-03-cluster-go-international
[19] http://s3platform.jrc.ec.europa.eu/
[20] http://ec.europa.eu/regional_policy/fr/policy/cooperation/european-territorial/trans-national/

4 Cluster policies in EaP countries

This first section intends to give an overviewof the development of clusters in EaP countries, as well as to provide background knowledge related to the cluster policies in EaP countries: their history of implementation, objectives, their selected approach of the cluster concept, their programmes and funding, and more largely, the approach to support business and research actors' cooperation at a local / regional level, as well as regional innovation ecosystems.

4.1 Cluster policy in Armenia

Although there is no clear reference to the "cluster" concept in recently adopted policy documents in the field of STI policy in Armenia, the importance of promoting education-research-industry cooperation in Armenia is regularly mentioned. The ***Action Plan 2017*** of the Armenian Government adopted in October 2016 states the need for initiation during 2017 of a 5-year program directed towards fostering university-research cooperation via creation of networking universities and scientific-educational clusters.

Armenia has made considerable progress in the establishment of the ***National Innovation System (NIS),*** which has been set as a strategic objective by the Armenian authorities. Important ingredients of this process are in place: strategic vision, political will and support at a high level of Government. However, several building blocks and linkages that are vital for a well-functioning NIS remain non-existent. The poor linkages between education/science and industry are notably critical as well as the existence of innovative intermediaries and support institutions in the country. There are also issues related to early stage financing which is practically non-existent. Thus, the local environment is not conducive to innovative entrepreneurship.[21] The innovation infrastructure remains among the least competitive dimension of Armenia's overall competitiveness performance. According to the World Economic Forum's Global Competitiveness Report 2015-16 Armenia ranks beyond 100th place among 144 economies in terms of quality of research institutes (105), company spending on R&D (109), university - industry collaboration in R&D (111) and government procurement of advanced technology products (109). According to a report from the UNECE (2014), there are only few measurable impacts and results of innovation-related policies in Armenia that are detailed in this report – partly due to lack of statistical data, and to relatively limited public funding for innovation support activities. The report states that "*public resources for innovation policy are very limited [in Armenia], with many programs supported by foreign or international organizations*"[22]. The low level of business competitiveness, as well as significant employment and labour market issues also hamper the innovation performance in Armenia.

In terms of policy tools, one of the first pillars establishing a legal framework for R&D in Armenia was the ***Law on Scientific and Technological Activity***, adopted by the Armenian Parliament in December 2000. This law regulates the activities of scientific and technical subjects, state agencies, and their relationships and use of scientific results. It was directed to formulate a set of policy objectives, including, closer integration of science, education and the manufacturing sector. Although the main objective of the law did not mention innovation as such, the basic principles of state policy refer,

[21] UNECE (2014): *Innovation Performance Review: Armenia.* New York and Geneva.
[22] Ibid.

among others, to supporting entrepreneurs, innovation promotion activities, and the protection of intellectual property rights. The ***Law on Small and Medium Entrepreneurship State Support*** was also adopted in 2000 (amended in 2010).

By the government resolution as of September 2006, the Ministry of Economy was recognized as an authorized body responsible for the development and implementation of an innovation policy, in cooperation and coordination with other concerned ministries and organisations. The Government approved two documents in 2011 which laid the grounds for a broader interpretation of the industrial and innovation policies. On 17 February, 2011, the Government approved the ***Concept Paper on the Initial Strategy of the Formation of Innovation Economy (ISFIE)***. Another important document was the government resolution on "***The Strategy of Export-Led Industrial Policy of the Republic of Armenia (RA)" (SELIP)*** adopted in December 2011. The two documents introduced a range of new policy instruments for the pursuit of these strategic policy directions and identified the implementing public agencies.[23]

The vision laid out in ISFIE is the transformation of Armenia into an R&D centre of multinational corporations. It defines key milestones of this strategy until 2020 including legal reforms, further development of innovation and business support institutions and instruments; modernization of the education system; adoption of international standards; support to the establishment of national centres of excellence; and support to the internationalisation of Armenian technological companies. On the other hand, ISFIE does not address important aspects of the National Innovation System (NIS) such as the environment and framework conditions, the general business environment, the importance of connectivity in the NIS, industry-science linkages, the support of non-frontier and non-technological innovation and the need for special instruments promoting the integration of local R&D institutes and businesses into global value chains. The second strategic document, SELIP, also reiterates that building a knowledge-based economy is a long-term strategic objective of the authorities. At the same time its specific objective is more oriented towards economic diversification by supporting the international competitiveness of industry sectors with export potential and targeted at export growth. [24]

To improve the policy-making and better coordination in the field of S&T, the government created the ***State Committee of Science (SCS)*** in October 2007, which is empowered to carry out integrated S&T policy in the country. This structure is subordinated to the Ministry of Education and Science, but with wider power of independent activity. SCS is responsible for initiation and implementation of research and innovation programmes. Among recent initiatives to promote research-industry cooperation, the funding programme for research projects, launched by the SCS in 2011, requires for research institutes to build partnership with an industrial enterprise in a project proposal with 15% co-funding by the industry partner. The industrial partner co-funding was increased up to 25% in 2013 call for proposals, and up to 35% in 2015. New Young Researchers Support and Infrastructure Programmes have also been launched recently which reflect the positive tendencies in S&T and Innovation system. In May 2010, the Government adopted the ***Strategy on the Development of Science in Armenia 2011-2020*** compiled by the SCS. This strategy outlines the state policy for scientific development over 2011-2020, and formulates the vision for Armenia to build a knowledge-based economy by 2020. The strategy

[23] Ibid, 2014.
[24] UNECE (2014): *Innovation Performance Review: Armenia.* New York and Geneva.

clearly formulated the will for the "*creation of a synergistic system of education, science and innovation*".

The ***National Academy of Sciences of Armenia (NAS RA)*** affiliates around 35 research institutes and centers, and around 2000 research staff remains tied to the main R&D performing organisation in Armenia. The Academy promotes and carries out fundamental and applied research in different scientific fields, and also coordinates basic research carried out in Armenia. The new Statute of the NAS RA was approved by the Government in May 2011, based on the Law on the National Academy of Sciences of Armenia, allowing the Academy to carry out wider business activities towards commercialisation of R&D outcomes and creation of spin-offs. It was decided to optimize the NAS structure and create scientific/technological/production centers through amalgamation of institutes involved in close research activities to promote innovation. In 2007, ***the Science Development Foundation*** was created within the NAS RA with the main objectives to support research projects with innovative potential, commercialisation of research outcomes and infrastructure modernisation projects. in addition, to ensure closer university-research cooperation the ***International Scientific-Educational Center of NAS RA*** was founded in 1997. ISEC's main objective is to prepare scientific brainpower through Master's, PhD and Postdoctoral courses, giving students opportunities to join practical courses and trainings in relevant research institutes and centers of the NAS RA.

A further instrument to support innovation in a broader sense is the approach of Free Economic Zones (FEZ) which were implemented in line with the ***Law on Free Economic Zones*** (in force since 2011). The overall aims of the FEZ are the promotion of foreign investment, the development of new and advanced technologies, the increase of exports from Armenia, and the generation of employment and economic growth. Armenia's first FEZ opened in July 2013 based in the **Yerevan Computer Research and Development Institute (YCRDI)** and the **Mars Motors Manufacturing Company**. A special technological focus of FEZ at Mars and YCRDI is on R&D and innovation in the fields of electronics, precision engineering, pharmaceutics and biotechnology, ICT, alternative energy, industrial design, and telecommunications. A "One-stop-shop" for services is offered to all zone residents who can enjoy tax benefits, exemption from import and export duties, profit tax, property tax, etc. It is still too early to assess the economic effects of this recent initiative.

The establishment of the **Small and Medium Entrepreneurship Development National Centre of Armenia** (SME DNC of Armenia) in 2002 is also among the major structural initiatives of the government. It was the first national body created to implement state support to small and medium-sized enterprises (SME) and programs directed towards their development, as well as to facilitate links between SMEs and other state support organizations. SME DNC provides support to SMEs through the following programs: 1) Loan guarantees provision; 2) Partial subsidizing of credit interest rates; 3) Information and consulting support; 4) Goods and services market promotion; 5) Start-up business support; and 6) Program for implementation of R&D activities for introducing innovations, new technologies and products. **Granatus Ventures (GV),** the first venture capital fund in Armenia, was launched in 2013. It is focused on investing in and helping start-ups achieve success by leveraging international value chains, the Armenian diaspora, and a global network of advisors, mentors, and partners.

A sector-specific initiative was the establishment of the **Enterprise Incubator Foundation (EIF)** in 2002 within the framework of the World Bank's "Enterprise Incubator" project with a main mission to support the development of ICT sector in Armenia through the creation of a productive environment

for innovation, technological advancement and company growth. The UNECE has qualified it as a "good practice" to implement the national innovation policy.

In addition, the EU-co-financed and GIZ implemented the **project entitled "*Support to SME Development in Armenia*" (SMEDA)**,initiated in 2016 with the objective to improve the national business and investment climate, and support the creation and development of SMEs to enable broad based growth. Among other support components, it also focuses on improving the design and management of management of **economic clusters** in Armenia.

Finally, the industrial policy in Armenia is led by the ***Strategy of Export-led Industrial Policy*** (2011), which initially focused on key export sectors, such as brandy manufacturing; pharmaceuticals and biotechnology; and precision engineering. The UNECE report in 2014 described those sectors as "good candidates for industry-science linkages".

4.2 Cluster policy in Azerbaijan

During the Soviet occupation of Azerbaijan, during which Azerbaijan was known as the Soviet Socialist Republic of Azerbaijan (1936-1991), and then during the early years of its independence (from 1991 onwards), "clusters" were not a known concept in the country. "Clusters" have recently been integrated in the State's economic and industrial strategies. The Ministry of Economy of Azerbaijan has defined clusters as "*systems of entrepreneurial subjects which operate in the same or similar sectors, are based on location of inter-related and complementary activity areas in a particular geographical district, arrange trade relations by sharing common infrastructure, technology, single market, labour force and services*". Nevertheless, there is no definition of a "cluster" as a legal norm in Azerbaijan, no official government concept for the development and classification of clusters, and no specific State program for the establishment and development of clusters.

Azerbaijani authorities have implemented several state programs on the economic development of sectors and regions, one of which is the ***State Program for Development of Industry in Azerbaijan in 2015-2020*** which shall implement the priority directions defined in the ***Development Concept*** (or strategy) ***"Azerbaijan 2020: Look into the future***". The mentioned documents underlined the will on the part of the government to transform the country into a "strong regional industrial hub", to engage in economic specialisation and to encourage the "development of the economy on the basis of clusters". The governmental approach towards cluster policy is based on the establishment of special economic zones and favourable conditions. The State program notably plans the establishment of industrial zones and clusters. High technologies parks, industrial parks and industrial districts are being created countrywide – eg. it plans the completion of infrastructure of Sumgait Chemical Industrial Park and Balakhani Industrial Park and the establishment of industrial parks in Ganja and Mingachevir, the formation of a High Technologies Park. The Ministry of Economy is responsible for industrial zones on the one hand, the Ministry of Communication and High Technologies is responsible for high technology parks. The program also assigns to the Ministry of Economy and Industry and local executive power organs the task to "*elaborate and implement proposals on relevant measures for the establishment of industrial clusters*". In addition to this, Azerbaijan National Academy of Sciences has recently been tasked to establish a **High Technology Park** to effectively encourage academia-industry collaboration and implement the science and technology policy. It is a unique opportunity for the Academy to actively engage in academia-industry collaboration in its park located in Baku, and produce innovative products in almost all fields of science, ranging from chemicals to smart vehicles. In terms of sectors

for the establishment of clusters, the *Development Concept* plans to build a complex in the field of oil and gas "consisting of oil and gas refineries and petrochemical factories" to attract investment, observe environmental rules, establish a production chain and increase the competitiveness of the sector as well as export capacity. The Concept and Program also plan to build special economic zones in every economic district of the country in the traditional production spheres of the non-oil industry (chemical industry, metallurgy, machinery construction, electrotechnology, electronics, light industry, food industry, etc.).

The Government also recently adopted a new document – ***The Strategic Roadmap for Perspectives of the National economy of Azerbaijan*** which covers the development of a dozen of sectors until 2025, including industry, research and innovation – with the objective of diversifying the economy and industry in Azerbaijan, and especially developing a competitive and sustainable non-oil sector which is a strategic priority of the Government. In addition, sectoral strategic roadmaps were also adopted to develop the sectors of heavy industry and mechanical engineering, specialised tourism, and production and processing of agricultural products.

Furthermore, State Programs on entrepreneurship and regional socio-economic development also highlight the acceleration of regional/local efforts to further develop sectors other than the oil industry as a part of the economic diversification strategy of Azerbaijan. The President of Azerbaijan declared 2014 as the "Year of Industry". The evaluation of the performance of those programs and policies from a cluster perspective is rarely conducted, and not easy to achieve, since the state programs do not directly target clustering.

Recent policies in science and technology fields demonstrate an increasing participation on the part of research institutes in industrial development. The **Azerbaijan National Academy of Sciences** develops new policies for science commercialization and technology transfer to increase the contribution of science in the national economy. According to the newly adopted ***Strategic Roadmap and State Law on Science***, the role of education, specialized trainings, as well as research will be targeted to work jointly with industrial enterprises. Despite being separated from science and research, universities are also interested in close participation in clusters relevant to their profile. The Science Development Foundation (SDF-AZE) under the President of the Republic of Azerbaijan regularly supports through grants research and innovation oriented projects submitted by the group of scientists either from academic or industrial organisations.

4.3 Cluster policy in Belarus

Cluster policy in Belarus is only in its beginning stages. In 2014, the Government adopted the ***Concept for Setting up and Developing Industrial Innovation Clusters in the Republic of Belarus*** (approved by the Regulation of the Council of Ministers of 16 January 2014 No 27)[25]. It was developed as a set of measures aimed at promoting entrepreneurship in the country in line with the President's Directive of 31 December 2010 No 4. The Concept assesses the existing industrial infrastructure and identifies the prospects and organisational and economic mechanisms for stimulating cluster development till 2020.

The *Concept* defines clusters as a "*geographically localised group of legal entities and individual entrepreneurs, interacting with each other on a contractual basis and creating added value*". The

[25] Concept for Setting up and Developing of Innovation Industrial Clusters in the Republic of Belarus, approved by the Regulation of the Council of Ministers of 16 January 2014 No 27.

document, however, only covers "*innovation industrial clusters*" whose members "*provide and implement innovative activities aimed at developing and producing innovative and high-tech products*".

It is worth noting that the term "industrial cluster" used in the Concept has some specific nuances. While a business cluster according to this document can be a group of businesses engaged in cooperative arrangements of rather loose and informal nature[26], the policy initiative stresses that cooperation among the businesses participating in the cluster should be established on a strict contractual basis. It is also recommended that the participants in more complex clusters establish a new joint "cluster body" – a commercial firm performing the coordination functions. The implied presumption was that large state-owned firms would take the lead and initiative in establishing such "clusters".

The purpose of the state cluster policy is to create conditions for improving the competitiveness of the national economy through the promotion of cluster development. In line with this objective, the following concrete tasks of the state cluster policy have been defined:

- establish a regulatory framework for cluster development of the economy;
- identifyi the priority areas for setting up and developing of clusters;
- develop conditions for training of managers and specialists in cluster development;
- develop conditions for implementation of cluster initiatives and projects;
- set up and maint a system of state support for the cluster development.

The *Concept* also highlights some specific features of the Belarus economy hampering cluster development such as.

- uncompetitive environment,
- high concentration in factors of production, monopolies,
- rigid hierarchical system of economic management,
- predominance of vertical links between enterprises before horizontal links,
- significant number of big public industrial enterprises which, according to the preliminary analysis, are not eager to take the lead and initiate clusters, and insufficient level of SMEs. Some of these big public companies, however, have strong clustering potential which has not yet been realised due to weaknesses regarding corporate governance, specialisation and the lacking layer of small competitive firms which would operate as subcontractors of the large enterprises.

As a result, the *Concept* sends out a clear message that cluster development is expected to be centered around innovative SMEs and their groupings, e.g. thematic business associations.

Together with the *Concept*, an ***Action Plan*** on its implementation was approved for 2013-2015 and till 2020. It contains a list of actions, timeframe and the public bodies in charge of implementing them, mainly the ministries and regional authorities. The practical steps the Government intends to implement include an annual competition for the selection of cluster initiatives and support for pilot cluster projects implemented by SMEs (via the Council for Entrepreneurship Development). However,

[26] Michael Porter, The Competitive Advantage of Nations, New York, Free Press, 1990.

neither the *Concept* nor the *Action Plan* have identified relevant financial support for promoting cluster development.

The Ministry of the Economy of Belarus was entrusted with the coordination of the state cluster policy (Regulation of the Council of Ministers of 31 March 2014 No 242).[27] In line with this new function and as a follow-up activity to the Concept development, the Ministry of the Economy supported by the German Federal Ministry of Economic Cooperation and SEQUA developed a document entitled ***Guidelines for Setting up and Organizing of Cluster Activities in the Republic of Belarus*** containing a range of model documents (2015).[28]

According to the *Action Plan*, the next steps in promoting the cluster policy should include the development of the following new legislative documents (or changing the existing ones), in particular:

- Development of a complex legal act on providing public support for cluster projects and setting up procedural rules for their competitive selection,
- Introducing changes in the Law of 1 July 2010 No 170 "On Supporting Small and Medium Entrepreneurship" in order to include cluster development centers in the SME support infrastructure,
- Introducing changes in the Law of 25 May 2009 No 255 "On Some Measure for Public Support of Small and Medium Entrepreneurship" in terms of providing public support to clusters.

However, during the time of this study, none of these legal acts were approved – this could possibly be explained by a low interest from business towards clustering under the above framework.

4.4 Cluster policy in Georgia

First steps towards developing cluster policy in Georgia

The Georgian society has been very inspired by cluster policy development at the European level. The Georgian economy is weak and economic development policy slow to emerge. Today, Georgia's imports exceed its exports by four times. New economic systems like clusters, permitting Georgia to become self sustainable in certain areas e or develop its modes of production are useful and interesting for Georgia.

At present, there are several kind of emerging cluster initiatives in Georgia. Howeverthere is no cluster policy and appropriate legislation to develop them. Recently, the Ministry of Economy and Sustainable Development of Georgia established the **Industry Development Group** which is responsible, amongs other things, for elaborating a concept for cluster development and will facilitate the involvement of private business in this system using Public-Private Partnership (PPP) principles in collaboration with public and private organisations. The other public bodies involved in the elaboration of the cluster concept are the Ministry of Education and Science, the Ministry of Regional Development and Infrastructure and the Ministry of Agriculture of Georgia.

[27] Regulation of the Council of Ministers of 31 March 2014 No 242 "On changes and amendments in the statute of the Ministry of Economy of the Republic of Belarus"

[28] Guidelines for Setting up and Organizing of Cluster Activities in the Republic of Belarus, http://ced.by/media/publication/books/rukovodstvo-klastery/rukovodstvo_po_sozdaniju_klasterov_2.pdf.

In addition to this, the German operating company Sequa, together with the German Corporation for International Cooperation (GIZ) in Georgia, started a project that aims to support the development of Georgia's export strategy and the establishment of clusters in different industrial sectors (apparel and textile, furniture, plastic industry, film industry). The project will run from September 2016 to July 2017.

Academia-industry collaboration, science and technology policy in Georgia

Collaboration between academia and industry is a critical component of an efficient national innovation system, as well as a pre-requisite for clustering. Due to the reforms in Georgia, most of the national scientific institutes in Georgia merged with appropriate universities.

Delta[29] constitutes a good example of academia-industry collaboration in Georgia. In 2010, under the the policy of the Georgian Government, the **State Military Scientific-Technical Center (STC) Delta** was established in which six scientific institutes and one manufacturing plant were united. These scientific institutes are: The Institute of Metallurgy and Material Science, the Scientific Research Institute of Optics, the Mining Institute, the Institute of Machine Mechanics, the Sukhumi Institute of Physics, the Technology and Institute of Micro and Nano electronics, and Tbilisi Aircraft Manufacturing Plant. Delta is a legal entity of public law established by order of the President of Georgia. The ambition beyond the establishment of Delta was to strengthen the development of successful military projects contributing to national defence along with the support of civil society's wellbeing. Consequently, the main sphere of Delta's work is oriented on the defence industry (designing, developing, integrating, producing, and servicing different kinds of military production) and partly on civil production.

The Georgian Government created a new structure in 2014 – the **Georgian Innovation and Technology Agency (GITA)**[30], which was assigned to coordinate and mediate an important role in the country in terms of innovation and technology. GITA is actively involved in the formation of innovation centres, innovation labs and business incubators. One of the main objectives is the creation of high-speed internet access, development of e-commerce, computerisation to stimulate electronic services development and utilisation. GITA is constructing a new physical infrastructure for the creation of i-labs, fab-labs, innovation centres within universities, fostering dialogue between academia and industry. Through these important functions, GITA plays an important role in promoting the development of clusters in Georgia.

SME development policy in Georgia

In European countries, SMEs are currently economically significant and politically popular. In Georgia, the statistical review has shown that SMEs have occupied an insignificant segment of the country's economy according to their contribution into the main macroeconomic indicators - turnover, output, added value, national income, etc. Despite the growth of the Georgian economy, only 13% of the total employed population is employed in the SME sector. According to a survey led in 2012[31] there is a set of macro factors (e.g. unstable legal environment, low purchasing power of the population, lack of qualified human resources, lack of market information, etc.) and micro factors (such as low coordination between organisations supporting SMEs, lack of proper marketing and managerial skills,

[29] Delta International, web article http://delta.gov.ge/en/about-delta/
[30] GITA web site http://www.gita.gov.ge/ge/
[31] The Role of SME Sector in Georgian Economy, Tatiana Papiashvili, İlyas Çiloglu, Journal of Business, 1(1):19-24,2012 ISSN:2233-369X.;

uncompetitive products, etc.) that still hamper the development of the SME sector in Georgia. The major problems faced by SMEs are the lack of adequate entrepreneurial and institutional conditions for developing foreign trade-oriented sectors for inclusive growth. Thus, there remains considerable potential to foster further employment through SME development, and to promote SME development as a way to reach sustainable and inclusive economic growth.It must be mentioned that there is a lack of governmental SME development support policy and programmes in Georgia. This development directly depends on national legislation. The SMEs definition was given in the ***Law of Georgia on "Small and Medium Enterprise Support"***[32]. A different tax regime is applied to individuals and companies involved in businesses. Thus, national legislation on SMEs is not specific and regulates mostly taxation. On the other hand, the Georgian government has a very clear role as an economic regulator. The promotion of widespread entrepreneurship through the setting up and intensive support of SMEs should be crucial for the full and definitive transformation of Georgian economy to a market-oriented and for the further democratisation of society. In this context, the Ministry of Economy and Sustainable Development established two new agencies: The ***Enterprise Development Agency (EDA)*** and the ***Georgian Innovation and Technology Agency (GITA)***. These institutions will play a crucial role in supporting SMEs. Georgian SMEs self-financing still prevails among available sources of financing. SME development causes incensement of the total investments as a component of GDP, complementing FDI. From this point of view, SME private investment might play a greater role in the country's economic growth strategy.

It should be mentioned as well that according to the World Bank/International Finance Corporation annual report "Doing Business 2014", Georgia improved by eight places compared to the previous year in the world's 189 economies in terms of "ease of doing business"[33], and this development should contribute to thecreation of new SMEs in the country. Georgia ranks sixteenth in the Doing Business for 2014 manual. The current state of the SME development policy will indirectly contribute to clustering and the example of this is foresaw first of all in the tourism sector.

4.5 Cluster policy in the Republic of Moldova

Clusters are a relatively new phenomenon in the Moldovan economy. The cluster creation policy in Moldova is still in its early stages. Although the mechanisms of cluster establishment are not clearly defined, the necessity of supporting the cluster formation for industrial development was mentioned among others subjects in several strategic documents. These are:

- Programme of the Government of the Republic of Moldova "European Integration: Freedom, Democracy and Welfare";
- Industry Development Strategy until 2015, approved by Government Decision no.1149 on 5 October 2006 (p.6.2; Annex no.13 Action Plan, Chapters V, VI, VII);
- Small and Medium Enterprise Sector Development for 2012-2020 (Government Decision no.685, dated 13 September 2012);
- National Innovation Strategy of the Republic of Moldova "Innovation for Competitiveness" 2013-2020 (Government Decision no.952, dated27 November 2013);

[32] SMEs and Country Growth Strategy: Evidence from Georgia, Journal of Business; ISSN 2233 369X; Volume 4, Issue 1, 2015.
[33] The World Bank, Economy Rankings, http://www.doingbusiness.org/Rankings , October 25, 2016.

- National Regional Development Strategy for 2013-2015 (Government Decision no.685, dated 04 September 2013).

All these documents address, to some extent, certain aspects of cluster creation. The government in Moldova is currently implementing the ***Small and Medium Enterprise Sector Development Strategy for 2012-2020***. One of the eight priorities supporting SMEs in this Strategy is the development of business partnerships, which consists in achieving the following objectives: developing public-private partnership in business; facilitating business partnerships "business to business"; facilitating private sector participation in the processes of improving the regulatory framework and decision making[34]. In the legal basis of the Republic of Moldova, the cooperation of SMEs was already designated in the *Law on Enterprise and Entrepreneurship* from 1992, which stipulates that "*enterprises have the right to establish societies in the form of associations, unions, corporation in the form of non-profit organizations*"[35].

Another important aspect of cluster creation is innovation. At the national level the state policy in science and innovation is developed, elaborated and promoted by the scientific community through the Academy of Sciences of Moldova. Some of the most important documents on innovation and technology transfer within this policy framework are: ***The Code on Science and Innovation of the Republic of Moldova nr.259-XV*** of 5 July 2004 and *the* ***Innovation Strategy of the Republic of Moldova "Innovations for Competitiveness 2013-2020"***. The implementation of the state policy in innovation and technology transfer – and notably the facilitation of exchanges and partnerships between research organizations, higher education institutions and the business sector is carried out by the **Agency for Innovation and Technology Transfer**. However, according to some studies[36] and interviews conducted with entrepreneurs, state efforts regarding the innovation and academia-industry collaboration remain largely unnoticed, and they are not in accordance with the expectations of entrepreneurs. One explanation for this could be the weak level of dialogue between public authorities responsible for policy innovation and industry and academia.

An important prerequisite for the creation of clusters in Moldova was the adoption by the Government in August 2013 of the ***Concept of Industrial Cluster Development***. This concept was developed in accordance with the national development strategy **"*Moldova 2020*"**, and the industrial developmentstrategy until 2015. According to the Concept, the notion of cluster is a "combination of interconnected companies located in geographic proximity, usually belonging to a sector or related sectors, and scientific research institutions, universities and other organizations, whose activities are focused on innovation and enable their cooperation to enhance the competitive advantages of enterprises".

[34] 1) Novac A., Aculai E. State policy on cluster development in the Republic of Moldova: opportunities and obstacles. In: Finding the right business partners and improving the business environment for SMEs. 8-9 october, 2015, Crete, Greece. ISBN: 978-605-4679-15-7, pp. 146-169
2) Ministry of Economy of the Republic of Moldova. Strategia de dezvoltare a sectorului întreprinderilor mici şi mijlocii pentru anii 2012-2020, Publicată în Monitorul Oficial nr.198-204/740 dated 21 September 2012. Chişinău: Moldovan Ministry of Economy, 2012. Online at http://www.mec.gov.md/sites/default/files/document/intr02_0.pdf

[35] Legea cu privire la antreprenoriat şi întreprinderi Nr. 845 din 03.01.1992. În: Monitorul Parlamentului, Nr. 2 din 28.02.1994

[36] E. Aculai, N. Vinogradova, N. Percinschi, A. Timus, A. Novac, L. Maier,and M. Doga-Mirzac. Analiza posibilităţilor şi constrângerilor în consolidarea parteneriatului dintre IMM-uri, instituţiile publice şi mediul de cercetare în vederea creşterii competitivităţii afacerilor. Raport ştiinţific. Chişinău: INCE, 2014.

The Concept of Industrial Cluster Development examined the premises for cluster development in the country's industrial sector and concluded that the Moldovan economy had sufficient economic prerequisites for the creation and development of local and international clusters. Manufacturing industries in Moldova where clusters would most likely result in innovation and increased competitiveness were the food and beverage industries; the textile manufacturing, enterprises engaged in the dressing and dyeing of furs; the manufacturers of leather products such as footwear, etc. The Concept of Industrial Cluster Development also determines the purposes, objectives, general principles and steps through which state policy can support the development of clusters in industrial sector. The main objective of the state policy supporting the development of clusters is to enhance the development of industrial sectors and increase their share in the national economy by strengthening the managerial and organizational efforts, supporting the innovation process, and increasing the competitiveness of the large industrial enterprises and the SME sector. According to the Concept of Industrial Cluster Development the specific objectives of the cluster policy are:

- The modernisation of traditional branches of the industry;
- Creating the conditions for innovation activities, strengthening cooperation between enterprises and research institutions;
- Increasing the efficient use of human, material and financial resources through use of advanced technologies in the industrial production process;
- The professional development of employees;
- Supporting the regional economic development;
- Growth of key financial and economic indicators of enterprises, and the subsequent increase of budget revenues.[37]

The Ministry of Economy of Moldova is the initiator and coordinator of cluster policy implementation at national level in achieving the strategic objective of creating and developing clusters. Although the Concept of cluster development was approved in 2013, the next steps to developing the cluster policy have not yet been accomplished.

The cluster concept is also encountered in the ***Law on scientific-technological parks and innovation incubators*** which operates with a different definition of the concept of cluster in the *Concept of Industrial Cluster Development of Moldo*va – "scientific and technology clusters". It stipulates that "*scientific and technological clusters represents groups of legal entities and/or individuals that is under an association contract concluded between accredited organizations in science and innovation and/or accredited higher education institutions, other non-profit organizations, on the one hand, and economic agents, local public administration authorities, associations of employers or professional associations, individuals, financial institutions, international organizations, national or foreign investors, on the other hand, for the*

[37] 1) Novac A., Aculai E. State policy on cluster development in the Republic of Moldova: opportunities and obstacles. In: Finding the right business partners and improving the business environment for SMEs. 8-9 october, 2015, Crete, Greece. ISBN: 978-605-4679-15-7, pp. 146-169
2) Ministry of Economy of the Republic of Moldova. Hotărîrea Guvernului nr.614 din 20 august 2013 cu privire la CONCEPŢIA dezvoltării clusteriale a sectorului industrial al Republicii Moldova. Chişinău: Moldovan Ministry of Economy, 2013. Online at http://www.mec.gov.md/sites/default/files/document/intr02_0.pdf

purposes of scientific research, education and technology transfer of scientific results and innovations, their capitalization through economic activities".[38]

Today, although the concept of cluster is present in some policy documents, their creation and development are not yet regulated at the legislative level. Hence, the lack of a proper legislative framework reduces the possibilities of cluster creation.

4.6 Cluster policy in Ukraine

The first document on cluster policy in Ukraine was prepared in 2008, when the ***Concept of creation of clusters in Ukraine*** was published by the Ministry of Economy of Ukraine[39]. This document identified the prospects of implementation of the cluster approach in the economy, highlighted the advantages of cluster organisation of production / manufacturing for the domestic economy, and defined the conceptual basis of clusters.

The Concept proposed to distinguish betweeb four types of clusters:

- Production clusters (especially, in auto, aircraft and shipyard sectors);
- Innovation and technological clusters (geographically localized companies, linked by the innovation product chains);
- Tourism clusters;
- Transport and logistics clusters.

On the basis of the above-mentioned concept, the ***National goal-oriented program for industrial development in Ukraine to 2017*** was adopted by the government (2008). Its implementation assumed the set up of the cluster model in the national economy. It also created some preconditions for the introduction of legal acts, aimed at further developing state cluster policy in the Ukrainian economy.

In May 7th , 2008, the Cabinet of Ministries of Ukraine issued a Decree (N 703), which made it difficult to undertake joint activities between predominantly state-owned companies/organisations (research institutes, universities and so on) with private national and foreign companies. These activities had to be approved by the Cabinet of Ministries. This Decree remained in force until 2012.

In 2009 another draft of the ***National Strategy formation and development of cross-border clusters*** was prepared. Its main purpose was to help to solve problems associated with asymmetries in Ukraine's regional development, the outflow of its labor intellectual and other resources in border countries, as Ukraine lagged behind them in terms of quality of life, investment attractiveness, competitiveness and level of innovation. To overcome these deficiencies, the government planned to establish cross-border cooperation with companies from these countries and to create and to develop cross-border clusters.

[38] Legea Nr. 138 din 21.07.2007 cu privire la parcurile ştiinţifico-tehnologice şi incubatoarele de inovare. In: Monitorul Oficial al Republicii Moldova, Nr. 107-111 din 27.07.2007.

[39] Konepcia stvorennya klasteriv v Ukraini (draft)- http://biznes.od.ua/index.php?option=com_content&task=view&id=499&Itemid=33

Later, the ***Concept of the State Target Economic Program of industrial development for the period till 2020*** was adopted by Decree of the Cabinet of Ministers of Ukraine[40] in 2013. In particular, a goal was established, promoting innovation in all promising areas of economic activity through the *"creation of scientific innovation and industrial clusters in high-tech brunches of industries",* based on the commercialization of their scientific research results, using idle production capacities of state enterprises and brunch research institutions.

Despite the fact that not all these documents have become the laws, they have opened the way for the creation of some cluster-type organizations in Ukraine, as well as three cross-border clusters, partially funded by the EU. On the other hand, it is worth to mention that there was no special cluster-oriented state programme in Ukraine in 2000-2010s. No funding from the state budget supported specific cluster-oriented initiatives in these years.

Recent legislation and legal initiatives, promoting the creation and development of clusters in Ukraine:

The legal basis for the formation of innovation clusters and activity in Ukraine is in Chapter 77 of the Civil Code of Ukraine, entitled ***Contract on joint activity***. It allows for the legal facilitation of the joint activities of different companies on the basis of standardized contracts. Clusters are mentioned as a specific form of such joint activities. Thus, companies in the cluster could, in principle, formalize their relations. At the same time, the law entitled "***Priorities of innovation activities in Ukraine***" has identified several priority areas of innovation activity in Ukraine.[41]

The *Priorities of innovation activities in Ukraine* orders the executive power bodies of Ukraine of all levels to create the most favorable conditions for the implementation of priority-oriented innovation activities and the concentration of financial, economic and intellectual resources on them.

With this law, the implementation of strategic priorities for innovation is one of the most important tasks of the Cabinet of Ministers of Ukraine, central executive bodies, National and branch Academies of Sciences of Ukraine, as well as innovative structures, created with the state support. In this context the efforts of the government, the National and branch Academies of Sciences of Ukraine are being made, despite some important problems of commercial activities of institutes of the academies still have to be solved.

Nowadays ideas of creation and support of clusters in the Ukrainian economy have become more popular, and the government has included them into its official documents, including the ***Action Plan of the Cabinet of Ministries of Ukraine*** (2015)[42] and into some programmes and tasks of specific ministries.

The new law entitled "***On Scientific and Scientific-Technological Activity***" [43] was enacted on January 16, 2016. One of the most important innovations of this document is the establishment of a permanent

[40] "The Concept of "State Target Economic Program of industrial development for the period till 2020" (approved by Decree of the Cabinet of Ministers of Ukraine #603-r, dated July 17, 2013) : http://zakon3.rada.gov.ua/laws/show/603-2013-%D1%80 (in Ukrainian)

[41] Law of Ukraine **3715-17**, (version of **05.12.2012** "On the priorities of innovation activities in Ukraine": http://zakon5.rada.gov.ua/laws/show/3715-17 (in Ukrainain)

[42] Pro zatverdzhennya plany zahodiv z vikonannya Programy dialnosti Kabinetu Ministriv Ukraini ta Strategii stalogo rozvitku ‚Ukraina-2020' u 2015 roci - http://zakon4.rada.gov.ua/laws/show/213-2015-%D1%80

[43] Law of Ukraine "On Scientific and Technological Activity" : http://zakon3.rada.gov.ua/laws/show/848-19

advisory body, the **National Council of Ukraine on Science and Technology** under the auspices of the Cabinet of Ministers of Ukraine, the main purpose of which is to ensure an effective interaction between representatives of the scientific community, governmental agencies, and industry

The document introduces the rule according to which public research institutions and state universities, academies, institutes are entitled to be co-founders of the economic societies with the aim of use of intellectual property.

Other legal initiatives, described below; are also aimed at supporting innovative development and influencing cluster-related activities:

- The draft of the "***Strategy of development of high-tech industries by the year 2025***" (prepared by the Ministry of Economic Development and Trade of Ukraine in 2016)[44] lists a series of measures aimed at creating an effective ecosystem of technological parks, scientific and industrial clusters. The Strategy contains a range of measures designed to bridge the gap between the system of creation and the system of implementation of created knowledge in innovation and production.

Some cluster–related initiatives are associated with the country's leading research organizations, universities and NGOS.For example, the National Academy of Sciences of Ukraine plays an active role in this process. In recent years, the Academy took part in the following actions:

- Participation in the creation of the the **National Association of Scientific, Technological Parks** and other innovative organizations[45] in Ukraine

- Adoption of a resolution by the National Academy of Sciences of Ukraine (№ 176) on the 10.06.2009 with a specific chapter on "***Scientific support of formation of the new type of innovative structures in Ukraine - national innovation clusters***"

- Adoption of a resolution on the ***Presidium of NAS of Ukraine*** (№#220) on the 08.07.2009 focusing on "***The order of construction/development of National Innovative Clusters***"[46]. This Resolution adopted recommendations on the formation and operation of innovation clusters in Ukraine, which, inter alia, contained a definition of innovative structures and innovative cluster specified goals and objectives of national and industrial innovative clusters.

NGOs are more active in training and information spheres relating to cluster formation. The experience of some developed countries shows that specially trained cluster managers are the key for success of cluster initiatives. This was taken into account in Ukraine: recently, several civil society organizations, NGOs and Universities have started various projects, aimed at providing assistance in the process of cluster formation and the activity intensification of clusters.

[44]The "Strategy of development of high-tech industries by year 2025" (prepared by the Ministry of Economic Development and Trade of Ukraine, May, 2016) - http://www.me.gov.ua/Documents/Detail?lang=uk-UA&id=c3081991-45fb-47df-abc6-59822e854a99&title=ProektstrategiiRozvitkuVisokotekhnologichnikhGaluzeiDo2025-Roku (in Ukrainian)

[45] National Association of scientific, technological parks and other innovative organizations of Ukraine web-page -http://nstau.org.ua/en/about-association/history-of-creation-2/

[46] (http://www1.nas.gov.ua/infrastructures/Legaltexts/nas/2009/regulations/Pages/220.aspx

Examples of such activities include:

- Support for the creation of the **National Association of Scientific-Technological parks** and other innovative organizations in Ukraine. It has been created with the assistance of the Ministry of Science and Education and of the National Academy of Sciences of Ukraine. The initiator of the Association creation was the International Fund of Assistance to Investment - a Ukrainian NGO.

- **Ukrainian Clusters Portal**[47] - connects members of Ukrainian regional clusters – entrepreneurs, academic community, local government officials. It was created by entrepreneurs Stanislav Sokolenko and Sergei Sokolenko and by the International Foundation for Market Assistance. This International Foundation for Market Assistance was founded in 1997 to promote the development of the market economy in Ukraine. The Foundation conducts studies of newly-emerging regional clusters in Ukraine and assists their organizers. The Foundation formed the Competitiveness Institute in 2002 to help to improve the economic conditions in Ukraine. The Institute assists in development of national and regional competitiveness programs based on networked valued chains - clusters, strategic partnerships and alliances.The main purpose of the Ukrainian Clusters Portal - is to support Ukrainian entrepreneurs and to remove the barriers for their communication and cooperation.

- A private consultancy company entitled the ***Cluster University*** has been established on the basis of The International Foundation for Market Assistance and the Cluster Portal. Over the past years, the Foundation's representatives have organized training seminars and made presentations at a large number of conferences in Ukraine and abroad[48].

- Since 2012, the department of the leading Ukrainian University **Kyiv Mohyla Academy – Kyiv Mohyla Business School** (KMBS) has been building an expertise in cluster development. KMBS experts studied world practices of cluster initiatives in the Netherlands, Italy, Switzerland, Estonia, the US, Chile, Brazil, and Argentina. *Business Clusters* is a compulsory course for all KMBS MBA programs. Additionally, the business school cooperates with authorities of the main cities and regions of Ukraine to initiate clusters in Ukraine. The School represents Ukraine in the TCI Network, a global network of more than 9,000 experts on cluster development and regional competitiveness[49].

Kyiv Mohyla Business School, in conjunction with the Cluster Navigators International Agency announced the first national selection of managers to work on its ***Develop Ukraine*** programme, aimed at training the management elite in Ukraine. They have established "*CLUST-UA*", which is a Ukrainian cluster development agency,[50] aimed to help Ukraine become an important part of the global economy by improving the efficiency of Ukrainian clusters. The agency is an NGO specialized in implementing cluster initiatives, policies and innovations in Ukrainian economy by facilitating the process of collaboration at the local, regional, national, and international levels, and by fostering synergy actions between industries, investors, regulators, and civil society.

The Agency provides consultancy in several areas, such as as solutions and techniques for analysis, mediation, leadership, and management, sustainable approaches, cluster identification, institutionalization, life-cycle management, and collaboration. Through its services, the Agency is offering to link stakeholders to Clusters through networking and partnership to pave the way for

[47] Web-Portal - http://ucluster.org/en/about/
[48] (http://ucluster.org/en/university/training/
[49] Web-site of the School: http://kmbs.ua/en/news/rozvitok-klasteriv-v-ukrayini
[50] Agency web-page: http://clust-ua.org/index_en.html

matchmaking and shared developmental priorities; support cluster policy's participants and regulators' with organisational services, expertise, and trainings; help in cluster development strategy design and implementation; market research and coordination of Cluster participants' joint marketing programs; support Ukrainian clusters cooperation with partners from abroad; assist in communication and organisation support in accessing funding opportunities for Ukrainian Cluster initiatives and projects; trainf Cluster initiative participants and assess their relevant competences; support Ukrainian clusters' participation in international exhibitions and conferences; give an expert assessment of Ukrainian cluster projects, programs, and initiatives.

5 Analysis of cluster development per country

The present section presents the current state of development of clusters in EaP countries: the existence of cluster initiatives in the country, the history of their development (when relevant), their form and characteristics – and level of institutionnalisation, as well as their sector and activities.

5.1 Cluster development in Armenia

Just like there is currently no national definition of clusters in Armenian's legislation, no major cluster development projects can currently be observed in Armenia that meet the accepted definition of "cluster".

Among cluster-emerging initiatives in Armenia, the **Union of Information Technology Enterprises (UITE)** was created in 2000 as a business association of ICT enterprises operating in Armenia. UITE was created by ICT enterprises and companies aiming at the protection of economic interests, business promotion and advancement of research in ICT sector. The members of UITE are local and international organisations operating in Armenia. The UITE members are particularly involved in software development, internet technologies and e-commerce, research and development, semiconductor design, and other specialties. A number of members occupy a leading position in the global market. [51]

The establishment of the **Technology Centers of Gyumri** and **Vanadzor** - the second and third largest cities of the country - can be considered as a first step towards promoting regional development and clustering. The Centers have been established by the Enterprise Incubator Foundation, the Armenian Government and the World Bank with the main objective to develop technical and business skills, promote technological entrepreneurship, commercialise innovative research undertakings, create new technology companies and attract foreign investments to these regions. There are 20 professionals at the Gyumri Technology Center, and20 mainly IT companies involved in software and hardware developments and services.[52] The Center in Vanadzor was established in October 2016.[53]

As a private initiative, the establishment of **Viasphere Technopark** can also be mentioned, as a state-of-the-art technology park, operating in Yerevan since 2001. It provides infrastructure to technology companies worldwide looking to extend their core development offshore. Viasphere Technopark is currently hosting around 20 companies involved in various business activities, including software and hardware developments, telecommunication, and retail trade.[54] The mentioned technology centers and the technopark could create a favourable environment for the development of cooperation and eventually clustering between the organisations of the ecosystem.

The **Armenian Society of Food Science and Technologies** (ASFoST) was established in 2009. It includes the European Hygienic Engineering and Design Group in Armenia, and is one of the founders of the Black Sea Food Science and Technology. The organization unites many food companies, representatives of research organizations and universities and government officials. ASFoST actively participated in programs focusing on the promotion of food (honey; aquaculture, fruit and vegetable processing products) exported to European Union and the United States. From 2014 onwards, ASFoST has been providing scientific support and help in commercialisation for the export of canned vegetable

[51] UITE's website: http://whyarmenia.am/partner-uite
[52] Technology Center in Gyumri, website http://www.gtc.am
[53] Technology Center in Vanadzor, website http://www.vtc.am
[54] Viasphere Technopark website http://viasphere.com/technopark/tenants.htm

foods to the United States.

Other professional associations and unions in Armenia, such as the **Association of Winemakers of Armenia**, the **Pharmaceutical Association of Armenia**, the **Touristic Association of Armenia**, the **Federation of Agricultural Associations of Armenia** and many others provide adequate platforms for organisations in similar fields, fostering a potential for cooperation between various economic interest groups. These can be considered as organisations with strong potential for the development of clusters in Armenia.

5.2 Cluster development in Azerbaijan

Clustering, as mentioned earlier, has been experienced in Azerbaijan under different conceptualizations. Based on comparative advantages, endowments of factors of production, and geographical concentration, various sectors and institutions related to cluster development are developed in particular regions. Those areas are established by the President of Azerbaijan Republic through State programs, and relevant authorities are assigned to work on the created institutions. Economic zones are also granted with tax-free and other favorable conditions to attract private sectors and startups.

However, several existing structures can be considered as potential future industrial clusters in Azerbaijan today. As mentioned, concentrations of certain industries in particular areas have emerged in Azerbaijan, and regions of the country are usually specialized in certain industry sectors. The Absheron peninsula, for example, is a hub for petro-chemical industry, while the Ganja-Gazakh region is specialised in mining and agriculture. However, it is to be noted that participation and involvement of research actors in cluster is currently low in Azerbaijan.

There is no identified knowledge-based cluster in Azerbaijan, although science is heavily concentrated in the Baku metropolitan area. The **Experimental Industrial Plant of ANAS** has been operating since 1970s in Baku where all the innovative and knowledge-based R&D and production take place. It can be considered as a knowledge hub, and therefore ANAS bis building a High Technologies Park in the same area.

Cluster-emerging initiatives, or organisations with cluster potential in Azerbaijan are included in this section:

- **Petro-chemicals**. As the main source of national welfare, this sector is heavily concentrated in the Absheron peninsula. Oil reserves of the Caspian basin grab related sectors and stakeholders to that area to generate advantages of clustering. SOCAR (State Oil Company of the Republic of Azerbaijan), BP, AzerKimya (“AzerChemistry”), and many other big enterprises effectively cooperate and compete in the peninsula while engaging in collaboration with government and academia.
- **Mining**. Disposing of a strong history in the country, the metallurgy industry is among the top priority sectors for the government. Alunite, gold, silver and many other valuable metal ore reserves are located in Ganja-Gazakh region. Big private and public enterprises, plants, and

research institutes work together to extract and produce metals. The development of the mining industry also leads to clustering in the region.

- **Agriculture.** Historically, Azerbaijan has a comparative advantage to other countries in the region in agriculture. The Government has also listed the sector as a priority sector. Each region has a regional specialisation in agriculture. For example, the Lankaran-Astara region is mainly known for its unique citrus, the Aran region for cattle-breeding, Zagatala-Balaken for the production of nuts and tobacco, Guba-Qusar for fruits, Ganja-Qazakh for cattle-breeding, vegetables and grapes, the Nakhchevan region for fruits, mineral waters, etc. A university specialized in agriculture (Azerbaijan State Agrarian University) is located in Ganja-Qazakh region to support and develop human capital. Cotton has also recently gained huge attention of the authorities.

- **Tourism**. The government and experts agree there is strong potential for clustering in the tourism sector in Azerbaijan. '*The Ministry of Culture & Tourism of Azerbaijan is conducting work on the creation of tourism clusters on the Sheki-Balaken route*'[55]. Touristic activities can help attract foreigners in the northern regions of the country for historical visits, business, winter tourism..

- **Information and Communication Technologies**. As one of the priority sectors of the government, the ICT industry has been attracting a lot of investment. High Technologies Park, AzerCosmos, and many other projects prove the government's policy support has helped. The Government is going to establish a cluster in Baku, the capital, to provide favorable conditions for start-ups and SMEs to develop the industry.

- **Heavy industry and machinery**. According to the Strategic Roadmap [56] this industry will heavily be concentrated in the Baku-Sumgayit economic zone, strategically located close to the Sea. Four plants are aimed to be established in the area together with Italian partners.[57] This cluster will also be a linkage industry for many other relevant sectors.

5.3 Cluster development in Belarus

As it was mentioned in the previous chapter dedicated to cluster policies, in Belarus, the Government's support and efforts in formulating a state cluster policy have not yet had a visible effect in terms of implementation in the business sector. It is worth mentionning however, that the first policy document in this area was approved less than 2 years ago and it is probably too early to expect a significant outcome.

According to the ***Concept for Setting up and Developing of Innovation Industrial Clusters in the Republic of Belarus*** (2014) and local analysts, the most promising industries for setting up innovation industrial clusters in Belarus are the following ones: biotechnologies and biomaterials, pharmaceutical

[55] "Azerbaijan creates tourism clusters", http://abc.az/eng/news/96324.html
[56] Strategic Roadmap for Development of Heavy Industry and Machinery in Azerbaijan - http://iqtisadiislahat.org/documents/fermanlar-2
[57] "Huge metallurgical complex to be built in Azerbaijani city of Sumgayit" - http://rome.mfa.gov.az/en/news/94/3326

industry, medical equipment and devices, resource and energy saving, nanotechnologies and nanomaterials, precision instruments, optics and electronics, robotics, and the ICT[58].

Several examples below illustrate some attempts to set up clusters or cluster-emerging organisations by different types of economic actors. Most of these attempts however cannot be qualified as typical clusters no matter how they are called.

1. **LED-cluster** was set up in early 2015 with the goal to promote the modernization of the lighting industry by developing standards and norms, improving the energy efficiency of lightening equipment and protecting the consumers. Key participants include: Institute of Digital Television (part of "GORIZONT" Holding, one of the largest producers of consumer and industrial electronics, Minsk), OJSC "Brest Electric Lamp Plant" (Brest) and Center of LED and Optoelectronic Technologies of the National Academy of Sciences of Belarus (Minsk). The setting up of the cluster was approved by the Ministry of Industry to which two of the three key members are subordinated to, as well as by the NAS of Belarus[59].
2. The pharmaceutical cluster **"Union of Pharmaceutical, Medical, Research and Educational Organizations"** was created in August 2015 in the Vitebsk region (Vitebsk oblast) with the goal of promoting the research, technology and industrial capacity of Vitebsk oblast in the pharmaceutical industry and contribute to developing a modern infrastructure for import substitution, as well as for the manufacturing of innovative drugs.

   Participants include: several businesses residing in Vitebsk oblast, such as "Rubikon", "Nativita", "Akonitpharma", "Beldbnunipharm", "Medelkombel", "VitVar", "Pharmmarketinggroup", Vitebsk State Medical University and Regional Marketing Centre in cooperation with NGO "Union of Pharmaceutical and Biomedical Clusters of Russia". The organizational support for the cluster is provided by the regional authorities[60].
3. **"High-Tech Park" (HTP),** one of the most successful Belarus innovation projects is also considered by some local policymakers to be an example of cluster activities in ICT. Set up in 2005 by the special Law, HTP was established with the main goal to support software industry. HTP provides special business environment for IT business with incentives unprecedented for European countries.

   The first residents were registered in 2006. 10 years after, 164 companies were registered as HTP residents all over the country. According to the origin of investments, 41% of HTP residents were set up by Belarusian investors, 24% are joint ventures and the rest 35% are enterprises with 100% foreign investments.

   The export share in the total production exceeds 91.5%. The resident companies are successful on the North American and European hi-tech markets. Today, they have customers in 61 countries around the globe. Several world leading corporations, such as Peugeot, Mitsubishi, British Petroleum, Gazprom, Reuters, British Telecom, the London Stock Exchange, the World Bank, etc. are among the major consumers of Belarusian software developed in HTP.

   Since 2015, HTP resident-companies are allowed to get involved in new science-intensive activities. Any company engaged in IT and related industries (micro-, opto- and

[58] Let's put clusters on a map. Interview with Dmitry Krupsky, Ministry of Economy of Belarus to "Belarusians and Market" Weekly Digest, №48 (1181), 19-25.12.2015.

[59] Led Center website, "Lighting cluster of the Republic of Belarus" webpage: http://www.ledcenter.by/assotsiatsii/svetotekhnicheskij-klaster-respubliki-belarusi.html

[60] Pharmaceutical cluster set up in Vitebsk oblast, http://www.vitebsk-region.gov.by/ru/news-ru/view/farmatsevticheskij-klaster-sozdan-v-vitebskoj-oblasti-11791-2015/

nanoelectronics, mechatronics, telecommunications, radar ranging, radio navigation and wireless communication), information protection and establishment of data processing centers can apply for residency within the HTP and benefit from tax-incentives and other advantages it provides[61].

There are several features, however, that formally distinguish HTP from a typical Belarusian cluster:

- Although the HTP Administration and many residents are located in Minsk, HTP in general has a distributed structure;
- Research organizations and universities are not among its residents. At the same time, there is close cooperation with the leading research universities (Belarusian State University, Belarusian State University of Informatics and Radio Electronics, etc);
- The main desired goal of a cluster in accordance with the Belarusian policy framework is to strengthen the linkages between its members in order to improve the connectivity between suppliers and producers and thus contribute to the market success of a joint product. By contrast, the HTP stated mission is to promote the activities of its residents and, basing on a success of specific companies, to contribute to software and connected industries development. The cooperation between the residents is neither the first goal nor an instrument for a success.

4. Similarly to the previous case, the **Scientific and Technological Association "**Infopark" is considered as an example of an informal ICT-cluster[62]. By nature, it is a business union of software developing companies with the legal status of a non-profit organization. Registered in 2001, Infopark currently unites 57 enterprises and organizations of various patterns of ownership which provide employment to more than 12 000 people. More than 11 000 of them are IT professionals. Identifying themselves as fast-developing and socially responsible businesses, the companies of Infopark contribute to the development of the Belarusian IT educational system, implementing the inter-sectoral research and strengthening of the competitive capacity of the IT enterprises.

   The Association's majors are **EPAM Systems** and **International Business Alliance (IBA)** which are ranked highly in the world ratings of software developers, consulting and IT services providers. Infopark contributed to the HTP foundation in 2005. The major part of Association members are also HTP residents.

   The project activity of Infopark reflects its priorities and its main objectives, i.e. "*consolidation of the emerging software engineering business cluster on the global market"* (Software Solutions & Services)[63]. Thus, in contrast to HTP, the STA "Infopark" has consciously set up "*a goal of developing a software cluster in Belarus"* and follows this path by playing the role of a leading organization.

5. **Clusters in the National Academy of Science of Belarus.** An important recent trend in NAS's overall activity has been the increasing emphasis on the commercialization of its R&D results. This matches a similar change in the general orientation of Belarus's S&T and innovation policy as reflected in some of the recent legislative and regulatory changes. Thus the existing downstream production facilities within NAS, established with the specific purpose to

[61] High Tech Park Belarus website, http://park.by
[62] Concept for Setting up and Developing of Innovation Industrial Clusters in the Republic of Belarus, approved by the Regulation of the Council of Ministers of 16 January 2014 No 27.
[63] Infopark website, http://infopark.by/

commercialize NAS R&D results, have been steadily growing in size and in the volume of their commercial output. Another recent development has been the formation of a number of "clusters", in response to the recent Government policy initiative to support cluster development. Many of the NAS research institutes have initiated the formation of their own clusters with the participation of businesses with which they have been cooperating traditionally. According to information by the Presidium of NAS (March 2016), some 72 "clusters" were already established or were in the process of being discussed, with the participation of NAS R&D organisations. E.g. the Republican Scientific and Practical Biotechnological Cluster has united research organizations of the NAS (Institute of Microbiology, Institute of Genetics and Cytology, Institute of Meat and Dairy Industry) and industrial companies – Bobruisk Biotechnological Plant, Frandesa Ltd. and Biokom Ltd.[64]

Although cluster development is on the agenda of the Government's strategic documents, progress is limited. One of the recommendations of the independent review of Belarus innovation performance (UNECE, 2016) stresses that relevant public bodies (i.e. Ministry of Economy, NAS, State Committee on Science and Technology) should seek further transformation of organisations and incentives which is needed to overcome the fragmented business structure, the shortage of R&D centres in several specialized fields of applied science, a lack of engineering and other innovation service firms, and a weak tradition in open innovation.

According to the Republican Confederation of Entrepreneurship which interviewed business on the prospects of cluster development in Belarus, just 2% of SMEs confirm they are part of a cluster, while 44,3% reply negatively and 51,5% find it difficult to answer (2,2% – no answer). The number of positive and negative answers to the question on feasibility of setting up a cluster with participation of his/her company is 13,5% and 21,8% respectively. Like in the previous case, the vast majority of SMEs have not defined their position about the feasibility of clustering prospects (47,6%) or do not answer (17,1%)[65]. These figures evidently demonstrate the need for awareness raising and supporting pilot cluster initiatives to demonstrate business the benefits of clustering.

5.4 Cluster development in Georgia

There are several clusters and cluster-emerging initiatives in the capital city and in regions of Georgia, with different models[66]. Although clusters are facing some development problems in Georgia, their number is increasing. In Georgia clusters were created in line with the demand of the local market without the involvement of the Government. Some Georgian economists consider that during the current term, dirigiste policy be more effective. The development of the Georgian economy and business clusters will be very effective tools and special attention should be paid to their formation.

[64] National Academy of Sciences of Ukraine website, News "The Institute of Microbiology, National Academy of Sciences will host a presentation of the Republican Scientific and Practical biotechnology cluster", December 2016. http://nasb.gov.by/rus/news/931/

[65] Julia Dzingailo, expert of EC aid project "Support for Regional and Local Development in the Republic of Belarus", 17.11.2015, http://www.google.by/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwips8LKuILSAhWEB5oKHeMyB2UQFggaMAA&url=http%3A%2F%2Fregdev.by%2Fru%2Fdownload%2Ffile%2Ffid%2F270&usg=AFQjCNFhmVEzDl1ePryp-Eon_90eEjS3mQ

[66] Dr. Larisa Korganishvili Library of Civil Society, Issue of Open Society- Georgia 2008.

Stimulation of business, structural reforms, development of high-tech and new economic structures characterize the main factors of country development.

The word "cluster" appeared recently in Georgia and there are a lot of amalgamations and wrong associations with respect to the word. Initially there were two types of industrial conglomerates in Georgia, which were called "clusters", or their prototypes. Some of them were institutionalised, others not. One type was the successor of former strong soviet amalgamations, which included production, processing and even research - all functions except marketing. They were disassembled in the process of privatization but still exist in forms which are a subject of study. The other type had emerged recently with various degree and forms of cooperation.

Modern cluster and cluster-emerging structures in Georgia mainly started their development in 2004 and 2005. The regroupment of enterprises in Georgia started in tourism, which encouraged the simplification of the visa regime for foreigners and the optimization of logistic systems. Later agriculture regroupments appeared, in the wine, nut, tea, milk, poultry sectors. At present, cluster-emerging initiatives exist in higher education, Health, as well as in ICT, microbiology and virology, etc. There are several health cluster and cluster-emerging structures in Georgia, for instance the **Eliava Institute** (Tbilisi), well-known for its applied microbiology, virology and bacteriophage research. It has also set up a cluster in Microbiology and Virology with its 5 spin-off companies. The **ICT Business Council of Georgia** (Tbilisi) was established by 14 leading ICT companies and IT specialists representing governmental, non-governmental and business sector. It was founded as an NGO, and aims to promote the development of the information-communication technologies in the country. It has significant experience in developing new technologies. The cluster promotes international cooperation with Balkan and Black Sea clusters. The first **ICT Techno Park** in Georgia has also been created in Tbilisi and is, in a sense, a cluster of companies (start-ups, SMEs, spin-offs, etc) in the field of ICT.

Business-focused regroupments of SME's have also been developed, e.g. in areas such as Plastics Processing, Honey & Beekeeping, Trout production, Creative Industries, etc.In the near future, more opportunities for Health, agriculture, wine and tourism clusters are foreseen in Georgia. In general, several components are necessary for the progress of Georgian clusters, such as the development of relationships and agreements between cluster members, starting or furthther developing R&D activities, the internationalization of the activities…, etc.

The examples below give a good indication of where the principal cluster and cluster-emerging organisations can be found in Georgia today, and in which areas they are most active in.

5.4.1 Health Clusters

5.4.2 Microbiology and virology

The Eliava Institute is known as a world leader in the fields of applied microbiology, virology and bacteriophage research. Since its establishment in the early 1920s, the institute has devoted its greatest attention to bacteriophage research and phage therapy[67].

[67] 5. G.Eliava Institute of Bacteriophage, Microbiology and Virology http://www.stcu.int/documents/reports/distribution/tpf/ipf/bio/ge/pdf/ELIAVA_INSTITUTE_Bacteriophage.pdf .

Institute implements activity in the following fields: Bacteriophage Research; Phage Diagnostics, Therapy and Prophylaxis; Clinical Microbiology; Environmental Microbiology; Food Microbiology; Biotechnology; Microbial and Phage Genetics; Biodefence and Plant protection.

The Institute is currently a legal entity of public law in Georgia. In order to support sustainable development of the Eliava Institute, the Institute and the employees established non-for-profit Eliava Foundation in 2008. The Foundation founded **spin-off companies to commercialize Institute research and products**. Currently, there are 5 spin-off companies: Eliava BioPreparations; Eliava Analytical Diagnostic Center; Eliava Media Production; Eliava Phage Therapy Center and Eliava Management Group.

On the basis of these spin-off companies **a cluster in Microbiology and Virology** was created. The profits generated by these spin-off companies are consolidated up into the Foundation. Total expenditure for research & development is about 2.2 mln in GEL in 2015. There is no special funding for the spin-off companies; their income depends on their activities.

The Eliava Institute cluster has a very fruitful collaboration with the scientists and partners from various countries. The scientists from US, Belgium, France, Germany, Switzerland, Greece, Ireland, UK, Canada, Turkey, Denmark, South Korea, Chile, Singapore were and are working in the joint projects together with the Institute scientists;

Strengths: The Eliava Institute is perhaps the most famous Institute in the World in bacteriophage research and application. The brand name – "Eliava" Institute is a very important asset – the worldwide recognition of the Institute, its activity (research and application) and traditions are well recognized by the scientists from the State or Private Institutions in the world. It has experienced specialists – who have a long history of working in this field, and has the know-how – working in bacteriophage (isolation, selection and preparation of therapeutic phage preparations for treatment and prophylaxis of human and animal infections).

Weaknesses**:** Limited human and financial resources; Lack of standardized operation procedures (lack of internationally approved accreditations).

5.4.3 Information and Communication technologies

a. ICT Business Council

The ICT Business Council of Georgia is located in Tbilisi[68]. The mentioned cluster was established by 14 leading ICT companies and IT specialists representing governmental, non-governmental and business sector. The ICT has significant experience in developing new technologies in the country. It is a comparatively new organization, with an NGO status and high capacity. All specialists working in cluster are part time employees. The budget of the cluster at present constitutes 120 000 GEL. The management of the cluster is conducted by a president and vice president. The ICT Cluster aims to promote the development of the information-communication technologies in the country through the following objectives: improving the e-literacy in the country; strengthening the standardization, certification and quality control processes in the ICT-industry in Georgia; initiating and supporting the cooperation between the state, business and educational sector for the ICT development. The cluster has International cooperation with clusters in Balkan and Black Sea countries.

[68] The ICT Business Council http://www.ictbc.ge

Strengths**:** The ICT Business Council each year conducts the cyber security conference in Georgia (GITI), which aims to strengthen partnership, innovation and competitiveness in the field, through th establishment and promotion of effective partnerships among the public and the private sectors, association with IT&T industry related organizations in the Central and East European countries, Baltic States, Caucasus and Middle Asia region, etc.

Weaknesses**:** lack of fast processing mechanisms, one-window-payment system, distance learning, e-business, e-Georgia etc.

b. Microsoft Georgia

Microsoft Georgia is located in Tbilisi[69]. It has several data centers and can be considered as a cluster in ICT. The main objectives of this cluster are the licenses, development of several softs, cloud technologies, etc. The status of the organization is that of a commercial company. The management of the cluster is conducted by Microsoft Seattle center from the USA. Microsoft Georgia has international contacts in EU countries, with Ireland, Germany and Netherland. Partner organizations of the cluster are: UGT Ltd; Softline Georgia; SQUALIO, DPA Group; Orient Logic Ltd.; High-Tech Solutions; Alta Software; BIT; Caucasus Online and others.

Strengths**:** new type services for Georgian customers, e.g. Microsoft Office 365, Microsoft Health services, Enterprise Products, Software development and Cloud computing.

Weaknesses**:** full package of services are not developed yet and new services to customers are planned for the nearest future.

c. ICT Techno Park cluster

The ICT Techno-park in Georgia was opened near Tbilisi[70]. It was constructed by the Georgian Innovation and Technologie Agency (GITA) of the Ministry of Economics. The park offers resources for the small, beginner companies. It has a special role in terms of business development, creation of new business and companies as well as new jobs. There are training centers and showrooms, a co-working center, a conference hall and many other services that promote the development of the high-tech industry. The park is aimed at the development of small and medium enterprises (SMEs). It also creates possibilities of founding offices of international companies in Georgia for attracting foreign investments. At present there are 2 existing centers in Tbilisi and 8 centers in regions. These centers can be considered as cluster of companies.

The ICT-Techno-park is a public organisation which in the future will become a public-private partnership (PPP). Research activity in the park is presented in theform of prototyping. ICT Techno-park has joint projects with Microsoft, Intel, HP, Samsung and other IT companies. Techno-park has contract with the Georgian patent agency. International cooperation with Estonian and Poland companies is developed, etc.

Strengths**:** it is the first example of creation of an ICT techno park in the country, which is oriented towards the development of entrepreneurship, stimulates creation of start-up and spin-off companies.

[69] Microsoft Company web site https://www.microsoft.com/ka-ge/about/default.aspx
[70] Techno Park http://techpark.ge/#gaxsna

Weaknesses**:** lack of legislation in Georgia regarding the entrepreneurship and PPP mechanism, there is no legislation of innovation productions at universities (e.g. techno parks), lack of equipment, qualified personnel, etc.

5.4.4 Education and Culture

The **IT and Entrepreneurship educational Cluster** consists in a concentration of high education and vocational centers/organizations, located in the capital city and in several regions of Georgia, and their cooperation with partners from the private sector. The main goal of the cluster is market investigation and search of education resources in the country. The preliminary budget equals to 400 000 USD. Zaza Tsiramua – Professor of Georgian Technical University, is manager of the cluster.

R&D activities are not conducted by cluster organizations on this early stage of cluster development in Georgia, nevertheless, they are searching innovation projects. CISCO Head Office located in Europe provides international partnership.

The strengths of the mentioned cluster is the activity are connected with elaboration of an active network and the involvement of business structures in education.

On the other hand, the weaknesses of the cluster are a lack of qualified specialists and the low speed of internet connectivity in Georgian regions.

5.4.5 5.4.5 Trade organisations and professional federations

Today in Georgia, it is noteworthy to say that many professional and industrial organisations have formed, with the ambition of regrouping their interests and internationalising their work. Some of them have the potential to become clusters, providing that the SMEs and universities/technical centres are part of the initiative. Below are some of these organisations:

- The **National Center for Tuberculosis** is a large medical centre regrouping several departments specialized in treating tuberculosis. The main goal of the recruitment of these departments is to implement an international strategy to be able to compete with other international research centres in curing tuberculosis. The link with SME's (private clinics for example) or associations is missing to fit the definition of a cluster in European terms.
- The **Georgian National Tourism Administration** is a legal entity, part of the Ministry of Economy and Sustainable Development of Georgia. It wishes to create and promote regional eco-friendly clusters. So far, it is missing members from the private sector, as well as a link with an environmental agency.
- In the agricultural goods sector, many professional federations have grown to defend and represent the interests of producers, both nationally and internationally. This is the case of the **Association Qveri Wine**, whose members are wine companies, as well as the **Georgian Hazelnut Growers Association**, which has over 700 members active in hazelnut growing. Although the federations regroup SME's with high potential and an international ambition, the absence of a research, innovation or sustainability organisation is missing to call such federations clusters.

5.5 Cluster development in the Republic of Moldova

The establishment of clusters in the Republic of Moldova (RM) is in its early stages. Concepts of cluster development emerged in Moldova's industrial sector and identified the basic elements and

management tools for cluster organisations, and the evaluation of their effectiveness[71]. But the mechanisms behind the establishment of clusters are not clear.

The main reasons identified for the insufficient development of the Moldovan industrial clusters are the following[72]:

- Low level of participation in these processes both of large companies and companies from SME sector, absence of a leader who would promote the group's interests;
- Lack of cooperation between business community and local authorities and R&D organisations;
- Limited access to business information as a result of lack of trust between domestic and foreign partners;
- Insufficient support from outside and absence of self-financing of modern infrastructure projects by businesses.

The main cluster and cluster-emerging initiatives in Moldova are mentioned in this chapter.

Scientific and technological Clusters

The Agency for Innovation and Transfer of Technology (AITT) Academy of Science of RM supports joint research activity between enterprises and educational institutions through grants and innovation vouchers in areas, such as nanotechnology, renewable energy, agriculture and food industry[73].

A number of emerging clusters have been identified in the interviews focusing in particular on development of cross-innovation potentials. Most of them create collaborative R&D and innovation projects, e.g. in the fields of nanotechnology and new materials, food processing and applications of renewable energy technology in agriculture.

1. *Scientific and technological cluster "Academica*", whose members have concluded an association agreement in 2007. At the same time, two structures of innovation infrastructure were created: STP "Academica" and II "Inovatorul". The cluster brings together 19 partners.
2. *Educational and Scientific Cluster "Universcience",* created in 2011 under an agreement between 20 partners, continues to provide training to the scientific staff in various fields.
3. *Moldova - Lithuanian Innovative Technologies Cluster* with the participation of 1 foreign and 5 national partners served as the basis for creating the Moldovan-Lithuanian Innovation Incubator "Media-Garage" in 2014.
4. *Science and Technology Park "Inagro",* specialized in ecology and intensive agriculture, was established in 2008 after merging of 4 partners.
5. *Cluster of science and technology in the IT field* created in 2015 from 5 "IT4BA" partners (IT Incubator for Business Application) at the Academy of Economic Studies of Moldova.
6. Scientific and technological cluster in the IT industry. In 2012, 2 innovation incubators were created: II "Itech" of the Academy of Economic Studies of Moldova and II "Inventica- USM" of the State University of Moldova.

[71] Veverita V., Aculai E. Elaboration of the policy for supporting SME clusters: proposals for the Republic of Moldova. In: Fin-Consultant, 2010, nr.11, p.75-81.
[72] Decision of the Government of the RM on the Concept of cluster development of the industry sector of the RM. No. 614.2013. In: Monitor Official of the Republic, 30.08.2013 No. 187-190 (4505-4508).
[73] AITT, Scientific and Technological Clusters. URL: http://aitt.md/en/scientific-technological-clusters.html

7. *Science and Technology Park "Micronanoteh",* specialized in the field of microelectronics and nanotechnologies, was established in 2009. Cluster Science and Technology in microelectronics and nanotechnologies "Micronanoteh", also created in 2009 by the association of two partners.
8. *"Innovative Entrepreneur" cluster* based on theinnovation incubator "North", established in 2012 by the association of five partners in the North of the country. Joining the efforts of II "Nord" established in 2012 and II "Innovative entrepreneur" (2013) led to the creation of the cluster in the northern region of the country on the basis of the Moldova State University "A. Russo" from Balti.

The most successful clusters that illustrate the progress in the development of relations between the members are *Science and Technology Park "Elchim-Moldova"*[74] which are reflected in the growth performance (synergistic effect) of companies - cluster members. It was created in 2013 as an association of 10 partners, mainly the following: JSC JV plant «TOPAZ», the Academy of Sciences, the Scientific Research Institute "Eliri" SA, Research Institute of the ASM, Agency for Innovation and Technology Transfer, Universities of Moldova. The purpose of the cluster - the concentration of scientific, intellectual and material resources to solve the problems of creating innovative high-tech equipment and technology for electrophysical and electrochemical methods of processing materials, and training of workers, engineers and scientists in this area.

Another one - *Innovation and Educational "InnoCluster"* that formed in 2012 by merging of 6 partners operating in Autonomy Territorial Unit (ATU) Gagauzia (Association of Entrepreneurs, Chamber of commerce educational institutions, technical NGOs, II "InnoCenter") based joint informational platform of the Comrat State University[75]. The purpose of the cluster - knowledge transfer or knowledge sharing from science to business environment whereby an enterprise - residents of Innovation incubator - converts scientific findings from research laboratories and universities into products and services in the marketplace.

Areas of potential cluster development of the Republic of Moldova

Moldovan experts in the field of innovation distinguish the following priority areas for innovative entrepreneurship and initiation of cluster processes: nanotechnology and new materials, biotechnology, medicine, information technology, light industry, manufacturing and processing of ecologically clean food, wine and touristic industry and others[76]. Moldova also participates in a number of international cooperation programmes supported by partners and donors. For example, the USAID program aims at enhancing the quality of products, introducing innovations, stimulating export and institutional environment in industries such as - winemaking, tourism, light industry and IT industry[77].

74 "ELCHIM-MOLDOVA" cluster. URL: http://www.topaz.md/en/Predpriatie/Klaster-%E2%80%9CELCHIM-MOLDOVA%22/

75 LevitskaiaA. Technology Transfer Handbook: Moldovan-Estonian cooperation in Technology Transfer by learning good practice. Siemon Smid, Vitalie Moraru, Vitalie Varzari.- Chisinau; Tallin; S.n., 2015, p.77-78.

76 Innovation and technological clusters of countries. (Information). URL: http://www.icsti.su/uploaded/201304/cluster.pdf

77 https://www.usaid.gov/moldova/economic-growth

The IT- Centre *("Centre of Excellence in IT")* is currently in the construction stage, on the basis of the project implemented jointly with the Technical University and the IT-industry Association (with the support of the Swedish and US Embassies and private companies)[78].

Drawing from the mentioned initiatives, preliminary research and the interviews carried out, the following areas can be identified that could be targeted by cluster-oriented measures in Moldova:

- ✓ *Automotive with a focus on the FEZ in Balti*: building upon major investments in the areas of wiring components and systems, measures could aim at extending value chains (e.g. electronics, injection molding, metal components), skills development and fostering linkages between foreign investors and domestic suppliers.
- ✓ *IT with a focus on Chisinau:* building upon the projects mentioned above, cluster development measures could focus on developing the innovation-oriented ecosystem (e.g. strengthening linkages between businesses and academia, promoting spin-offs and start-ups, training and skills development) and upgrading the industry profile.
- ✓ *Wine with a focus on the wine region(s):* building upon existing structures and initiatives (e.g. National Office for Wine, National Wine Fund), cluster development measures could focus on areas such as quality management and internationalization fostering linkages to other wine clusters or centres of excellence abroad.
- ✓ *Light industry* focusing on different regions reflecting the more widespread geographic distribution: building upon a longstanding industrial tradition and various competitiveness enhancement schemes (e.g. by USAID), cluster development measures could focus on strengthening business-academia partnerships, on upgrading business models and developing new fields of application, e.g. in the automotive industry
- ✓ *Fruit and vegetable processing:* building upon the existing concentration of processing companies, cluster development efforts could focus on upgrading value chains and strengthening linkages between food processing and agriculture.

"Lower Prut", "Northern Harmony","Road reefs", "Vilador" are organisations operating on a long-term strategy with the main objectives to promote the sustainable development of tourism by modernizing and improving the marketing of tourism products; support and promotion of cultural activities; human capacity building and environmental sustainability projects in the areas of agrotourism[79]. These touristic organisations also present a potential for cluster creation, providing they find a link to national or regional research, academia and innovation institutions.

5.6 Cluster development in Ukraine

The first attempts to create clusters were made in the mid 1990s in the Podillia economic region (Western Ukraine). The first official cluster 'Podillia Pershiy' was set up in Ukraine in 1998 in the Khmelnytsky region. The idea of creating this cluster with multiple specializations (in clothing, building materials and agro sectors) was supported by the Khmelnytsky oblast administration (regional authorities). Because the region had not sufficiently developed industrial potential and had limited

[78] http://www.ict.md/about

[79] Agro clusters in Moldova/Miron V., Miron M., Roman M., Molski C., Tourism Development Association in Moldova, Polish Cooperation Program for Development Cooperation Centre European - Chisinau. 2016. -230 p.

opportunities for investment, the core cluster was made from predominantly small and medium enterprises with different ownership structures. It was aimed at the promotion of regional production and the export of highly competitive products through the involvement of all cluster's internal resources. It was crucial that the cluster had assistance of the regional administration, scientific and educational centers, financial and banking institutions of the region. The USAid has provided substantial financial support for the initiative. The cluster has included 24 companies and research and educational organisations, which provided expertise. However, after the termination of the aid programme from the American donor and use to economic problems, the activity of the cluster (and its visibility) has declined80.

In 2012-2015 most of the regional state administrations proposed special programmes of economic and social development for the period 2013-2020. These programmes included recommendations, related to the creation and development of innovative industrial clusters. The implementation of the programms (or strategies) included the development and implementation of action plans, and the creation of appropriate institutions and mechanisms for setting up clusters in the corresponding regions. However, these initiatives have weak financial and organizational support, which creates barriers for cluster development. According to research, around 50 effective cluster and cluster-emerging structures were operational in different regions and industries of Ukraine in the period 2012-2014. However, there is insufficient information about the work of Ukrainian clusters. Some of these clusters are 'self-proclaimed' and they have not demonstrated visible results in the past.

Forest, recreational, environmental

- Volyn region: forest and tourist-recreational clusters
- Zhytomyr region: forest and recreational clusters
- Ivano-Frankivsk region, a cluster of souvenir production: "Constellation"
- Kiev region: national innovation cluster "Energy for sustainable development"
- Poltava region: a regional cluster of environmentally friendly products
- Rivne region: a cluster for wood products;
- Sumy region: a regional cluster of environmentally friendly products, Sumy building cluster

Food processing

- Vinnytsia region: Vinnitsa food processing cluster
- Zaporozhye region: Technological innovation cluster "AhroBUM", cluster of honey industry "Bee knows no boundaries," food cluster "Buy Zaporozhye products!

Innovation and business

- Donetsk and Luhansk regions: national innovation cluster "New technologies of natural resources use";
- Kiev national innovation cluster "Technology innovation society," national innovation cluster "Innovation culture society"
- Lviv region: Lviv cluster of IT and business services
- Ternopil region: innovation and investment cluster

[80] Vojnarenko M.P. (2011) "Clusters in the economy", *TOV «Triada-M»*, Khmel'nyts'ky , Ukraine (in Ukrainian)

- Kharkiv region: Kharkiv industrial park "Technopolis" - a cluster of alternative energy and scientific-educational cluster, etc

Transport and logistics

- Dnipropetrovsk (Dneeper) region: national innovation cluster "New cars"
- Transcarpathian region: transport and logistics cluster;
- Odessa: cluster "Transit potential of Ukraine", etc
- Kherson region: transport and logistics cluster "Southgate of Ukraine"

Building and construction

- Khmelnytsky region: rural tourism cluster, Khmelnitsky building & constructing cluster, Khmelnitsky sewing cluster; Kamenets tourist cluster

Technology

- ICT cluster in the Lviv region

It is important to mention that only a small number of clusters can be associated with the high tech sector in Ukraine. One of them is the ICT cluster in the Lviv region. It is formed on the basis of severallocal companies and universities. At the end of 2015, it comprised 25 companies and more than 7000 employees81. This cluster has a special managerial department, which consists of 8 persons, who provide different services for the cluster members, including legal support, marketing research, information about possible contracts and so on. The cluster has its representative office in neighboring Poland.

The ICT cluster partners cooperate in the following areas:

• Promotion:

The Lviv IT Cluster is a partner and organiser of several events. Amongst others, it organises the “Lviv IT Arena” which gathers 1,000 participants and 100 speakers, making it one of the largest IT conferences in Ukraine. Furthermore, as part of the Lviv IT Tour, a roadshow with conferences in Kyiv, Vinnytsia, Dnipropetrovsk, Kharkiv and Odessa has been carried out. Members benefit from the promotion and loyalty programme of the “Lviv IT Club”, which is supported by 200 partners and offers discounts on accommodation, traveling, flight tickets and other services.

• Education:

Every year, the Lviv IT Cluster supports an IT Competition in Lvian schools in collaboration with Lviv City Council and the Lviv Polytechnic. The project “IT Expert” aims at modernising the curriculum of programmes at Lviv Universities. Together with Lviv Business School, a new master programme in

[81] Program for support of clusters in Ukraine: principles of development and key features. – German Consulting Group and Institute of Economic Research and Political Consultations. – Report PP/04/2015. - Berlin and Kyiv, Dec. 2015 (in Ukrainian)

technology management has been developed. Furthermore, cluster members benefit from a unique database of Lviv IT School graduates.

- Infrastructure:

The cluster develops innovative housing projects, such as the IT House, offering 72 apartments, an underground parking and a roof terrace to be completed in 2017.

- Business development:

The Lviv IT Cluster has a representative office in Poland which helps member companyies open offices in EU countries and provides visa support. There is a law committee within the cluster. It provides assistanceto member companies in legal matters and develops recommendations on current legislative and regulative issues in Ukraine. Furthermore, the cluster provides market related information. For example, one report was done on the Lviv IT market and industry. The cluster is organised in the legal form of an association. The cluster management has currently eight employees, and is financed by membership fees and paid services

The ICT cluster is a good example of a successful IT cluster in Ukraine. More IT clusters could be created in other Ukrainian regions, especially in Kyiv, Kharkiv, Odesa, as the country has a substantial (and growing) number of IT specialists and companies.

It is also possible to expect innovation clusters in the areas of new materials, where Ukraine has a rich tradition in production and R&D. The overall objective of the initiative is of creating new materials in areas of transportation technology, health and environmental protection, and subsequently commercializing these materials through the public-private partnership mechanisms.

Conclusions

Ukraine has formed some clusters that operate successfully, but the potential of cluster development is still not used in a full scale, especially at the regional level. Clusters are represented in different regions of Ukraine and they vary in size, institutional forms and functions. The institutionalization of cluster development is an important prerequisite for successful clustering in Ukraine. In many cases, the formation of cluster associations is a key factor for the effective economic development activity of the region, helping develop highly competitive products, new technologies and attracting investment.

There is a possibility to create cluster associations in different sectors of the regional economy in such regions as Transcarpathia, Lviv, Kharkiv, etc. and even cross-border clusters with partners from the EU countries . The creation of several international transport corridors, some passing through the territory of Ukraine, (the Transcarpathian, Lugansk, Odessa, Kherson, etc.) should help Ukraine develop cross border clusters. Clusters could also appear in some new sectors. Despite a growing interest in new forms of economic organization, including clusters, the number of clusters in Ukraine grows slowly.

This is due to several factors:

- Poor national legislation, with few institutions supporting cluster activites. There is no legal definition of a "cluster" in Ukraine; specialists insist that the government should adopt the concept of cluster policy at local, regional and national levels;
- Insufficient information on establishing and the functioning of existing clusters in Ukraine;
- Unwillingness of SMEs to pool resources within larger production organizations;
- Poor experience of existing clusters in Ukraine in establishing co-operation between the cluster participants;
- Relatively low attractiveness of the country and its regions for potential investors due to economic problems and unresolved military conflict in the East of the country;
- Weak understanding of the importance of educational and training programs for the potential cluster participants.

In the short run, Ukraine should initiate a pilot program, which will help to identify several clusters with high potential. These clusters could receive organizational and financial support both from internal and external sources. Such program could be implemented with the assistance of international and domestic experts.

All in all, it should be emphasized that the Ukrainian economy could benefit not only from domestic, but also cross-border clusters. The latter could contribute to the development of international cooperation between Ukraine and bordering regions.

6 Strengths and weaknesses of clusters in EaP countries

The present section intends to summarise the previous chapters, highlighting the strengths and weaknesses of clusters in EaP countries. The analysis and appreciation from the authors is provided in this chapter on two topics: clusters policies, which are often key to encourage the development of clusters – and the status of cluster development on EaP countries.

6.1 Cluster policies and policy framework for clusters in EaP

Cluster policies are still in their early stages in the identified EaP countries. However, there is a clear signal on the part of most of the six countries to develop cluster related policies in the next years. Some of the countries' governments – Belarus, the Republic of Moldova, and Ukraine – already mention clusters in their strategic documents, and have started developing cluster specific development programmes in their countries. Nevertheless, it can be said overall that cluster programmes have not been specifically elaborated and implemented until now to boost the creation and development of excellence clusters in EaP countries. According to the above analysis, it can be said that Azerbaijan and Ukraine are the two countries that have so far achived the most developed cluster specific policies among the EaP countries. The respective governments in each country have adopted cluster definitions in national policy, and launched several programmes favouring cluster development at the national and regional levels.

Ukraine: Recent but effective cluster policy develoment

In Ukraine, the first document on the cluster policy, the ***Concept of the creation of clusters in Ukraine*** was was prepared in 2008 and later adopted, and followed by a programme which allowed to setup the cluster model in the economy. However, there was no special cluster oriented state programme in Ukraine in the past years and decade, to support financially cluster initiatives. The cluster concept was integrated over the years in the economy and there are some cluster-type organisations in Ukraine today. According to the authors, the ideas of cluster policies have become more popular in very recent years, and the government has now included clusters in its strategic document (notably in 2015) and action plans.

Belarus and the Republic of Moldova: a cluster policy diagnosis has been made, but the implementation of national cluster development programmes is still slow

The cluster concept is very recent in Belarus and the Republic of Moldova, and the strategic documents and actions plans have not been followed by an effective implementation, through a cluster programme. This is the case in Belarus with the recent ***Concept for Setting Up and Developing of Innovation Industrial Clusters approved in 2014*** and the corresponding ***Action plan until 2020.*** The cluster policy is still new in Belarus and the implementation framework is not yet in place. As a result, there is no specific cluster programme yet to implement the concept. The Republic of Moldova has integrated the cluster concept in several strategic documents dedicated to SME development, industry development, innovation and regional development. The cluster concept is thus understood in a very comprehensive way in Moldova; and the Government has adapted recently the ***Concept of Industrial Cluster Development***, in 2013. However, the next steps for developping the cluster policy in Moldova have not yet been implemented.

Georgia: Bottom-up cluster initiatives have forestalled top-down policy initiatives

Georgia is a typical example of a EaP country where bottom-up cluster related activities have emerged faster than top-down government policies relating to cluster. Today there are cluster organisations in Georgia, but still no specific cluster policy. Clusters have formed progressively according to the needs in the field. The Government only very recently acknowledged the concept of clusters, and has established an **Industry Development Group** in charge of elaborating a concept for cluster development in the country.

Armenia and Azerbaijan: Strong policy development in recent years targeted at innovation, research, and technology development pave the way for cluser policy initiatives

The Government of Armenia has not yet formed specific cluster related policies, but SME development, research and innovation structure development, and public-private partership facilitation in several key fields has been a strong policy focus of the government in the past years. Some of these include the **Action Plan 2017** directed at fostering university-research cooperation via the creation of networking universities and scientific-education clusters; the establishment of the **National Innovation System** to reinforce education and science cooperation; the **ISFIE** (Initial Strategy for the Formation of an Innovation Economy) (2011) which introduced a range of new policy instruments to support innovation and industry development, like the support to the internationalization of Armenian technology companies; the **SCS** (State Committee of Science) (2007) which promotes research-industry cooperation through, for example, cooperative funding programmes; and finally the **Free Economic Zones**, in place since 2011, which attract and promote competitive companies, national and international, in a common location, and favour their interraction.

Similarly to Armenia, the Republic of Azerbaijan has focused on industry, research and innovation and public-private partnership policy development over the last years. As 2014 was declared the "year for industry" in Azerbaijan, many state-led measures have favoured industry development, such as the **State Program for the Development of Industry 2015-2020** and later the **Strategic Roadmap for Perspectives of the National Economy 2025.** Industrial zones, technology parks, special economic zones have all emerged in the past years, laying the ground for stronger interactions between actors in focus areas like IT, science and research, chemicals, etc. Despite the Azerbaijan governement's adoption of a cluster definition, policy developments have been focused on areas related to innovation, research and SME development, yet not tailored to the emergence of cluster specific policy in the country so far.

Conclusions

Although there is no evidence of cluster specific policies and cluster programmes in all six EaP countries, there are other policies and programmes targeted towards entrepreneurship, innovation and research that contribute to lay the ground for cluster development and effective cluster policies in all six countries. The analysis has shown that there are policies and laws that **encourage academia-industry collaboration** in several countries. In addition to this, several countries have also initiated an approach of **Free economic zones (FEZ)** which encourages the geographical concentration of firms, notably in fields requiring R&D and intended for exports. Armenia has implemented such a policy, as well as Azerbaijan. Azerbaijan has also developed a set of tools named „industrial zones" and „clusters", as well as „high technology parks", „industrial parks", intended to enhance the industrial activities in specific regions. There are also initiatives and programmes intended to encourage the **development and competitiveness of SMEs**, and sometimes facilitate the links between SMEs. Moreover, some of the countries, such as Azerbaijan whose economy strongly relies on the oil sector,

have the will to engage in the economic diversification of the country, and develop emerging sectors in its industry.

The next steps for developing effective cluster policies in EaP countries will thus be different from one country to another, according to the advancement of cluster policies in each country. Some countries have already included clusters in their strategic documents, and now need to define effective **cluster development programmes** to support pilot clusters in their economy. Other countries still need to ackowledge the cluster concept and **define their own cluster policy**, and notably its objectives, its own definition of clusters and cluster model, the cluster policy stakeholders and means.

6.1 Cluster development in EaP countries

Cluster development in EaP countries encompasses different forms and phenomenons. Although there is no evidence of the existence of cluster organisations in all EaP countries, cluster-emerging initiatives were identified in all countries. The initiatives do not necessarily respect the current definition of clusters, but they do present certain opportunities for enhancing EU-EaP cooperation in industry and research and innovation. The analysis notably allowed to identify industrial clusters – which consists in geographical concentration of business and entities in the same sector –, science, technology and business parks with a sectoral specialisation, sectoral business associations, which can either constitute a first step towards the establishment of a cluster, or play a similar role in the ecosystem.

In **Armenia**, there are no officially identified existing clusters. However, the analysis allowed to identify a business association in the field of ICT with an international orientation (the Union of Information Technology Enterprises in Armenia), created by companies and which gathers more than 50 companies and organisations (also a training center for instance).

In **Azerbaijan**, the "clusters" mentioned in the analysis are what are generally called **industrial clusters** – geographical concentrations of industries from a particular sector – without a specific cluster organisation at its top for fostering the development of the sector and linking the different stakeholders. Industrial clusters are a prerequisite for creating cluster initiatives, but do not necessarily lead to creating such initiatives which require *at minima* an initiator and the will from the ecosystem to participate in such initiative and collaborate with each other.

There are interesting cases of cluster-emerging initiatives in **Belarus**. The present report mentions initiatives in the sectors of ICT, in the lighting industry, as well as pharmaceuticals. The initiatives have different goals (promote the modernisation of their sector, enhance research and technology in their sector …). Two of them are not actual clusters, and are more related to technology parks specialised in ICT, which present a critical mass of companies from the ICT sector and with the objective to promote and support their growth. They could benefit from activities of cooperation EU-EaP such as cluster exchanges on good practices. In addition to this, the National Academy of Science has initiated its own research and innovation clusters, with the participation of businesses, for instance in biotechnologies.

In **Georgia**, there are a range of initiatives and conglomerates that are called clusters or considered as such, in the industry sector, in research and innovation, as well as agriculture and tourism. Research clusters were identified in the area of health research and microbiology and virology. The existence of an ICT business council was also mentioned, which notably promotes international cooperation.

In the **Republic of Moldova**, there have been a number of initiatives identified as being close to the cluster concept. These initiatives are mainly consisted of academic incubators and scientific parks which form the basis for scientific and technological clusters. All initiatives gather a number of partners from the business and academic and research communities, although they do not constitute a proper "critical mass" (from 5 to 20 partners). There are also clusters in the agritourism sector which mainly promote the development of tourism and sustainable tourism in their region as well as encourage cooperation between the members, with a model in which a company or more entities encompass the role of cluster coordinator.

In **Ukraine** several initiatives were identified that fully comply with the definition of clusters in Europe, such as the ICT Cluster in Lviv region, with a management structure that provides services for cluster members, to encourage technology advancement, business growth, and cooperation amongst members. A cluster development agency exists in Ukraine which could support a better understanding and knowledge of the cluster development in Ukraine and make the link with Ukrainian clusters.

Below are two tables giving an overview of cluster development in EaP countries. The **first table** gives an overview of clusters and emerging clusters' sectoral divison in EaP countries. The **second table** gives an overview by experts in EaP countries of the current cluster or emerging cluster initiatives that are closest to the European cluster definition today as of January 2017.

Table 2: Overview of the clusters and emerging clusters sectoral divison in EaP countries

Country	Sectors						
	Energy	**Natural ressrouces exploitation**	**Forest/ tourism/ environm ental**	**Innovation/ research/ medicine**	**Transport /logisitcs**	**Building /constr uction**	**Techn ology**
Armenia		2		3			4
Azerbaijan	1	1	1	3	1	1	1
Belarus				4			3
Georgia				4			3
Rep of Moldovia	4	2	9	1		1	
Ukraine	7	2	5	4	1	1	

Table 3: Clusters or emerging cluster organisations in EaP countries closest to meeting the European definition criterias for "cluster" as of January 2017

Country	Sector of the cluster	Cluster name	Actors involved	International partners? Yes or no
Armenia	IT	Gyumri Technology Center and Vanadzdor Technology Center	Enterprise Incubator Foundation; Armenian Government; World Bank; IT companies.	Yes
Armenia	Food/IT	Armenian Society of Food Science and Technologies	Food companies, researchers, univesrities, government officials	Yes
Azerbaijan	Energy	Petro chemical cluster of Azerbaijan	SOCAR, BP, Azerkimya; Azerbaijan government; academia (unspecified).	Yes –UK
Belarus	Pharmaceuticals	Union of Pharmaceutical, Medical, research and Education Organisations	Vitebsk Medical University; Nativa; Akonitpharma; Beldbnunipharm; Medelkombel, VitVar.	Yes – Russia
Georgia	IT	ICT Techno Park	Georgian Innovation and Technology Agency, Ministry of Economics, Microsoft, INTEL, HP, SME's (unspecified)	Yes – Poland
Republic of Moldova	Education, innovation	Innocluster	Comrat University; Council for Science and Innovations; SME's (unspecified); techno park.	No
Ukraine	IT, Technology, Urbanism	Lviv IT Cluster	IT companies (listed on website), Ivan Frank National University, Lviv city council, etc.	Yes

The analysis has demonstrated that there is still inconsistency in cluster development in EaP countries from one country to another, although all countries do have initiatives that are close to the cluster concept. Based on the above information, it can be said that:

- The adoption of "clusters" in the policy language of the country has not yet occurred in all the six EaP countries. So far, Azerbaijan, Berlarus and Ukraine have given formal definitions for clusters.

- It is possible to globally distinguish two kinds of developments related to cluster development in the six EaP countries. The first is a top-down approach, in countries like Belarus where the state has a strong interventionist role in the economy. The other is a bottom-up approach, where cluster-emerging organisations have existed for several decades already, and the policy and institutional frameworks for developing clusters are still not operational (Georgia).
- Existing cluster development related policies in the EaP countries are predominantly organised at a national level today, and there seems to be little interaction between national, regional and local levels of cluster development related policies.
- In all six EaP countries, there is a growing dynamic for regional specialization. This is clear in countries like Ukraine and Georgia, where specific sectors are being developpped in certain regions of the country, likes agricultural or touristic clusters for example. Additionally, all countries have developed policy programs tailored towards improving entrepreneurship opportunities, SME's competitiveness and internationalization, the development of high potential sectors like technology, research and innovation. These are good indicators that there is a progressive build up, both from institutions and businesses, for cluster development in the future.
- IT, environment and health sectors regroup the most dyamic cluster or emerging cluster initiatives in all EaP countries. This is something to build on in the future and include when thinking of future EaP cluster related projects.

The next chapter provides the recommendations of the authors on how to further develop clusters in EaP.

6.2 Summary of the main strengths and weaknesses of clusters in EaP countries

The identified strengths are:

- Political willingness – or declaration of such will - to develop the cluster policies in the next years.
- Strong motivation and "bottom up" initiatives - there are some cluster type organisations, even if there is no cluster policy in some countries
- (Although the policy framework for cluster development in most of EaP countris is not very much developed), there are other policies and programmes that contribute to set the ground for cluster development and effective cluster policies in all six countries, for instance to encourage SME development, as well as academia-industry collaboration
- A number of initiatives have been identified aleady as being close to the cluster concept. Some of the initiatives, such as in the field of ICT or other technology sectors, are already internationally-oriented.

On the other hand, the analysis has allowed to identify the following weaknesses that hamper cluster development in EaP:

- **Cluster policies** are not yet fully developed in EaP – they are still in their early stages. There is a need to clearly identify the responsibilities in terms of cluster policy (for instance the Ministries in charge) and set up the frame for effective cluster policies. On the other hand,

strategic documents and actions plans (when developed) have not been followed by an effective implementation, such as in Belarus or the Republic of Moldova.

- Similarily there is no **cluster programme** to develop and support clusters in EaP, including with public funding.
- Because of the absence of a **cluster label** in EaP countries – for instance validated by a cluster programme, it is still difficult to identify which initiatives constitute effective clusters with an active management and activities between the members.
- As a result, it is possible to state that cluster development is still inconsistent in EaP countries, ranging from a country to another.
- Although some initiatives, such as business associations, seem to have as clear objective to facilitate the internationalisation of its members, cooperation between existing cluster initiatives in EaP and EU countries is generally low.

7 Recommendations for cluster development in EaP countries

The recommendations provided in this chapter aim to encourage and support cluster development in EaP countries, notably by addressing the weakness of clusters in EaP countries. Recommendations provided in this report are of two types: policy recommendations intended to policy-makers and governmental institutions in EaP countries, as well as recommendations intended to cluster organisations and cluster-emerging initiatives in EaP. The present report suggests 6 main recommendations, which will be partly implemented or encouraged through the activities of the EaP Plus project as well as refined through the activities.

7.1 Recommendations at the Policy level

As mentioned in the chapter 6 of this report, cluster policies are in their initial stages in most of the EaP countries. Although the laws and strategic documents in the 6 countries often recognize the concept of "clusters" and acknowledge it, specific cluster development programmes are not yet implemented. The experts involved in EaP Plus project have identified a need for further promoting the cluster concept in EaP countries for the benefit of the local economies and the enhancement of Research and Development, technological progress, and the internationalisation of SME's.

The authors strongly recommend to EaP policy stakeholders to engage in exchanges of good practices with EU policy-makers and governmental institutions, to benefit from the EU Members states' existing experience in terms of setting up cluster policy and implementing programmes intended to encourage the development and excellence of clusters. According to the authors, the EaP policy makers may take the initiative to contact the policy stakeholders from the EU, and propose exchanges in the form of cluster policy roundtables, or mentoring activities intended to encourage the transfer of experience and good practices.

To summarize, cluster development at the policy level in EaP countries can be achieved largely by raising awareness of policy makers in EaP countries on the benefits of cluster development, encouraging the exchange of good practices in terms of cluster policies and cluster development programmers between EaP countries and EU Member States, and launching pilot cluster programmes in EaP countries.

7.1.1 Raise the awareness of policy makers in EaP countries on the benefits of cluster development:

- Sharing reports and policy briefs, positive evaluation and results of cluster policies and cluster associations implemented in EU countries, as well as best practice examples from European innovation agencies
- The promotion of success stories (notably from eastern European countries having benefited from EU regional funds for example) and positive evaluation and results of the cluster policies implemented in other countries, such as the successful cluster policies implemented in EU countries.
- The creation of cluster associations – EaP-wide or national – dedicated (partly) to the promotion of the cluster concept in economic, industrial and research policies in the country / EaP, and acting as lobby or think tank of these questions. A cluster development agency exists in Ukraine which supports a better understanding and knowledge of the cluster development

in Ukraine and make the link with Ukrainian clusters. There is also, amongst the EaP Plus project partners, one partner willing to engage in such an initiative in Georgia, ICARTI, with a project to establish the Association for the Advancement of Clustering in Georgia (National Cluster Association): „The aim of this organization will be the unification of all existing clusters in our country, opening of new clusters, management and training of cluster managers, demonstration of their services, internationalization, etc.".

7.1.2 Encourage the exchange of good practices in terms of cluster policies and cluster development programmes, between policy makers and institutions from EaP countries and the EU MS

In line with the first recommendation, the authors strongly recommend to EaP policy stakeholders to engage in exchanges of good practices with EU policy-makers and governmental institutions, to benefit from the EU Members states' existing experience in terms of building and implemented cluster policy programmes intended to encourage the development and excellence of clusters. According to the authors, the EaP policy makers should take the initiative to contact the policy stakeholders from the EU, and propose exchanges in the form of cluster policy roundtables, or mentoring activities intended to encourage the transfer of experience and good practices. Such transfer of best practices could be implemented using TAIEX or, if requested by several EaP countries, take a form of regional event(s) under the aigeis of the EaP Panel of R&I.

As it was mentioned in the above paragraph, the International Center for Advancement of Research, Technology and Innovation (ICARTI) expressed an interest in the establishment of the National Cluster Platform Association in Georgia (with the participation of local governmental and nongovernmental organizations and companies). This organization will play a role of national entry point for discussing cluster cooperation and will facilitate international cluster collaboration. The Georgian cluster platform will be registered on the European ECCP web portal, and will consequently conduct certain measures for the promotion of cluster models, the development of clustering principles for companies in the country. The creation of a national cluster agency in Georgia will be of substantial added value for the EaP Plus project objectives.

The EaP Plus project concentrates on encouraging the exchanges between clusters in the EU and EaP countries. However, activities aimed to encourage exchanges at policy level between the instititions in charge of the management of cluster programmes in the EU and policy-makers in EaP countries, could also be organised in the frame of another similar project. For instance, a project financed by EuropeAid could be launched on such a topic.

7.1.3 Launch pilot cluster programmes in EaP countries

The analysis provided in this report has shown that most EaP countries are implementing policies that set the ground for cluster policies, such as policies intended to develop regional specialisation, develop key strategic industrial sectors, encourage the growth and competitiveness of SMEs, encourage industry-academia cooperation… However, specific cluster development programmes are not yet implemented in EaP countries. The authors recommend to launch pilot programmes in EaP countries

to support the creation and/or development of key national clusters – with a restricted number of clusters acting as pilot – with clear objectives in terms of cluster management excellence (services implemented) and regional and sectoral growth, as well as research and innovation.

GIZ, the German Corporation for International Cooperation, implements projects in some of the EaP countries with the objective of establishing and developing clusters in different industrial sectors.

7.2 Recommendations at the Cluster level

Promoting cluster development at the cluster level in EaP countries can be achieved largely by encouraging the exchange of experiences between cluster organisations in EaP countries and EU Member States, enhancing the visibility of existing EaP clusters in EU MS, and launching pilot cluster programmes in EaP countries.

7.2.1 Encourage the exchange of experiences between cluster organizations in EaP countries and EU member states

The analysis demonstrates that there are already cluster-like initiatives in EaP countries, although most of them are still young and not all of them have a proper management structure able to implement services and encourage exchanges in the ecoystem, for the benefit of SMEs, companies and research and innovation. The authors recommend to encourage the exchanges of experiences between cluster initiatives in EaP and the EU MS clusters.

The exchanges of experience shall notably address topics such as: the objectives of the cluster and activities / services implemented by the cluster, the support to Research and innovation activities and academia-research-industry collaboration – if relevant, cluster management team (competences, composition…), funding of the cluster (sources of funding, business model) and other supports (including policy and governmental support), developping the cluster (number of members), internationalisation of the cluster and integration in international networks, …

However, such a recommendation requires that the clusters in EaP have the awareness regarding the potential benefit of improving their management and activities through benefiting from the experience of clusters from other regions and countries in the world, and notably from the EU. National or regional cluster associations, if they exist, would be instrumental in raising awareness of the cluster community on such advantages and encouraging / organising such activities of cooperation.

Therefore, the EaP Plus project will facilitate the implementation of these recommendations through a set of measures:

- **Bilateral exchanges** between clusters in EaP and EU from the same sector of activity, at the initiative of the clusters. Such exchanges can be a visit of the cluster management team to the other cluster (EU-EaP), or staff exchanges for example (one employee / representative of the cluster from EaP working for a few weeks in the cluster from the EU and vice versa to better experiment the practices in the daily activities of management of the cluster).
- In line with this, the EaP Plus project plans **a "cluster grant scheme"which** will facilitate exchanges between clusters from EaP countries and the EU: the grant scheme will intend at operating a matchmaking for the clusters through six grants (one for each country) to support activities of cooperation such as **management teams missions from EaP to the EU cluster and**

vice-versa; exchanges of staff to learn about RDI cluster strategy and practices; organisation of a common event etc.

- The organisation of a broad **cluster workshop or roundtable** dedicated to discuss the good practices of cluster management between clusters in EaP and EU. The EaP Plus project is planning such workshop at a later stage of the project, and the project *Black Sea Horizon* (funded by Horizon 2020 programme also) also plans a workshop for discussing good practices of cluster management between clusters from the EU and Black sea region.
- etc.

7.2.2 Encourage the visibility of existing EaP clusters in in EU member countries

Although the analysis has shown that there is no evidence of the existence of clusters in all EaP countries, and cluster development is still weak, it has also shown that there are cluster-like initiatives in EaP, which however can benefit from promotion and raising their visibility in the EU. The visibility of the local clusters outside of the country is not key for all sectors: certain clusters might be dedicated to domestic activities only – whereas international visibility can be key for other clusters acting in sectors for which internationalisation is key and with high research and innovation requirements.

One factor that might hamper the visibility of clusters from EaP countries in the EU is the absence of a cluster structure able to have communication and marketing activities for most clusters in EaP, as well as international activities. The first step toward the visibility of the clusters from EaP countries in the EU is thus to work on the cluster organisations themselves: having a clear structure with a name, a website (with English language available) and a good marketing of the clusters is one of the good practices of clusters from the EU to implement in EaP. The international visibility of a cluster facilitates the international visibility of the cluster members and ecosystem, and thus of the local strenghts.

Secondly, there are key international networks for clusters in the EU, that could be instrumental in allowing for the visibility of the most active and internationally-oriented existing clusters in EaP – which are detailed in the next chapter of the report.

7.2.3 Set up cluster associations in EaP countries

The EaP Plus project encourages the creation of an association dedicated to the advancement of cluster policies in EaP countries. This could begin as an EaP association designed for all six countries, or as a national association in one country with particularly strong emerging cluster initiatives like Georgia, and be later opened to other countries. The aim of this national or regional association is to enhance the cluster visibility and promotion of clusters in EaP countries, support the cluster excellence in EaP countries and encourage cluster exchanges (including internationally). Such an association could encompass the role of facilitator to implement the recommendations provided in this chapter, through the EaP panel on R&I.

8 Opportunities for cooperation with clusters from the EU

The following section provides a preliminary analysis of initiatives and networks in the EU that would be relevant means to build and enhance EU-EaP cluster-oriented cooperation (current cluster organisations and aspiring or emerging cluster organisations). The section does not intend to provide an exhaustive list, but a first basis on which it can build cooperation opportunities during the next months, under the EaP Plus project. In this table, ***opportunities for training / sharing good practices in terms of cluster management***, ***opportunities for business and RDI cooperation*** as well as ***opportunities for policy dialogue on clusters*** are proposed.

It is also the first step towards the development of the final report of the Work Task 3.3 "*Report on cluster potential in EaP and recommendations*" which should put the emphasis on recommendations for cluster development in EaP countries and **their collaboration with similar structures and networks in EU.** The initiatives and networks that were identified as presenting the most potential to enhance EU-EaP countries cluster cooperation are presented in the table below.

Initiative	Short description (with cluster focus)	Opportunities and potential
European Cluster Collaboration Platform	**The ECCP is the European hub for clusters to cooperate with counterparts in Europe and beyond.** The ECCP is a European Commission funded initiative supported by the COSME programme (EU programme for SMEs) managed by EASME. The European Cluster Collaboration Platform is a web based platform (www.clustercollaboration.eu) that provides high visibility to clusters and their members at the international level. Already 460 cluster organisations have created their profile on the ECCP and can thus be found on the cluster mapping tool (http://www.clustercollaboration.eu/cluster-mapping). The registered clusters benefit from a range of services such as a partner search tool, international cluster matchmaking events, weekly information digest on cluster events in Europe and from around the world, and much more. The ECCP is also in charge of **facilitating the policy dialogue on international cluster cooperation** of the European Commission with ministries and high representatives of countries beyond Europe. Inno TSD (France), partner in the EaP Plus project and coordinator of WP3 and cluster activities, is also **coordinator of the ECCP,** under contract for DG Growth and EASME of the European Commission.	The ECCP presents: • opportunities for EaP clusters to **profile on the platform** and gain visibility in Europe. Registration is free of charge but only cluster organisations with a proper management structure and cluster activities are accepted on the platform. • the ECCP is an excellent source of information on cluster calls / funding in Europe, opportunities such as cluster events, news on cluster activities, international cluster cooperation, and display of cluster success stories. • possibility for clusters in COSME countries (ie. Including Armenia and Moldova) to participate in **cluster matchmaking events** (eg. Brussels, 31th November 2016, 100 cluster organisations expected). • opportunities to **facilitate policy dialogue on international cluster cooperation.**
ESCP-4i projects	The European Strategic Cluster Partnerships – Going International (ESCPs-4i) were labelled by the European Commission, DG Growth and the Executive	The ESCP-4i projects are interested in international opportunities: opportunities for

	Agency for SMEs of the European Commission following the COSME programme call *COS-CLUSTER-2014-3-03 – Cluster Go International* and their activities started as ESCP-4i labelled partnerships at the beginning of 2016. The ESCP-4i are transnational cluster partnerships in a selected area / sector and which develop and implement a joint internationalisation strategy and support SME internationalisation towards third countries beyond Europe. They aim to develop common actions and an implementation roadmap as part of a long-term cooperation agenda. The European Commission has selected 26 "European Strategic Cluster Partnerships – Going International" as a result of the COSME call "Cluster Go International" (COS-CLUSTER-2014-3-03). The projects are profiled on the European Cluster Collaboration Platform (which facilitates their communication): http://www.clustercollaboration.eu/escp-list	business abroad, opportunities for cluster cooperation.... They represent a good opportunity for clusters in EaP interested in engaging in international cluster cooperation.
Black Sea Horizon project	The project **Black Sea Horizon "Enhanced bi-regional STI cooperation between the EU and the Black Sea Region"** funded by Horizon 2020 programme has been designed to sustainably enhance bi-regional STI cooperation between the EU and the Black Sea region. The project notably aims to increase the understanding of cluster policies and cluster management, establish direct business contacts between cluster managers from the EU and target countries and raise awareness on the programming of as well as on the advantages of inclusive, sustainable and social innovation. For this, Black Sea Horizon project implements activities such as mapping the clusters in the Black sea region (on the website of the project – see https://blacksea-horizon.eu/cooperation-networks/clusters), organising a seminar in Kiev for 15 to 20 cluster managers from the Black Sea region on best practices on establishing, managing, sustaining and internationalising industrial clusters (backed up by corresponding guidelines) (*upcoming – in 2017*); the organisation of a bi-regional cluster networking and business exchange meeting in Budapest for around 20 cluster managers from the EU and the target region (incl. visit to EIT) to establish direct contacts (2017 also),	The project's objectives as regards cluster activities meet the recommendations made in the present report. The Black Sea Horizon project proposes good opportunities for EU-EaP cluster exchanges of different nature (discussing good practices, discussing business opportunities…). EaP Plus project and Black Sea Horizon project have complementary activities for enhancing cluster cooperation in the region. Both projects should cooperate in this regards (for example disseminating the news of both projects in their networks and website). The cooperation between the projects will be facilitated as there are common partners involved on both projects.

	and the facilitation of individual visits to relevant clusters in the CENTROPE region. ZSI (Austria) is the coordinator of the project, and SPI (Portugal) is the leader on the cluster activities in this project. Inno TSD (France) is also involved in the cluster activities.	
RI-LINKS2UA project	The overall aim of the project entitled '**Strengthening Research and Innovation Links towards Ukraine (abbr. RI-LINKS2UA)** (funded by Horizon 2020 programme) is to further support and enhance the integration of Ukraine to the European Research Area. Amongst the activities implemented by the project are planned a cluster management training and cluster internationalisation support.	The activities dedicated to clusters in Ukraine to be implemented by the project meet the objectives of the EaP Plus project in Ukraine. Similarily to Black Sea Horizon, cooperation should be engaged with the RI-LINKS2UA project.
The Balkan and Black Sea Cluster Network (and the Cluster House)	The Cluster House, as an innovative business development organization for support to cluster –based economic development in the Balkan and Black Sea Region, is the initiator and coordinator of the **Balkan and Black Sea Cluster Network** since 2012 which includes over 170 members – clusters and supporting institutions in the region. The mission of the Networks is the making of cluster synergy in the Balkan and Black Sea region in order to develop transnational cluster-based sustainable economic development projects, approach development funds and appear on new markets.	The Balkan and Black Sea Cluster Network presents good opportunities for clusters in EaP countries to engage in international cluster exchanges, and proposed activities for the benefit of clusters (eg. annual conference for clusters). The membership is free.
The Balkan and Black Sea ICT Cluster Network	The **Balkan and Black Sea ICT Clusters Network** is a bottom-up initiative that reunites some of the most important cluster initiatives in the ICT sector from the Balkan and Black Sea macro-region. Currently the Network includes 17 organizations from all countries in the Balkan and Black Sea Region. The aim is to create new business opportunities for cluster members, to open new markets and to build bridges for cross-border and cross-industry collaborations. Its mission is to strengthen collaboration between cluster initiatives in the ICT sector from the Balkan and Black Sea region and to act such as to increase the competitiveness of this sector on the global market by means of specific actions and projects. "*We strive for constantly enlarging the network with new members from this particular macro-region*". The network	The Balkan and Black Sea ICT Cluster Network is an interesting network for clusters in EaP acting in the field of ICT – to facilitate cluster cooperation in the region.

	as an annual meeting. More information can be found on the ECCP: http://www.clustercollaboration.eu/cluster-networks/balkan-and-black-sea-ict-clusters-network	
National cluster associations as contact point	A number of national and regional cluster associations exist in Europe and other parts of the world which are good entry point for discussing cluster cooperation, and which often facilitate international cluster exchanges: examples are “France clusters”, “Portugal clusters”, “Serbian cluster network”, “Union of Slovak clusters”, “Austrian cluster platform”, etc.	The national cluster associations are important stakeholders, especially for cluster associations in EaP, to discuss potential exchanges, disseminate interesting news and events, and enhance international cluster cooperation.

1. Table: Table of pre-identified opportunities for cluster cooperation

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10 List of interviews

A number of interviews were conducted with external stakeholders and experts to elaborate this report, notably chapters 3 and 4 of the report. The list of interviewees is provided below.

Armenia:

1. Tigran Arzumanyan, International S&T Programmes Department, National Academy of Sciences in Armenia – NAS RA.

Azerbaijan:

1. Academician Prof. Dr. Ibrahim Guliyev, Vice-president of the Azerbaijan National Academy of Sciences (responsible for innovations, international realtions)
2. Dr. Vugar Babayev, Head of Innovation Department, Presidium of the Azerbaijan National Academy of Sciences
3. Dr. Fatali Abdullayev, Head of Administration, Azerbaijan National Academy of Sciences
4. Prof. Dr. Nurali Yusifbayli, Deputy Head of the State Agency on Alternative and Renewable Energy Sources of the Republic of Azerbaijan

Belarus:

1. Dr. Anatoly Hryshanovich, Deputy Head, Belarusian Innovation Fund
2. Dr. Natallia Yankevich, Head of unit, Main Department of Science, Technology, Innovation and Production Activities, Presidium of National Academy of Sciences
3. Ms. Julia Dzingailo, expert of EC aid project “Support for Regional and Local Development in the Republic of Belarus”

Georgia:

1. Dr Givi Kochoradze (International Center for Advancement of Research, Technology and Innovation in Georgia)
2. Dr. Tamaz Marsagishvili, Deputy Minister of the Ministry of E&S of Georgia
3. Dr. Oleg Shatberashvili, The Chairman of a Georgian think-tank Association European
4. Studies for Innovative Development of Georgia (ESIDG).
5. Koba Kikabidze, Strategic Initiatives Agency.

Republic of Moldova:

- Alla Levitskaia, PhD, Associate Professor, Faculty of Economics, Director, II "InnoCenter", Comrat State University
- Alexandra Novac, Scientific researcher, PhD, Head of „Policies and mechanisms of economic growth” Department, National Institute for Economic Research

Ukraine:

- Igor Yegorov, Department Head, Department of Innovation Policy, Institute of Economics and Forecasting, National Academy of Sciences of Ukraine

Annexes

Annex 1. Methodology: Common Framerwork for analysis

Common framerwork for analysis of the cluster policies

Cluster policies in the country at national level

1. Is "cluster" a concept / vocabulary that is considered in the national/ State level policies?

2. Is there some specific policy / several policies dedicated to develop clusters at national level? / Is there a project to implement such policy?

3. If yes, on which official definition of clusters is this policy (/those policies) built on, if any, and what is the objectives of the policy (or example: support innovation, support academia-industry exchanges, support business to business cooperation and market opportunities, support SMEs..)

4. Which is / are the organisation-s in charge to define and fund national cluster policies in the country? (for eg. Ministry, and which one)

5. What is, in brief, the history of cluster policies in the country? Is it inspired by another cluster policy (eg. from foreign country)?

6. Which is the programme (/ programmes) that implements the cluster policy, and what does it consist in?

7. Key facts regarding the programme: eg. Budget, duration, history, etc. Key contact if possible.

8. Is there an evaluation of the cluster policy, are there any known results of it? (quantitative and qualitative)

Cluster policies in the country at regional / local level

9. In the EU, regions are key actors of cluster policies in many countries. Are there regionally / locally supported cluster policies in the country? If yes, same questions as above on the concept, definition of clusters, objectives of the policy, organisation in charge, history, programme, results.

Cluster policies are not necessary implemented as such, however several more traditionally found policies contribute to the development of clusters without naming it: regional development policies, industrial policies, science and technology policies, SME development policies…

Regional specialisation policies in the country - *Cluster policies often build on critical mass of actors in selected regions involved in specific sectors*

10. Does the country have a **regional specialisation** strategy (implemented at national level, or regional), aimed to build on regional sectoral strengths?

Academia-industry collaboration, science and technology policy

11. Are there any policy, at national level, aimed to support r**egional innovation ecosystems**, and to enhance academia-industry collaboration in the country / at local level?

SME development policy

12. Is there a policy dedicated to support the development of SMEs, and especially through supporting linkages and collaborations between SMEs?

Common framerwork for analysis of the cluster development

Cluster development in EaP - Framework for analysis

Key characteristics of clusters are:
- *same sector / having similar industrial focus / with complementarities*
- *spatial proximity of actors,*
- *critical mass (number of actors)*
- *cluster life cycle,*
- *nature of cluster actors,*
- *dynamics and linkages within the cluster: connections between cluster actors, mutual trust, common vision and strategy, institutionalisation, and balance between cooperation and competition.*

Criteria	Description	Recommendations
Existence of clusters in the country, described as agglomerations of business and science (and education) actors in a location	**Indicators for assessing this can be for example:** number of businesses and other actors from one industrial sector located in a restricted regional area (eg. Regional, city level), employment data evaluated geographically and per sector, ***level of interactions*** between the different actors.	Please give **examples of clusters** (indicating the sector and location) if this is not possible to provide an *exhaustive list,* with **quantitative data**. Also, give data regarding the **approximate number of clusters** in the country. If possible, *a map* showing the clusters can be used also.
Types of actors / composition of the clusters	**Indicator** is the typology of actors involved: companies (e.g. SMEs, MNEs), research institutions (e.g. universities, laboratories, colleges, etc.), financial institutions (e.g. VC, banks, private equity firms, etc.), and public actors (national, regional and local policy).	You can provide a general statement on the usual composition of clusters in your country. There can be different types of clusters according to the actors involved also (if this is the case, please mention it).
Research and innovation activities in the clusters	**Indicators for assessing this can be for example:** existence of research centers/ universities in the clusters, and their integration in the cluster/ their **level of interactions and cooperation** with actors such as businesses, SMEs, at the regional level.	Please give an overview of the level of research and innovation activities implemented inside the clusters. Please give examples of clusters with good integration of research / academic actors, and if possible examples of R&I projects developed in the clusters, and assess the importance of the research actors for shaping and building the clusters: *eg. are the clusters built around them?* Give examples of RDI collaborative projects developed between the members of the cluster / in the cluster.

Cluster lifecycle: mature, emerging?	**Indicators for assessing this can be for example:** is there a growing employment / number of firms in this cluster, are those figures rather stable? Is the cluster in the process of being institutionalised, or recognized, etc. Is there a very limited number of actors yet, around a big one (typical emerging cluster)? Is there a will (political, or from the actors) to expand it?	Please refer to specific clusters - you can classify all identified clusters between "birth" "growth" "mature" according to the lifecycle.
Level of institutionalisation of the cluster (very important)	**Indicators:** existence of a structure (eg. with a name, a legal status), with a governance (board, assembly); existence of a **common agreed strategy between the members**; existence of a common budget. Supported by public funding / how is it funded?	Analysis per clusters. If those are too numerous, you can provide a list of institutionalised clusters, and choose to make a focus on 1 or 2 of them (and mention this). If there are only 1 or 2 institutionalised clusters, please provide information on them (composition, number of members, how is it structured, funded, etc.).
Cluster management excellence	**Indicators:** which **services** does the cluster management provide? What are its objectives? How many companies are supported (eg. each year)? How many RDI projects supported and how?	**Describe the services provided**. Describe how the management of the cluster contribute to enhance exchanges and cooperation activities of every nature between the members. Give figures but also provide examples (eg. **Example of RDI projects**, and how the cluster supported it).
Cluster internationalisation	**Indicators:** level of internationalisation of the cluster: does it have a strategy to promote its members internationally? Does it have services dedicated to support the members going international? Are the members active internationally (international RDI activities, export, etc.)	Describe the services to support internationalisation, give concrete examples of cases of support if possible, assess if overall the cluster and cluster members are open / turned to internationalisation...